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Critical Success Factors for ERP Implementation:

Two Directions Focusing on Employee Perceptions in Qatar

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ABSTRACT

Due to the high failure rate of enterprise resource planning (ERP) systems, implementation issues have been highly addressed in the literature. Two major directions were followed in the literature focusing on technology adoption theories and focusing on the critical success factors (CSF) of ERP implementation from organizational perspectives. However, few studies covered both directions in one study. This study extended the TAM with computer self-efficacy (CSE) and explored the major CSF that influence the implementation process of ERP systems in a Qatari environment. Three hundred twenty-one valid responses were collected from employees working in 40 different organizations with varied business lines in Qatar. Results indicated that perceived usefulness, perceived ease of use, and computer self-efficacy were significant predictors of behavioral intention ($R2 = 0.56$). Major findings of the descriptive analysis related to the CSF concluded that top management support followed by users' training and project management process are the major ones perceived by the sample.

KEYWORDS

Computer Self-Efficacy, Critical Success Factors, Enterprise Resource Planning, ERP, Qatar, TAM, Technology Acceptance Model

1. INTRODUCTION

Information systems support business through realizing value and increasing business processes efficiency. Users are important component of Information Systems (IS) as they use IS for collecting, processing, storing and using information for decision-making (Hassan, Mulyani, & Anugrah, 2016). Organizations are investing in enterprise resource planning systems or ERP systems to gain market value, improve their efficiency and effectiveness, or gain a competitive advantage (McKeen & Smith, 2015). A study conducted by Henderson, Blaylock, Lollar and Beheshti (2014) defined ERP system as a set of business modules that connect functional areas like finance, accounting, manufacturing, procurement and customer service into an integrated single system with a shared information platform throughout the whole organization. Research suggests that ERP systems are crucial for the effective

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and efficient supply chain management (Reitsma & Hilletofth, 2018). The authors argue that using ERP systems is essential for an organization that intends to remain competitive in the local and international markets.

Even though enterprise resources planning (ERP) systems have received great attention from experts and researchers, the implementation failure rates are still substantial (Cheng, Yang, Han & Song, 2007). According to Rajan and Baral (2015) many of these systems fail, where such failures are associated with technical and behavioral factors encountered during their implementation or use. Based on that, the authors emphasize the need for organizations to comprehend the adoption of such systems from a users' perspective to ensure they reap tangible benefits from using them. Another study reported challenging processes related to users and organizational requirements when implementing ERP systems (Ismail & Zamre, 2015). In order to ensure successful ERP implementation and to prevent failure, it is important to take into consideration all stakeholders involved in the process. The implementation of these systems entails the effective involvement of the entire organization (Ağaoğlu, Yurtkoru & Ekmekçi, 2015).

The first challenge mentioned requires organizations to facilitate the successful adoption of users to start realizing the value behind ERP systems. It is important to raise users' awareness regarding the value of such systems. The most popular theory guiding technology adoption is the technology acceptance model (TAM, Davis, 1989). The model is founded on two major constructs: perceived usefulness and perceived ease of use. Our literature supported the continuous influence of perceived usefulness and ease of use in predicting users behavior. In addition many studies tried to explore the model and extended it with many other variables, where the TAM was supported in most cases. This study tried to build on the TAM by extending it with self-efficacy. Such conceptualization integrates two major theories the TAM and the social cognitive theory (SCT, Compeau & Higgins, 1995). Based on that, our first research question is: *What are the major factors influencing the behavioral intention to use ERP systems?*

The implementation of ERP systems is a challenging process, where many functional areas intersect and operational processes need to be streamlined to make such systems a reality. The second major contribution of this study is the investigation of employees' opinion regarding the critical success factors that would lead to the success of ERP implementation. Such conceptualization is important as some criticize building an argument that supports the success of ERPs based on users adoption. The implementation process is critical to the success of the system, where organizations need to be aware of such factors to overcome the many challenges faced. Based on that, our second research question is: *What are the major critical success factors influencing the ERP implementation process?*

The two research questions are complementary and portray the overall picture of a successful and value added ERP system. The content analysis of both directions complement each other and adds more to the value of this research. Based on the previous introduction, this paper will determine the factors influencing the adoption of ERP systems and the critical success factors of ERP system's implementation from employees' perspective in Qatar. ERP users targeted in this study are mainly employees working in organizations in Qatar. This study is one of few studies that addressed the two direction with one study and one sample (which provides a pivoted view of the issue, and portrays a unified overall image of the success and value of ERP system). This study also is the first that addresses this topic in Qatar with a real ERP system users, who can evaluate our statements offered more accurately.

The following section will explore the literature related to the topic. Section 2 is divided into sub-sections based on the adopted variables from the TAM, the extension from the SCT, and the CSFs related to ERP system implementation. The section also starts by an introduction of ERP systems and their benefits, features and implementation process. The third section will describe the research method, followed by data analysis and discussion in section four and five. Finally, conclusions and future work are depicted in section six.

2. LITERATURE REVIEW

This study started by exploring one of the popular and technology acceptance models (TAM) and explored the literature for an extension. Self-efficacy (adopted from the social cognitive theory) was utilized based on the literature review. The following sections explore the literature related and how we concluded to the CSF list.

2.1 ERP Systems (Benefits, Features, and Implementation)

Enterprise Resource Planning systems (ERP) were first used in 1990 and denoted the *"special market segment of business software referring to integral, integrated, modular packages of application software intended to support line transaction processing of business information systems"* (Garača, 2011, p. 23). In this regard, the author indicates that ERP systems are used for offering support for business processes to achieve higher effectiveness or efficiency. ERP systems are essential for ensuring that the necessary information needed for managing complex business processes or systems are available. The author indicates that the effectiveness or speed of implementing a technology ensures that the company gains competitive advantage since the success an organization arises from its ability to perform the required activities. The author also indicates that the adoption of ERP systems is influenced by the theoretical knowledge users possess, where users of ERP systems require two types of knowledge and they include theoretical knowledge of information technologies and the use of ERP systems.

