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Empirical Examination of User Acceptance of Enterprise Resource Planning Systems in the United States

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2016

Abstract

Empirical Examination of User Acceptance of Enterprise Resource Planning Systems in the United States

by

Rohan Roy Oldacre

MBA, Webster University, 2007

BS, Cameron University, 2004

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Information Systems Management

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Abstract

Enterprise resource planning (ERP) systems are complex software packages that support an integrated real-time setting among the various business functions in an entire organization. ERP systems improve productivity, but only to the extent that employees accept and use the systems extensively to perform their duties. The leaders of many organizations have not been able to realize the expected benefits because of a lack of user acceptance. The purpose of this quantitative cross-sectional survey study was to examine the factors that influence user acceptance of ERP systems in the United States. Davis's technology acceptance model was the theoretical foundation used to relate the independent variables (perceived usefulness and perceived ease of use) to the dependent variable (user acceptance of ERP systems). The focus of the research questions was on the strength of the relationships between each of the independent variables and user acceptance of ERP systems in the United States. Data were from 97 purposively selected ERP system end users in the United States using the survey instrument based on the technology acceptance model. Regression and correlation analyses revealed a positive relationship between perceived usefulness and user acceptance, but no relationship was found between perceived ease of use and user acceptance. The findings indicated difficulties in using ERP systems for end users in the United States, which stakeholders could rectify to improve productivity in organizations. Positive social change implications include improving the standard of living, increasing the literacy rate, and reducing negative externalities to improve human and social conditions in society.

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Dedication

I dedicate this dissertation to my mother, Icelyn Maine, who started me out on my education journey and was my source of inspiration because she has always valued higher education.

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I would not have completed this dissertation successfully without the exemplary guidance of Dr. David Bouvin, committee chair, Dr. Godwin Igein, committee member, and Dr. Lee Lee, university research reviewer. I truly and sincerely appreciate the Walden University team.

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Chapter 1: Introduction to the Study

Introduction

Chief executive officers of institutions around the world have discontinued using obsolete legacy systems and made large investments in the implementation of costly enterprise resource planning (ERP) systems since the 1990s (Chang & Chou, 2011; Hurbean & Negovan, 2013; Kanellou & Spathis, 2013). The ERP systems have shown strong potential in their effectiveness to improve organizational performance, improve productivity, and increase efficiencies across the different business functions (Lipaj & Davidaviciene, 2013; Mouakket, 2012). Leaders of organizations cannot realize the benefits of ERP systems unless individual end users accept and use the systems adequately and appropriately to perform their job functions (Sternad, Gradisar, & Bobek, 2011; Sun & Bhattacherjee, 2011). Empirical examinations conducted around the world (Al-Jabri & Roztocki, 2015; Shih, 2006) have revealed a lack of user acceptance of ERP systems.

Deficiencies in user acceptance hinder the return on investment for costly ERP systems (Al-Haderi, 2013; Hsieh & Wang, 2007). This lack of acceptance impedes the anticipated savings of time and effort in business operations and the likely advancement in data quality (Kanellou & Spathis, 2013; Saatcioglu, 2009); further research is necessary into the acceptance of complex systems such as ERP systems (Galy & Sauceda, 2014; Youngberg, Olsen, & Hauser, 2009). This cross-sectional survey study sought to examine the factors that affect user acceptance of ERP systems in the United States. The findings of this study may effect positive social change through strategies

developed to improve user acceptance of ERP systems that thereby increase productivity and corporate social responsibility programs leading to improvements in the worth and development of individuals as well as organizations.

Chapter 1 includes an outline of the basis for the research and background information concerning the development and implementation of the study. The focus of this chapter is the problem statement, purpose, research questions, hypotheses, and theoretical foundation of the study. Chapter 1 also includes the nature of the study, limitations, and the significance of the study, including potential contributions to positive social change.

Background of the Study

Organizations have been experiencing numerous challenges, including tougher competition, customers who expect more, and stronger market concentration in the present global economy (Pasaoglu, 2011; Shih, 2006). Correspondingly, institutional leaders have been using various protective strategies to reduce costs, improve quality, increase productivity, and enhance customer service (Kanellou & Spathis, 2013). One strategy is to use information technology to standardize and govern every section of an institution to achieve greater efficiency and effectiveness in business operations (Maas, Fenema, & Soeters, 2014). The implementation of ERP systems in organizations is a significant strategy and gives companies a collection of integrated application components that incorporate most business activities (Chao, Wu, Wu, & Garfolo, 2012; Kanellou & Spathis, 2013). An ERP system is a complex software package that has several enterprise components such as human resource management, budgeting, financial

management, supply chain management, and customer relationship management in an integrated real-time environment (Staehr, Shanks, & Seddon, 2012; Usmanij, Chu, & Khosla, 2013).

An ERP system can support specific business functions in a firm using industry best practices to integrate data across departments and business processes (Kanellou & Spathis, 2013; Xuefei & Tawei, 2014). An ERP system can also resolve the most demanding management challenges to realize the most desired structure for the organization and ultimately to improve operational performance and productivity (Teittinen, Pellinen, & Jarvenpaa, 2013). The systems have made considerable changes to the collection, storage, distribution, and use of data within organizations (Kanellou & Spathis, 2013). In this regard, ERP systems standardize and combine processes as well as facilitate more transparency throughout organizations (Maas et al., 2014), which results in a greater extent of flexibility for departments, especially accounting, and the organization as a whole (Kanellou & Spathis, 2013). Additionally, within ERP systems, users must adhere to established processes and assign specific roles in the organization that limit access to transactions to advance the discipline in the organization (Maas et al., 2014). Furthermore, the systems reduce the time to carry out business processes substantially and promote the sharing of information (Gelogo & Kim, 2014). Ultimately, ERP systems facilitate an improvement in decision making with timely and reliable information, improve the quality of reports to include financial statements, and reduce the time to close yearly accounts, thereby improving auditability (Kanellou & Spathis, 2013).

Organizational leaders have made large investments in ERP systems, but many of the investments have not yielded the expected outcome (Chang & Chou, 2011). The total investments globally in ERP systems since the 1990s are in the hundreds of billions of dollars (Staehr et al., 2012). More than 60% of the ERP systems implemented eventually fail (Maas et al., 2014; Mouakket, 2012). The annual cost of failed and troubled software is between $60 billion and $70 billion for both corporate and government investments in the United States (Charette, 2005). Furthermore, the benefits promised of ERP systems did not occur in most organizations (Sternad & Bobek, 2012), and ERP systems are frequently unsuccessful (Shih, 2006), but the reasons for varying results in organizations are still not sufficiently understood (Staehr et al., 2012). Even though users have a more efficient system (Sternad & Bobek, 2012), ERP systems exhibit high failure rates and unfulfilled benefits (Maas et al., 2014; Mouakket, 2012). Organizational leaders need to overcome barriers inherently related to user satisfaction of ERP systems during implementation or else those obstacles can evolve into drivers of risks (Saatcioglu, 2009). As there are few instances of academic research on ERP systems, understanding how workers use the systems dominates the interest of different stakeholders (Mouakket, 2012). Furthermore, conflicting successes and failures, in addition to the lack of agreement on its effect on business performance, have generated interest in the determinants of ERP system success and user satisfaction (Kanellou & Spathis, 2013).

Many end users grossly underuse ERP systems, even though organizational leaders make huge investments in the systems (Mouakket, 2012). Achieving the benefits of ERP systems or improvements in performance is not likely when the users are not

using them to the maximum extent (Murphy, Chang, & Unsworth, 2012). End users frequently do not use ERP systems efficiently (Zhang, Gao, & Ge, 2013), which presents serious difficulties for many organizations (Hsieh & Wang, 2007). Enterprise resource planning users who are not accepting and using the systems properly are one reason why organizational leaders do not realize the promised benefits of the systems (Sternad & Bobek, 2012). User acceptance is the most evident facet in the ultimate success of ERP systems (Hurbean & Negovan, 2013). Organizational leaders achieve benefits from ERP systems only to the extent to which users accept and use the systems often and extensively, especially in the routine stage (Sternad et al., 2011). Even if the implementation of an ERP system is successful, the system is not desirable if users perceive it as being useless for performing their jobs or if users have to exert too much effort to understand how to use it (Kwak, Park, Chung, & Ghosh, 2012). The failure or success of ERP systems hinges on the users, so it is imperative to understand the determinants of user acceptance of ERP systems (Pasaoglu, 2011).

Business leaders have deduced that investing in ERP systems to take the place of obsolete legacy systems might boost the quality, integration, auditability, generation, and potential of their data as well as reports (Kanellou & Spathis, 2013). However, the difficulties relating to job performance after implementing the systems demonstrate that ERP systems pose serious challenges to institutions (Jalal, 2011; Sykes, Venkatesh, & Johnson, 2014). The acceptance or rejection of information systems by users is not completely understood (Al-Jabri & Roztocki, 2015). The focus of most of the literature on the acceptance and use of ERP systems is the selection and implementation stages (Ha

& Ahn, 2014; Teittinen et al., 2013) for which researchers conducted the majority of the studies in countries other than the United States. Further research was necessary, particularly for assessing user acceptance of ERP systems during the routine stage in the United States. This study attempted to close the gap by seeking to identify methods for assessing and enhancing user acceptance of ERP systems during the routine stage in the United States.

Problem Statement

User acceptance of ERP systems remains one of the main factors affecting successful implementation and use of such systems (Sternad & Bobek, 2012). Users' lack of acceptance has led to significant problems and inefficiencies in many organizations (Gohmann, Guan, Barker, & Faulds, 2013; Hsieh & Wang, 2007). More than 60% of ERP systems implemented eventually fail (Maas et al., 2014; Mouakket, 2012). The annual cost of failed and troubled software is between $60 billion and $70 billion for both corporate and government investments in the United States (Charette, 2005). Although several researchers such as Al-Jabri and Roztocki (2015), Hou (2014), Sternad and Bobek (2013), and Zhang et al. (2013) conducted studies in various countries around the world, scholarly empirical literature on the routine use and acceptance of ERP systems in the United States has been sparse. The lack of scholarly studies illustrated the need for empirical research to examine user acceptance of ERP systems in the United States. The specific problem is a lack of user acceptance of ERP systems during the routine stage of operation in the United States.

Purpose of the Study

The purpose of this quantitative cross-sectional survey study was to test the technology acceptance model (TAM; Davis, 1989) that relates the factors that influence user acceptance of information technology (independent variables) to user acceptance of information technology (dependent variable) for employees who have been using ERP systems to perform their jobs in organizations throughout the United States. Perceived ease of use and perceived usefulness of the ERP systems were the independent variables. User acceptance of the ERP systems was the dependent variable. For the purposes of this study, perceived usefulness refers to the extent to which workers believe using the ERP system enhances their job performance (Davis, 1989). Perceived ease of use refers to the extent to which workers believe using the ERP system is free of mental effort (Davis, 1989). User acceptance is the self-reported extent of actual use of the ERP system to perform job functions in an organization (Davis, 1989).

Research Questions and Hypotheses

The literature revealed a gap in user acceptance of ERP systems and the research questions in this study served to narrow the gap. The extent of the relationships between perceived usefulness and user acceptance as well as between perceived ease of use and user acceptance underwent testing relative to employees using ERP systems in the performance of their duties in the United States. A self-reported Web survey instrument adapted from the TAM (Davis, 1989) consisting of Likert-type scales was suitable for measuring the variables. The analysis of the relationships involved linear multiple regression with perceived ease of use and perceived usefulness as the predictor or

independent variables and user acceptance of ERP systems as the outcome or dependent variable. This study attempted to provide insightful responses to the following research questions:

1. To what extent, if any, is there a linear relationship between the perceived usefulness and end user acceptance of ERP systems in the United States?
2. To what extent, if any, is there a linear relationship between the perceived ease of use and end user acceptance of ERP systems in the United States?

The following hypotheses were suitable for addressing the preceding research questions:

$H1_0$: There is no relationship between perceived usefulness and end user acceptance of ERP systems in the United States.

$H1_a$: There is a positive relationship between perceived usefulness and end user acceptance of ERP systems in the United States.

$H2_0$: There is no relationship between perceived ease of use and end user acceptance of ERP systems in the United States.

$H2_a$: There is a positive relationship between perceived ease of use and end user acceptance of ERP systems in the United States.

Theoretical Framework

This study involved examining user acceptance of ERP systems during the routine stage in the United States using the TAM (Davis, 1989) as the theoretical foundation. The TAM includes the basic principles for examining the determinants of user (employees) acceptance of a specific information technology in an organization. Davis (1989) introduced the TAM in 1986 by adapting the theory from the theory of reasoned action

(TRA; Fishbein & Ajzen, 1975) and refined it in 1989 to model user acceptance of information technology (Davis et al., 1989). According to the TAM, perceived usefulness and perceived ease of use intrinsically determine the use and acceptance of information systems (Kwak et al., 2012). Davis (1989) found that perceived usefulness and perceived ease of use significantly influenced user acceptance of information technology. Additional details of the TAM are in Chapter 2.

Potential users are likely to accept a system that they perceive to be useful and somewhat easy to use (Davis, 1989). Perceived usefulness has a wide range of explications, including perceptions of users that an information system may boost job performance and result in promotions (Davis, 1989). Therefore, users will accept a system for which a subjective probability exists relative to increasing their work performance (Kortteisto, Komulainen, Mäkelä, Kunnamo, & Kaila, 2012). Additionally, perceived ease of use is the extent of the belief that using a particular information system will be effortless (Davis, 1989). Perceived ease of use indicates the point to which users do not think about an information system as being too inflexible for interaction (Ali & Younes, 2013). Perceived ease of use and perceived usefulness are key determinants for using ERP systems as well as other types of information systems (Zhang et al., 2013).

Designers of computer systems involving human interaction were traditionally likely to exaggerate the importance of ease of use and ignore usefulness (Burke, 2013; Lin, Hung, Tsai, & Chou, 2012). Davis (1989) suggested ease of use as a possible precursor to usefulness. The logic is that ease of use helps to uncover the usefulness of information systems to users (Weiyin, Thong, Chasalow, & Dhillon, 2011). Burke (2013)

found that people tend to use ease of use ratings to form an overall conclusion about a system, which indicated that designers could seek to develop systems perceived as easy to use regardless of technical excellence. An information system that is difficult to use can inhibit the acceptance of a useful system (Davis, 1989). The recurring release of new features or modules at regular intervals during the life cycle of agile information systems requires constant learning, which highlights the significance of ease of use (Weiyin et al., 2011). In contrast, Davis found that perceived usefulness correlates substantially with user acceptance and suggested that designers who are making an effort to implement successful systems should not overlook perceptions of usefulness.

Researchers have used the TAM considerably in investigations of information technology acceptance and usage (Sternad & Bobek, 2013). The primary variables hypothesized in the TAM are fundamental in the framework of ERP systems and the overall context of information technology (Kwak et al., 2012). The goal of TAM is to operationalize the perceived ease of use and perceived usefulness constructs to explain the factors that determine whether users accept or reject technology across a wide range of systems in a manner that demonstrates extreme care and theoretical justification (Davis et al., 1989), which is consistent with the approach of this study. According to the TAM, users are likely to accept a specific information system when they perceive it as being useful and somewhat easy to use (Al-Jabri & Roztocki, 2015; Davis, 1989). Therefore, it was rational and logical to use TAM (Davis, 1989) to answer questions regarding the extent of the relationships between perceived ease of use and user acceptance as well as

between perceived usefulness and user acceptance relative to using ERP systems during the routine stage in the United States.

Nature of the Study

The nature of this quantitative cross-sectional survey study is an empirical examination regarding the extent of possible relationships between the independent variables (perceived ease of use and perceived usefulness) and the dependent variable (user acceptance) as defined in the TAM (Davis, 1989) constructs. Researchers conduct survey research to test theory to examine the relationships between variables from theoretically grounded expectations regarding how and why relationships should exist among the variables (Rea & Parker, 2014; Roberts, 2012). The cross-sectional survey design was appropriate because this study involved examining the relationships between independent and dependent variables based on measurements obtained from a survey instrument at one point in time to identify attributes of a population from a representative sample of the population.

According to the TAM, the independent variables perceived usefulness and perceived ease of use are two distinct constructs that significantly influence the dependent variable user acceptance of computing technologies (Davis, 1989). Perceived usefulness is the extent to which employees believe using the ERP system enhances their job performance (Davis, 1989). Perceived ease of use is the extent to which employees believe using the ERP system is free of mental effort (Davis, 1989). User acceptance is the self-reported extent of actual use of the ERP system to perform tasks on the job (Davis, 1989). Purposive sampling was suitable for collecting data from employees who

had been using ERP systems to perform their jobs in organizations throughout the United States. The participants consisted of members of the SurveyMonkey American audience, identified by the staff at SurveyMonkey as using ERP systems to perform their job functions at various organizations in the United States. The prescreened participants self-administered the TAM survey instrument via a private Web survey. Given a medium effect size of 0.15, alpha of .05, a desired power of .80, and two predictors, the appropriate sample size was a minimum of 68 participants based on calculations from G*Power Version 3.1.9.2. The study included 97 participants.

The study included the IBM SPSS multiple regression program to test and analyze the data. According to Legris, Ingham, and Collerette (2003), studies conducted with the TAM most often include a linear regression model. This study included descriptive, correlational, and inferential statistics to clean and screen the data as well as to analyze the hypotheses and answer the research questions. The multiple regression analysis facilitates predicting the dependent variable from a linear combination of two or more independent variables (Field, 2013). Therefore, multiple regression analysis helped assess the relationships between the independent variables (perceived ease of use and perceived usefulness) and the dependent variable (user acceptance). The strength of the correlation between the constructs also underwent an assessment from the values of the Pearson correlation coefficient that was available from the descriptive option within the multiple regression program (Field, 2013).

Definitions

The basis of using the following terms in this study was their interpretation based on their general acceptance and operational descriptions provided by professionals in the information technology field:

End user: All employees who are not information technology experts, but who use a computer system to perform their duties at work (Costabile, Fogli, Mussio, & Piccinno, 2007).

Legacy system: An information system operating on generally older technology that continues to be useful in current businesses and for which replacing such systems might be cost prohibitive and not necessarily urgent (Laudon & Laudon, 2012).

Perceived ease of use: The extent of the belief that using a specific information system will be effortless (Davis, 1989).

Perceived usefulness: The extent of the belief that using a specific information system will improve job performance and provide rewards or benefits to the user (Davis, 1989).

Technology acceptance model (TAM): An information-technology-specific theory that hypothesizes perceived ease of use and perceived usefulness are the predominant traits relevant to the behavior of users toward technology acceptance (Davis, 1989).

User acceptance: The noticeable willingness to use information technology in accordance with the purpose and functions of the technology to accomplish tasks on the job (Yucel & Gulbahar, 2013).

Assumptions

This study included assumptions that were necessary to prevent any misunderstandings and to facilitate others in evaluating the conclusions about user acceptance of ERP systems on the job in the United States that result from such presumptions. Assumptions have a material significance to research problems and are the foundation for the existence of research studies as well as the basis for judging the quality of a study (Leedy & Ormrod, 2015). Since the implementation of ERP systems began during the 1990s in the United States, a general assumption now exists that ERP systems in the United States are in the postimplementation phase. This assumption was necessary to differentiate the stages of the ERP system life cycle and to prevent misunderstandings of the perceptions in the routine stage. Organizational leaders somewhat resolve the risk factors in the implementation stage by the time the ERP system reaches the postimplementation stage, which allows the ruling out of confounding effects from implementation factors during the postimplementation stage (Tian & Xu, 2015).

The existence of this study also depended on the assumptions that the participants would correctly interpret the statements in the survey and express their views honestly. Another assumption was that the self-reported perceptions accurately represented the feelings of ERP system users in the United States. Self-reported measures of system use can approximate usage, even though they are not precise measures for the frequency of actual system use (Junco, 2013; Pynoo et al., 2012; Reuver & Bouwman, 2014). Accordingly, another assumption was that self-reported system use from the participants correctly represented the actual frequency of system use. The final assumption was that

the members of the SurveyMonkey American audience who the staff at SurveyMonkey purposively invited on my behalf to participate in the survey would accurately represent the population of interest. These assumptions were necessary to have meaningful results and to reflect a practical depiction of user acceptance of ERP systems in the United States.

Scope and Delimitations

The scope of the study was to examine user acceptance of ERP systems in the routine stage of operation concerning employees who were end users in the United States. The problem of a lack of user acceptance of ERP systems results in the underuse of the systems and subsequently prevents organizational leaders from realizing the expected benefits that include improvements in operational performance as well as productivity. The specific focus served to ensure that the data facilitated accurate conclusions about relationships within the data. The participants were end users who had been using ERP systems to perform their jobs in organizations within the United States. The study excluded information technology professional employees. The study also excluded employees using ERP systems in any country other than the United States.

Since the study included participants purposively selected from members of the SurveyMonkey American audience, the sample might not be totally representative of all the ERP system end users in the United States. Researchers have used the TAM, TRA, and theory of planned behavior (TPB), among other theories, to examine the determinants of user acceptance of computing technologies around the world involving a plethora of different constructs. However, this investigation only included the TAM (Davis, 1989) in

relation to end users in the United States and therefore might not be generalizable to end users in other countries. Additionally, since the scope of the study was within the TAM constructs, other theories may yield different outcomes regarding user acceptance of ERP systems in the United States. Furthermore, the TAM does not cover all possible determinants that could affect user acceptance, so the study did not provide a complete explanation of all the aspects of user acceptance of ERP systems in the United States.

Limitations

The cross-sectional design is inherently not very robust due to methodological limitations because researchers cannot manipulate the independent variable. Furthermore, before and after comparisons of observations or measurements are not possible due to the nature of the variables. Additionally, perceptions may change over time intervals, and the totality of all the foregoing limitations prevents the establishment of causality. The cross-sectional design restricts causal inferences because researchers collect data and conduct the study at one moment in time, for which it is difficult to establish temporal priority (Aikens, 2012). However, statistical analysis was suitable for making approximations in an attempt to overcome the methodological limitations, but the focus of this study was on examining user acceptance of ERP systems instead of implying cause and effect. The findings may not be generalizable to individuals other than end users in the United States, and the results may not be generalizable to users during other moments in time.

