ERP IMPLEMENTATION - SEEING THROUGH A LENS

[A comparative literature review regarding the factors that influence a successful ERP system implementation.]
Acknowledgement

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Abstract

**Purpose:** The purpose of this thesis is to describe and analyse the factors that contribute to the successful ERP system implementation, the stakeholders of ERP system and how these stakeholders are related to CSFs of ERP system implementation.

**Design/methodology/approach:** The research methodology approach chosen for this research is based on reality and clear research which includes qualitative and quantitative method for collecting and analysing data. Data for this research consists of secondary data, gathered by conducting a critical literature review of research papers published by journals, magazines and books. The content analysis and comparative study methods are used to analyse data.

**Findings:** Seventeen CSFs that are considered to contribute to ERP implementation success have been identified in accordance with their prioritization where twelve of them have been described; by analyzing some widely accepted in prior researches. Three stakeholders of ERP such as “Top management, IT professionals and End-users” have been identified and their involvement in the ERP implementation has been described. The result revealed that several CSFs of ERP such as “user training and involvement, ERP teamwork and selection of ERP are directly related to End-users”.

The findings also revealed that Top management are related to majority of CSFs such as “top management support and commitment, change management, business plan and vision, system quality, project management, effective communication plan, selection of ERP, monitoring and focused performance evaluation, project champion, and business and IT infrastructure”.

The result from analysis also showed a correlation between IT professionals and several CSFs such as “selection of ERP, system quality, user training and involvement, post-implementation evaluation, business plan and vision, change management, ERP teamwork, effective communication plan, and business and IT infrastructure”.

**Useful implications:** This research thesis is useful because the categorization and comparative analysis of CSFs of ERP implementation help researchers to understand and recognize the identical CFSs called by different names. The identified critical success factors for ERP implementation success is proved to be important and needs to be taken into consideration by business managers when planning and designing the implementation project. Also the, this thesis reveals that there exists different perception of success by stakeholders of ERP system which is valuable for both researchers studying ERP implementation and practitioners involved in ERP project.

**Key words:** critical success factors, ERP system success evaluation, ERP system stakeholders, ERP management, ERP users satisfaction and ERP implementation process.
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1 Introduction

In last two decades enterprise resource planning systems have increased their significance, they have been adopted as the best technological solutions for the effective and efficient information management (Francoise et al. 2009). An enterprise resource planning system (ERP) is defined as a packaged software system for business that enable a corporation to effectively and efficiently use its resources, among which materials, finance, human resources and etc are included (Francoise et al., 2009; Dezdar & Sulaiman, 2009; Nah et al., 2001). Other researchers like Wu & Wang (2006) and Häkkinen & Hilmola (2008) have defined ERP as a standard software package that gives integrated operational processing and access to information that spread to numerous firm’s units and multiple business transactions. ERP systems provide management a better overview to deeply analyze the organization’s managing and functional activities by improved process flow, better data analysis, higher quality information for decision making, less inventories, decreased information flow timing, improved coordination for overall supply chain, and better consumer service (Francoise et al., 2009; Dezdar et al., 2009). ERP systems are valuable in rise and fall of business firms in more and more competitive markets, where globalization has been flourished (Saatcioglu, 2009; Sarkis & Gunasekaran, 2003). Although ERP system implementation has gained numerous benefits for organizations, research has showed that implementation projects commonly do not meet their initial goals, and operations commonly undergo from related disruptions (Häkkinen & Hilmola, 2008).

Researches and practitioners have revealed that implementation of ERP is not without problems and there are many challenges that need to be dealt with (Dezdar et al., 2009). A number of researches discovered that the gap between results and initial objectives is very common during the implementation of ERP (Francoise et al., 2009). Sammon and Adam cited in Saatcioglu (2009) noticed that high failure rate is also found in ERP project implementation because of joined effect of insufficient organizational analysis at the starting of the project, the difficulties of ERP market and complex implementation. ERP systems are extremely intricate pieces of software applications and expensive systems (Al-Mashari et al., 2003; Luo and Strong, 2004; King and Burgess, 2006; Saatcioglu, 2009; Somers and Nelson, 2003), the implementation of them needs heavy investments of money, time and expertise (King and Burgess, 2006; Saatcioglu, 2009). A lot of ERP implementation projects have been criticized in regard of completion time, over budget, disruption and sometimes less or limited benefits, after the systems come in operational condition (King and Burgess,
2006; Saatcioglu, 2009). A research report presented by a Standish group (Wu & Wang, 2006) regarding ERP implementation projects revealed that ERP projects exceeded the time of completion by 2.5 times longer than expected and those were averagely 178 percent over the budget (Francoise. et al., 2009; Dezdar & Sulaiman, 2009).