Another study by Calisir, Altin and Bayram (2009) examined the factors affecting users' behavioral intentions for using ERP systems. The authors indicate that organizations are adopting of ERP systems to acquire a competitive advantage over others. They, like Garaca, define ERP systems as "*integrated, customized, packaged software-based systems that handle the majority of system requirements in all functional areas, such as finance, human resources, manufacturing, sales and marketing*" (Calisir et al., 2009, p. 597). The significant attributes that ERP systems possess include the power for sharing common practices and data across enterprises and producing and accessing real-time information. The authors indicate that projects for implementing ERP systems in organizations are likely to fail if poor communication exists and the inability of the top management in an organization to offer support. They add to the list: inadequate training, underestimation of the resources required for utilizing such systems, and the resistance from employees.

Abu-Shanab and Saleh (2014) suggested that the performance of an ERP system is measured by the system's effectiveness, quality, and efficiency. The authors argue that ERP systems are implemented to improve operations and to ensure the better use of material, financial and information resources. These activities are shown as aiming at improving customer satisfaction and organizational performances. In successfully implementing ERP systems, four key stages have been proposed and include the steps of readiness assessment, re-engineering business processes, selecting ERP systems and applying them. In turn, the authors argue that the successful implementation of ERP systems requires objectives, the embedding of technology or organizational dimensions into an information system, and the resolutions to the problems experienced. Further, they suggest that implementing an ERP system requires that the management in the organization explores and analyzes the processes and pay attention towards the issues positively influencing financial measures. The failure of adopting or implementing the ERP systems in an organization is also considered to be associated with vendor support and employee education. Finally, ERP systems need to be flexible so that they can increase an organization's ability for adapting to sudden changes that grant them a competitive advantage (Abu-Shanab & Saleh, 2014).

Rajan and Baral (2015) suggest that ERP systems are software systems having the capability of integrating business processes in various functional areas like sales, manufacturing, human resources, customer services, and budgeting among others. They also suggest that ERP systems have benefits that include reducing the volume of data entered in a system, ensuring upgradability of systems, adaptability, portability and the application of best practices. Similar perspective was introduced by

Bourgault, Françoise, and Pellerin (2009), where they argued that ERP systems were essential for integrating the overall information needs of a company into one system.

"The decision to adopt a new technology is influenced by users' initial perceptions of the technology characteristics" (Govindaraju, Salajar, Chandra, and Sudirman, 2015, p. 1292). Factors that have been proposed include compatibility, complexity, technological innovativeness, system performance, system learnability, perceived trust, output quality, perceived fit, and data quality. In this regard, they have defined the use of ERP systems as the extent that users utilize the system to support tasks they are required to perform. Govindaraju et al. (2015) describe ERPs dependability as the extent that an individual believes he can rely on the services or functions delivered by these applications for completing his/her tasks. In this regard, the technology characteristics influencing the adoption of ERP systems include predictability, dependability, and the ability to meet users' needs. Subsequently, they indicate that top management's support or commitment is a major factor in influencing individual's beliefs concerning a technology being useful. In short, ERP systems could extend the management reach to both internal and external processes and partners. and boost the automation level and business value.

2.2 Technology Acceptance Model

Intention to use has been given considerable attention in the literature, where several models were developed based on social psychology discipline. Fishbein and Ajzen (1980) proposed the theory of reasoned action (TRA), and after few years, Ajzen (1985) proposed the theory of planned behavior (TPB), where he extended the perspective of the TRA. Davis (1989) proposed the technology acceptance model (TAM), where it also extended the TRA, where he focused more on the acceptance of information systems (Amoako-Gyampah & Salam, 2004). TAM is an extensively used information system model for explaining the adoption of computing systems by the end user (Rajan & Baral, 2015; Igbaria, Guimaraes & Davis, 1995). It proclaims that whenever users are introduced to some new technology, their perceived usefulness (PU) and perceived ease of use (PEOU) will affect their decision to use it (Alok & Mocherla, 2016). Perceived usefulness (PU) reflects to what extent a user considers using certain system could boost performance, and perceived ease-of-use (PEOU) reflects to what extent a user considers using certain system wouldn't need any effort (Davis, 1985). Behavioral Intention reflects the extent to which an individual has built a plan in mind to do or not some certain behavior in the future such as using a new technology (Davis, Bagozzi & Warshaw, 1989). Attitude was included in TAM, then was excluded in later propositions (Davis et al., 1989).

Later the TAM was extended by Davis and his student with more than one variable like subjective norms, voluntariness, image, job relevance, experience, and results demonstrability (Venkatesh & Davis, 2000). Lately, TAM has been used to explain the implementation complexity and adoption issues of end users and stakeholders of ERP systems. Recent researches have applied the components of TAM as part of the fundamental constructs in an attempt to understand success stories of ERP implementation (Amoako-Gyampah & Salam, 2004; Calisir et al., 2009). Rajan and Baral (2015) suggest that organization will not reap the benefits of ERP systems in cases where the implementation of ERP systems fails because of users' adoption. The claim that PU has positive associations with an ERP use. Subsequently,

Song, Han, Cheng, and Zhang (2007) indicated that perceived usefulness and perceived ease of use are directly responsible for affecting the attitudes of users towards ERP system. Nah, Tan and Beethe (2005) recommended that the TAM should be revised or extended to explain end-users' acceptance of complicated and advanced information technology (such as ERP). A study by AlHirz and Sajeev (2013) revealed that communication and training influenced shared beliefs among computer users. They also reported that perceived compatibility and PEOU had indirect and direct effect on adoption, but PU was mediated by a user's attitude. Similarly, a study by Mahindroo, Singh and Samalia (2013) revealed that PU, system flexibility and the PEOU are major predictors of ERP

adoption. In this regard, these authors suggested that TAM was responsible for impacting users' satisfaction from using ERP systems.

Alhirz & Sajeev (2013) concluded that experience was not responsible for influencing adoption of ERP throughout the Middle-East region. Similar studies indicated that TAM is more parsimonious, predictive, and robust than other theoretical models and has been widely used by IT researchers (Sternad & Bobek, 2013; Rajan & Baral, 2015; Song, Han, Cheng & Zhang, 2007).

Recent studies supported the role of PU and PEOU in explaining the way that technology is accepted or used. Macedo (2017) used effort expectancy and performance expectancy and social influence to predict behavior. Liu and Wang (2010) examined the TAM and concluded that behavioral intentions were influenced by an individual's attitude toward the system. Similarly, Igbaria et al. (1995) emphasized the use of PU and PEOU of using a system as the critical variables for determining the acceptable level of these technologies. The authors also suggested that TAM has various advantages that include being easier and simpler to apply but only supplies general information concerning the system. In summary, PU and PEOU are strong predictors (indirect or direct) of the computer system's usage (Sternad & Bobek, 2013; Rajan & Baral, 2015; Song, Han, Cheng & Zhang, 2007).