The precision of the degree to which self-reports represent the actual manner of conduct is controversial because user acceptance measures were self-reported instead of measured objectively, thereby highlighting another limitation of the study that might have

threatened internal validity. The survey questions were limited and closed-ended, which limited the range of responses and might have affected construct validity as well as introduced bias. Additionally, the study involved using the same questionnaire for measuring perceived ease of use to measure perceived usefulness as well as facilitate the recording of the self-reported frequency of ERP system usage. Therefore, a chance existed of having a halo result. Furthermore, as the TAM does not cover all possible factors, unknown confounding variables may have damaged the internal validity of the study.

The study included a representative sample and the original validated TAM (Davis, 1989) survey instrument to lessen the effects from the methodological limitations inherent to the cross-sectional design. Alsumait et al. (2015) noted that using a representative sample and a validated questionnaire might lower the consequential limitations of using a cross-sectional design, a self-administered survey instrument, and the introduction of bias. I used a large sample size to enhance the external validity of the study and subsequently improve the generalizability of the results. A large sample size served to reduce differences that may have existed between the sample and the target population. According to Grygorowicz, Piontek, and Dudzinski (2013), using a large sample size may ensure the characteristics of the participants in the sample will not differ from the required characteristics in the population of interest.

I used the multiple linear regression approach to analyze the data to examine the relationship between numerous covariates and the outcome. Pourhoseingholi, Baghestani, and Vahedi (2012) asserted that researchers could use multiple linear regression to

identify and account for confounding variables such as attributes in the demographic information of participants and isolate the relationship under investigation. Simple and multiple linear regressions can explain the extent to which confounding variables affect the relationship between the independent variable and the dependent variable through comparing the results of the regression models. Accordingly, I used a representative sample, the original validated TAM (Davis, 1989) survey instrument, a large sample size, multiple linear regression to clarify distortion in the relationships of interest, and limited inferences to only qualified conclusions to address the limitations and increase the validity of the study.

Significance of the Study

The global economy has resulted in the proliferation of many difficulties in organizations, such as tougher competition, stronger market concentration, and consumers who expect more from organizations (Pasaoglu, 2011; Shih, 2006). The implementation of ERP systems is one of the most significant defensive strategies that organizational leaders have employed to lower costs, increase quality, improve customer service, and increase productivity to handle the challenges of globalization (Kanellou & Spathis, 2013). Even though organizational leaders have made huge investments in ERP systems, many have not realized the expected outcome (Chang & Chou, 2011). More than 60% of the ERP systems implemented eventually fail (Maas et al., 2014; Mouakket, 2012). Furthermore, many ERP systems are underused (Mouakket, 2012), which prevents the systems from yielding the expected benefits to the organizations (Murphy et al., 2012). One major cause of the problem is that ERP system end users are not accepting

and using the systems properly (Sternad & Bobek, 2012). Therefore, it is essential to understand the factors that influence the acceptance and use of ERP systems (Al-Jabri & Roztocki, 2015; Sternad & Bobek, 2013).

Significance to Theory

As more than 60% of ERP system implementations result in failure and the technology continues to evolve with promising potential benefits (Maas et al., 2014; Mouakket, 2012), the results of this study could be valuable for theory advancement. Studying the influence of perception factors on constructs may contribute to theory development on user acceptance of ERP systems and could build on the theoretical relationships among the variables, which need continued attention. The results of this study could be a stepping-stone for validating an ERP system success model after obtaining valuable theoretical insights. The identification of external factors that are influencing the perceptions of users may contribute to theory advancement and subsequently might result in the development of more robust models for assessing complex ERP systems.

Furthermore, the findings of this study may add to the understanding of the perceptions that affect the use and acceptance of ERP systems and may improve the explanatory power of the TAM in the context of complex systems. This study might also contribute to the body of theoretical knowledge on user acceptance of information technology and more specifically ERP systems in the routine stage of operations. This could add to the literature by focusing on user acceptance of ERP systems in the United

States and might highlight the need for more research as well as theory development about this topic, which has so far received limited investigation.

Significance to Practice

Because an ERP system requires large investments and may produce significant changes in business processes and the actions of the users, understanding the factors that influence user acceptance and use are of practical importance (Zhang et al., 2013). If organizational leaders want to improve user acceptance and business performance, they could take into account the findings of this study. The results of the study may assist managers in better assessing the benefits they are deriving from their ERP systems. Practitioners could obtain beneficial insights into their management practices that might allow them to improve the acceptance and use of their ERP systems, which may subsequently improve their competitive advantage in a rapidly changing global business environment. Managers may see the need to emphasize the functionality of the system and help users to understand how the system could improve their productivity.

Critical ERP system success factors in the literature only indicate the perspectives of managers or information technology professionals (Kwak et al., 2012), but the results of this study demonstrate the importance of the perspectives of end users. Enterprise resource planning consultants could use the findings to guide organizational leaders who need to improve the efficiency and effectiveness of their systems. Academics could use the results to analyze further user acceptance of ERP systems. Both educators and employers might see the need to educate and employ persons who meet new proficiency criteria as end users of modern complex systems. Managers may see the need for

intervention programs to improve the perceived usefulness and perceived ease of use of the systems to improve usage within their organizations. System designers may see the need for designing better systems in which the architecture matches employee tasks to improve the perceived usefulness and perceived ease of use as well as enable employees to appreciate the technology more easily and effectively.

As the initial success of ERP systems is not the exclusive determination of performance (Ha & Ahn, 2014), the results could be helpful to organizational leaders struggling to achieve the benefits in the later stages of the ERP system life cycle. This study may contribute to increasing awareness about the complete process of ERP system implementation so that practitioners could consider all the necessary issues from the beginning, thereby preventing unexpected crises after implementation. Being aware of postimplementation risks could help managers in better achieving the full benefits of the complex and expensive ERP systems. This study may contribute to a rising overall depiction of how and why organizational leaders realize the business benefits promised from ERP systems. Therefore, this study may be beneficial to various stakeholders in organizations whose leaders have already implemented an ERP system and to those considering replacing their legacy systems with a complex ERP system. The study may contribute to the body of knowledge on user acceptance of information technology and more specifically ERP systems in the routine stage of operations.

Significance to Social Change

The findings of this study could lead to positive social change through the contribution of valuable information that researchers and practitioners could use for

improving social conditions. The results may enlighten leaders about how perceptions concerning the use of computing technology could affect the performance of workers on the job and lead to inefficiencies in their organizations. The leaders could then develop procedures to increase user acceptance of computing technology that might result in an improvement in job performance. Higher levels of job performance could improve productivity as well as profitability and consequently benefit workers and communities leading to positive social change. Increases in the effectiveness and efficiency of organizational performance may increase the resources available to advance corporate social responsibility and generate the possibility to achieve positive social change.

Corporate social responsibility consists of activities that organizational leaders use to demonstrate a responsible business approach toward the broader society beyond the bounds of the organization (Gorny, 2014). Leaders of organizations with improvements in productivity, increases in profitability, and subsequent increases in funding for social programs may give priority to social investments and invest in socially beneficial programs. Initiatives such as funding school programs for children, supporting opportunities for youth through training, and philanthropic donations may improve the social conditions of citizens in the society. A profitable organization may provide more jobs, pay more taxes, purchase materials and services, and consequently contribute to improvements in the social conditions of individuals. Organizational leaders may create positive social change through the supply of goods and services at cost-effective prices to benefit underserved communities. Positive social change may also manifest in society through reduced costs of goods to consumers due to the efficiency that appropriately used

ERP systems introduce in organizations. An increase in productivity is the key to improvements in prosperity and a better standard of living in any society (Parham, 2013).

Other potential benefits of ERP systems such as better quality data and comprehensive auditability inherently create the possibility for leaders to become more knowledgeable about the social aspects of their company, which could help to improve working conditions and ultimately stimulate positive social change. Practitioners have confronted and transformed critical problems and perceptions in communities because of evidence generated from empirical studies. Therefore, the findings of this research could induce innovation and discovery, thereby bringing about comprehensive positive changes regarding culture and social systems over time. Because technological systems interrelate with current social systems, improvements in users' acceptance of information technology could produce far-reaching effects including positive social change in society. This study may promote the worth and development of organizations as well as improve human and social conditions in society.

Summary and Transition

Chapter 1 included an outline of the objective of the research that involved examining user acceptance of ERP systems in the United States in relation to employees who were end users at organizations within the country. The research questions and corresponding hypotheses were suitable to explain the extent of the perceptions that influence user acceptance of ERP systems and ultimately lead to acceptance or rejection of the systems. The highly robust and parsimonious TAM served as the theoretical framework of the quantitative cross-sectional survey study. Data collection involved a

private Web survey using the TAM survey instrument with purposively selected members of the SurveyMonkey American audience who met the criteria for the sample. The various sections throughout this chapter provided support and justification for conducting the study as well as highlighted the significance of the research.

Chapter 2 consists of a more detailed discussion of the theoretical foundation that includes some previous applications of the TAM in similar studies. Chapter 2 also includes a review of the current literature that corresponds with the scope of this research. Chapter 3 includes a discussion of the research methodology and relevant procedures consistent with the research design in relation to the objective of the study. Chapter 3 includes the rationale for the research design, a detailed explanation of the data analysis plan, factors that were threats to the validity of the study, and ethical procedures for the treatment of human participants. Chapter 4 consists of data collection procedures, the results of the cross-sectional survey, descriptive statistics, statistical analysis of the responses, and analysis of the results. Chapter 5 is the final chapter containing all key findings, interpretation of the findings, limitations of the research, recommendations for future studies, and implications for positive social change.

Chapter 2: Literature Review

Introduction

User acceptance of ERP systems remains one of the main factors affecting the successful implementation and use of such systems (Sternad & Bobek, 2012). Users' lack of acceptance has led to significant problems and inefficiencies in many organizations (Gohmann et al., 2013; Hsieh & Wang, 2007). Empirical examinations conducted around the world (Al-Jabri & Roztocki, 2015; Shih, 2006) have revealed a lack of user acceptance of ERP systems. The annual cost of failed and troubled software is between $60 billion and $70 billion for both corporate and government investments in the United States (Charette, 2005). The specific problem in the United States is a lack of user acceptance of ERP systems during the routine stage.

Even though researchers such as Al-Jabri and Roztocki (2015), Hou (2014), Sternad and Bobek (2013), and Zhang et al. (2013) have conducted studies in various countries around the world, scholarly empirical literature on the routine use and acceptance of ERP systems in the United States is sparse. This lack of scholarly studies illustrated the need for empirical research to examine user acceptance of ERP systems in the United States. Therefore, the purpose of this quantitative cross-sectional survey study was to test the TAM (Davis, 1989) that relates factors that influence user acceptance of information technology (independent variables) to user acceptance of information technology (dependent variable) for employees who have been using ERP systems to perform their jobs in organizations across the United States.

Chapter 2 starts with a restatement of the problem and purpose of the study. The chapter continues with a description of the literature search strategy and the various key search terms used to retrieve pertinent journals from databases accessed through the Walden University online library. This chapter includes a description of the TAM (Davis, 1989), which was the major theoretical proposition in the study. Chapter 2 also consists of an extensive review of the literature including the historical background of ERP systems, user adoption of information technology, variables that influence user acceptance of ERP systems, and existing gaps in the literature. The summary and conclusion consist of an overview of major themes outlined in the literature and the transition connecting the gap in the literature to Chapter 3.

Literature Search Strategy

The strategy for searching the literature consisted of reviewing major subject areas in business and management, psychology, social science, and information technology within multiple databases. Due to the interdisciplinary structure of user acceptance of ERP systems, appropriate literature appeared in several different journals. An exhaustive review of the literature took place on databases by name and by subject area, as well as within multidisciplinary databases accessible through Walden University online library to assess the current state of the relevant literature. To ensure a comprehensive review, the types of literature reviewed in this study included books, peer-reviewed articles, conference papers, and journals relating to technology acceptance, ERP systems acceptance, technology adoption, ERP systems software, and use of ERP systems.

The search performed using databases accessed through the Walden University online library included Business Source Complete, Computers and Applied Sciences Complete, IEEE Xplore Digital Library, and PsycINFO databases. The search conducted using databases by subject included ABI/INFORM Complete and Emerald Management databases. The multidisciplinary databases consisted of ProQuest Central, Academic Search Complete, and ScienceDirect. The wide variety of databases from psychology to business management facilitated locating various applicable articles to highlight views from different perspectives. Additionally, Google Scholar was accessible through the Find Exact Article section of the Walden University library, and Gartner Group Research was accessible through the Walden University portal.

The key search terms used in the literature search strategy included *perceived usefulness, perceived ease of use, user acceptance, technology acceptance, technology usage, user acceptance of ERP systems, ERP systems, enterprise resource planning, ERP software, ERP systems failure, utilization of ERP systems,* and *acceptance of complex systems*. I used the EBSCOhost service within the multidisciplinary databases to enhance the search in which I could select optional fields such as author or subject terms. Furthermore, I limited the parameters of the search to full-text, scholarly journals in English. As a basic understanding of information systems was fundamental, I located and used selected articles on information systems especially with historical content.

Scholarly literature from a variety of databases, Google Scholar, and books resulted in 170 references used. Eighty-two percent of the references, consisting of 140 of the 170 references, had publication dates between 2011 and 2015. Information from

books by authors such as Campbell and Stanley (1963), Chen (2012), Field (2013), Frankfort-Nachmias, Nachmias, and DeWaard (2014), Laudon and Laudon (2012), Leedy and Ormrod (2015), Nunnally and Bernstein (1994), and Rea and Parker (2014) are in the study. Furthermore, the study includes information from seminal articles on theories such as those by Ajzen (1991), Bandura (1977), Davis (1989), Davis, Bagozzi, and Warshaw (1989), Fishbein and Ajzen (1975), and Tornatzky and Klein (1982). An extensive review of the relevant literature resulted in a comprehensive list of references supporting the study.

Theoretical Foundation

The TAM (Davis, 1989) is a parsimonious model for predicting and explaining the use and acceptance of information technology on the job (Zhang et al., 2013). Davis (1989) introduced the TAM in 1986 in his doctoral dissertation in which he adapted the theory from the social psychology TRA (Fishbein & Ajzen, 1975) and later refined it in 1989 (Davis et al., 1989). Davis et al. (1989) highlighted the following objective of the TAM:

> The goal of TAM is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified. (p. 985)

The TAM theorizes that perceived usefulness and perceived ease of use fundamentally determine the use and acceptance of information systems (Kwak et al., 2012). The TAM includes an assumption that perceived usefulness and perceived ease of use predict user

perceptions, which ultimately influences technology acceptance (Zhang et al., 2013). After conducting a field study consisting of 120 users and two information systems followed by a lab study consisting of 40 masters of business administration students and two graphics systems, Davis (1989) concluded that perceived usefulness and perceived ease of use significantly influenced user acceptance of information technology.

The relationship between perceived usefulness and using information technology is significantly stronger than the relationship between perceived ease of use and using information technology (Davis, 1989; Kwak et al., 2012; Liu & Ma, 2004; Zhang et al., 2013). Perceived usefulness is the extent of the belief that using a specific information system will improve job performance and provide rewards or benefits to the user (Davis, 1989). Perceived usefulness has a wide range of interpretations, including users' perceptions that an information system may enhance job performance, improve efficiencies, boost effectiveness, and result in reinforcements such as promotions, bonuses, and raises (Davis, 1989). Users believe that a highly perceived useful system exhibits a positive relationship between use and performance (Davis, 1989). Therefore, users will accept a system that they perceive to be beneficial in bringing about the accomplishments desired (Echeng, Usoro, & Majewski, 2013). Perceived usefulness demonstrates whether users can get correct, pertinent, valid, and trustworthy information at the right time from a system (Ali & Younes, 2013). Accordingly, a useful system will improve performance on the job, output, work quality, and using time and effort (Ali & Younes, 2013).

Perceived ease of use has a strong influence on the perceived usefulness of an information system (Davis, 1989; Liu & Ma, 2004; Sternad & Bobek, 2013; Yousafzai, Foxall, & Pallister, 2010). Perceived ease of use is the extent of the belief that using a specific information system will be effortless (Davis, 1989). Given two information systems that perform the same functions, the one that users perceive as easier to use should be more useful and therefore more likely for users to accept (Davis, 1989, 1991). However, an information system that is much easier to use cannot offset a system that fails to do a useful action (Davis, 1989). Users may believe a system is too difficult to use if they are toiling to use it and when the effort exerted appears to outweigh the performance benefits, which results in a reluctance to use the system (Reynolds & Ruiz de Maya, 2013). Therefore, perceived ease of use demonstrates the point at which users do not view an information system as too laborious to understand, learn, and use (Ali & Younes, 2013). Potential users are likely to accept a system that they perceive to be useful and somewhat easy to use, for which they weigh the possible benefits against the difficulties of using the system and decide to either accept or reject the system (Al-Jabri & Roztocki, 2015).

Researchers have used the TAM extensively in examining information technology acceptance and usage (Liu & Ma, 2004; Sternad & Bobek, 2013; Venkatesh, Morris, Davis, & Davis, 2003; Yousafzai et al., 2010). Zhang et al. (2013) adapted TAM to examine end users' use of ERP systems in China. The major hypotheses included that perceived ease of use of the ERP system would positively influence the perceived usefulness of the system, perceived usefulness of the ERP system would positively

influence use of the system, and perceived ease of use of the ERP system would positively influence use of the system. After analyzing the results of surveys from 127 ERP users, Zhang et al. concluded that perceived ease of use significantly influenced perceived usefulness in a positive way and perceived usefulness as well as perceived ease of use positively influenced the use of ERP systems. Additionally, Sternad and Bobek (2013) adapted TAM to examine the factors that influence the acceptance of ERP systems in Slovenia. Among the major hypotheses were that perceived ease of use positively and directly influenced the perceived usefulness of the ERP system and that perceived ease of use as well as perceived usefulness positively and directly influenced attitude toward ERP system. The analysis of 293 questionnaires from users of ERP systems resulted in Sternad and Bobek concluding positive results for the above-mentioned hypotheses.

The main variables theorized in the TAM are fundamental in the framework of ERP systems and the overall context of information technology (Kwak et al., 2012; Yucel & Gulbahar, 2013). Kwak et al. (2012) examined user acceptance of ERP systems during the implementation stage. Among the major hypotheses were that both perceived usefulness and perceived ease of use would positively relate to behavioral intention to use ERP systems. After analyzing the survey results from 254 respondents, Kwak et al. concluded that the relationships of perceived usefulness and perceived ease of use were significantly positive with behavioral intention to use ERP systems. Furthermore, Mouakket (2012) modified the TAM to investigate the use of ERP systems in the United Arab Emirates, in which two of the main hypotheses were that perceived ease of use and

perceived usefulness would positively connect to the true use of ERP systems. The analysis of 344 questionnaires resulted in Mouakket concluding that perceptions of usefulness and ease of use positively influenced the use of ERP systems.

The TAM is a well-established and extensively tested model that is robust and directly applicable to examining user acceptance of information technology such as ERP systems (Kwak et al., 2012; Sternad & Bobek, 2013; Zhang et al., 2013). Legris et al. (2003) conducted a critical review of the TAM using 23 empirical studies for analysis that included perceived usefulness and perceived ease of use among other constructs. Legris et al. determined TAM was a valuable theoretical model with proven quality and statistical reliability. The results of a meta-analysis of 26 empirical studies of the TAM indicated that strong relationships exist between perceived usefulness and acceptance as well as between perceived usefulness and perceived ease of use (Liu & Ma, 2004). King and He (2006) conducted a meta-analysis of the TAM in which they used 88 empirical studies from various fields. King and He concluded that TAM was a credible and powerful model that researchers have used extensively, but exhibit the potential for broader applicability. Hsiao and Yang (2011) investigated the intellectual development of the TAM using 72 articles and found that TAM was one of the most extensively used theories for explaining user acceptance of information technology. Yucel and Gulbahar (2013) analyzed 50 articles to examine the predictors of the TAM and found that even though there were many attempts to add other constructs to the original variables, the main variables perceived usefulness and perceived ease of use remained the most effective TAM constructs (Yucel & Gulbahar, 2013).

Even though the TAM has been the most widely used model for user acceptance and usage of information technology (Yucel & Gulbahar, 2013), the model has several limitations (Legris et al., 2003; Turner, Kitchenham, Brereton, Charters, & Budgen, 2010; Yousafzai et al., 2010). The self-reported usage is a subjective rather than an objective measure and does not reflect the precise actual system use (Davis, 1989; Legris et al., 2003; Yousafzai et al., 2010). Furthermore, measures of system usage are proxies for measures of the value of technology, but the TAM does not determine the advantage of using a technology (Turner et al., 2010). Moreover, common method variance is an issue because the data for all the variables of the TAM are from self-reporting (Yousafzai et al., 2010). Another limitation is that the TAM does not indicate how the perceptions of usefulness and ease of use develop or how practitioners can exploit them to promote user acceptance and increase usage (Mathieson, 1991).

Researchers have used various theories to explain the acceptance and use of information systems, including the TRA (Fishbein & Ajzen, 1975), the TPB (Ajzen, 1991), and the TAM (Davis, 1989). However, TAM is the most parsimonious and robust in comparison to other theories (Liu & Ma, 2006; Venkatesh & Davis, 2000). Therefore, I selected the TAM (Davis, 1989) as the main theoretical foundation for my study concerning user acceptance of ERP systems in the United States due to the validity and preciseness of TAM to explain user acceptance of information technology (Zhang et al., 2013). The research questions in this study involved the main original constructs of the TAM (Davis, 1989) and therefore supported an attempt to build upon the existing theory as well as contribute to the body of literature, as examinations of user acceptance of ERP

systems in the United States is sparse. Furthermore, TAM scholars have predominantly disregarded the use of complex systems such as ERP systems in organizations (Zhang et al., 2013).