Many theories tried to extend the TAM, but could not escape from its robustness embedded in the two major constructs mentioned. In 2003, Venkatesh et al. (2003) tried to comprehensively summarize the previous literature (8 theories and models) into one model and concluded to 3 major predictors of behavioral intentions: performance expectancy (perceived usefulness surrogate), effort expectancy (perceived ease of use surrogate), and social influence. The authors assumed that perceived facilitating conditions will influence use behavior directly. Our study abandoned social influence (or subjective norms in other theories) based on the direct influence in an organization context. Employees will not be influenced by their colleagues of families when using a system (or embracing it) in an organizational settings. They will be encouarged by its usefulness and ease of use (complexities faced.)

2.3 Self-Efficacy

Self-efficacy is the key component in Bandura's theory of social learning (Bandura, 1977; Bandura, 1978), which Simply indicates one's belief in his or her ability to carry out some particular task. It concerns the assessment of how well an action can be taken to deal with prospective situations (Bandura, 1982). Individuals assess their skills and capabilities, then they accordingly manage their choices and efforts (Bandura, Adams, Hardy & Howells, 1980). In general, people who are expected to have high-level efficacy are more likely to successfully accomplish certain tasks. Moreover, individuals with high-levels of self-efficacy are more hard-working than individuals with low-levels of self-efficacy (Robert & Albert, 1989). Scholars have frequently detected that the performance gets better with better self-efficacy (Bandura, 1982).

There are three dimensions of Self-efficacy. The first one is the *magnitude* of self-efficacy, which can be translated into the difficulty extent of a task that an individual believes she or he is able achieve (Gist, 1987). Magnitude reflects the level of expected capability. The second one is *strength*, which indicates the confidence a person has in his or her capability to do a task. The third is *generalizability*, which refers to the extent to which Self-efficacy expectations are generalized in different situations or limited to particular ones. Some people may believe that they can perform certain behaviors, but only under certain circumstances, while others may believe that they can perform specific behavior under any circumstances (Compeau & Higgins, 1995).

Self-efficacy is a key predictor of system use, and in helping users obtain skills related to efficient computer use (Shih & Huang, 2009). Venkatesh and Davis (1996) pointed out that the mechanism of training which is set to enhance self-efficacy is more likely to result in user acceptance. Compeau and Higgins (1995) suggested that self-efficacy and the use of computers were related, and self-efficacy could be defined by magnitude, generalizability, and strength. Hence, the individuals who exhibit high self-efficacy were seen as using computer systems more. Further, Rajan and Baral (2015)

indicated that among the individual traits that influence the use of the ERP system, there are traits associated with computer self-efficacy. In this case, the authors suggested that self-efficacy is the user's confidence in using technology, or their judgment of the ability they possess to use a system. Hence, they indicated that self-efficacy plays a vital role in expounding on usage intentions utilizing PU and self-efficacy which were also strong determinants of PEOU and behavioral intention.

Kwahk and Lee (2008) argue that readiness for change that users possess is responsible for indirectly affecting the behavioral intentions, and this readiness affects PEOU or PU of a computer system. They asserted that it was the readiness for change that was responsible for explaining the variance in computer system use. In turn, the authors argued that PEOU and PU had positive effect on use intentions for ERP systems. They added that self-efficacy was not solely responsible for affecting the technological attributes a system possessed, but other factors were responsible for doing so.

Gist (1987) suggested that self-efficacy is the belief an individual possessed about his or ability to carry out a task, and it had the capability of affecting persistence, goal difficulty and expressed interest in specific tasks. The author argued that self-efficacy arose from the attainment of multifaceted linguistic, cognitive, social, or physical skills via the experiences individuals go through. Four information cues were responsible for influencing self-efficacy, and these cues included vicarious experience, enactive mastery, emotional arousal, and verbal persuasion. In turn, Gist argued that it was the absolute mastery of skills that increased self-efficacy, whereas negative experiences were responsible for decreasing self-efficacy. Finally, a relation between performance and self-efficacy was also supported (Gist, 1987).

Self-efficacy was also associated with users' satisfaction with computer systems, where the study utilized social influence as a moderator (Abu-Shanab et al., 2003). The study utilized responses from 352 subjects filling a survey that included the items of the study. Results showed that higher levels of self-efficacy are associated with higher users' satisfaction and better performance. Finally, social factors within an organization did not have any moderating influence.

Both previous studies indicates that self-efficacy had the capability of affecting an individual's choice of activities and settings, where individuals possessing low self-efficacy levels engaged in less coping activities. Subsequently, the works presented by Gist (1987) suggested a relationship existed between performance and worked motivation and self-efficacy. Bandura (1982) argued that self-efficacy was responsible for assisting in accounting for diverse phenomena like the levels of physiological stress reaction, despondency towards failure experiences and career pursuits among other events. In this regard, Bandura indicated that perceived self-efficacy is concerned with the judgments made about how an individual could carry out specific actions that were required in dealing with various prospective situations. Bandura indicates that the decisions individuals have concerning their self-efficacy are responsible for determining how much or how long effort is expended in facing aversive experiences. Bandura concluded that the higher the perceived self-efficacy an individual possessed, the greater was their performance accomplishment.

2.4 ERP Critical Success Factors

Past research has mainly focused on the critical success factors (CSFs) for implementing enterprise resources planning (ERP) systems that include personal and organizational aspects (Song et al., 2007). The authors suggest that studies on CSFs focused on various issues like: IS planning, requirement analysis, and project management. They claim that CSFs are those "factors which influence the implementation effectiveness of an ERP system" (p. 6255). Hau and Kuzic (2010) asserted that "the adoption and implementation of ERP systems in organizational contexts have been widely studied at different levels of analysis" (p. 178). They also suggest that the high failure rates and difficulties experienced when implementing ERP systems have been widely investigated in the literature. In addition, the authors suggest that various studies have also been implemented with the aim of identifying the CSFs experienced in implementing ERP systems. They cite a survey conducted by

Fortune on 1000 CIOs probing their perceptions regarding the topic, where they indicated that "change management was ranked as one of the top five factors for the success of ERP implementation".

Hawking, Foster and Stein (2005) reported that the major issues affecting ERP implementation revolved around change management. However, other studies reported other CSFs in addition to change management (Ngai, Law & Wat, 2008). The issue of change management is closely related to the uncertainty and insecurity perceptions of employees. Other reported factors affecting ERP implementation include top management support, vender's support, consultant's competence, user's support, IT capability, and project leadership (Abu-Shanab, Abu-Shehab, & Khairallah, 2015). The same study proposed additional factors to ensure the successful implementation of ERP systems like internal audits, project management, interdepartmental cooperation, and the competency of project team.

Subsequently, Reitsma and Hilletofth (2018) suggest that implementing ERP system is a challenging, expensive, complex and time-consuming activity. There are three types of ERP implementation currently known and they include the phased, big bang or concurrent implementation (Plant & Willcocks, 2007). Many of these projects are not meeting their schedule, cost and scope. In turn, the authors stress that comprehending the CSFs minimizes the chances for failure and offers guidance to an organization during the implementing process. The authors argue that the project team is the most important success factor in shaping ERP success. Still, the authors support the argument made by Abu-Shanab et al. (2015) about the role of top management support. Both studies claim that top management can support the roles and structure of projects, the funding and training required for project implementation, and facilitate users' involvement and education.

This study started by summing all the reported CSFs from the literature (shown in Table 1 with their source citation). A careful look at Table 1 reveals that the top reported CSF in the area of IT projects and specifically ERP systems are: top management support, issues related to systems' requirements, issues related to project management, issues related to project team competency, and change management. In Summary, we can conclude that the list of CSF in ERP environment is long, where previous research focused on a partial list, and did not cover all/most of them. This study is the first to adopt all the factors in Table 1 and build a comprehensive list that will provide important insights for organizations to understand the CSF related to ERP implementation. This research attempt is the first study that tries to investigate such topic in a Qatari environment and see if such issues are also important for real users of ERP systems in Qatar.

Table 1. Reported CSFs reported in the literature

Factor	Slevin & Pinto (1987)	Sumner (1999)	Nah et al. (2001)	Parr & Shanks (2003)	Hawking et al. (2005)	Song et al., 2007	Plant & Willcocks (2007)	Ngai et al. (2008)	Bourgault et al. (2009)	Hau and Kuzic (2010)	Nagpal et al. (2014)	Henderson et al. (2014)	Gajic et al. (2014)	Abu-Shanab et al (2015)	Wijaya et al. (2017)	Reitsma & Hilletofth (2018)	**Count**
Top management support	✓	✓	✓	✓			✓			✓	✓	✓		✓	✓	✓	**11**
Requirement Analysis (& issues)	✓	✓	✓	✓		✓	✓	✓			✓	✓	✓	✓			**11**
Project management	✓		✓	✓	✓	✓	✓				✓	✓		✓	✓	✓	**11**
Project team competencies	✓	✓	✓	✓	✓	✓	✓	✓			✓					✓	**10**
Change management					✓				✓	✓	✓	✓		✓	✓	✓	**8**
Interdepartmental cooperation	✓		✓	✓	✓		✓					✓					**6**
IS planning					✓	✓					✓		✓		✓		**5**
Utilizing Lessons learned	✓		✓	✓			✓								✓		**5**
Training employees		✓										✓			✓	✓	**4**
Vender's support							✓					✓		✓	✓		**4**
Project champion role		✓					✓				✓				✓		**4**
Business process reengineering									✓		✓	✓			✓		**4**
Consultants competence		✓												✓	✓		**3**
Communication issues		✓									✓	✓					**3**
Off-Shelf solutions fit							✓				✓	✓					**3**
Users involvement									✓			✓			✓		**3**
Management Structure		✓											✓				**2**
Resources (Funding + Prersonnel)							✓						✓				**2**
Internal audit					✓												**1**
SLA related issues											✓						**1**
Scope escalation control		✓															**1**
Managing expectations							✓										**1**
Compensation issues											✓						**1**
IT infrastructure adequacy											✓						**1**
Organizational culture												✓					**1**

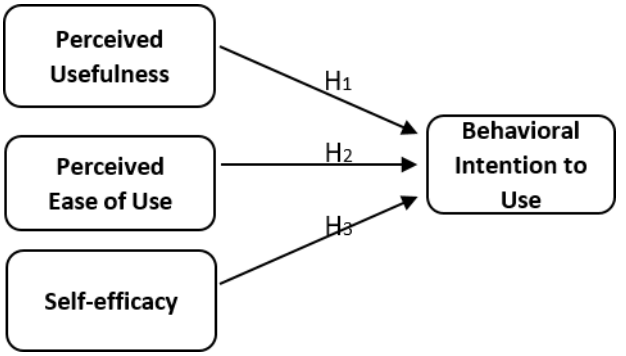
2.5 Research Model and Hypotheses

This paper is the first to investigate the factors that affect the success and failure of enterprise resource planning (ERP) systems in Qatar. The critical success factors (CSF) direction is an exploratory one, where we adopted a list from previous research (check Table 1 for a set of factors reported in the literature) and tried to explore our sample's perception regarding that. Most of the research reported in section 1 and specifically Table 1 used a descriptive and perceptional method to investigate such factors.

The second direction this study followed is the technology adoption domain, where research in this area is popular and many theories are reported in the literature. One of the most popular theories in technology adoption domain is the technology acceptance model (TAM). The model was based on one of the behavioral psychology theories; the theory of reasoned action (TRA, Fishbein & Ajzen 1975). The TRA was extended later to the theory of planned behavior (TPB, Ajzen & Fishbein, 1985). Davis (1989) attempted to build his argument on two major predictors of behavioral intentions and they are perceived usefulness and perceived ease of use. The TAM was based around the technology adoption, which made it a direct link toward exploring ERP adoption. The reported studies in section 2

concluded to a major construct that adds value to our proposition and is adopted from another famous theory (the social cognitive theory, SCT). The SCT was proposed by Bandura (1982) and extended later by more than one study (Compeau & Higgins, 1995). Based on that Self-efficacy was added to extend the TAM, and the proposed research model is shown in Figure 1.