Literature Review

The literature review includes a discussion on user acceptance of ERP systems and the factors that influence user acceptance of information technology, as well as a description of research concerning the constructs of interest and the rationale for selecting each variable. The analysis and synthesis of studies related to user acceptance of ERP systems set the basis for identifying the gap in the literature and connecting the gap to the research method in Chapter 3. Discussions about the historical background, characteristics, and usage of ERP systems unfold throughout this section.

History of ERP Systems

Using information systems is essential for the successful and continuing operation of organizations (Lavtar, 2013). The globalization of business and increasing competition has stimulated leaders of organizations to operate more efficiently, to lower operation costs, and to accomplish greater competitiveness using information technology (Tsai, Lee, Liu, Lin, & Chou, 2012). The evolution of information systems in organizations started from data processing, continued to management information systems, and evolved into strategic information systems (Lavtar, 2013). During the 1960s, manufacturing systems primarily involved inventory control using the traditional inventory approach to meet customer demand and remain competitive (Pasaoglu, 2011). Cost was the main competitive factor in the 1960s, with organizational strategies consisting of high volume

production and minimizing cost (Jacobs & Weston, 2007). Manufacturing systems transitioned to material requirements planning (MRP) systems in the 1970s to facilitate the materials planning process (Pasaoglu, 2011). Computers used the bill of materials, production plans, and inventory information to calculate material requirements in manufacturing enterprises (Xia, Min, & Shuang, 2013). Marketing was the primary competitive factor in the 1970s, with priorities for better production integration as well as planning (Jacobs & Weston, 2007).

The increased power and economical cost of technology led to the development of manufacturing resource planning (MRP II) systems in the 1980s (Pasaoglu, 2011). MRP II handled resource planning by incorporating manufacturing, financial accounting, financial management, and supply chain management to establish one complete business process (Pasaoglu, 2011; Xia et al., 2013). Quality became the main competitive element in the 1980s with an emphasis on reducing overhead costs as well as increasing priorities for better process control and first-rate manufacturing (Jacobs & Weston, 2007). MRP II expanded into ERP systems in the 1990s in which the systems integrated all resource planning information relating to financial and accounting, human resources, supply chain, and customers (Pasaoglu, 2011). The system achieved greater integration capabilities, became more flexible, and became applicable to different industries as well as to organizations with global operations (Xia et al., 2013). The Gartner Group created the term ERP early in the 1990s to represent an integration of the software across as well as within the different business functions of an organization (Jacobs & Weston, 2007). The shift from MRP II to ERP complemented the changing character of information systems

architecture, which progressed from detached, function-based, departmentally restrained, self-contained systems toward intricate, ERP systems that encompass the entire organization (Murphy et al., 2012).

ERP System Software

Enterprise resource planning system software is application software that directly services the operation, production, and management of an organization (Xia et al., 2013). An ERP system consists of different software modules that each carry out a variety of tasks to accomplish specific business functions and can include database management systems as well as security software (Zeng & Skibniewski, 2013). Enterprise resource planning system software uses state-of-the-art information technology consisting of the Internet, networks, databases, and data warehouses to integrate the supply chain, financial, and manufacturing management operations (Xia et al., 2013). Several types of ERP systems exist, including huge vendor products, in-house systems, and software from small vendors (Olson, Chae, & Sheu, 2013). The term ERP system referred to either Baan, Oracle, PeopleSoft, JD Edwards, or SAP during the earlier years of ERP implementation (Olson et al., 2013). SAP began in Germany in 1972, JD Edwards and Oracle began in the United States in 1977, Baan began in 1978 in the Netherlands, and PeopleSoft began in 1987 in the United States (Jacobs & Weston, 2007). The top ERP software suppliers in descending order are SAP, Oracle, Sage, Infor, and Microsoft (Columbus, 2014; Kim, Park, & Lee, 2013; Ruivo, Johansson, Oliveira, & Neto, 2013). The global ERP software market was $25.4 billion in 2013 (Columbus, 2014).

Purpose of ERP Systems

Enterprise resource planning systems are enormous, intricate software packages that support an integrated real-time setting in accordance with a data model comprising the whole enterprise (Staehr et al., 2012). The system consists of a collection of standardized software and a database that supports the entire organization for entering, recording, processing, monitoring, and reporting all business transactions (Zhang et al., 2013). Furthermore, the comprehensive purpose and function of ERP software make the systems complex and sizable (Zeng & Skibniewski, 2013). An ERP system includes a group of business modules that interconnects the multiple business functions of an institution into a closely combined single system using a common platform to facilitate the movement of information throughout the organization (Beheshti, Blaylock, Henderson, & Lollar, 2014; Kumar & Malik, 2012). The design of the software enables information to circulate between the various business functions of an organization (Bhattacharyya & Dan, 2014). The system supports accounting, finance, purchasing, human resources, logistics, production, and customer service among other business functions (Beheshti et al., 2014; Kumar & Malik, 2012; Zhang et al., 2013). An ERP system serves as the backbone for the information system that encompasses an entire organization, thereby allowing decision makers to see all pertinent information in a timely, trustworthy, and consistent manner (Bhattacharyya & Dan, 2014).

Enterprise resource planning systems handle the internal as well as external resources of an entire enterprise and expedite the flow of information among different activities (Zeng & Skibniewski, 2013). The Internet facilitates using ERP applications

outside of corporate perimeters and further enables the internal business processes of an organization to connect with the relevant business mechanisms of their clients, business partners, and suppliers (Beheshti et al., 2014). Accordingly, an ERP system enables the sharing of information across the units of an enterprise as well as across dispersed geographical locations (Bhattacharyya & Dan, 2014). Enterprise resource planning systems transform the disconnected condition of different programs in traditional styles of business operations to enhance the quality and potency of business plans (Xia et al., 2013). A central database is at the heart of the system for receiving and sending data to modular applications using the same type of computing platform (Bhattacharyya & Dan, 2014). Moreover, as all the data are in one relational database that all the modules use, the system abolishes inputting identical data in multiple instances (Kumar & Malik, 2012). Therefore, the system standardizes business processes as well as data definitions into a centralized setting, which facilitates entering data only once and results in consistency and visibility throughout the entire organization (Bhattacharyya & Dan, 2014; Escobar-Rodriguez & Bartual-Sopena, 2013).

System designers can configure an ERP system for promoting efficiency or effectiveness regarding the goals and objectives of an organization (Murphy et al., 2012). Therefore, ERP systems are suitable for adapting to adjustments that are both internal and external to an organization based on patterns in the global economy (Xia et al., 2013). System administrators must closely examine the configuration of the system to ensure the accuracy and legitimacy of data at all stages to accomplish evolving business requirements (Grabski, Leech, & Schmidt, 2011). System designers can also configure

the system to comply with laws and regulations peculiar to different locations (Beheshti et al., 2014). Accordingly, an ERP system imposes business processes, limits and monitors the tasks of workers, and strengthens internal controls along with audit trails (Grabski et al., 2011). Furthermore, a basic purpose of an ERP system is to facilitate coordination and collaboration between corporate employees (Pasaoglu, 2011). Enterprise resource planning systems can handle language translations as well as differences in currencies (Beheshti et al., 2014). In addition to coping with several languages and various currencies, ERP systems can meet the needs of many units and different locations (Xia et al., 2013), which promotes the flow of information across many locations, including in different countries (Beheshti et al., 2014).

Implementation of ERP Systems

Implementing ERP systems is the most extensive, complex, and challenging information systems undertaking for organizations (Grabski et al., 2011). Kumar and Malik (2012) echoed these sentiments when they investigated the critical success factors in implementing ERP systems in India and reported that they are extremely complex information systems. Bhattacharyya and Dan's (2014) examination of trends in ERP software supported this claim in their revelation that ERP implementation projects are often the largest exercise for an organization. Kumar and Malik found that ERP systems commonly serve as the main structure of numerous manufacturing and service organizations. The main structure integrates the fragmented data in an organization to provide standardized and consistent information. Blazer (2012) emphasized that leaders in an increasing number of organizations have been implementing ERP systems to take

over from obsolete systems and to integrate data. Xia et al. (2013) contended that an ERP system represents the nervous system for the organization.

Enterprise resource planning system implementation is not similar to a conventional, functionally aligned information system, and it represents a notable change from the typical detached and departmentally oriented systems of the past (Grabski et al., 2011). Beheshti et al. (2014) examined critical success factors for implementing ERP systems and found that new systems and processes that changed the culture in organizations replaced the old infrastructures. The operational structure and transaction processes connect with the implementation of the ERP system that requires the integration of operations and the reengineering of processes (Grabski et al., 2011). Kanellou and Spathis (2013) analyzed satisfaction in ERP environments and reported that ERP systems create universal changes in business processes that result in considerable changes to the use, storage, collection, and circulation of data. Furthermore, the implementation of ERP systems dismantles hierarchical structures, rebuilds the structures aligned to new business processes, and changes how employees perform their daily tasks (Beheshti et al., 2014).

The implementation of ERP systems is an arduous and expensive scheme that requires a significant amount of corporate time, effort, and resources (Beheshti et al., 2014; Kumar & Malik, 2012; Zeng & Skibniewski, 2013). Tsai et al. (2012) and Pasaoglu (2011) supported this assertion in their arguments that investments in the implementation of ERP systems are time consuming and require a substantial amount of money. Bhattacharyya and Dan (2014) highlighted that the implementation of ERP systems

includes high expenditure activities that cost organizations millions of dollars and use a substantial amount of capital budgets. Accordingly, as ERP systems demand a substantial amount of business resources, the enormous investments needed make the implementation of such systems inherently risky (Youngberg et al., 2009). The task is complex and difficult, in which a combination of many elements influences the extent of success (Grabski et al., 2011). Furthermore, the procurement is intricate, demanding, exhaustive, and involved (Bhattacharyya & Dan, 2014). Therefore, due to the extremely high costs involved, it is essential for the implementation to be successful, and the organization to begin realizing the benefits as soon as possible (Kumar & Malik, 2012).

To achieve success in the implementation of an ERP system, organizational leaders must align business processes with the best practices of the system or customize the software to meet the special requirements of the organization (Sharma, Patil, & Tandon, 2012). The general nature of ERP systems is not always suitable for the specific circumstances of an organization because the goal of the system is to handle all the processes in any business (Zeng & Skibniewski, 2013). Therefore, many organizational leaders customize the software to conform to their unique business processes, as the software is often too inflexible or restrictive (Blazer, 2012). Nevertheless, a substantial amount of customization is occasionally necessary, but leaders should avoid it except if customization is crucial for the business (Panorama Consulting Solutions, 2014). As ERP systems are modular and standardized applications, the cost of the system increases when customization is necessary (Beheshti et al., 2014). Even though customization can be integral to implementation and can define success, the procedure is time consuming,

increases expenditure, and requires skillfulness in software programming and mastery of business techniques (Sharma et al., 2012). However, Sharma et al. (2012) further emphasized that a fundamental and strategic reason to customize the software is to achieve a more user-friendly package and to increase user acceptance of ERP systems.

Benefits of ERP Systems

The primary reason for implementing ERP systems is at the request of top management to improve efficiency and reduce costs to create the potential for their organizations to remain competitive (Beheshti et al., 2014; Vinatoru & Calota, 2014). Xia et al. (2013) supported this view in their report that ERP systems improve market competitiveness and economic efficiency. Lance and Cook (2013) further added that competitive advantage or staying with the competition is the main reasons for adopting ERP systems. Furthermore, Grabski et al. (2011) found that the ultimate goal is for economic advantages such as improvement in decision-making, greater efficiencies, or cost savings. Zeng and Skibniewski (2013) highlighted that ERP systems create the possibility for organizations to decrease expenditure and cycle time substantially, as well as increase productivity and efficiency. Enterprise resource planning systems boost flexibility, enhance data collection and processing, and incorporate accounting applications with business processes (Kanellou & Spathis, 2013). Tsai et al. (2012) found that the immediate output and unification of information are powerful features that enhance business continuity, improve the generation of financial statements, and decrease earnings management.

The ability to access information that is consistent and at the right time from different functional areas of an organization is a benefit that motivates management to adopt ERP systems (Grabski et al., 2011). Bhattacharyya and Dan (2014) reiterated this point in their argument that ERP systems provide easier access to dependable and integrated information. Additionally, the generation of timely and correct information across the organization with a combined view of pertinent data improves decision-making (Beheshti et al., 2014). Some further consequences of these benefits are eliminating redundant data and rationalizing business processes, resulting in significant cost savings (Bhattacharyya & Dan, 2014). Moreover, ERP systems support transparency and organizational control due to the standardization and integration of processes across an organization (Maas et al., 2014). Organizational leaders implement the systems with best business practices to have better operational performance and productivity (Mouakket, 2012). Enterprise resource planning systems replace organizational practices with the best practices of the industry already embedded in the software (Kanellou & Spathis, 2013). Sharma et al. (2012) found that using best business practices results in transferring past successes to new projects, improves effectiveness and efficiencies, and helps to avoid failure.

The internal as well as external connectivity features of the software facilitate connections between the organization, customers, and all stakeholders, which lead to quicker accomplishment of business goals, lowering of costs, and an increase in productivity (Beheshti et al., 2014). The external communication interface of the ERP system allows customers and suppliers who have the appropriate network security

clearance to access specific categories of information (Kumar & Malik, 2012). This medium enables organizational leaders to enhance the customer relationship, improve supply chain management, and reduce inventory costs (Beheshti et al., 2014). Accordingly, using ERP systems can result in greater customer satisfaction, improvement in the performance of the supply chain, and better vendor performance (Kumar & Malik, 2012). The modules for customer relationship management record and store all interactions with the customer in a database, which increases the visibility of customers to managers and employees across the organization (Beheshti et al., 2014). This feature makes the organization more responsive to the needs of customers and reduces lead times (Kumar & Malik, 2012). As customer relationships are essential to the performance of organizations, ERP systems ultimately reduce operating costs to earn operating profit, to gain market share, and to accomplish organizational goals (Xia et al., 2013).

A major benefit of using ERP systems is an increase in opportunities to audit business financial data automatically with improvements to access transaction details directly (Grabski et al., 2011). Tsai et al. (2012) emphasized that ERP systems can improve the quality of audits, which reflects the quality of the system that supports accountants. Furthermore, Murphy et al. (2012) concluded that the systems improved the capability of audits, enhanced the visibility of operations, and augmented error control. Kanellou and Spathis (2013) supported these claims with their report that accounting benefits include improvements in the flexibility to generate information, improvements in the quality of reports, and a decrease in the time to close annual accounts. Additionally, ERP systems contribute to risk management with benefits that include tighter internal

controls, improved audit trail, and better regulatory compliance (Grabski et al., 2011). ERP systems enable both investors and investment analysts to access pertinent information to make the market more transparent, thereby reducing the instances of insider trading as well as improving corporate governance (Tsai et al., 2012). A further advantage is that ERP systems capture the requirements of the Sarbanes-Oxley as well as the Health Insurance Portability and Accountability acts (Grabski et al., 2011). Organizations can achieve many benefits from ERP systems (Mouakket, 2012).

ERP Systems in the United States

Organizational leaders have implemented ERP systems in many organizations across the world to integrate disparate and complex business processes, which has fundamentally changed the processing of business data (Grabski et al., 2011; Kanellou & Spathis, 2013; Maas et al., 2014; Teittinen et al., 2013). The systems promise smooth integration of data across organizations, with benefits such as better decision making, increases in productivity, higher profitability, and enhanced competitiveness (Ali & Younes, 2013; Xia et al., 2013; Zeng & Skibniewski, 2013). Since the 1990s, the worldwide investments in ERP systems total in the hundreds of billions of dollars (Bhattacharyya & Dan, 2014; Staehr et al., 2012). Maas et al. (2014) indicated that the leaders of approximately 75% of big institutions implemented ERP systems and the implementation rate for Fortune 500 companies was 80%. The expenditure for organizations in the United States alone was more than $165 billion in 2010 (Laudon & Laudon, 2012). Even though ERP systems have a high implementation rate, the rate of failure is more than 60% (Maas et al., 2014; Mouakket, 2012). The annual cost of failed

and troubled software averages between $60 billion and $70 billion for both corporate and government investments in the United States (Charette, 2005). This cost includes projects that overrun their budgets, projects not delivered on time, the opportunity costs of reworking or abandoning systems, and litigation costs when angry customers bring legal charges against suppliers for underperforming systems (Charette, 2005).

The implementation of many ERP systems eventually fails because the systems do not accomplish set business goals (Kumar & Malik, 2012). The failure of ERP systems has continued to plague organizations in the United States since the 1990s, as highlighted in Charette's (2005) report. One example from the report was that after spending $165 million over more than 3 years, the parent consortium for American Airlines abandoned their project in 1992. Another example was leaders in the U.S. Federal Aviation Administration who began implementing their system in 1981 and canceled it in 1994 after numerous flight cancellations due to traffic jam in the skyways. The leaders spent $2.6 billion on the system, and the total economic impact on only U.S. airlines was almost $50 billion. A third example was the FoxMeyer Drug Company that went into bankruptcy in 1996 after spending $40 million. Another example was the cancellation of a system supposed to process vehicle registrations and driver's licenses in the state of Washington in 1997 after an expenditure of $40 million. A fifth example was when Kmart launched a system in 2000 to compete with Wal-Mart and canceled it in 2001 after spending $130 million, which led to a declaration of bankruptcy. Charette also reported that ERP system problems contributed to a $151 million loss for Hershey Foods

in 1999 and a $160 million loss for Hewlett Packard in 2004. These examples were a few of the earlier ERP system challenges that Charette reported.

In a more recent study on ERP systems similar to Charette's (2005) report, Blazer (2012) reported some notable failures in the United States. One example from the report was that City Time in New York spent $760 million and ended up with a troubled payroll system in 2011 that resulted in federal prosecutors indicting the vendor. Another example was that Montclair State University spent a predetermined $20 million in 2009 to replace legacy applications and eventually sued Oracle in 2011, at which time an additional $20 million was necessary to complete the project. A third example was that Marin County in California brought legal charges against Deloitte and SAP in 2011 after spending $20 million on their ERP system. Another example was Whaley Foodservice Repairs in South Carolina that sued Epicor in 2011 stemming from an ERP system launched in 2006 at an original cost of $190,000 and had eventual expenditures of $1 million. A fifth example was a lawsuit against SAP filed by Waste Management Incorporated in 2008 for an unstable system after spending $100 million. Another example was Major Brands brought legal charges against Epicor in 2012 for a system that was not suitable after more than $1 million in extra costs. Blazer also reported that the state of Idaho faced the possibility of losing millions of dollars starting in 2010 because of issues with a Medicaid claims system implementation in 2007 that resulted from inadequate end user participation, among other factors. These examples were some of the ERP system failures that Blazer reported and further highlighted a chronic problem.

Numerous ERP system implementations have not lived up to expectations and resulted in failure to achieve the promised benefits (Kumar & Malik, 2012). In addition to many failed cases, there were a few catastrophic disasters resulting in the demise of organizations (Bhattacharyya & Dan, 2014). Many organizations are still having difficulties attaining the promised benefits of ERP systems in spite of their extensive adoption (Ha & Ahn, 2014). Furthermore, organizational leaders have not been able to identify the most substantial effects of using their ERP systems (Sternad & Bobek, 2013). Even though some organizations achieve success with their initial implementation, many do not benefit substantially from the ERP systems in their postimplementation stages (Ha & Ahn, 2014). Organizational leaders must intentionally promote technology acceptance among end users to capitalize completely on the potential of ERP systems (Youngberg et al., 2009). Accordingly, one reason why organizations have difficulties with their ERP systems is users are not accepting and using the systems appropriately (Sternad & Bobek, 2013; Zhang et al., 2013). Organizational leaders must use ERP systems effectively and extensively to achieve maximum benefits and have a successful system (Deng & Chi, 2012; Gohmann et al., 2013). Enterprise resource planning systems affect organizations and individuals widely, and numerous precarious matters are awaiting research (Grabski et al., 2011), but a crucial issue is to understand the elements that influence user acceptance of ERP systems (Al-Haderi, 2013; Pasaoglu, 2011).

User Adoption of Information Technology

Even though the leaders of many organizations worldwide have implemented ERP systems, the results have been quite different, and the varying outcomes regarding

the use of such systems are still not sufficiently understood (Staehr et al., 2012). User acceptance is the most prominent aspect in the eventual success of ERP systems (Hurbean & Negovan, 2013). Understanding the determinants of positive or negative behavior toward information technology is critical because a lack of acceptance may decrease the overall performance of organizations (Al-Jabri & Roztocki, 2015). User acceptance of ERP systems is lacking and researchers have described factors that contribute to the behavior of individuals toward ERP system usage and acceptance (Hou, 2014; Hwang, 2011; Kwak et al., 2012).

Based on the disappointing results from end users failing to use ERP systems properly, Chang and Chou (2011) analyzed the drivers and effects of ERP postimplementation learning from a sample of 812 users at companies in Taiwan and used a cross-sectional survey approach with structural equation modeling to perform the analysis. Chang and Chou found that posttraining self-efficacy was an essential antecedent to postimplementation learning and an influence to ERP usage as well as to the impact of ERP systems. The findings also suggested that users who have high self-efficacy generally have more motivation to use ERP systems and display remarkable productivity at work. The single source of self-reported data may have contributed to common method bias in this study. Furthermore, a longitudinal design could have been more effective, as learning consists of continuous interactions between users.