Figure 1. Proposed research model



To investigate the adoption of ERP systems in Qatar, We adopted then TAM and extended it with self-efficacy. The variables incorporated were identified and defined in the literature section. The dependent variable adopted in this study is users behavioral intentions (BI) to adopt ERP systems. BI reflects end-user's attitude towards certain technology (Moon & Kim, 2001). Therefore, it serves as an indicator of how technology is adopted in the organization. Perceived usefulness refers to what extent utilizing ERP by a person would improve his or her performance and hence resulting in a successfully implemented ERP system (Davis, 1989). Similarly, perceived ease of use refers to how an ERP system can be used with minimum effort, thus creating a better intention to use, and thus leading to successful adoption of ERP system (Bodenburg, Garrett & Jong-Ho, 2009). Based on that, we propose the following two hypotheses.

H1: Perceived usefulness has a positive impact on the intention to use ERP System.
H2: Perceived ease of use has a positive impact on the intention to use ERP System.

In the same context, self-efficacy refers to an individual's perceived capability to succeed in using ERP to accomplish business tasks (Abu-shanab et al., 2003; Shih & Huang, 2009). It would considerably affect user's intention to use ERP system (John, 2013). Based on that H 3 is stated.

H3: Self-efficacy has a positive impact on the intention to use ERP System.

3. RESEARCH METHODOLOGY

This research intends to evaluate the factors that influence the adoption or implementation of an enterprise resources planning (ERP) system along with the critical success factors that would make the implementation of such systems possible. The study takes employees perspective into consideration and limited to the Qatari context. Such environment might be generalizable to other Gulf countries and similar ones in the Arab world region. The study started with a thorough review of the literature related to ERP implementation and technology adoption theories. Such review provided the foundation for an empirical study utilizing a survey instrument. It was important to set the stage by going over the

relevant literatures from the same research area, then conducting a survey study to assess the factors influencing the adoption of ERP systems together with ERP critical success factors. The items used in the survey were adopted from previous literatures (Kwahk & Lee, 2008; Abu-Shanab & Saleh, 2014), which strengthen the reliability of the instrument and to assure the validity of its content.

3.1 Research Instrument

An online-based questionnaire was used to probe the perceptions of ERP system users regarding the factors that influence the adoption of ERP systems in Qatar. The survey included three sections. First, an introduction to survey objectives and simple questions about respondents' demographics. Second, a section related to the adoption related items. Finally, a set of items related to the CSF of ERP systems. The list of demographic factors captured by the questionnaire included gender, educational level, position held by the respondent, the type of industry they work in, previous experience with ERP systems, and type of software used. Subsequently, the second section of the questionnaire included perceptional measures capturing statements related to behavioral intention (BI), perceived usefulness (PU), perceived ease of using an ERP system (PEOU), and computer self-efficacy (CSE).

The instrument contributed to the extraction of employees' perspective to the two pivoted view of system success. First, it demonstrated the factors influencing users behavioral intention to adopt ERP systems, such factors are not closely related to the implementation process. Second, the survey tried to utilize the same sample to explore their perceptions regarding the factors related to the implementation success of such systems. Based on the perspective of users' involvement in ERP implementation, it is important to explore the factors that would influence the success of such systems. System success can be viewed as two intertwined directions; 1) the system implementation success and 2) the adoption of users. This study covered both with the same sample.

Under the third section, the questionnaire also comprised items related to the CSF by allowing respondents to check on the best ratings for the critical success factors provided. The score provided by respondents is based on the importance they attribute for each of these CSF to the successful ERP implementation. The ratings used for measuring the critical success factors ranged from 1 to 7 with number 1 being used for denoting the least important contribution to implementation success, while seven denoting the most important contribution to implementation success. According to social sciences research, and in a 7-point scale estimated means between 1 and 3 refers to low perceptions, between 3 and 5 refers to moderate perceptions, and between 5 and 7 refers to high perceptions.

Among the factors provided in the questionnaire are top management support, user training, interdepartmental cooperation and communication, project management process, project manager role, project team competence, and change management.

The questionnaire also included a field for reporting comments on the survey content. Pilot tests were carried out on the questionnaires to determine whether they are understandable to the respondents in Qatar since they will be delivered in English. Online-based survey created using an online application and utilizing an e-mail list. The survey link was sent to all prospective users via their e-mail address, where they can access the survey and fill it accordingly. Online-based surveys are faster, cheaper, more accurate, and easy to use for research. Participation in the survey was voluntarily and anonymous, where no personal identifying information was required. The short description of the items used in the survey is shown in Table 3.

3.2 Sample and Data Collection Procedure

The target population of this study was enterprise resource planning (ERP) system users in Qatar. The sample taken from such population focused on a holding company with many diverse branches (XYZ), where they used ERP systems in their daily activities. The sample was reached an online-based questionnaire, where an online link was distributed using an e-mail list. XYZ is a large Qatari holding group working in diverse business lines such as retail, service, real estate, hospitality, travel service, healthcare, and construction. The company included 40 different businesses in Qatar, 5000

employees, and conducted more than 200 projects. Moreover, the group is using the most popular ERP systems like SAP, Microsoft Dynamics, and Oracle. The survey was distributed to the list of employees using any type of ERP system and after XYZ's approval. Due to our non-disclosure agreement with top management, the name of the company is withheld. Online-based questionnaires were distributed to 800 ERP end-users of the group from all different business firms. A total of 325 responses were obtained, out of which 321 responses were usable, representing a response rate of 40% and forming the sample for data analysis. The data was collected between March 15 to March 20, 2019.

4. DATA ANALYSIS & DISCUSSION

The sample used in this study represented 40 companies and included 321 responses from managers, Chief Executive Officers (CEOs), Chief Information Officers (CIOs), and employees. The demographics of the sample are shown in Table 2 below. The majority of the sample consisted of males (83.5%), working as employees (65.7%), holding a bachelor degree (68.5%), with an age between 20-40 years (74.8%). The majority of sample came from contracting firms, (55.8%). The demographics of data are shown in Table 2.

Table 2. Sample demographics

Age	Freq.	%		Industry	Freq.	%
18-20 Years	2	0.6%		Service	56	17.4%
20-40 Years	240	74.8%		Manufacturing	37	11.5%
More than 40 years	79	24.6%		Information technology	21	6.5%
Total	321	100%		Consultancy	9	2.8%
Gender	**Freq.**	**%**		Retailing and wholesale	19	5.9%
Male	268	83.5%		Contracting	179	55.8%
Female	53	16.5%		Total	321	100%
Total	321	100%		**Education**	**Freq.**	**%**
Position	**Freq.**	**%**		Bachelor	220	68.5%
CEO	6	1.9%		Master	64	19.9%
CIO	3	0.9%		PhD	5	1.6%
Manager	101	31.5%		Other	32	10.0%
Employee	211	65.7%		Total	321	100%
Total	321	100%				

4.1 Descriptive Analysis

The perceptions of respondents regarding the diverse statements included in the survey are important indicators of status of ERP adoption. We estimated the items' means and standard deviations and reported them in Table 3.