In an attempt to understand the cultural dimensions and ERP adoption beliefs of end users, Hwang (2011) investigated the influence of cultural orientation and innovativeness on ERP system adoption using general computer self-efficacy as one of

the key constructs. The sample consisted of 101 users from a user group in the international community who participated in a survey, and the researchers used the partial least squares method to analyze the data. Hwang concluded that computer self-efficacy as well as innovativeness influenced ease of use. Additionally, the findings demonstrated that collectivism influences usefulness. Perceptions of ERP system usefulness and ease of use are powerful antecedents to ERP system adoption (Hwang, 2011). The weakness of this approach is that the end users were information technology experts who came across the survey in the user group on the Internet. Therefore, self-selection may have biased the outcome.

Al-Jabri and Roztocki (2015) examined the effects of perceived information transparency due to the adoption of ERP systems using a sample of 106 ERP system users in Saudi Arabia. Apprehension urged the authors to conduct the study due to their belief that it was unfortunate not to have a complete understanding about why users accept or reject information technology. Al-Jabri and Roztocki employed convenience sampling to administer the online survey and performed the partial least square technique for data analysis. Al-Jabri and Roztocki determined that perceived information transparency significantly influenced the perceived usefulness and ease of use of ERP systems. The findings also indicated that perceived usefulness and perceived ease of use significantly relate to ERP system adoption. A weakness of this approach was that the convenience sampling method, which eventually evolved into snowball sampling during the study, produced results that were not generalizable. Researchers are unable to

generalize from survey data with an identified degree of accuracy when they employ nonprobability sampling (Rea & Parker, 2014).

Hou (2014) examined the determinants of user acceptance of business intelligence systems in Taiwan and sought to identify the factors that affect behavioral intention to use and the actual usage of business intelligence systems. A sample of 330 users from Taiwanese electronics manufacturers participated in a mail survey, and data analysis involved structural equation modeling. The findings indicated that perceived behavioral control and behavioral intention were significant determinants of actual system usage. Furthermore, Hou concluded that perceived usefulness and perceived ease of use significantly determined attitude toward systems use while perceived usefulness was a significant predictor of behavioral intention to use business intelligence systems. The major weakness of the study arose from the circumstance that only users from one industry participated in the study, which may prevent generalizations to other industries.

In an effort to understand why results vary after organizational leaders implement ERP systems, Staehr et al. (2012) offered a framework for realizing business benefits from the use of ERP systems in Australia using a case study design. Staehr et al. conducted an in-depth investigation of four manufacturing companies in their natural setting during the postimplementation stage of the ERP systems and identified nine themes in the analysis of the cases for explaining the realization of business benefits during the postimplementation stage. Among the nine themes, Staehr et al. highlighted efficient and effective use as business benefit drivers. As a result, Staehr et al. concluded that users needed to use ERP systems more efficiently and more effectively to achieve the

business benefits and to prevent a decrease in productivity. The comprehensive account involving reports from multiple perspectives provided a detailed explanation about achieving the benefits of ERP systems and demonstrated a strength of the qualitative approach.

Using a similar approach, Teittinen et al. (2013) sought to explore the benefits and difficulties for management control during the use of ERP systems in Finland. Teittinen et al. performed a holistic examination of one manufacturing company during the postimplementation stage of an ERP system. The researchers administered semistructured interviews in a case study approach with participants from three different levels of the organization. The results revealed a significant finding that the ERP system did not satisfy the expectations of top management. Teittinen et al. determined that inadequate use of the ERP system hindered the benefits that the organization had expected to achieve from using the ERP system. Even though the researchers cannot robustly generalize this result, the qualitative approach is fundamental for understanding complex processes in organizations.

Despite considerable investments in ERP systems, according to Maas et al. (2014), researchers have demonstrated the underutilization of ERP systems in organizations. Maas et al. examined the effect of control and empowerment in organizations on the usage of ERP systems in the Netherlands. A sample of 260 ERP system users from a public sector organization responded to the questionnaire, and data analysis involved using multiple regression analysis. The findings showed a positive relationship between empowerment and infusion, a curvilinear impact of control on

infusion, and a significant relationship between infusion and the success of ERP systems. As a result, Maas et al. concluded that organizations are more likely to achieve the promised benefits of ERP systems when end users utilize the systems to the maximum extent. As the study took place in a public organization, the results may not be generalizable to corporate institutions.

In an analysis of ERP systems usage, Pasaoglu (2011) sought to identify the factors that affect user acceptance of ERP systems in Turkey. Pasaoglu highlighted that the complexity of ERP systems has a negative influence on user acceptance of ERP systems for which the success or failure depends on the behavior of end users. Data collection involved using questionnaires, and the data analysis involved using logistic regression analysis. From the results of the regression, Pasaoglu noted that perceived ease of use significantly influenced user acceptance of ERP systems. Furthermore, the results of the study indicated that ERP systems are social systems that require team collaboration and information sharing. A weakness of this approach is that it does not give insight into the personal experiences of end users.

In a similar analysis of ERP systems usage, Sun and Bhattacherjee (2011) sought to determine the variables that influence the usage of ERP systems in China. Sun and Bhattacherjee acknowledged that the benefits of ERP systems cannot exist in organizations unless the employees use the system enough and correctly to perform their assigned duties. The participants consisted of 128 end users and 26 managers who completed survey questionnaires in 26 firms across eight provinces. Data analysis involved using structural equation modeling with a multilevel technique. The study

demonstrated that user training influences the usage of ERP systems by framing pertinent user perceptions that determine the extent of ERP system usage. Consequently, Sun and Bhattacherjee concluded that user training positively affected perceived usefulness and perceived ease of use, which are determinants of user acceptance of ERP systems. The findings of this cross-sectional approach were vulnerable to common method bias, which highlighted a possible weakness in the study.

While attempting to understand user acceptance of ERP systems from the perspectives of end users, Kwak et al. (2012) conducted a study to address user acceptance of ERP systems during the implementation stage in project-based sectors. Kwak et al. recognized the findings of prior research, which demonstrated that even when the implementation of an ERP system occurs as planned, it is not acceptable if the employees who are the end users perceive the ERP system as useless or difficult to use in the performance of their daily tasks. A sample of 254 end users from the international community participated in the study. Kwak et al. suggested that the main findings further demonstrated the validity of the TAM under complex circumstances. The results of the regression analysis, according to Kwak et al., indicated that the perceived usefulness and perceived ease of use constructs in their model were significant and had comparable explanatory power as those achieved in the original TAM. Kwak et al. used e-mail to distribute the questionnaires and they had a low response rate, which could have made the results susceptible to nonresponse bias and may have been a weakness for the study.

Due to the realization that end users were not using ERP systems efficiently, Zhang et al. (2013) sought to understand the factors that influence the usage of ERP

systems in China. A sample of 127 ERP system users in Chinese firms participated in an online survey. The study employed multiple regression analysis to identify the most significant variables. The findings indicated that both perceived usefulness and perceived ease of use are significant and positive factors regarding the use of ERP systems. Additionally, the results showed that perceived ease of use had a significantly positive influence on the perceived usefulness of ERP systems and that perceived usefulness is a somewhat stronger factor than perceived ease of use in user acceptance of ERP systems. Based on the results of the analysis, Zhang et al. concluded that end users were likely to assess ERP systems as less valuable if the users had difficulties using the systems. As the study only involved surveying users of one brand of ERP system, the results may not be generalizable to other organizations with different types of ERP systems.

Sternad and Bobek (2013) noted that because users are not accepting and using ERP systems correctly, it is partly the justification why organizational leaders are unable to identify the main benefits of using ERP systems. In an examination of the factors that influence the actual use of ERP systems, Sternad and Bobek sought to identify the external factors that affect the acceptance of ERP systems in Slovenia. A sample of 293 users from 44 organizations representing different industries participated in the survey. The results from the partial least squares analysis indicated that both perceived ease of use and perceived usefulness of ERP systems had positive effects toward using the system. Furthermore, perceived ease of use had a positive effect on the perceived usefulness of ERP systems. These findings supported the original relationships in the TAM. As a result, Sternad and Bobek acknowledged that user acceptance of ERP

systems are fundamental for organizational leaders to achieve success in their use of the systems. Based on the approach of this study, the findings may not be generalizable to other countries.

In an effort to understand, why ERP systems have a high failure rate and ERP systems remain underused in many organizations, Mouakket (2012) investigated the use of ERP systems in the United Arab Emirates. A convenience sample of 344 users responded to the paper-based survey, and the data analysis involved structural equation modeling. The results demonstrated that perceived ease of use positively affected both perceived usefulness and the actual use of ERP systems. However, perceived usefulness did not have a significant influence on the actual use of ERP systems, which contradicts this relationship in the original TAM as well as the findings of several researchers in this review of the literature. The results of the analysis led Mouakket to surmise that management might have made the employees use the ERP systems, regardless of how the employees perceived the usefulness of the systems, which resulted in the contradictory outcome. Researchers may not be able to generalize the results of this study due to the use of the convenience sampling technique.

In an attempt to evaluate the usefulness, efficiency, and effectiveness of ERP systems in organizations, Ali and Younes (2013) examined the effect of ERP systems on the performance of users in Tunisia. A sample of 269 users in Tunisian companies participated in a survey. Ali and Younes determined that perceived usefulness and perceived ease of use of ERP systems contributed to user performance. The results also showed that the greater the perceived ease of use of the ERP systems, the more positive

the impact on user performance. Based on the results of the analysis, Ali and Younes concluded that the impact of using ERP systems hinges on the extent of user acceptance for the systems. Furthermore, the results supported the findings of previous studies in which researchers demonstrated that a higher level of user performance occurs when ERP systems are easier to use and are more useful (Ali & Younes, 2013). Due to the snapshot nature of this study, the approach may inhibit the prediction of changes over time.

Perceived Usefulness of Information Technology

Perceived usefulness was one of the two key independent variables in this study. Davis (1989) defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 320). This concept of perceived usefulness originated from the TRA and the TPB, in which attitude toward behavior correlates with perceived usefulness (Venkatesh et al., 2003). Employees compare the capabilities of a system with the tasks that they need to perform, which results in judgments about the perceived usefulness of the system (Davis & Venkatesh, 2004). The perceived usefulness concept is similar to the outcome beliefs in the self-efficacy framework (Davis, 1989; Khayati & Zouaou, 2013). Self-efficacy is the perception of an individual regarding how well the individual can perform the courses of action required to accomplish a specific task (Bandura, 1977). In the case of perceived usefulness, the beliefs of the anticipated outcome of a behavior influence the behavior.

The perceived usefulness of information technology is similar to the relative advantage concepts in Tornatzky and Klein's (1982) meta-analysis of the theory of diffusion of innovations (Khayati & Zouaou, 2013). According to Weigel, Hazen,

Cegielski, and Hall (2014), the adoption of a technology or innovation hinges on the extent to which users perceive it as having a relative advantage or being useful. In a case study on the use of interactive whiteboards, Mustafa and Al-Mothana (2013) indicated that participants highlighted the relative advantages of the whiteboards and emphasized how they were useful in saving time and effort. Furthermore, Davis and Venkatesh (2004) contended that users evaluate cause and effect possibilities in which they relate actions to results and form perceptions of usefulness. For example, employees exhibit more willingness to use ERP systems when the systems support their routine tasks and decrease rework (Moalagh & Ravasan, 2013). The foundational information systems theories present the notion of perceived usefulness as an increase in performance that employees think they can achieve while using a technology (Khayati & Zouaou, 2013).

In their study, Haijiao, Liming, and Zhong (2015) investigated the usage of mobile digital textbooks at elementary schools in China. The results of the study demonstrated that perceived usefulness significantly related to usage. According to Haijiao et al., the results indicated that the participants believe the use of digital textbooks would help them to achieve better educational performance. Ong, Muniandy, Ong, Tang, and Phua (2013) examined user acceptance of performance management systems in Malaysia at a higher education institution. The findings of Ong et al. showed that perceived usefulness scored higher than all the other variables in the study. As a result, Ong et al. concluded that the users accepted the systems largely in terms of the usefulness of the systems for completing their tasks. Additionally, Hung and Wu (2012) conducted a study to understand factors affecting user acceptance of Web-based decision support

systems in Taiwan. The results of the study led Hung and Wu to conclude that perceived usefulness is a crucial factor in user acceptance of information technology.

Despite the potential increase in productivity that information systems can contribute to organizations, according to Gohmann et al. (2013), the users of the systems play a central role in the failures and low acceptance levels. Gohmann et al. examined the link between information requirements determination and user acceptance of the information systems. The outcome demonstrated incomplete fulfillment of requirements and resulted in Gohmann et al. concluding that deficiencies, or a lack of usefulness of information systems, lead to lower levels of user acceptance. Additionally, Davis and Venkatesh (2004) emphasized that perceived usefulness reflects an evaluation of the outcome in a use and performance possibility condition. In an effort to understand postadoptive behaviors in the use of information systems, Deng and Chi (2012) conducted a study and found that frustrated employees use workarounds when they perceive a system is not useful, which results in undesirable outcomes. Moreover, Yucel and Gulbahar (2013) reviewed the predictors of technology acceptance and found that perceived usefulness was the most effective and most meaningful of all the variables currently in use. Therefore, it is evident that perceived usefulness is a significant factor in user acceptance of information technology.

Perceived Ease of Use of Information Technology

Perceived ease of use is the other key independent variable in this study. Davis (1989) defined perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort" (p. 320). In this case, perceived ease of use is

comparable to self-efficacy (Davis, 1989; Jashapara & Tai, 2011). Furthermore, computer self-efficacy refers to the opinion of individuals in their ability to perform tasks competently using a computer (Compeau & Higgins, 1995). Therefore, a theoretical relationship exists between perceived ease of use and computer self-efficacy (Jashapara & Tai, 2011). Davis and Venkatesh (2004) noted that self-efficacy theory is the basis for the perceived ease of use construct in terms of how individuals consider the difficulty or easiness of performing a task. In an attempt to understand the perceptions of ease of use, Jashapara and Tai (2011) conducted a study in which the findings suggested that self-efficacy is an influential factor for perceptions of ease of use.

The perceived ease of use of information technology is the opposite of the complexity concepts in Tornatzky and Klein's (1982) meta-analysis of the theory of diffusion of innovations (Al-Jabri & Sohail, 2012). Tornatzky and Klein (1982) found that the rate of adoption is lower when the technology is more complex. Weigel et al. (2014) conducted a meta-analysis of diffusion of innovations and TPB, which demonstrated that the adoption of a technology has a negative association with its complexity (perceived difficulty of use). Additionally, in a study on the innovation characteristics that influence the adoption of e-government services by veterans, Lawson-Body, Illia, Willoughby, and Lee (2014) found that it was more likely for veterans to adopt e-government services when the perceived complexity of use was lower. In support of the complexity and ease of use concepts, Davis and Venkatesh (2004) emphasized that ease of use perceptions reflect the degree of difficulty or easiness connected to using technology.

Terzis, Moridis, Economides, and Mendez (2013) examined user acceptance of computer-based assessment systems such as the Graduate Record Examination and the Graduate Management Admission Test in Greece and Mexico. The results of the study indicated that computer self-efficacy positively influenced ease of use, which significantly related to user acceptance of computer-based assessment systems. As a result, Terzis et al. suggested that the students who were competent in using computers probably found it easier to use computer-based assessment systems. Additionally, in an effort to understand the factors that influence user acceptance of e-government services in Jordan, Althunibat, Alrawashdeh, and Muhairat (2014) conducted a survey study and concluded that it is more likely for citizens to accept e-government when the perceived ease of use is greater. Furthermore, Hussain Chandio, Irani, Abbasi, and Nizamani (2013) investigated user acceptance of online banking information systems in Pakistan. The findings showed that perceived ease of use is a key determinant of user acceptance. Consequently, Hussain Chandio et al. suggested that systems should be easily accessible and user-friendly with simple language to boost perceived ease of use.

Despite the investment of billions of dollars in information systems at U.S. Government customs, according to Tunnell (2014), the systems have significant usability problems. In an attempt to understand the perceptions of military users that predict adoption, Tunnell conducted a survey study and found that perceived ease of use is one of the strongest predictors for the extent of technology adoption. Additionally, Schmidt, Pfleging, Alt, Shirazi, and Fitzpatrick (2012) emphasized that ease of use is the key for interacting with computers in the 21st century. Schmidt et al. further added that people

want interfaces easy to use, have simple technology, and lead to positive experiences for them to use technology. In their study, Al-Jabri and Roztocki (2015) concluded that perceived ease of use influences perceived usefulness in a positive way. This conclusion supported the assertions of Schmidt et al. that individuals expect to use technology without being preoccupied with technical details or without uneasiness with the technology. Moreover, Ali and Younes (2013) highlighted an interdependent relationship between perceived ease of use and perceived usefulness while Hameed, Counsell, and Swift (2012) concluded that these two variables are key determinants of user acceptance of information technology.

User Acceptance of Information Technology

User acceptance was the key dependent variable in this study. Davis (1989) concluded that perceived ease of use and perceived usefulness are the main factors for determining computer usage, which was synonymous with user acceptance in this study. The TAM and other acceptance models use system use as the measure for technology acceptance resulting in acceptance and usage being equivalent terms (Davis, 1989; Mathieson, 1991; Taylor & Todd, 1995; Venkatesh et al., 2003). Yucel and Gulbahar (2013) defined user acceptance as "the observable willingness to make use of information technology while working on the tasks to be accomplished" (p. 93). Furthermore, Althunibat et al. (2014) described user acceptance as the result of user behavior based on a given technology in a particular setting. Guimaraes, Armstrong, de Oliveira Neto, Riccio, and Madeira (2014) highlighted that the behavior of end users is influential to

success because negative behavior is likely to make end users feel miserable about the system and do not use the system resulting in a total waste of the investment.

User acceptance is the most prominent factor in the eventual success of the implementation of ERP systems (Chou, Lin, Lu, Chang, & Chou, 2014; Hurbean & Negovan, 2013). In their study, Sternad and Bobek (2013) noted the disinclination and unwillingness of users to use the system is a prevalent reason why ERP systems fail. Ruivo et al. (2013) supported this claim in their argument that a significant reason why ERP systems fail is the aversion or reluctance of end users to accept the systems. Additionally, Beeler and Saint-Leger (2014) found that end users' resistance to using an ERP system was a fundamental cause of failure. Sternad et al. (2011) noted that organizations achieve benefits from ERP systems only to the degree that users accept and use the systems considerably. Kanellou and Spathis (2013) indicated that a much better understanding of user acceptance is necessary for organizational leaders to ensure the effective use of ERP systems. Moreover, the goal of managers is to achieve acceptance of users through user involvement, which is a primary critical success factor that leads to the acceptance of ERP systems (Hurbean & Negovan, 2013; Kumar & Malik, 2012; Ruivo et al., 2013).

In a study on user acceptance of information technology, Venkatesh et al. (2003) emphasized that employees have to accept and use technology for technology to increase productivity in organizations. Likewise, Ali and Younes (2013) found that the outcome of using ERP systems is contingent on the extent of user acceptance, which exemplifies this outcome when limited use of ERP systems hinders the expected benefits (Teittinen et al.,

2013). Studies have shown the underuse of ERP systems (Chang, Chou, Yin, & Lin, 2011; Maas et al., 2014). Even though organizations invest large sums of money in ERP systems, according to Mouakket (2012), much of the systems are underused. Chou et al. (2014) supported this assertion in their argument that many organizational leaders have been disappointed in their inability to achieve expected business goals for which the fundamental reason is the underutilization of ERP systems. Furthermore, Ononiwu (2013) found in his study that while organizations have registered success in the implementation of their ERP systems, they are unable to achieve strategic business value due to ineffective system use by the employees.

Despite the potential for information technology to reduce costs in organizations, according to Gohmann et al. (2013), the potential benefits are only achievable if users accept and use the technology. Deng and Chi (2012) further strengthened this assertion with their claim that the use of information systems must be productive and extensive to achieve the utmost benefits from the systems. In the case of ERP systems, Grabski et al. (2011) found that these systems affect the behavior of employees, which determines the acceptance or nonacceptance of systems due to resistance from users and workarounds. A lack of user acceptance can lead to users developing makeshift workarounds, thereby bypassing the ERP system and ultimately leading to adverse effects (Beheshti et al., 2014). In an effort to understand user acceptance of information technology in Yemen's public sector, Al-Haderi (2013) conducted a study in which the results led to a suggestion that it is essential to understand user acceptance. Al-Haderi further noted that users needed to perceive the system as useful as well as easy to use to inspire themselves to

accept the system and prevent a waste of time, effort, and resources. Accordingly, Yucel and Gulbahar (2013) emphasized that examining the factors that influence user acceptance of information technology is a significant event.

Gap in the Literature

After examining previous research on the factors that influence user acceptance of ERP systems, Sternad et al. (2011) emphasized the need to investigate user acceptance of ERP systems to understand the influential factors better to facilitate the successful use of the systems. Grabski et al. (2011) noted that the implementation of ERP systems affects organizations as well as individual users considerably, and an abundance of problematic matters in need of research exists. Additionally, empirical examinations conducted around the world have indicated a lack of user acceptance of ERP systems (Al-Jabri & Roztocki, 2015; Chang & Chou, 2011; Hou, 2014; Kwak et al., 2012; Shih, 2006; Sternad & Bobek, 2013; Zhang et al., 2013).

The ERP system life cycle typically consists of the selection, implementation, and postimplementation stages, for which the postimplementation stage consists of the stabilization and routine stages (Hurbean & Negovan, 2013; Sternad & Bobek, 2012). An ERP system life cycle can stretch over years as well as decades (Jian, Nicolaou, & Bhattacharya, 2013). According to Sternad et al. (2011), the focus of most of the studies concerning user acceptance of ERP systems is on the selection and implementation stages, while studies on the postimplementation stage remain scarce. Additionally, in a review of ERP systems research, Grabski et al. (2011) indicated that the focus of the bulk of ERP systems research is on the success factors as well as the selection and

implementation stages, but rarely on the postimplementation stage. Wickramasinghe and Karunasekara (2012) supported this assertion with their argument that empirical studies rarely address the postimplementation impact of ERP systems from the perspective of end users. Grabski et al. further suggested that this revelation illustrates a significant research gap because a tremendous need exists for continued improvement and evaluation while the use of ERP systems evolves over time. Furthermore, Ha and Ahn (2014) noted that it is particularly difficult to locate studies explaining favorable usage of ERP systems during the postimplementation stage.

Reviewing prior research on user acceptance of ERP systems, Youngberg et al. (2009) noted the need for studies about the variables that affect success or failure, as more than 50% of the systems failed, scholarly research in this area is lacking, and the technology has strong interests among various stakeholders. In a study on postimplementation practices, Galy and Sauceda (2014) highlighted that there should be concerns about the success of ERP systems in organizations, not only up to the implementation stage, but also during postimplementation. In spite of the significance regarding maximum usage for success in adopting ERP systems, according to Chou et al. (2014), very few studies exist on usage in the postimplementation stage. Murphy et al. (2012) further reiterated that a poor understanding exists about the long-term impacts of ERP systems in relation to how employees assimilate the systems into their activities. Moreover, despite huge investments in ERP system software, according to Galy and Sauceda, further research is necessary to figure out the factors that influence success and failure at the highest rates.

Researchers do not need to be too concerned about the problems in the implementation stage of ERP systems, but the focus needs to be about the total benefits and continued effective usage of the systems (Grabski et al., 2011). Analyzing previous research on ERP systems, Teittinen et al. (2013) indicated that most of the findings are from the views of top management, who are normally positive because they strategized the concept of ERP system usage and were unlikely inclined to blame their own decisions. Grabski et al. supported this assertion with their argument that most of the studies on ERP systems are from the perspectives of top management or consultants, and insights from individual users are frequently missing. Additionally, even though system use problems are important, according to Deng and Chi (2012), researchers have not studied user problems and especially the ongoing development of different user problems enough. Oja and Lucas (2011) added that it is important to understand the particular usability problems experienced by ERP system users, but research on this issue has been inadequate. To emphasize all the aforementioned gaps regarding user acceptance of ERP systems further, Zhang et al. (2013) highlighted that TAM scholars have largely neglected the usage of complex systems in organizations.

The focus of some of the prior studies was on the selection stage, while the focus of others was on the implementation stage, but the focus of this study was on the routine use of ERP systems. Furthermore, many studies were from the viewpoint of top management or consultants, but this study was solely from the perceptions of the end users of ERP systems. The most vital determinants for the successful operation of information systems are acceptance of the systems and the satisfaction of users (Chao et

al., 2012). Although several researchers such as Al-Jabri and Roztocki (2015), Hou (2014), Sternad and Bobek (2013), and Zhang et al. (2013) have conducted studies in various countries around the world, scholarly empirical literature on the routine use and acceptance of ERP systems in the United States is sparse. This lack of scholarly studies indicated the need for empirical research to examine user acceptance of ERP systems in the United States. In an attempt to fill the gap in the literature, the target of this study was the postimplementation stage and specifically the routine use of ERP systems in the United States from the perspectives of end users.

Summary and Conclusions

Enterprise resource planning systems are enormous, intricate software packages that support an integrated real-time setting among different business functions in an entire organization (Staehr et al., 2012). Using ERP systems has the potential to improve efficiency, reduce costs, and enhance the competitiveness of organizations (Beheshti et al., 2014). However, organizations achieve benefits from ERP systems only to the extent that users accept and use the systems often and extensively, especially in the routine stage (Sternad et al., 2011). A review of the literature demonstrated that despite the potential benefits that are achievable from the use of ERP systems, many ERP systems are often underused (Mouakket, 2012), which prevents the systems from yielding the expected benefits to the organizations (Murphy et al., 2012). In spite of the various studies about user acceptance of ERP systems conducted throughout the world, no researchers have conducted a scholarly study on the factors influencing user acceptance of ERP systems in

the United States. Therefore, this study fills this gap in the literature and may add to the understanding of the perceptions that affect the use of ERP systems.

Even though researchers have used other theories to explain the acceptance and use of information systems, TAM is the most parsimonious and robust in comparison to the other theories (Liu & Ma, 2006; Venkatesh & Davis, 2000). The original TAM (Davis, 1989) was the main theoretical foundation for this study. A review of the literature showed that user acceptance of information technology, including ERP systems, closely relates to the extent of the perceived usefulness and perceived ease of use from the point of view of the users. An aim of this study was to assist in evaluating the strength of the relationships between user acceptance of ERP systems in the United States and the variables of the original TAM consisting of perceived usefulness and perceived ease of use. The main variables of the original TAM have remained the most effective TAM constructs (Yucel & Gulbahar, 2013).

Having outlined the theoretical foundation and an overview of the study in which a gap emerged in the literature, Chapter 3 includes an outline of the study with details about a methodological approach that is consistent with techniques appropriate for addressing the gap. Chapter 3 includes a discussion about research design, sampling procedures, data collection, and instrumentation. Chapter 3 also includes the data analysis plan, threats to validity, ethical procedures, and a summary.

Chapter 3: Research Method

Introduction

The purpose of this quantitative cross-sectional survey study was to test the TAM (Davis, 1989) that relates the factors that influence user acceptance of information technology (independent variables) to user acceptance of information technology (dependent variable) for employees who have been using ERP systems to perform their jobs in organizations throughout the United States. The bases for quantitative research are the interrelationships of cause and effect (positivist paradigm) consisting of philosophical assumptions regarding the nature of reality (ontology), what we know (epistemology), and the practices of how we can know (methodology; Arghode, 2012; Raadschelders, 2011). Researchers conduct cross-sectional studies to observe natural reality without direct interference to model and determine the relationships between two or more variables measured at one point in time (Field, 2013; Hoe & Hoare, 2012).

The research methodology is the focus of this chapter; it includes discussions about the research design and rationale, including a Likert-type scale survey instrument to address the research questions and associated hypotheses. The discussions proceed with the methodology, which includes a description of the population of interest along with sampling and sampling procedures. The methodology continues with procedures for recruitment, participation, and data collection, as well as instrumentation and operationalization of constructs. This section also includes the data analysis plan, threats to validity, and ethical procedures.

Research Design and Rationale

Understanding the factors that affect user acceptance and usage of ERP systems is critical for organizations to realize the full benefits expected from implementation of expensive and complex systems. According to Maas et al. (2014), employees underuse ERP systems. Organizational leaders might find the results from this study helpful to improve the use of their ERP systems and achieve maximum benefits. In examining user acceptance of ERP systems, perceived ease of use and perceived usefulness of ERP system end users were the independent variables; user acceptance of ERP systems was the dependent variable. The fact that this study was an empirical examination with measured variables, an existing survey instrument, and a proven corresponding theoretical foundation solidified the rationale for choosing the quantitative design. Quantitative researchers examine the relationship between measured variables to test theories by using statistical procedures to analyze numerical data (Leedy & Ormrod, 2015).

The survey approach is suitable for examining a sample of a population and results in a quantitative or numeric description of the measured attributes of the population (Rea & Parker, 2014). The cross-sectional survey design was suitable for testing the research hypotheses and answering the research questions in this study. The cross-sectional approach was appropriate for this study because it involved examining the relationships between independent and dependent variables based on measurements obtained from a survey instrument at one point in time in order to pinpoint traits of a target group from a typical cross section of the target group. Survey research involves

precisely defined independent and dependent variables and a particular model of the anticipated relationships examined against observations of the occurrence (Rea & Parker, 2014; Roberts, 2012), which were characteristics of this study. Previous research with similar questions seeking to understand the acceptance of technology included all or some of the variables used by this study with a survey method and comparable Likert-type scales (Davis, 1989; Fillion, Braham, & Ekionea, 2012; Kwak et al., 2012; Pasaoglu, 2011; Sternad & Bobek, 2013; Zhang et al., 2013).

Survey research involves testing theory to examine the relationships between variables from theoretically grounded expectations of how and why relationships should exist among the variables (Rea & Parker, 2014; Roberts, 2012). This attribute illustrates a direct connection of the survey design to the research questions in this study, which was examining relationships among variables. Additionally, the data for the variables consisting of perceptions and system usage within the population are not collectible through observational techniques because the phenomena are not directly observable by the researcher. Through the surveys, the respondents self-reported their perceptions of the usefulness and ease of use, as well as the usage, of the ERP systems using Likert-type scales for data collection in an efficient manner, even from geographically dispersed participants. The survey design is cost effective and has a very fast turnaround in data collection (Rea & Parker, 2014). It requires standardized information about participants using structured and predefined questions in a questionnaire that takes participants approximately 15 minutes to complete. Researchers have agreed that survey research provides benefits in time and resources such as its uniqueness to facilitate generalizations

about a whole population using data collected from only a portion of the population (Aaron, 2012; Erişen, Erişen, & Ozkeçeci-Taner, 2013; Rea & Parker, 2014; Roberts, 2012). Further benefits include the standardization of survey instruments that other researchers can use in related studies and thus lower costs (compared to interviews).

The cross-sectional design is prevalent in the social sciences and frequently identified with survey research to examine the relationship between variables without definitively concluding causality (Frankfort-Nachmias et al., 2014). This classification demonstrates that the cross-sectional design is in accordance with research designs that researchers are using to progress in developing knowledge in the social sciences. Additionally, quantitative research is entrenched in the positivist paradigm in which knowledge consists of logically connected general laws and assumes causal determinants for phenomena, then seeks to find the effects of those determinants (Arghode, 2012), thereby advancing knowledge in the discipline. Furthermore, objectivist epistemology informs quantitative research and therefore pursues the development of broad laws in social behaviors using statistical measurements of reality (Yilmaz, 2013). Moreover, fundamental to the positivist paradigm are the interrelationships of cause and effect as well as the assumption that a solution exists for every problem (Arghode, 2012; Goduka, 2012). Accordingly, the design of this research was consistent with the methods needed for knowledge to advance in the social sciences. Due to the potential for advancing knowledge in the discipline along with financial and time constraints, I chose to use this quantitative approach with the original validated survey instrument of the TAM (Davis, 1989) administered online to conduct this study.

Methodology

Methodology is a system of specific principles and processes for doing research and assessing claims of knowledge (Frankfort-Nachmias et al., 2014; Wahyuni, 2012). Methodology provides the base for conducting research studies, as well as the rules and procedures for sampling, data collection, analysis, logical inference, and generalization (Frankfort-Nachmias et al., 2014). Methodology facilitates communication between researchers who have common interests by using explicit rules as well as sufficient depth to establish a structure for other researchers to replicate and provide constructive criticism (Frankfort-Nachmias et al., 2014).

Population

The focus of the study was examining the factors that influence end user acceptance of ERP systems among employees in the United States. Therefore, the target population was end users who had been using ERP systems to perform their jobs in organizations within the United States. The estimated size of the target population was 90 million end users based on Bureau of Labor Statistics data in 2005 and projections for 2012 (Scaffidi, Shaw, & Myers, 2005). The target population included ERP system end users in the United States with different income levels, education levels, age groups, ethnic backgrounds, and industries.

Sample and Sampling Procedures

Random sampling would have been the most appropriate sampling strategy to conduct this study to ensure each ERP system end user in the United States had equal possibility to participate, which would have had a strong potential to obtain a sample

wherein representation of the target population was adequate. However, I used purposive sampling to select the participants based on the subjective judgments of those who met the criteria for this study (Kandola, Banner, O'Keefe-McCarthy, & Jassal, 2014; Rea & Parker, 2014). The inherent bias of purposive sampling contributes to its efficiency, especially with limited time and resources (Tongco, 2007). Furthermore, sometimes random sampling is not feasible, random samples can become invalid for statistical analysis due to missing data, and randomly selected sample units can unexpectedly become unavailable for administering the survey (Tongco, 2007). Researchers select participants through purposive sampling because they fit specific criteria (Rea & Parker, 2014), and purposive sampling is a reasonable strategy that can be more efficient and more cost effective than random sampling when properly used (Tongco, 2007). Even though purposive sampling and snowball sampling are both forms of nonprobability sampling, the study did not involve snowball sampling.

The purposive sample came from members of the SurveyMonkey American audience who had used ERP systems on the job as end users in the United States. The SurveyMonkey audience consists of members from the United Kingdom, the United States, and Australia (SurveyMonkey, 2015a). Researchers can access a targeted audience who are members of SurveyMonkey Contribute in which participants participate in surveys for charity every month. The population of members for SurveyMonkey in the United States is approximately 5 million American residents who are doing surveys for charities such as American Red Cross, American Diabetes Association, and Teach for America. The default charity of the SurveyMonkey members

automatically receives a donation after each member completes a survey (SurveyMonkey, 2015c). Prospective respondents create a profile with questions about their demographics, employment status, industry, job function, business software usage, Internet usage, mobile phone usage, household income, and several other targeting criteria to become a member of the SurveyMonkey audience. The staff at SurveyMonkey can invite members to participate in targeted surveys based on the attributes that the members provide in their profiles.

This study consisted of participants who fit the specific targeting criteria of workers who had used ERP systems to perform their jobs at organizations in the United States for which the staff at SurveyMonkey was "purposefully focusing on a particular subset of the population" (SurveyMonkey, 2015b). I used the targeted audience service (see Appendix D) at SurveyMonkey in which the staff at SurveyMonkey prescreened members whose profile indicated that they were using business software and resided in the United States. The prescreened members identified as using ERP software packages such as SAP, Oracle, and Microsoft Dynamics received an invitation to self-administer the TAM survey instrument via the private Web survey. The possibility that the researcher selects a sampling unit in the purposive sample mainly depends on the subjective judgment of the researcher (Frankfort-Nachmias et al., 2014; Rea & Parker, 2014). The staff at SurveyMonkey selected members of their audience on my behalf based on the targeting criteria, which excluded information technology professionals.

The population of interest consisted of an estimated 90 million end users at organizations in the United States (Scaffidi et al., 2005). However, the sampling frame

for this study only consisted of ERP system end users at organizations in the United States who were members of the SurveyMonkey audience. An ideal sampling frame consists of all sampling units, but such information is seldom available in practice, especially in a nationwide study (Frankfort-Nachmias et al., 2014). The expected participants were employees in various industries across the United States performing a variety of job functions as ERP system end users who contribute to accomplishing the goals of their organizations. I used the G*Power Version 3.1.9.2 statistical power analysis program (Buchner, Erdfelder, Faul, & Lang, 2014) to calculate the sample size. Given a medium effect size of 0.15 (Cohen's f^2: Cohen, 1992), alpha of .05, a desired power of .80, and two predictors, the appropriate sample size was a minimum of 68 end users of ERP systems at jobs in the United States. The goal was to attain a balance with effect size, alpha level, power, and sample size to enable sufficient power that would be able to detect the presence of a true effect and accurately confirm the theory.

Procedures for Recruitment, Participation, and Data Collection

The procedures for recruitment, participation, and data collection began with gaining permission from the Walden University Institutional Review Board (IRB) and adhering to the guidelines to protect the rights of the participants in the study. I obtained permission from SurveyMonkey to conduct this research via their platform for academic purposes (see Appendix C). I had adapted and established the TAM (Davis, 1989) Web survey instrument (see Appendix E), but I did not proceed with data collection until after gaining approval from IRB. After I obtained approval from IRB, including the approval number, professional staff at SurveyMonkey facilitated the targeting of members of their

audience who were using ERP systems at organizations throughout the United States based on the specific criteria for the purposive sample. Information technology professionals were not eligible to participate in the survey.

Prescreened members of the SurveyMonkey audience who resided in the United States, used ERP software packages as end users on the job at organizations in the United States, and were not information technology professionals received invitation to self-administer the private Web survey instrument. I received 97 valid surveys. Web surveys are more economical than mail or interview surveys and offer instantaneous delivery to a large number of potential participants (Rea & Parker, 2014; Tung-Zong & Vowles, 2013). Furthermore, researchers can conveniently disseminate Web surveys, participants can have sufficient time to respond accurately, and researchers can download the data from respondents directly into a statistical software package, thereby facilitating more powerful analysis (Gill, Leslie, Grech, & Latour, 2013; Rea & Parker, 2014).

The potential participants received the informed consent form on the Web page preceding the actual survey. The informed consent included the purpose of the study, a description of the process, the role of the participants, any associated risks and benefits, an assurance of confidentiality and anonymity, and identification of who would view the data. The informed consent also indicated that participation was voluntary and advised participants that they could decline to participate or withdraw at any time. The participants received instructions to print the informed consent form for their records. By selecting to proceed to the survey, the participants acknowledged agreement to participate and an understanding of the study, including the terms as well as conditions of the

survey, as stated in the informed consent form. Therefore, completing the survey constituted the implied consent of the respondents to take part in the study. The respondents received a reminder that participation was voluntary and that they could decline to participate or withdraw at any time.

The first section of the survey consisted of demographic questions such as gender, age, education level, industry, state, and ERP system platform. The second section of the survey consisted of 13 questions relating to perceptions of the usefulness and ease of use of the ERP system as well as the frequency of use of the ERP system. At the end of the survey was a Web debriefing form (see Appendix F) with information regarding concepts and research pertinent to the study, as well as references for additional information. This form served as proof of participation, and respondents received instructions to print the debriefing form for their records. This study did not require participants to do follow-up interviews or take part in any form of follow-up procedures. Data collection from the purposive sample took place at one moment in time using the cross-sectional survey approach. I downloaded the data from respondents directly into a database, and used IBM SPSS Version 20 to carry out quantitative data analysis. I used a compact disc to store the data files in a fire and waterproof safe using my biometric credentials for approximately 5 years at a safeguarded location, after which time I will destroy the data files.

Instrumentation

The cross-sectional survey instrument in a self-administered Web format contained a perceived ease of use, a perceived usefulness, and a usage scale adapted from the TAM (Davis, 1989). Davis (1989) developed the Likert-type scales to measure user

acceptance. According to Davis, the perceived ease of use as well as perceived usefulness constructs existed as the fundamental predictors for user acceptance (usage) of information technology. The TAM was appropriate to the current study because the focus of the research was user acceptance of ERP systems using perceived usefulness and perceived ease of use as the predictors for which the TAM is information-technology specific. The TAM is pertinent to the perceptions and behavior studied, in addition to its proven validity and reliability in measuring as well as predicting the acceptance and use of technology within different organizational contexts in a parsimonious manner (Zhang et al., 2013). I slightly modified the statements in the instrument to reflect ERP system, which should not have presented any significant effect on the established reliability or validity of the constructs. Davis granted permission for use of his validated survey instrument to perform data collection for this study (see Appendix A). Additionally, a representative from *MIS Quarterly* granted permission to include the survey instrument or an adaptation of the instrument in this study (see Appendix B).

The reliability of a survey instrument relates to the degree to which the survey instrument produces the same outcome during repeated assessments. Reliability indicates the extent of variable errors in a measuring instrument (Frankfort-Nachmias et al., 2014; Ursachi, Horodnic, & Zait, 2015). The validity of a survey instrument relates to the degree to which the survey instrument accurately measures the particular concept that it is seeking to measure. Validity signifies how well the measuring instrument accomplishes the measurement of the relevant variable (Alumran, Hou, & Hurst, 2012; Frankfort-Nachmias et al., 2014). Reliability pertains to the accuracy of the particular measuring

instrument, whereas validity applies to the amount of success the measuring instrument achieves in measuring the required variable. Davis (1989) defined the central idea for the scales he was developing and used the perceived ease of use as well as perceived usefulness definitions in developing the scales. Upon pretesting and refining the scales, the measuring instruments gave similar results for repeated tests and properly measured the variables for which the design of the scales should measure (Davis, 1989).

Davis (1989) used several steps in developing and testing the perceived ease of use and perceived usefulness scales. Following the introduction of the earlier scale items, Davis pretested the initial items in a pilot study and removed a few scale items that demonstrated the removal of low priority rankings, which left a 10-item perceived usefulness scale and corresponding perceived ease of use scale. The scales underwent additional testing in two more validation studies, followed by further refinement and streamlining that produced six-item scales for the constructs. The first study consisted of 112 participants at an IBM development laboratory in Toronto, Canada, and the second study consisted of 40 masters of business administration students attending Boston University (Davis, 1989). The reliability test employed was Cronbach's alpha in which the perceived usefulness scale scored .97 during the first study followed by .98 during the second study. Similarly, the perceived ease of use scale scored .91 during the first study followed by .94 during the second study. The original TAM (Davis, 1989) single-item usage scale operationalized usage. It is not possible to assess the internal consistency of reliability for single-item scales (Davis et al., 1989).

Operationalization of Constructs

Operational definitions describe a combined mode of actions that researchers can adhere to for determining the presence of the occurrence that an idea describes (Brito, 2013; Mezuk, Lohman, Dumenci, & Lapane, 2013; Frankfort-Nachmias et al., 2014). Researchers cannot directly observe perceptions such as the perceived usefulness as well as perceived ease of use constructs, and objective usage metrics are not practical in this circumstance, which results in the need for operational definitions. Furthermore, Frankfort-Nachmias et al. (2014) asserted that operational definitions are necessary when directly observable characteristics of a phenomenon do not exist, thereby necessitating the description of what actions to take along with what to observe so that humans can perceive and understand the phenomenon. The reactions of respondents to the items in the survey, as well as a collection of indicators, empirically represent a direct observation of the construct of interest and illustrate the operational definition (Frankfort-Nachmias et al., 2014). The outline of the operational definition of the perceived usefulness, perceived ease of use, and usage constructs appears in the subsections that follow.

Perceived usefulness. The indicators for perceived usefulness reflect in the self-reported belief about the extent to which using a system enhances job performance and results in an increase in benefits or rewards. The results of the responses to the perceived usefulness construct items in the survey facilitated a quantitative summary from which the researcher inferred the extent of perceived usefulness. The items for the perceived usefulness construct appeared in previous research (Davis, 1989; Hess, McNab, & Basoglu, 2014), and Table 1 outlines the six indicators.