Table 3. Items' means and standard deviations (Relational research model)

Behavioural intention (BI)	Mean	Std. Dev
Q8_1: Assuming I have access to the system, I intend to use it	5.73	1.332
Q8_2: Assuming I have access to the system, I predict I would use it	5.46	1.563
Q8_3: I plan to use the system in the future	5.68	1.529
Total Construct - BI	5.62	1.288
Perceived usefulness (PU)	**Mean**	**Std. Dev**
Q9_1: ERP Systems are useful to my work	5.81	1.359
Q9_2: ERP Systems enable me to accomplish transactions quickly	5.66	1.49
Q9_3: ERP Systems increase my productivity	5.68	1.406
Q9_4: ERP Systems enhance my effectiveness	5.69	1.356
Total Construct - PU	**5.71**	**1.266**
Perceived Ease of Use (PEOU)	**Mean**	**Std. Dev**
Q10_1: Interacting with ERP systems is clear and understandable	5.24	1.409
Q10_2: It is easy for me to become skilful using ERP Systems	5.32	1.383
Q10_3: ERP Systems are easy to use	5.18	1.393
Q10_4: ERP Systems are flexible to interact with	5.06	1.48
Total Construct - PEOU	**5.2**	**1.249**
Computer Self-Efficacy (CSE)	**Mean**	**Std. Dev**
Q11_1: I could use ERP System if there is no one around to tell me what to do	4.77	1.672
Q11_2: I could use ERP System if there is someone to assist via phone	4.9	1.638
Q11_3: I could use ERP System if there is a built-in help facility for assistance	5.08	1.667
Q11_4: I could use ERP System if I have used similar systems before	5.29	1.638
Q11_5: I could use ERP System if someone else helps me get started	5.42	1.666
Total Construct - CSE	**5.09**	**1.307**

The majority of item means are considered high (Means between 5-7). The results shown in Table 3 indicate that ERP is perceived useful and easy to use and shows a high individual confidence in using ERP as well, where PU, PEOU, and CSE variables reported high means. Consistency was shown by the values of all items in each construct, where most items were close to each other in value. Similarly, almost all standard deviation values were close to each other in value, which indicates that data is similarly dispersed around the means.

4.2 Reliability and Cronbach's Alpha

Internal consistency is a measure of the cohesion between the items of each variable and it denotes the reliability of each variable (usability of instrument in the future in other studies). Reliability is measured by Cronbach's alpha, which represents a measure of the correlations between items within the same construct. The value recommended would be higher than 0.8. However, no adjustment would be required to an acceptable value above 0.6 (Hair, Black, Babin & Anderson, 2010). Table 4 shows high internal consistency of all constructs (BI, PU, PEOU & CSE). These results confirm the validity of the used instrument and its consistency if used in further research.

Table 4. Cronbach's alpha of the research model variables

Constructs	N	Number of items	Cronbach's alpha
Behavioural intention (BI)	321	3	0.842
Perceived usefulness (PU)	321	4	0.924
Perceived Ease of Use (PEOU)	321	4	0.905
Computer Self-Efficacy (CSE)	321	5	0.849

4.3 Correlations and Regression Analysis

It is important to evaluate the correlations between the variables to find out if there is a possibility of multicollinearity. The correlations shown in table 5 indicate significant bivariate correlations between the dependent variable and the independent variables, this means that the variables are selected accurately and based on a solid conceptual basis. Moreover, the correlations presented in table 5 are within the accepted range ($r<0.85$). If the correlations are over 0.85 a question of multicollinearity could be considered. In addition, regression analysis enables us to test for multicollinearity.

Table 5. Pearson's correlations matrix

Constructs	PU	PEOU	CSE	BI
Perceived usefulness (PU)	1			
Perceived Ease of Use (PEOU)	.723**	1		
Computer Self-Efficacy (CSE)	.476**	.514**	1	
Behavioural intention (BI)	.726**	.616**	.496**	1

The last step is to test the assumed hypotheses in the research model. Multiple regression was used for that purpose. Multiple regression is a robust technique recommended by most statistical sources (Hair et al., 1998, Hair et al., 2010; Cohen & Cohen, 1983; Cohen et al., 2003). It is recommended when we have one dependent variable and multiple independent variables. It is a powerful technique that utilizes the sample size and improve the power of prediction of the research model. It overcomes most of statistical limitations related to the statistical assumptions required by many other statistical techniques.

We entered the three predictor into the model to be regressed on BI. Such model is adopted when the research model aims at confirming a theory or an assumed model. Results of the test revealed that the prediction of behavioral intention is significant and resulted in an $R^2 = 0.564$ (Adjusted $R^2 = 0.560$) with an $F_{3, 317} = 136.925$ and a $p<0.001$. One of the important tests that were evaluated is the multicollinearity test that produced an acceptable level (VIF is around 2, the threshold is more than 10; Tolerance is around 0.2, the threshold is less than 0.01).