Table 1

Perceived Usefulness

Item	Indicators
PU1	The ERP system improves work rate.
PU2	The ERP system improves job performance.
PU3	The ERP system increases productivity.
PU4	The ERP system enhances effectiveness on the job.
PU5	The ERP system makes it easier to do the job.
PU6	The ERP system is useful in my job.

Note. PU = perceived usefulness. Adapted from "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," by F. D. Davis, 1989, *MIS Quarterly, 13*, p. 340. Copyright 1989 by the Regents of the University of Minnesota. Adapted with permission.

Perceived ease of use. The indicators for perceived ease of use are in the self-reported belief about the extent to which the use of the system is free of mental effort. The results of the responses to the perceived ease of use construct items in the survey facilitated a quantitative summary from which the researcher inferred the extent of perceived ease of use. The items for the perceived ease of use construct appeared in previous research (Davis, 1989; Hess et al., 2014), and Table 2 lists the six indicators.

Table 2

Perceived Ease of Use

Item	Indicators
PEOU1	Learning to operate the ERP system is easy.
PEOU2	It is easy to get the ERP system to do a task.
PEOU3	Interaction with the ERP system is clear and understandable.
PEOU4	The ERP system is flexible for interaction.
PEOU5	It is easy to become skillful at using the ERP system.
PEOU6	I find the ERP system easy to use.

Note. PEOU = perceived ease of use. Adapted from "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," by F. D. Davis, 1989, *MIS Quarterly, 13,* p. 340. Copyright 1989 by the Regents of the University of Minnesota. Adapted with permission.

Usage. The indicator for usage was the self-reported frequency of the user's actual system use. The researcher inferred the actual system use of each respondent from the response to the single-item usage construct in the survey. Davis (1989) used this construct in previous research. It represents actual system use, and it is consistent with self-reported measures for operationalizing system use, but this measure is not the exact frequency of actual system use (Davis, 1989). Self-reported measures of system use can approximate usage, even though they are not precise measures for the frequency of actual system use (Junco, 2013; Pynoo et al., 2012; Reuver & Bouwman, 2014).

A generally accepted threshold for reliability is a minimum of .8 (Nunnally & Bernstein, 1994). Hess et al. (2014) conducted a meta-analysis on the reliability coefficients of the perceived usefulness and perceived ease of use scales in which the studies used either Cronbach's alpha or composite reliability. The authors reviewed 380 articles and reported a mean reliability value of .89 for perceived usefulness and .87 for perceived ease of use. The reported reliability coefficients ranged from .60 to .98 for

perceived usefulness and from .62 to .98 for perceived ease of use. The results of the analysis suggested that the studies that used the original six-item scales achieved higher reliability than the studies in which the researchers modified the scales or the number of scale items varied (Hess et al., 2014). In another meta-analysis, King and He (2006) examined 88 empirical studies of the TAM and reported average Cronbach's alpha reliability of .90 for perceived usefulness and .87 for perceived ease of use. In this study, the reliability coefficients ranged from .67 to .98 for perceived usefulness and from .63 to .98 for perceived ease of use (King & He, 2006).

Pai and Huang (2011) conducted a study in which they applied the TAM to health care information systems in Taiwan using a sample of 366 health care participants. Pai and Huang reported Cronbach's alpha reliability values of .96 for perceived usefulness and .94 for perceived ease of use. Yusoff, Zaman, and Ahmad (2011) investigated user acceptance of mixed reality technology in Malaysia with a sample of 63 biomedical science students. Yusoff et al. reported Cronbach's alpha reliability values of .78 for perceived usefulness and .81 for perceived ease of use. Kwak et al. (2012) reported Cronbach's alpha reliability values of .96 for perceived usefulness and .93 for perceived ease of use. Zhang et al. (2013) reported Cronbach's alpha reliability values of .84 for perceived usefulness and .82 for perceived ease of use. Ali and Younes (2013) reported Cronbach's alpha reliability values of .95 for perceived usefulness and .90 for perceived ease of use. Finally, Mouakket (2012) reported Cronbach's alpha reliability values of .75 for perceived usefulness and .78 for perceived ease of use, as well as composite reliability values of .94 for perceived usefulness and .93 for perceived ease of use.

Convergent validity and discriminant validity are techniques for construct validation (Frankfort-Nachmias et al., 2014; Kopcha, Ottenbreit-Leftwich, Jung, & Baser, 2014). Davis (1989) tested the validities of the scales using multitrait–multimethod analysis and reported that the analysis in the two validation studies demonstrated strong convergent as well as discriminant validity. The scales were factor analyzed using principal components extraction as well as oblique rotation. Davis reported that favorable factor validities existed in the perceived ease of use as well as perceived usefulness scales. Furthermore, Zhang et al. (2013) used the confirmatory factor analysis approach and achieved desirable convergent and discriminant validities for both scales. Pai and Huang (2011) reported attaining sufficient construct validities for both scales using factor analysis. Finally, Ali and Younes (2013) reported acceptable convergent and discriminant validities for both scales using confirmatory factor analysis.

The perceived ease of use rating scale and perceived usefulness rating scale are 7-point Likert-type scales that measure perceptions on a continuum from *extremely likely* to the outermost opposite of *extremely unlikely* (Davis, 1989). Each scale has six items, and for each item, the participants received instructions to mark one expression that illustrated their feeling from a group of seven given inflexible alternative expressions on the continuum. The respondents had the option of remaining neutral about an item with the expression of *neither* as the middle value on the continuum. The neutral response for each item made the scales easy to work with and user-friendly, as the respondents did not have to select an expression that illustrated the likely or unlikely extent of their feelings. A 6-point Likert-type scale was suitable for measuring usage on a continuum of *don't use*

at all to the outermost expression of *use several times each day* (Davis, 1989). The usage scale had only one item for which the participants needed to mark one expression that represented their frequency of usage from a group of six given inflexible alternative expressions on the continuum.

The perceived ease of use, perceived usefulness, and usage Likert-type scales provided the data to evaluate each variable. Two 7-point rating scales and one 6-point rating scale comprised the survey instrument. Data collected from these Likert-type scales are ordinal (Li, 2013; Rea & Parker, 2014). Ordinal data exhibit some relation to each other and can be rank ordered (Ferrari & Barbiero, 2012; Frankfort-Nachmias et al., 2014). However, the responses on Likert-type scales in the social sciences are generally accepted as interval data to facilitate the calculation of the mean because the ordinal level only permits ranking the data, but arithmetic manipulation of the data highlights the power of the information achieved from the data (Gadermann, Guhn, & Zumbo, 2012; Rea & Parker, 2014). Furthermore, Chen (2012) noted that researchers treat the responses from Likert-type scales as interval data, even though interval data have equal distances and a subjective point of zero, unlike ordinal data.

The value of each expression represents the relative weights and direction of the responses based on the likeliness of the perception or the frequency of the usage. Higher numerical scores represent a more positive or a more agreeable response on rating scales that are numeric. Entering data in SPSS from the 7-point rating scales for the independent variables consisted of assigning a value of 7 for *extremely likely* to the lower value of 1 for *extremely unlikely* on the continuum. The 6-point rating scale for the dependent

variable had scores assigned in SPSS using the value of 1 for *don't use at all* to the upper value of 6 for *use several times each day* on the continuum. Aggregating the scores for the responses of all items in each construct led to determining a single score per construct for each respondent during testing. An example item is as follows:

Please select the most appropriate choice for your situation.

1. Using the ERP system in my job would enable me to accomplish tasks more quickly.

   ○ Extremely Likely

   ○ Quite Likely

   ○ Slightly Likely

   ○ Neither

   ○ Slightly Unlikely

   ○ Quite Unlikely

   ○ Extremely Unlikely

Data Analysis Plan

The program used to perform statistical analysis was IBM SPSS Version 20. Screening and cleaning the data preceded the statistical analysis of the data set. Screening the data involved checking for accuracy; dealing with incomplete data; assessing the effects of outliers; and evaluating the assumptions of linearity, normality, and homoscedasticity against the fit of the data (Chao et al., 2012; Gorondutse & Hilman, 2014). Checking the frequency of each variable identifies if data are missing, in which

case a researcher may delete or replace the missing data (Chen, 2012). Running descriptive statistics revealed the characteristics of the data set and the normality of variables (Chen, 2012). The skewness identified if the data were symmetric while the kurtosis identified if the distribution of the data set was normal. Graphs were suitable for checking for normal distribution and homoscedasticity (Field, 2013). A review of scatterplots indicated whether a linear relationship existed between any two variables; histograms and normal Q-Q plots were suitable for examining the distribution of the variables (Chen, 2012). Researchers can resolve linearity problems by transforming the data (Bishara & Hittner, 2012; Field, 2013).

Further investigation of the data involved using correlations because high correlations between independent variables result in multicollinearity problems during multiple regression analysis (Chen, 2012; Field, 2013). I made a decision regarding how robust multiple regression analysis performs relative to any assumption violated before deciding to carry on with the test, transform variables, or use an alternative method of analysis. If any assumptions were not tenable, Chapter 4 would include a report on the violations. The research questions for this study were as follows:

1. To what extent, if any, is there a linear relationship between the perceived usefulness and end user acceptance of ERP systems in the United States?
2. To what extent, if any, is there a linear relationship between the perceived ease of use and end user acceptance of ERP systems in the United States?

I developed the following hypotheses to address the preceding research questions:

$H1_0$: There is no relationship between perceived usefulness and end user acceptance of ERP systems in the United States.

$H1_a$: There is a positive relationship between perceived usefulness and end user acceptance of ERP systems in the United States.

$H2_0$: There is no relationship between perceived ease of use and end user acceptance of ERP systems in the United States.

$H2_a$: There is a positive relationship between perceived ease of use and end user acceptance of ERP systems in the United States.

Using a confidence interval of 95%, the study included the multiple regression statistical approach to assess the extent of the relationship between perceived usefulness of ERP systems (X_1) and user acceptance of ERP systems (Y). The test also examined the extent of the relationship between perceived ease of use of ERP systems (X_2) and user acceptance of ERP systems (Y). The regression model in this study was $Y = B_0 + B_1X_1 + B_2X_2$. The study involved testing the null hypothesis directly. Rejecting the null hypothesis indicated support for the alternative hypothesis. Standardized beta values indicate how many standard deviations the outcome is going to change because of the predictor changing one standard deviation (Field, 2013). Thus, the standardized coefficient beta demonstrates how well each independent variable predicts the dependent variable in which an independent variable makes a statistically significant contribution when the value of significance is less than .05 (Chen, 2012). Furthermore, the standardized coefficient beta values signify the level of influence for each predictor, and

the largest absolute beta amount indicates the stronger relationship, as the respective variable would be more influential on the outcome (Field, 2013).

Threats to Validity

Threats to validity are factors that are cause for concern in the ability of a researcher to arrive at a significant and justifiable conclusion that is also interpretable and generalizable (Campbell & Stanley, 1963). The validity of a research study refers to the precision, quality, and integrity of the overall study that allows a researcher to arrive at meaningful and tenable conclusions from the data (Leedy & Ormrod, 2015). The threats to validity can occur at one or more stages of the research process, including during research design and data collection, data analysis, and data interpretation (Benge, Onwuegbuzie, & Robbins, 2012). Additionally, bias in the process of the study consisting of the total of all errors throughout the entire study can distort the results and threaten validity (Oluwatayo, 2012). Threats to validity are typically threats to internal or external validity (Leedy & Ormrod, 2015). Internal validity concerns interpretation of the data, while external validity refers to the generalizability of the results; both are essential, although elements for increasing one may threaten the other (Campbell & Stanley, 1963). I drew only qualified inferences from the analysis and results to provide meaningful and tenable findings as well as to establish confidence in the conclusions of the study.

External Validity

External validity is the extent to which a researcher can generalize the results of a research study to other circumstances (Henderson, Kimmelman, Fergusson, Grimshaw, & Hackam, 2013; Leedy & Ormrod, 2015). Threats to external validity emerge when

researchers formulate wrong inferences from data in the sample and then to other individuals, environments, or situations, thereby jeopardizing representativeness (Campbell & Stanley, 1963; Leedy & Ormrod, 2015). Population validity was the main threat to the external validity of this study. Population validity is the extent to which results are generalizable from the sample of participants in the study to the target population that contains the sample (Benge et al., 2012). Differences that exist between the sample and the population of interest threaten population validity (Benge et al., 2012). Even strong internal validity of a study does not indicate that the result is generalizable to other circumstances. Internally valid results might be specific to a certain group (Campbell & Stanley, 1963).

I used purposive sampling to ensure the sample reasonably represented ERP system end users who met the specific criteria for the population. The participants had different genders, age groups, education levels, industries, locations across the United States, and ERP system platforms to ensure the sample was representative of the population of interest. A sample that is more representative of the population will enable a more defensible generalization from the sample to the population. Additionally, the G*Power statistical power analysis program was useful for calculating the minimum sample size of 68 participants, but the study included a larger sample size of 97 participants. Using a large sample size is a method for increasing external validity (Benge et al., 2012). Population validity is a threat to external validity that researchers cannot eliminate as a possible threat, as both random and nonrandom samples can have errors in

sampling (Benge et al., 2012). Therefore, I used a representative sample and a large sample size to address the threats to external validity in the study.

Internal Validity

Internal validity is the extent to which the research designs and the generated data enable correct inferences regarding cause and effect as well as other relationships within the data (Leedy & Ormrod, 2015; Vos et al., 2013). Threats to internal validity are processes or occurrences of the participants that jeopardize accurate conclusions about the population of interest from the data (Campbell & Stanley, 1963; Leedy & Ormrod, 2015). Other possible explanations of the findings that researchers cannot exclude threaten internal validity (Benge et al., 2012; Leedy & Ormrod, 2015). Instrumentation was the major threat to the internal validity of this study. An instrumentation threat happens when a quantitative measure gives scores for which the level of consistency or the content is inadequate (Benge et al., 2012; Campbell & Stanley, 1963).

Using the original TAM (Davis, 1989) survey instrument, which has demonstrated adequate levels of reliability and validity from repeated uses by other researchers in a variety of different contexts, mitigated the instrumentation threat to internal validity in this study. Other threats to internal validity are violating assumptions due to failure to check the assumptions of statistical models, and multicollinearity due to failure to test multicollinearity when it exists in multiple regression models (Benge et al., 2012). As illustrated in the data analysis plan and the results section, I checked all relevant assumptions and assessed multicollinearity in the intended multiple regression model. Accordingly, I used the widely validated TAM (Davis, 1989) questionnaire,

checked the assumptions of the statistical model, and assessed multicollinearity to address the threats to internal validity in the study. Furthermore, I promoted the importance of the study and requested the participants to be truthful in the self-report of their perceptions and system usage instead of giving biased responses.

Construct Validity

Construct validity is an essential factor for empirically testing all theories that pertains to the extent of correspondence between the theoretical constructs of interest and the relevant measures (McGinley & Curran, 2014; Wiener, Krauss, & Lieberman, 2011). Characteristics that a researcher cannot directly observe and measure in participants such as perceptions are constructs that researchers must infer from instruments that have proven validity for the purpose (Leedy & Ormrod, 2015). The standards of construct validity are convergent validity and discriminant validity (Frankfort-Nachmias et al., 2014; Salekin, Chen, Sellbom, Lester, & MacDougall, 2014). Convergent validity occurs when researchers measure the same construct using two different techniques and correlate highly with each other, while discriminant validity occurs when researchers measure two different constructs using similar methods and do not correlate highly with each other (Guerra, Gouveia, Araújo, Andrade, & Gaudencio, 2013; Leopold, Bryan, Pennington, & Willcutt, 2014; Oluwatayo, 2012). I mitigated the threat to construct validity in this study using the original TAM (Davis, 1989) survey instrument, which exhibited an acceptable level of convergent and discriminant validities, as discussed in the operationalization section of this study.

Statistical conclusion validity pertains to the extent to which researchers make accurate statistical inferences from data analysis (Brutus, Aguinis, & Wassmer, 2013; Levine, 2011). Threats to statistical conclusion validity occur due to making wrong conclusions from data because of insufficient statistical power or a violation of statistical premises and when disconnects exist between the theoretical and operational levels of a construct (Drost, 2011; Petter, Rai, & Straub, 2012). The insufficient statistical power relates to Type I errors that involve falsely rejecting a null hypothesis and Type II errors that involve incorrectly failing to reject a null hypothesis (Benge et al., 2012; Levine, 2011). The threat to statistical conclusion validity decreased in this study using an effect size of 0.15, alpha of .05, and desired power of .80, along with a large sample size of 97 participants to allow sufficient power that would be able to detect the presence of a true effect and accurately confirm the theory. I would have used a different analysis technique or transformed the data if the conditions of the data violated the statistical assumptions.

Ethical Procedures

Researchers must consider ethical standards whenever humans are the focus of a research study in order to protect the interests of the participants (Leedy & Ormrod, 2015). I obtained permission to gain access to the participants who consisted of members of the SurveyMonkey American audience via the SurveyMonkey platform (see Appendix C) and the SurveyMonkey targeted audience service (see Appendix D). Universities in the United States must have an IRB to examine in detail all proposals that will involve human participants in research with guidance from the university (Leedy & Ormrod, 2015). This study received approval from the IRB at Walden University (Approval no.

08-18-15-0126481 on August 18, 2015) before any data collection began, and I strictly adhered to the IRB ethical guidelines. Guidance from the IRB was critical for ensuring the research took place within the highest ethical standards, including the protection of respondents and their associated information.

Participation was voluntary, no participants experienced coercion to take part in the study, and participants could have declined to participate or withdraw at any time. Participants received informed consent documentation prior to data collection that outlined the purpose of the study, the process, the role of the participants, any associated risks and benefits, an assurance of confidentiality, who would view the data, the voluntary nature of participation, and contact information for the researcher. There was no harm that might put participants in danger, the guarantee of confidentiality included keeping all information confidential until the destruction of the data occurred, and responses as well as respondents remained anonymous. All records, including paper and digital data, will remain stored at a secured location to which only I have access for 5 years from the end of the study, at which time I will shred the paper and destroy the digital data.

Summary

Chapter 3 included a description of the research methodology used to address the research questions and test the associated hypotheses. The quantitative cross-sectional survey design was a suitable design to test the TAM (Davis, 1989) for the objective of the study. Chapter 3 included the rationale for the research design, sampling strategy, recruitment procedures, and data collection strategy. Multiple regression analysis was

suitable to test the relationship between the two-predictor variables (perceived usefulness and perceived ease of use) and the outcome variable (usage). This chapter also included a discussion on threats to validity and ethical procedures to protect the interest of participants.

Chapter 4 consists of the data collection procedures and the demographic attributes of the participants. Chapter 4 also includes the results of the cross-sectional survey, descriptive statistics, statistical analysis of the responses, and analysis of the results. Chapter 4 concludes with a summary of the answers to the research questions.

Chapter 4: Results

Introduction

The purpose of this quantitative cross-sectional survey study was to test the TAM (Davis, 1989) that relates the factors that influence user acceptance of information technology (independent variables) to user acceptance of information technology (dependent variable) for employees who have been using ERP systems to perform their jobs in organizations throughout the United States. Perceived ease of use and perceived usefulness of the ERP systems were the independent variables. User acceptance of the ERP systems was the dependent variable. The specific problem was a lack of user acceptance of ERP systems during the routine stage of operation in the United States. The results of this research assisted in providing insightful answers to the following research questions:

1. To what extent, if any, is there a linear relationship between the perceived usefulness and end user acceptance of ERP systems in the United States?
2. To what extent, if any, is there a linear relationship between the perceived ease of use and end user acceptance of ERP systems in the United States?

The following hypotheses served to address the preceding research questions:

$H1_0$: There is no relationship between perceived usefulness and end user acceptance of ERP systems in the United States.

$H1_a$: There is a positive relationship between perceived usefulness and end user acceptance of ERP systems in the United States.

$H2_0$: There is no relationship between perceived ease of use and end user acceptance of ERP systems in the United States.

$H2_a$: There is a positive relationship between perceived ease of use and end user acceptance of ERP systems in the United States.

Chapter 4 includes the results of the data collection process, including a detailed description of the data collection procedures and the techniques used to analyze the data to answer the research questions based on the specific problem examined in this study. A description of the data collection process follows, which leads to the results of the study derived from statistical analysis. The chapter concludes with a summary of the responses to the research questions.

Data Collection

Data collection started after the Walden University IRB provided approval documentation that precisely defined limits to ensure compliance with the ethical standards of U.S. federal regulations and Walden University. Recruitment and data collection proceeded according to the plan outlined in Chapter 3 and took 7 days from August 20, 2015, to August 26, 2015, via the SurveyMonkey organization, which has a robust cloud-based online survey platform through which to administer surveys. There were 32 responses on August 22, 50 responses on August 23, 11 responses on August 24, four responses on August 25, and seven responses on August 26, which totaled 104 responses, of which 97 were part of the final analysis. The meticulous and efficient use of the purposive sampling strategy resulted in a 100% response rate and exceeded the minimum required sample size of 68 participants based on an effect size of 0.15, alpha of

.05, desired power of .80, and two predictors. The larger sample size enhanced the external validity of the nationwide study.

Data Collection Process

After screening the members of the SurveyMonkey American audience to identify the ERP system end users, professional staff at SurveyMonkey targeted members of their audience who resided in the United States and used ERP software packages as end users on the job at organizations in the United States. The prescreened participants experienced purposeful selection to provide a diverse and representative sample of the nationwide population regarding the type of industry and location of the participants. The respondents consisted of members of the SurveyMonkey American audience who were ERP system end users in the United States representing different education levels, age groups, ethnic backgrounds, and industries. The participants self-administered the private Web survey instrument consisting of six demographic questions and 13 statements relating to perceptions of the usefulness and ease of use of the ERP systems, as well as the frequency of use of the ERP systems. I downloaded the data from the respondents directly into SPSS to facilitate accurate and robust data analysis.

Demographic Characteristics

Data were from a diverse cross section of ERP system end users in the United States to facilitate a quantitative survey study designed to examine the factors influencing user acceptance of ERP systems in the United States. Initially, 104 individuals completed the survey. Boxplots identified univariate outliers for the three primary study variables (usefulness, ease of use, and end user acceptance). From that analysis, I removed seven

respondents from the study. In addition, I created Mahalanobis distance values to identify multivariate outliers, but found none. Therefore, the final sample for this study was 97 respondents.

The frequency counts for selected variables are in Table 3, which reflects a somewhat representative sample. For ERP system usage, which was the primary dependent variable in this study, 45.4% reported using the system several times a day and all but three respondents (96.9%) used the system at least occasionally. For region of the country, participants represented 33 states, with the largest participation being from California (n = 13), Florida (n = 11), New York (n = 9), and Texas (n = 8). There were somewhat more male respondents (57.7%) than female respondents (42.3%) surveyed. The ages of the respondents ranged from 21-29 years (12.4%) to 60 years or older (12.4%), with the median age being 44.50 years. Most respondents had either a bachelor's degree (47.4%) or a graduate degree (41.2%). The participants represented 17 industries, with the most common being finance and financial services (22.7%) and manufacturing (15.5%; see Table 3).

The sample represented the target population because the data proportionately reflected the most popular types of ERP systems. In descending order, the main types of ERP systems the respondents used were SAP (32.7%), Oracle (26.9%), in-house developed systems (11.5%), Microsoft Dynamics (9.6%), and Sage (5.8%). The most frequently used ERP software in the United States in descending order are SAP, Oracle, Sage, Infor, and Microsoft Dynamics (Columbus, 2014).

Table 3

Frequency Counts for Selected Variables

Variable and category	*n*	%
ERP system use		
Don't use at all	3	3.0
Use less than once each week	7	7.2
Use about once each week	13	13.4
Use several times a week	15	15.5
Use about once each day	15	15.5
Use several times each day	44	45.4
Region (33 states represented)		
Southeast (seven states)	20	20.6
Northeast (11 states)	27	27.8
Midwest (eight states)	20	20.6
Southwest (three states)	12	12.4
West (four states)	18	18.6
Gender		
Female	41	42.3
Male	56	57.7
Age range [a]		
21-29 years	12	12.4
30-39 years	25	25.7
40-49 years	29	29.9
50-59 years	19	19.6
60 years or older	12	12.4
Highest education		
Less education	11	11.4
Bachelor degree	46	47.4
Graduate degree	40	41.2
Principal industry		
Finance and financial services	22	22.7
Government	7	7.2
Health care and pharmaceuticals	7	7.2
Manufacturing	15	15.4
Retail and consumer durables	5	5.2
Telecommunications, technology, Internet, and electronics	8	8.2
Utilities, energy, and extraction	5	5.2
Other industries (10 other industries)	28	28.9

Note. $N = 97$.

[a] Age range: $Mdn = 44.50$ years.

Reliability of the Survey Instrument

Researchers have frequently used Cronbach's alpha to assess the internal consistency of survey instruments that consist of several items for which a minimum of .8 is a generally considered acceptable threshold for reliability (Field, 2013). Even though the original TAM (Davis, 1989) survey questionnaire used in this study is a validated instrument, I calculated Cronbach's alpha for the two independent variables to substantiate the reliability and validity of the TAM survey instrument in this study. The psychometric characteristics for the two aggregated scale scores are in Table 4. The basis of these scales was a 7-point metric that ranged from 1 = *extremely unlikely* to 7 = *extremely likely*. Both scales, usefulness (M = 5.94, α = .96), and ease of use (M = 5.53, α = .93), as outlined in Table 4, had acceptable levels of internal reliability (Field, 2013; Nunnally & Bernstein, 1994).

Table 4

Psychometric Characteristics for the Aggregated Scale Scores

Scale	Number of items	*M*	*SD*	Low	High	α
Usefulness	6	5.94	0.88	3.67	7.00	.96
Ease of use	6	5.53	0.89	3.50	7.00	.93

Note. N = 97. Scales based on a 7-point metric that ranged from 1 = *extremely unlikely* to 7 = *extremely likely*.

Descriptive Statistics for Usefulness

The descriptive statistics for the six individual perceived usefulness survey items sorted by the highest mean are in Table 5. The basis of these items was a 7-point metric that ranged from 1 = *extremely unlikely* to 7 = *extremely likely*. The highest mean was for Item 9, "Using the ERP system in my job increases my productivity" (M = 6.05), while

the lowest mean was for Item 7, "Using the ERP system in my job enables me to accomplish tasks more quickly" (*M* = 5.86).

Table 5

Descriptive Statistics for the Individual Usefulness Items Sorted by Highest Mean

Survey item	*M*	*SD*
9. Using the ERP system in my job increases my productivity.	6.05	0.87
12. I find the ERP system useful in my job.	6.00	1.06
10. Using the ERP system enhances my effectiveness on the job.	5.94	0.94
8. Using the ERP system improves my job performance.	5.93	0.93
11. Using the ERP system makes it easier to do my job.	5.87	1.07
7. Using the ERP system in my job enables me to accomplish tasks more quickly.	5.86	1.15

Note. *N* = 97. Items based on a 7-point metric that ranged from 1 = *extremely unlikely* to 7 = *extremely likely*.

Descriptive Statistics for Ease of Use

Descriptive statistics for the six individual perceived ease of use survey items sorted by highest mean are in Table 6. The basis for items was a 7-point metric ranging from 1 = *extremely unlikely* to 7 = *extremely likely.* Item 15, "My interaction with the ERP system is clear and understandable," had the highest mean (*M* = 5.66), and Item 16, "I find the ERP system flexible to interact with," had the lowest mean (*M* = 5.26).

Table 6

Descriptive Statistics for the Individual Ease of Use Items Sorted by Highest Mean

Survey item	*M*	*SD*
15. My interaction with the ERP system is clear and understandable.	5.66	1.00
17. It is easy for me to become skillful at using the ERP system.	5.64	1.02
13. Learning to operate the ERP system is easy for me.	5.60	1.19
18. I find the ERP system easy to use.	5.60	1.01
14. I find it easy to get the ERP system to do what I want it to do.	5.44	1.07
16. I find the ERP system flexible to interact with.	5.26	1.24

Note. *N = 97.* Items based on a 7-point metric: 1 = *extremely unlikely* to 7 = *extremely likely.*

Study Results

The descriptive statistics of the characteristics of the sample are in Table 7. The average score for the perceived usefulness scale was 5.94, which consisted of a minimum of 3.67, a maximum of 7, and a standard deviation of .88. For the perceived ease of use scale, the average score was 5.53 consisting of a minimum of 3.50, a maximum of 7, and standard deviation of .89. From 104 respondents, 97 were valid. Even though the study required 68 participants, the larger sample size facilitated the assumption that the regression coefficients came from a normally distributed sampling distribution. According to Field (2013), larger samples permit the assumption that unstandardized regression coefficients are from a normally distributed sampling distribution based on the central limit theorem.

Table 7

Descriptive Statistics Characterizing the Sample

Variable	Minimum	Maximum	Mean	*SD*
Usefulness	3.67	7.00	5.94	.88
Ease of use	3.50	7.00	5.53	.89

Note. $N = 97$.

Research Question 1 was as follows: *To what extent, if any, is there a linear relationship between the perceived usefulness and end user acceptance of ERP systems in the United States?* The related null hypothesis predicted the following: *There is no relationship between perceived usefulness and end user acceptance of ERP systems in the United States.* To answer Research Question 1, the data in Table 8 include the relevant Pearson and Spearman correlations. I added the Spearman correlation for hypothesis testing due to the ordinal nature of the dependent variable (ERP system usage) and the

negative distribution skew found from 45.4% of the respondents having had the highest value (“use several times each day”; see Table 3). The analysis included one-tailed probabilities due to the directional nature of the hypothesis. Both the Pearson correlation (r = .26, p = .006) and the Spearman correlation (r_s = .24, p = .01) were significant, which provided support to reject the null hypothesis (see Table 8). The analysis led to rejecting the null hypothesis that stated no relationship exists between perceived usefulness and end user acceptance of ERP systems in the United States. Therefore, this result indicated a positive relationship exists between perceived usefulness and end user acceptance of ERP systems in the United States.

Research Question 2 was as follows: *To what extent, if any, is there a linear relationship between the perceived ease of use and end user acceptance of ERP systems in the United States?* The related null hypothesis predicted the following: *There is no relationship between perceived ease of use and end user acceptance of ERP systems in the United States.* To answer this question, as before, the relevant Pearson and Spearman correlations appear in Table 8. Both the Pearson correlation (r = .09, p = .19) and the Spearman correlation (r_s = .12, p = .13) were not significant, which provided support to retain the null hypothesis (see Table 8). The analysis led to retaining the null hypothesis that stated no relationship exists between perceived ease of use and end user acceptance of ERP systems in the United States. Accordingly, this result showed that there was no relationship between perceived ease of use and end user acceptance of ERP systems in the United States.

Table 8

Pearson and Spearman Correlations Among the Primary Study Variables

Correlation type and variable	*1*	*2*	*3*
Pearson			
1. ERP system use	1.00		
2. Usefulness scale	.26**	1.00	
3. Ease of use scale	.09	.58***	1.00
Spearman			
1. ERP system use	1.00		
2. Usefulness scale	.24**	1.00	
3. Ease of use scale	.12	.56***	1.00

Note. *N = 97.* Significant levels based on one-tailed tests.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Regression Analysis

I created the multiple regression model using ERP system usage as the dependent or outcome variable along with the usefulness and ease of use scale scores as the two independent or predictor variables. Analysis involved performing a series of statistical assumption tests to determine the suitability of this regression model. Specifically, I found no univariate or multivariate outliers. Standardized residuals from the regression model were all within normal limits. The Durbin-Watson statistic (1.59) was acceptable for which values less than 1 or greater than 3 may be problematic. Cook's distance values (maximum = 0.11) revealed no overly influential cases, as only values greater than 1 could influence the model. Inspection of the histogram and p-p plot for the residuals revealed both were within acceptable limits. The variance inflation factor (1.51) was below 10 and the tolerance statistic (.66) was above .2. Therefore, the variance inflation factor and tolerance statistic indicated no evidence of multicollinearity among the independent variables. Taken in combination, along with the sample size of 97 and the

robust general nature of the general linear model, the data indicated that the assumptions for multiple regression were adequately met (Field, 2013).

The multiple regression model predicting ERP system usage based on the perceived usefulness and perceived ease of use scale scores is in Table 9. The two-variable model was significant (p = .02) based on a one-tailed test and accounted for 7.1% of the variance in the respondent's ERP system usage score. Inspection of the beta weights found ERP system usage positively related to the usefulness score (β = .31, p = .007), but not related to the ease of use score (β = -.09, p = .24; Table 9). Therefore, the results of the multiple regression analysis provided similar answers to the research questions as previously stated for the Pearson and Spearman correlations. As perceived usefulness (β = .31, p = .007 < .05) was significant, I rejected the null hypothesis, which resulted in the multiple regression analysis indicating that a positive relationship existed between perceived usefulness and end user acceptance of ERP systems in the United States to answer Research Question 1. The perceived ease of use score (β = -.09, p = .24 > .05) provided support to retain the null hypothesis, which resulted in the multiple regression analysis indicating no relationship existed between perceived ease of use and end user acceptance of ERP systems in the United States to answer Research Question 2.

Table 9

Prediction of ERP System Usage Based on Usefulness and Ease of Use

Variable	*B*	*SE*	β	*p*	95% CI
Constant	2.42	1.09		.01	[0.25, 4.59]
Usefulness scale	0.52	0.21	.31	.007	[0.11, 0.93]
Ease of use scale	-0.15	0.20	-.09	.24	[-0.55, 0.26]

Note. N = 97. Significant levels based on one-tailed tests.
Full model: F (2, 94) = 3.57, p = .02. R^2 = .071. Durbin-Watson = 1.59.

Demographic Analysis

The Spearman correlations relating the respondent's gender, age, and highest education with the three primary study variables (usage, usefulness, and ease of use) are in Table 10. Based on one-tailed tests, four of the nine correlations were significant. Specifically, female respondents had higher usefulness scores (r_s = -.17, p = .04) and ease of use scores (r_s = -.20, p = .02). In addition, ease of use scores were higher for younger respondents (r_s = -.29, p = .002) and those with less education (r_s = -.21, p = .02).

Table 10

Spearman Correlations for Gender, Age, and Education With Usage, Usefulness, and Ease of Use

Variable	ERP system use	Usefulness	Ease of use
Gender [a]	-.12	-.17*	-.20*
Age	.01	-.14	-.29**
Highest education	.11	-.12	-.21*

Note. N = 97. Significant levels based on one-tailed tests.
[a] Gender: 1 = *Female* 2 = *Male*.
* p < .05. ** p < .01.

Summary

Chapter 4 included an examination and description of the results of the analyses from the data collected via SurveyMonkey for the self-administered private Web survey. The quantitative cross-sectional survey study involved examining the factors that influence user acceptance of ERP systems for employees who have used ERP systems to perform their jobs in organizations throughout the United States. Data came from a diverse cross section of ERP system end users in the United States who were members of the SurveyMonkey American audience. The target population consisted of ERP system

end users in the United States who were of different income levels, education levels, age groups, ethnic backgrounds, and industries. The data collection provided responses from 104 participants, from which I discarded seven outliers, which resulted in 97 valid surveys for the final analysis. I used SPSS Version 20 to analyze the data and answer the research questions.

The results included support for Alternative Hypothesis 1 on perceived usefulness with ERP system usage. The correlation analyses showed that Pearson correlation (r = .26, p = .006) and the Spearman correlation (r_s = .24, p = .01) were significant, which provided support to reject the null hypothesis for Research Question 1. Additionally, the multiple regression analysis showed that ERP system usage positively related to the usefulness score (β = .31, p = .007). Therefore, all the analyses indicated that there was a positive relationship between perceived usefulness and end user acceptance of ERP systems in the United States. The results further revealed no support for Alternative Hypothesis 2 on perceived ease of use with ERP system usage. The correlation analyses illustrated that the Pearson correlation (r = .09, p = .19) and the Spearman correlation (r_s = .12, p = .13) were not significant, which provided support to retain the null hypothesis for Research Question 2. Furthermore, the multiple regression analysis showed that no relationship existed between ERP system usage and the perceived ease of use score (β = -.09, p = .24). Accordingly, the entire series of analyses indicated that there was no relationship between perceived ease of use and end user acceptance of ERP systems in the United States.

Chapter 5 includes an interpretation of the findings from Chapter 4 and a comparison to the literature, conclusions and implications, and a series of recommendations. Chapter 5, which is the final chapter, also includes the limitations of the study, the potential for positive social change, and the main significance in the conclusion of the study.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

This study examined user acceptance of ERP systems in the United States and consequently sought to decrease the gap in the literature. The purpose of this quantitative cross-sectional survey study was to test the TAM (Davis, 1989), which relates the factors that influence user acceptance of information technology (independent variables) to user acceptance of information technology (dependent variable) for employees who have been using ERP systems to perform their jobs in organizations throughout the United States. Perceived ease of use and perceived usefulness of the ERP systems were the independent variables. User acceptance of the ERP systems was the dependent variable. Purposive sampling was suitable for collecting data via a self-administered private Web survey from members of the SurveyMonkey American audience who used ERP software packages as end users to do their job at organizations in the United States.

Given a medium effect size of 0.15, alpha of .05, desired power of .80, and two predictors, the appropriate sample size was a minimum of 68 end users of ERP systems at jobs in the United States. The larger sample size enhanced the external validity of the nationwide study and permitted the assumption that the regression coefficients were from a normally distributed sample. One hundred four participants provided data, 97 of which were valid. The findings of this study showed that there was a positive relationship between perceived usefulness and end user acceptance of ERP systems in the United States. The study also indicated that there was no relationship between perceived ease of use and end user acceptance of ERP systems in the United States. In a further analysis of

the data, the findings uncovered that female respondents perceived ERP systems to be more useful and easier to use. The findings also revealed that younger respondents and respondents with less education perceived ERP systems as being easier to use.

Interpretation of Findings

Organizational leaders have been facing numerous challenges, including tougher competition, customers who expect more, and stronger market concentration in the present global economy (Pasaoglu, 2011; Shih, 2006). The implementation of ERP systems in organizations is one of the most significant strategies used to reduce costs and improve productivity in an attempt to withstand the various challenges (Kanellou & Spathis, 2013). However, user acceptance of ERP systems remains one of the main factors affecting the successful implementation and use of such systems (Sternad & Bobek, 2012). More than 60% of ERP systems implemented eventually fail (Maas et al., 2014; Mouakket, 2012). The annual cost of failed and troubled software is between $60 billion and $70 billion for both corporate and government investments in the United States (Charette, 2005). User acceptance of ERP systems is lacking during the routine stage of operation in the United States. This quantitative cross-sectional survey study was a design to examine the factors influencing user acceptance of ERP systems in the United States. Throughout the following subsections, I interpreted the results of the study in terms of the scholarly literature outlined in Chapter 2, as well as the theoretical framework of the TAM (Davis, 1989).

Findings Compared With the Literature

The finding of the first research question showed that there was a positive relationship between perceived usefulness and end user acceptance of ERP systems in the United States. Davis (1989) defined perceived usefulness as the extent of the belief that using a specific information system will improve job performance and provide rewards or benefits to the user. More than 88% of the respondents indicated that the ERP systems improved their job performance and enhanced their effectiveness on the job. According to Davis, people are likely to use or not use an information system to the degree that they think the information system would improve their job performance. The finding that the perceived usefulness of ERP systems positively related to end user acceptance of ERP systems in the United States was consistent with the findings of previous similar studies conducted in other countries.

The positive relationship between perceived usefulness and end user acceptance of ERP systems in this study is comparable to the findings of studies such as Al-Jabri and Roztocki (2015) and Kwak et al. (2012). Al-Jabri and Roztocki examined factors influencing the adoption of ERP systems in Saudi Arabia to have a more comprehensive understanding of why users accept or reject information technology. Al-Jabri and Roztocki found that perceived usefulness significantly related to the adoption of ERP systems in Saudi Arabia. Kwak et al. investigated user acceptance of ERP systems during the implementation stage in project-based sectors to understand user acceptance of ERP systems from the perspectives of end users. Kwak et al. revealed that the findings demonstrated a significant relationship between perceived usefulness and user acceptance

of ERP systems with comparable explanatory power as those achieved in the original TAM.

Furthermore, researchers such as Ali and Younes (2013), Sternad and Bobek (2013), and Zhang et al. (2013) examined user acceptance of ERP systems. Ali and Younes examined the effect of ERP systems on the performance of users in Tunisia to evaluate the usefulness, efficiency, and effectiveness of ERP systems in organizations. Ali and Younes determined that perceived usefulness contributed to user performance in the findings of their study. Sternad and Bobek probed the factors that influence the acceptance of ERP systems in Slovenia. An analysis of questionnaires from ERP system users showed that perceived usefulness positively and directly influenced attitude toward ERP system use in Slovenia. Zhang et al. studied end users' use of ERP systems in China. An analysis of surveys from ERP system users in China showed that perceived usefulness had a positive influence on the use of ERP systems in China. The results of these studies supported the positive relationship between perceived usefulness and user acceptance of ERP systems.

Contrary to the support that the findings of the foregoing studies offer to the finding of the first research question in this study, Mouakket (2012) uncovered a different result. The first research question showed that there was a positive relationship between perceived usefulness and end user acceptance of ERP systems in the United States. Mouakket investigated the use of ERP systems in the United Arab Emirates to understand why ERP systems had a high failure rate and why end users underused ERP systems in many organizations. Mouakket found that perceived usefulness did not have a significant

influence on the actual use of ERP systems in the United Arab Emirates. The findings contradicted the relationship in the original TAM as well as the findings of other researchers in Chapter 2. Mouakket surmised that the contradictory finding might have been the result of the mandatory use of the ERP systems, whether or not the employees had perceived the systems as being useful.

The answer to the second research question revealed that there was no relationship between perceived ease of use and end user acceptance of ERP systems in the United States. Davis (1989) defined perceived ease of use as the extent of the belief that the use of a specific information system will be effortless. Fifteen percent of the respondents found it extremely likely that the ERP system was easy to use, and 12% found it extremely likely that it was easy for them to get the ERP system to do what they wanted it to do. Davis pointed out that users may think an information system is too difficult to use, even if they think that it is useful when the effort of using the information system exceeds the performance advantages of using the system. The finding that there was no relationship between perceived ease of use and end user acceptance of ERP systems in the United States was not consistent with the findings of previous similar studies conducted in other countries.

The revelation that there was no relationship between perceived ease of use and end user acceptance of ERP systems in this study contradicted the findings of studies such as Ali and Younes (2013), Sternad and Bobek (2013), and Zhang et al. (2013), among others. In their examination of the effect of ERP systems on the performance of users in Tunisia, Ali and Younes found that perceived ease of use of ERP systems had a

positive influence on user performance. After examining the factors that influence the acceptance of ERP systems in Slovenia, Sternad and Bobek determined that perceived ease of use had a positive and direct influence on attitude toward ERP systems. Zhang et al. investigated the use of ERP systems among end users in China. The findings of their study revealed that perceived ease of use positively contributed to the use of ERP systems in China. The findings of these studies did not support the finding that there was no relationship between perceived ease of use and end user acceptance of ERP systems in the United States.

In light of the discovery that there was no relationship between perceived ease of use and end user acceptance of ERP systems in the United States, which contradicted the findings of the other studies, I further analyzed the literature outlined in Chapter 2. Tunnell (2014) found that the information systems in use at U.S. Government customs had extensive usability problems, despite the investment of billions of dollars. Additionally, Zhang et al. (2013) revealed that perceived usefulness was a somewhat stronger factor than perceived ease of use in user acceptance of ERP systems. Zhang et al. further concluded that end users were likely to assess ERP systems as less valuable if the users had difficulties using the systems. In combination, these findings and the finding of the second research question led me to surmise that the end users of ERP systems in the United States were finding it difficult to use the ERP systems, even though they believed that the systems were useful. Furthermore, it would appear that the systems were mandatory to use in the performance of their jobs, so the employees did not have

the choice to use or not to use the ERP systems, regardless of their perceptions about the ease or difficulty of using the systems.