To test the research hypotheses we utilize the "t" test of the beta values in the regression analysis. The bivariate correlations support of the selection of variables, but are not satisfactory for testing hypotheses. The regression results show that the three variables were significant predictors of the BI. The sample indicated that the strongest predictor was PU (beta = 0.553, $p < 0.001$), followed by CSE (beta = 0.165, $p < 0.001$), and finally, PEOU (beta = 0.132, $p < 0.01$). Consequently, these results support the study's hypotheses H1, H2 and H3. Table 6 depicts the coefficient table of regression. Accordingly, the overall multiple regression equation can be written as follows:

Table 6. Multiple regression coefficient

Constructs	Unstand. Coefficients		Stand. Beta	t	Sig.
	B	Std. Error			
(Constant)	0.879	0.243		3.617	000
Perceived usefulness (PU)	0.562	0.055	0.553	10.142	000
Perceived Ease of Use (PEOU)	0.136	0.058	0.132	2.353	0.019
Computer Self-Efficacy (CSE)	0.163	0.043	0.165	3.758	000

4.4 Critical Success Factors Analysis

The second research question in the study was to identify the critical success factors (CSF) of enterprise resource planning (ERP) systems from an employee's perspective. In order to investigate the critical success factors, a literature review was conducted and a total of twenty-two questions were used to identify the CSFs. The questions were adopted from previous research (Somers & Nelson, 2004; Abu-Shanab et al., 2015). The respondents were asked to identify how important each factor based on their experience. According to the results shown in Table 7, the most important CSF is "Top management support" followed by "User training on software", "Project management process", and "Clear goals and objectives of system" respectively. There seems to be an agreement on the influence of top management support as a factor to ensure that the implementation of an ERP system is carried out successfully (Std. Dev. = 1.33, mean = 5.78). Other factors with the highest means are "Project management process" (Std. Dev. = 1.35, mean = 5.64) and "User training on software" (Std. Dev. = 1.36, mean = 5.65).

Table 7. Means and standard deviations of the ERP implementation CSF

Rank	Critical Success Factor (CSF)	Mean	Std. Dev
1	Top management support	5.78	1.33
2	User training on software	5.65	1.36
3	Project management process	5.64	1.35
4	Clear goals and objectives of system	5.6	1.37
5	Data analysis and conversion	5.54	1.46
6	Careful ERP package selection	5.51	1.45
7	Dedicated resources	5.51	1.41
8	Project champion role (Project Manager)	5.5	1.4
9	Project team competence	5.47	1.38
10	Interdepartmental communication	5.47	1.38

Table 7 continued on next page

Table 7 continued

Rank	Critical Success Factor (CSF)	Mean	Std. Dev
11	Vendor support	5.45	1.51
12	Training on new business processes	5.45	1.41
13	Interdepartmental cooperation	5.44	1.44
14	Use of vendor's tools	5.29	1.46
15	Use of consultant for support	5.23	1.46
16	Role of steering committee	5.23	1.48
17	Business process reengineering	5.19	1.5
18	Management of expectations of different stakeholders	5.11	1.52
19	Minimal customization needed	5.1	1.53
20	Change management	5.05	1.62
21	Partnership with vendor	5.01	1.54
22	Architecture choices available	4.98	1.59

In contrast, the lowest ranked CSFs in Table 7 are mostly controversial factors (Abu-Shanab et al., 2015). They presented relatively higher standard deviations compared to the previous ones. Examples are "Architecture choices available" (Std. Dev. = 1.59, mean = 4.98), "Partnership with vendor" (Std. Dev. = 1.54, mean = 5.01), and "Change management" (Std. Dev. = 1.62, mean = 5.05). The last one contradicted with the majority of reported research (Hau & Kuzic, 2010; Abu-Shanab et al., 2015).

5. DISCUSSION OF RESULTS

In this study, the technology acceptance model (TAM) was extended with computer self-efficacy construct. The extended TAM was tested in the context of ERP systems' adoption. CSE construct reñects on individual's capability to succeed in using ERP to accomplish business tasks. The data collected from a 321 Qatari surveys was analyzed and reported significant results. Descriptive statistics supported all items used to measure the variables, and regression analysis supported all research hypotheses.

H1 was supported, which reveals that PU has a significant impact on the BI to use ERP system. Such results is aligned with previous ERP studies (Amoako-Gyampah & Salam, 2004; Calisir & Calisir, 2004; Chung et al. 2009; Garača, 2011). This signifies that if ERP system improves the job performance of employees and increases their efficiency, they will have the intention to use the system. Qatari firms have to guarantee that the implemented ERP system increases the efficiency of employees and therefore provides them with the impulse to use ERP systems to achieve their organizational and personal objectives. Therefore, managerial endeavors concentrated on improving ERP PU will certainly be important to increase the intention to use the system.

H2 was also supported, which means that PEOU significantly influenced BI of employees. PEOU refers to the extent to which a system is expected to be effort free by the potential user (Chung et al., 2009; Davis, 1989). The potential user in this situation is the employee who is going to use the ERP system. Qatari firms need to implement easy systems, and simple intuitive interfaces to improve the chances that their employees will adopt the system. Deploying simple and easy ERP systems will result in greater BI.

Finally, H3 was supported, where it indicates that CSE enhances individual intention to use an ERP system, which supported previous research (Agarwal & Karahanna, 2000; Venkatesh & Davis, 1996). Managers or practitioners need to consider carefully the factors that could promote CSE like adequate knowledge of computer systems. Qatari firms need to conduct for their employees the needed computer training programs. Consequently, providing the required knowledge and training helps employees increase their CSE, thus increasing the chances of successful ERP implementation.

In summary, the regression analysis showed that in the case of Qatari firms, 56% of the variance in the intention to use of ERP systems is explained by three factors. While these three factors are important factors that impact the intention to use, the rest of the variance could be explained by others. To successfully implement an ERP system, companies should analyze practically and systemically the factors which affect the implementation process (Jing & Qiu, 2007). Table 8 shows the hypotheses testing and their results.

Table 8. Hypotheses testing results

H	Independent Variable	Dependent Variable	Beta	t-value	Sig.	Status
H1	Perceived usefulness (PU)	Behavioral Intentions	0.553	10.142	0.000	Supported
H2	Perceived Ease of Use (PEOU)	Behavioral Intentions	0.132	2.353	0.019	Supported
H3	Computer Self-Efficacy (CSE)	Behavioral Intentions	0.165	3.758	0.000	Supported

This study highlighted the top factors to be considered by the management of the organizations in the Qatari context to guarantee that the implementation is successful, and the organization benefits from it. These factors are "Top management support" followed by "User training on software", "Project management process", and "Clear goals and objectives of system" respectively. Top management support strengthens the commitment of all employees in the firm and is essential to the implementation of the ERP system, in particular during the early stages of the project (Bingi et al., 1999). A major reason for failing in ERP implementation is the lack of senior management commitment to the project (Huang et al., 2004). The organization must be ready to use ERP systems in their daily work. Sufðcient training for employees can guarantee an effective and correct utilization of the ERP system. Therefore, training is a key element for the successful implementation of the ERP system (Dowlatshahi, 2005). Strong project management is required during ERP implementation and should comprise clear objectives, efficient work plan development, and a cautious monitoring for the development and progress of the project (Laughlin, 1999).