Findings Compared With the Theoretical Framework

The TAM (Davis, 1989) theorized that perceived usefulness and perceived ease of use significantly influence user acceptance of information technology and serve as the theoretical foundation in this study. Potential users are likely to accept a system that they perceive to be useful and somewhat easy to use (Davis, 1989). The result of the first research question indicating a positive relationship between perceived usefulness and end user acceptance of ERP systems in the United States provided support for the perceived usefulness construct in the TAM. The findings revealed that more than 89% of the respondents agreed that the ERP systems were useful in their jobs, and more than 90% agreed that the ERP systems increased their productivity. These findings illustrated that ERP system end users are more likely to accept an ERP system that they perceive to be useful. The overall scores of the perceived usefulness construct in the TAM survey instrument regarding the psychometric characteristics for the aggregated scale scores further reinforced the reliability of the perceived usefulness scale.

As revealed in the finding of the second research question, there was no relationship between perceived ease of use and end user acceptance of ERP systems in the United States. This finding did not support the perceived ease of use construct in the TAM, which theorized that perceived ease of use significantly influences user acceptance of information technology. Furthermore, according to Davis (1989), potential users are likely to accept (use) a system that they perceive to be somewhat easy to use. For ERP

system usage, the primary dependent variable in this study, more than 45% of the respondents reported using the system several times per day and all but three respondents (97%) used the system at least occasionally. In accordance with the TAM, these findings should have illustrated that ERP system end users are more likely to accept (use) an ERP system that they perceive to be easy to use. However, the findings showed that 22% of the respondents found it extremely likely that learning to operate the ERP systems was easy for them, and 17% of the respondents found it extremely likely that it was easy for them to become skillful at using the ERP systems. This combination of findings indicates that most of the end users were experiencing difficulties in using the systems.

As the ERP system end users were using (accepting) the ERP systems, even though most of them found it somewhat difficult to use the systems, it appears that the employees had to use the systems regardless of whether they perceived the ERP systems easy to use. In the context of the TAM, these findings supported the indication that the original TAM (Davis, 1989) needs adjusting, particularly the items in the dependent variable (usage), to reflect the mandatory use of complex information systems. The adjustment would enhance research in organizations where employees must use the provided ERP systems regardless of the extent of their perceptions about the usefulness and ease of use of the systems. An adjustment is necessary because most of the employees used (accepted) the ERP systems, even though the majority of them found the systems difficult to use. This adjustment could contribute to theory advancement and subsequently might result in the development of more robust models for assessing complex systems such as ERP systems that require mandatory use in organizations. The

overall scores of the perceived ease of use construct in the TAM survey instrument regarding the psychometric characteristics for the aggregated scale scores further reinforced the reliability of the perceived ease of use scale.

Limitations of the Study

The execution of the data collection and analysis highlighted a few limitations in this study. As perceptions may have changed over time, the cross-sectional design was inherently not very robust due to its methodological limitations. The recruitment strategy may have contributed to limitations in this study. Because the participants were only from the SurveyMonkey American audience, this strategy limited the possibility of including participants who were not registered members of the SurveyMonkey American audience. Therefore, even with the meticulous and efficient use of the purposive sampling strategy to recruit a diverse representative sample, the true representativeness of the sample to the population of interest might still be questionable. Furthermore, as random selection was a limitation in the purposive sampling, the potential for selection bias existed in the recruitment strategy.

Even though the large sample size permits generalizability of the findings, the results may not be generalizable to individuals other than end users in the United States. Additionally, the findings may not be generalizable to users during other moments in time. As the results indicated that the ERP systems involved mandatory use, the results may not be generalizable to ERP systems where use is voluntary. Another limitation of the study was that the self-report format of user acceptance measures might have threatened the internal validity of the study. The precision of the degree to which the self-

reported responses represented actual manner of conduct was controversial because user acceptance measures occurred as self-reports instead of objectively measured. Furthermore, I used the same questionnaire for measuring perceived ease of use to measure perceived usefulness as well as to facilitate the recording of the self-reported frequency of ERP system usage. Accordingly, the chance of having a halo result and findings vulnerable to common method bias were limitations in this study.

A further limitation in this study arose from the conceptual foundation of the TAM. Although TAM (Davis, 1989) is a valid and reliable model for assessing user acceptance of information technology, the TAM is not sufficiently comprehensive to cover all the possible factors that may be influencing user acceptance of complex information systems such as ERP systems. As a result, unknown confounding variables may have damaged the internal validity of the study. The survey questions in the TAM were limited and closed-ended, which limited the range of responses and may have affected construct validity as well as introduced bias. Moreover, the research design did not include follow-up interviews. Finally, the ERP system end users were from diverse backgrounds consisting of different experiences, ages, and values. Therefore, the differences of the ERP system end users may have significantly affected the perceptions of the participants.

Recommendations

The results of this study generated several recommendations for further investigation that may address the strengths and limitations highlighted in the present study. The contradictory findings surrounding the second research question regarding

perceived ease of use indicated that the ERP system end users were using the ERP systems in mandatory settings and not in voluntary environments. The findings could mean that most of the ERP system end users preferred not to use the systems due to the difficulty of use implied in their responses, but they used the systems only because they had no choice for alternatives. For that reason, future researchers should examine the factors that influence user acceptance of ERP systems in mandatory settings where employees must use a specific system due to organizational mandates. Although TAM serves as a base for further research, researchers should adjust or extend TAM to include other variables such as subjective norm in the TRA, complexity in the theory of diffusion of innovations, computer self-efficacy, computer experience, and voluntariness in an attempt to assess user acceptance of ERP systems accurately in mandatory settings.

Another recommendation is that future researchers should examine different theoretical frameworks such as TRA, TPB, innovation diffusion theory, and task technology fit or a combination thereof in a similar study in which there is differentiation between mandatory and voluntary usage of ERP systems in the model. These frameworks should also consider other factors that may influence user acceptance of ERP systems. As it is difficult to establish temporal priority in cross-sectional designs because researchers collect the data at one moment in time, future researchers could use a longitudinal research design to capture acceptance levels and confirm relationships between variables over time. Additionally, continuous reciprocal interactions between ERP system end users are essential in learning to use the various modules and regular updates to the

systems. Therefore, the longitudinal design may deal with the temporal dynamics surrounding user acceptance of ERP systems to investigate the issue fully.

Future researchers should also consider using a qualitative approach to conduct an in-depth investigation into user acceptance of ERP systems in the natural setting of the end users to develop a comprehensive account with reports from multiple perspectives. The qualitative approach could involve investigating the influence of user and technology characteristics, as well as contextual factors such as organizational culture and top management support, as all these factors may influence individual activities in terms of ERP system usage. Furthermore, the issues with ERP systems are complex and using either qualitative or quantitative strategies separately might not be enough to deal with the complexity. Integrating quantitative and qualitative approaches might provide more insight into the factors influencing user acceptance of ERP systems than either approach by itself. An integrated approach might contribute to a more comprehensive understanding about user acceptance of ERP systems, whether or not the setting is mandatory or voluntary.

The survey for future research involving a nationwide study should extend beyond the limits of a single forum such as the registered members of the SurveyMonkey American audience. This will enhance the representativeness of the sample to the population of interest and increase the potential generalizability of the findings. Additionally, a future quantitative research study should involve the random sampling strategy to ensure each ERP system end user has an equal probability of selection. The random sampling will provide a good potential to obtain a representative sample of the

target population. Instead of using usage as the measure for user acceptance, another area for future research should be to find other ways to measure user acceptance, as there might be areas where the frequency of use is not pertinent to determining user acceptance of ERP systems. Moreover, future researchers should investigate factors that contribute to perceived ease of use and perceived usefulness.

Because the failure rate of ERP systems is more than 60% (Maas et al., 2014), another recommendation for future research is to find out which factors are responsible for the highest success as well as the highest failure rates. This study could include financial returns and managerial practices to determine which managerial practices give the highest potential for success and failure of ERP systems pertaining to user acceptance. Furthermore, based on the persistent failures of ERP systems associated with user acceptance, future research should involve investigating outside the limits of current user acceptance of ERP systems literature to provide insight into other possible reasons for the persistent lack of user acceptance of ERP systems. Finally, the cumulative results from this study, along with refined models in the future, might assist in arriving at a more comprehensive understanding of user acceptance of ERP systems.

Implications

Although several researchers such as Al-Jabri and Roztocki (2015), Hou (2014), Sternad and Bobek (2013), and Zhang et al. (2013) conducted studies in various countries around the world, scholarly empirical literature on the routine use and acceptance of ERP systems in the United States is sparse. This lack of scholarly studies illustrated the urgent need for empirical researchers to examine users' acceptance of ERP systems in the

United States. This study narrows the gap in the current user acceptance of ERP systems literature and the findings include several valuable implications.

Implications for Social Change

The findings of this study have substantial implications regarding positive social change. Researchers and practitioners need the valuable information generated from the results of this empirical study to serve as a catalyst for improving social conditions. The findings revealed that more than 90% of the respondents (employees) agreed that the ERP systems increased their productivity and more than 88% agreed that the ERP systems improved their job performance. Leaders can use these findings to understand how perceptions about the usefulness of ERP systems can affect the performance of employees and create efficiencies in organizations. At the same time, 15% of the respondents found it extremely likely that the ERP systems was easy to use, and 12% found it extremely likely that it was easy to get the ERP systems to do what they wanted the systems to do. Leaders can reflect on these results and develop strategies to improve the perceived ease of use of the ERP systems to enhance user acceptance and further improve job performance. An increase in job performance as well as productivity and subsequently profitability will increase resources to promote corporate social responsibility, which is an agent for achieving positive social change.

When the leaders in organizations achieve improvements in productivity, increases in profitability, and subsequent increases in funding for social programs, they may give priority to social investments and invest in socially beneficial programs. Strategies informed from the findings of this study can therefore lead to initiatives such

as funding school programs for children, supporting opportunities for youth through training, and philanthropic donations that may improve the social conditions of citizens in the society. A more profitable organization may provide more jobs, pay more taxes, purchase materials and services, and consequently contribute to improvements in the social conditions of individuals. Positive social change may also manifest in society through reduced costs of goods to consumers due to the efficiency that appropriately used ERP systems introduce in organizations. Therefore, the findings from this study may create the potential to advance the worth and growth of organizations, as well as improve human and social conditions in society.

Theoretical Implications

A few theoretical implications emerged from the results of this study. The finding that there was a positive relationship between perceived usefulness and end user acceptance of ERP systems supported previous results from the perceived usefulness scale in the TAM. This result added to the understanding of the perception that influences the usefulness and acceptance of ERP systems. However, the finding that there was no relationship between perceived ease of use and end user acceptance of ERP systems was contrary to previous results from the perceived ease of use scale in the TAM. This finding, in combination with the frequency of use statistics, indicated that the employees had to use the ERP systems and they apparently had no alternative systems to do their jobs. As a result, this study created a valuable opportunity to advance theory in user acceptance of ERP systems that will take into account the use of ERP systems in both mandatory and voluntary settings.

The findings of this study also indicated that researchers needed to develop and extend the current theory to build on the theoretical relationships among the variables. These results provided a foundation for advancing the validation of an ERP system success model after gaining further theoretical insights. The recommendation for future research to use additional variables such as complexity and voluntariness may contribute to theory advancement and subsequently might result in the development of more robust models for assessing complex ERP systems. The Cronbach's alpha obtained for the perceived usefulness as well as perceived ease of use scales in this study corresponded with those obtained in the original TAM and further reinforced the reliability of the scales. As a whole, the results of this study contributed to the body of theoretical knowledge on user acceptance of ERP systems during the routine stage in the postimplementation phase of the ERP system life cycle. As user acceptance of ERP systems in the United States during the routine stage has received limited attention, the results of this study emphasized the need for theory development and further research in this area.

Recommendations for Practice

Several beneficial recommendations for practice developed from the findings of this study. The leaders of organizations should take into account the findings of this study to improve user acceptance and business performance. The difficulty uncovered in using the ERP systems should undergo investigation within organizations from which managers should adjust their management practices and implement intervention programs to improve the ease of use of the systems. The managers should emphasize the functionality

of the ERP systems and assist users to become more proficient in using the systems, which may improve productivity and subsequently improve their competitive advantage in a rapidly changing global business environment. As most of the studies on user acceptance of ERP systems were from the perspectives of top management or consultants, the findings from this study highlight the importance of the perspectives of end users from whom managers should obtain valuable insights to improve the efficiency and productivity of their organizations.

Enterprise resource planning system consultants should use the findings to help organizational leaders improve the difficulties that end users encounter in using the systems to improve the efficiency and effectiveness of their systems. Academics should use the results to analyze further user acceptance of ERP systems and particularly the perceived ease of use of the systems in mandatory settings. Educators should upgrade how they educate prospective ERP system end users and design new proficiency criteria that will make end users more skillful in using ERP systems. Similarly, employers should adjust their entry requirements to ensure that new employees have the basic skills to become competent in using complex systems within a short period. System designers should use the findings from this study to design systems that are easier to use so that employees can appreciate the technology more easily and effectively.

Leaders should become aware of postimplementation risks that arise from difficulties in using ERP systems during the later stages of the system life cycle and use this awareness to adopt training programs designed to enable organizations achieve the full benefits of the complex and expensive systems. Enterprise resource planning vendors

such as SAP, Oracle, and Microsoft offer the training and certification programs that managers should use to improve the proficiency of their ERP system end users. The investment in professional training during the later stages of the ERP system life cycle has the potential to improve the return on investment of the expensive ERP systems significantly and possibly lengthen the life cycle of the systems. Therefore, stakeholders who have already implemented ERP systems and those who are considering replacing their legacy systems should adhere to the recommendations from this study.

Conclusion

This quantitative cross-sectional survey study examined the factors influencing user acceptance of ERP systems in the United States during the routine stage of the postimplementation phase of the ERP system life cycle. The study involved testing the TAM (Davis, 1989) that relates the factors influencing user acceptance of information technology to user acceptance of information technology. The population of interest was employees who have been using ERP systems as end users to perform their jobs in organizations throughout the United States. Responses from 97 participants, who were representative of the target population and associated with SurveyMonkey, comprised the final analysis.

The results showed a positive relationship between perceived usefulness and end user acceptance of ERP systems in the United States. This finding was consistent with the results of research in other countries and further validated the perceived usefulness construct in the TAM. However, the findings also indicated there was no relationship between perceived ease of use and end user acceptance of ERP systems in the United

States. This result contradicted the TAM and the findings of other studies that employed the perceived ease of use construct in the TAM. The findings indicated that using the ERP systems was mandatory for the employees to perform their jobs whether or not they perceived the systems as easy to use. Additionally, the results revealed that female respondents perceived ERP systems to be more useful and easier to use. The findings also uncovered that younger respondents and respondents with less education perceived ERP systems as being easier to use.

Using ERP systems in organizations is a valuable defensive strategy to reduce costs and improve productivity to address challenges in the present global economy. Enterprise resource planning systems have the potential to improve productivity and profitability, but only to the extent that the end users find the systems useful and somewhat easy to use. This study provided insights about the factors influencing user acceptance of ERP systems in the United States. The findings of this study indicated that the ERP system end users in the United States are experiencing difficulties using the systems, which will prevent organizational leaders from realizing the full benefits of the systems. Leaders can use the results of this study to design strategies to improve user acceptance of ERP systems in both mandatory and voluntary settings.

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Appendix A: Author's Permission to Use Survey Instrument

Request for Permission to use TAM

Fred Davis <FDavis@walton.uark.edu> Wed, Sep 17, 2014 at 1:04 AM
To: Rohan Oldacre <rohan.oldacre@waldenu.edu>

Rohan

Thanks for your request. I consider TAM to be in the public domain, so you have my permission to use it.. You should cite sources, and request copyright permission from journals from where you reproduce figures/diagrams.

Best wishes
Fred Davis

Appendix B: Publisher's Permission to Use Survey Instrument

MIS Quarterly
Carlson School of Management
University of Minnesota
Suite 4-339 CSOM
321 19th Avenue South
Minneapolis, MN 55455

February 13, 2015

Rohan Oldacre
Ph.D. Candidate
Information Systems Management
School of Management and Technology
Walden University

Permission to use material from
MIS Quarterly in Dissertation Research

Permission is hereby granted for Rohan Oldare to use material from "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," Fred D. Davis, *MIS Quarterly* (13:3), September 1989, pp. 319-340, specifically the survey instrument (or an adaptation thereof) in a doctoral dissertation titled "Empirical Examination of User Acceptance of ERP Systems in the United States" being completed at Walden University.

In addition to the citation information for the work, the legend for the material should include

Permission to use this adaption also extends to distribution of the dissertation through ProQuest Information and Learning in electronic format, and to any academic journal articles resulting from the dissertation.

Janice DeGross

Digitally signed by Janice DeGross
DN: cn=Janice DeGross, o=MIS Quarterly, ou, email=degro003@umn.edu, c=US
Date: 2015.02.13 10:17:09 -06'00'

Janice I. DeGross
Manager

Appendix C: Permission to Use the SurveyMonkey Platform

SurveyMonkey Inc.
www.surveymonkey.com

For questions, visit our Help Center
help.surveymonkey.com

Re: Permission to Conduct Research Using SurveyMonkey

To whom it may concern:

This letter is being produced in response to a request by a student at your institution who wishes to conduct a survey using SurveyMonkey in order to support their research. The student has indicated that they require a letter from SurveyMonkey granting them permission to do this. Please accept this letter as evidence of such permission. Students are permitted to conduct research via the SurveyMonkey platform provided that they abide by our Terms of Use, a copy of which is available on our website.

SurveyMonkey is a self-serve survey platform on which our users can, by themselves, create, deploy and analyze surveys through an online interface. We have users in many different industries who use surveys for many different purposes. One of our most common use cases is students and other types of researchers using our online tools to conduct academic research.

If you have any questions about this letter, please contact us through our Help Center at help.surveymonkey.com.

Sincerely,

SurveyMonkey Inc.

Appendix D: SurveyMonkey's Targeted Audience Service

Use of SurveyMonkey Audience for Academic and Research Purposes is Permitted

SurveyMonkey Audience is a service provided by SurveyMonkey which helps customers reach a targeted audience for their surveys. We recruit survey takers from the millions of people who answer SurveyMonkey surveys each month to help customers target the people they need for their survey projects. Recruitment of potential survey takers occurs through our member site, SurveyMonkey Contribute (https://contribute.surveymonkey.com).

This note is to confirm that SurveyMonkey Audience is commonly used by students, researchers and academics to collect data for their research.

SurveyMonkey Audience will run a customer's survey so long as it meets our survey length and other compliance requirements, and we are able to fulfill the customer's targeting requirements at the time of launch. Please refer to http://help.surveymonkey.com/app/answers/detail/a_id/5809 for more information about these requirements.

Appendix E: TAM Survey Instrument (Davis, 1989)

Part I – Demographic Information

1. In what state do you currently work?

Alabama

2. Are you male or female?

- Female
- Male

3. What is your age?

- 18-20
- 21-29
- 30-39
- 40-49
- 50-59
- 60 or older

4. What is the highest level of school you have completed or the highest degree you have received?

- Less than high school degree
- High school degree or equivalent (e.g., GED)
- Some college but no degree
- Associate degree
- Bachelor degree
- Graduate degree

5. Which of the following best describes the principal industry of your organization?

Advertising & Marketing

6. What type of ERP system is in use at your organization?

- Don't know
- SAP
- Oracle
- Microsoft Dynamics
- Epicor
- Infor
- Sage
- In-house Developed System
- Other

Part II – Statements Relating to User Acceptance of ERP Systems

7. Using the ERP system in my job enables me to accomplish tasks more quickly.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

8. Using the ERP system improves my job performance.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

9. Using the ERP system in my job increases my productivity.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

10. Using the ERP system enhances my effectiveness on the job.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

11. Using the ERP system makes it easier to do my job.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

12. I find the ERP system useful in my job.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

13. Learning to operate the ERP system is easy for me.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

14. I find it easy to get the ERP system to do what I want it to do.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

15. My interaction with the ERP system is clear and understandable.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

16. I find the ERP system flexible to interact with.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

17. It is easy for me to become skillful at using the ERP system.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

18. I find the ERP system easy to use.

- Extremely likely
- Quite likely
- Slightly likely
- Neither
- Slightly unlikely
- Quite unlikely
- Extremely unlikely

19. How often do you use the ERP system?

- Don't use at all
- Use less than once each week
- Use about once each week
- Use several times a week
- Use about once each day
- Use several times each day

Prev Next

Appendix F: Debriefing Form

Thank you for your participation in this study. Your participation is greatly appreciated.

Purpose of the Study:
I previously informed you that the purpose of the study is to test the theory of Technology Acceptance Model (TAM) relative to examining the attitude of employees toward using ERP systems to perform their jobs in organizations throughout the United States.

Final Report:
If you would like to receive a copy of the final report of this study (or a summary of the findings) when it is completed, please feel free to contact the researcher.

Contact Information:
If you have any questions or concerns regarding this study, its purpose or procedures, or if you have a research-related problem, please feel free to contact the researcher, Rohan Oldacre, via email at Rohan.oldacre@waldenu.edu.

References for Additional Reading:
If you would like to learn more about the user acceptance of information technology, please see the following references:

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Quarterly, 13(3), 319-340.

Davis, F.D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioural impacts. International Journal of Man-Machine Studies 38, pp. 475-487.

Please print or save a copy of this form for your future reference. Once again, thank you for your participation in this study.

Click "Done" to submit and exit the study.

Prev Done