In contrast, the study also highlighted some of the CSFs that are mostly disputable and considered as less important in ERP implementation like "Architecture choices available" and "Partnership with vendor" (Abu-Shanab et al., 2015). Finally, it looks like that the Qatari environment have no space for resistance by users, where respondents considered change management of less importance than in previously reported research (Abu-Shanab et al., 2015; Hau & Kuzic, 2010; Nah et al., 2001). Reitsma and Hilletofth (2018) reported similar findings mentioning that the end users of the sample they studied believed that using change management tools and techniques is unnecessary for ERP implementation. These results show that there is a discrepancy between studies and needs more exploration.

6. CONCLUSION AND FUTURE DIRECTIONS

This paper tackled an important research inquiry, where the resolution of the challenges faced when adopting an enterprise resources planning (ERP) system is an important research problem. This study combined two methods, where two major research questions were addressed (the technology adoption

area and CSF area). Such environment is important as few studies adopted a mixed method and two different directions in exploring the area. Also, the work is the first in the Qatari context, which is a second major contribution. Finally, this study targeted real users of ERP systems (organizational employees), which adds to its value (many studies in the technology adoption area utilized university students or general public).

In order to implement an ERP system, an organization requires financial resources, time and commitment. In view of the time and budget limits, managers need to recognize strategies that can bring about greater benefits. Although ERP systems have changed the functioning of companies in relation to their operations to increase efficiency and effectiveness, these systems experience numerous challenges that bring about their failure even before they are implemented. This requires more studies provide further information about achieving ERP implementation success. The end user perspective brings significant insights to industry, where technology adoption is vital to the success of ERP systems.

This paper is the first in the Qatari environment to support the role of perceived usefulness (PU), perceived ease of use (PEOU), and computer self-efficacy (CSE) in predicting behavioral intentions to use ERP systems. At the same time the paper explored various factors that will ensure successful ERP implementation. All factors presented in the study were listed in a survey and distributed among different Qatari companies of different business lines. The results emphasized the significant role of top management support, user training on software, and project management process in the Qatari context. However, a big difference found in comparison with the literature is that users considered change management unimportant for ERP implementation.

This study followed two paths to understand the context of successful ERP implementation from users perspective. The first path looked at the factors that would influence their adoption. Adopting BI as a dependent variable, three major factors were significant predictors in a model that yielded significant and fair prediction. Perceived usefulness, perceived ease of use and self-efficacy were the predictors, where all of them successfully predicted BI. The second path utilized a list of factors that would improve the success chances of ERP implementation (22 CSFs). All factors were perceived highly (except one), with means exceeding 5. Both paths need considerable attention from organizations and require effort and resources to gain success.

Consequently, organizations should assess PU, PEOU, CSE and, ERP CSFs which obviously influence ERP adoption helping to explore the good and bad practices of ERP implementation and clearly differentiate the factors that are significant for ERP acceptance. To achieve a successful ERP implementation, a compatible and appropriate atmosphere should be created in the enterprise. The more useful and easier an ERP system is to use, the more value it generates.

6.1 Implications and Recommendations

This study has important implications for organizations and businesses working in Qatar. It provides insights for management to efficiently support the implementation process of an ERP system throughout the organization. Organizations must comprehend and recognize organizational, individual, and technological factors when implementing a complicated system such as an ERP. In order to facilitate end users' ERP acceptance, it is essential to enhance their perceived usefulness and perceived ease of use. In parallel, enhancement of end users' computer self-efficacy can increase their ERP acceptance. Before an ERP system is adopted in an organization, a variety of features must be provided to prompt end users of its usefulness and a user-friendly interactive interface must also be provided to increase the adoption possibilities.

Finally, improving users' computer self-efficacy through training and coaching can increase end users adoption. Such effort needs formal and structured training programs and workshops. The main objective of the training programs is to improve and enhance computer efficiency of the ERP users. Such training programs should be comprehensive, planned carefully, considering choosing the right experienced instructors, and breaking down the training tasks into smaller phases. This will show

users that they are able to handle the system on their own. Moreover, there are many other ways to enhance end users' computer self-efficacy in addition to the aforementioned suggestions.

The successful implementation of ERPs relies on PU, PEOU, CSE, and a set of CSFs. Thus, the assessment of factors such as compatibility, complexity, technological innovativeness, system performance, system learnability, perceived trust, output quality, perceived fit, and data quality will help in understanding the process of ERP implementation, provides more insights, and aid the integration and utilization of ERPs in the achievement of corporate objectives. The strong correlation and dependence of different factors illustrate the role of human agents in determining the implementation and harnessing of benefits from ERPs. TAM is the most widely used model in explaining the relationship between user's perceptions, attitudes, and beliefs and their system use. Therefore, executive management and decision makers in an organization should closely consider such factors when identifying ERP systems. Thereby, TAM will assist in improving the BIs of users which in turn will contribute to the success of ERP implementation.

6.2 Limitations and Future Directions

Even though the results of the study lead to a better comprehension of the factors that influence behavioral intention toward ERP systems, there are still limitations to this study. Only 56% of the variance of intention to use ERP systems was explained by the model variables. The large percentage of the unexplained variance suggests that additional research is necessary to incorporate unmeasured potential variables in the current study. These potential variables would be system flexibility or capability, computer anxiety, end user's satisfaction or characteristics, which can importantly contribute to the explanation of intention to use ERP systems and could be employed for further studies as well.

The results of this study can be applied to Qatar only, and to countries that are economically and culturally similar to Qatar, such as the countries of the GCC; nevertheless, they might not be applicable to other different countries. Because recently, the implementation of ERP has witnessed a considerable growth in the Middle East (Razi & Hossain, 2012), and this can probably make a gap with other countries with inferior economies. Qatar is known for its multicultural society and multinational companies; however, this study didn't investigate the various cultural dimensions that have an influence on ERP adoption decision (Miller, Batenburg & Wijngaert, 2006). Accordingly, future studies might be needed to explore these cultural dimensions. Moreover, future research can focus on performance disparities in certain CSFs and the reasons behind them. Finally, the sample was collected from 40 different Qatari companies of different business lines, but all these companies belong to one holding Qatari group, so the results might be validated among different populations. Therefore, a similar future investigation into this topic could serve to extend and enrich those findings in a wider sample of companies and organizations.

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