Since high amount of money is involved in ERP implementation and success rate is low, it is important to identify, understand and categorize the solutions confirming success (Francoise. et al., 2009; Dezdar & Sulaiman, 2009; Nah, et al., 2001). A lot of studies have been conducted in the last decade to explore the success factors behind ERP implementation (Françoise. et al., 2009; Dezdar & Sulaiman 2009; Nah et al., 2001). Rockhart (1979) was one of those researchers who initially worked to find out critical success factors (CSFs) for implementation of ERP (Dezdar & Sulaiman, 2009). CSFs for the implementation of ERP are not only focused by researchers; it also has grasped the attention of managers. It concerns them because studies of CSFs contribute a lot for the success or failure of any ERP system (Dezdar & Sulaiman, 2009). This study enables readers, managers and others to understand those CSFs and their priorities regarding the implementation of ERP. However, there is much criticism as well regarding the CSFs for implementing ERP system. Researchers such as Yu (2005) are criticizing CSFs by arguing that CSFs are factor-based ERP research, which fails to explain the implementation process fully as CSFs are static view while implementation process is dynamic. The complexity of the system, the costly investment and the risk of failure related to ERP project highlight the need for an evaluation of the success of ERP system implementation (Wu & Wang, 2006). Measurement and evaluation of performance is a critical factor for making sure the successful implementation of any information system (Häkkinen & Hilmola., 2008). One of these measurement used for evaluating ERP system implementation is user satisfaction which has been referred by some researchers. However, research regarding user’s perception on ERP implementation success is limited and the need for further research into how different users perceive ERP success (Ifinedo, 2007; Sedera, 2003).
1.1 Benefits of ERP

ERP systems are common in present day organizations functioning in competitive business environments. The basic idea behind the ERP concept is to use Information technology (IT) for the combined planning of the central resources of the organization, ahead of the capacity of conventional IT solutions (Häkkinen & Hilmola 2008; Yu, 2005).

ERP systems combine different core organizational activities into integrated database to make available single data entry and access to information (Häkkinen & Hilmola., 2008). Yanhong describes ERP as a merger of a company’s information systems planned to unite more closely different company functions including human resource management (HRM), inventory control and financial management, while integrating company’s customers and suppliers through a package of business software (Yanhong, 2009). The ERP systems are claimed to enhance effectiveness and efficiency of processes and decreasing cost (Nah, et al., 2001). For many companies, ERP implementation has been a success story, and they have gained tangible and intangible benefits from this, such as better internal activities and customer service. Besides those, strategic achievements have been also associated with ERP implementation (Häkkinen & Hilmola., 2008). However there are problems associated with ERP implementation such as gap between benefit of the system and the organizational objectives that could lead to failure with devastating results for the organization (Dezdar & Sulaiman, 2009).

According to Velcu (2010), International Data Group (IDG) investigated and disclosed that global expenditure on ERP systems climbed up with yearly increasing rate of 13.5% between 2001 and 2006, and hit at $187 billion in 2006.
1.2 Problem statement

Although, ERP systems have gained numerous benefits to the organizations, research has shown that the Implementation of ERP system is complex, resource consuming and costly procedure (Al-Mashari et al., 2003; Finney & Corbett, 2007; Häkkinen & Hilmola, 2008; King and Burgess, 2006; Saatciglu, 2009). Managers of ERP implementation projects face extensive problems and challenges (Dazdar & Sulaiman, 2009). Due to insufficient organizational analysis and difficulties of ERP implementation, the failure rate of ERP implementation project is high (Francoise et al., 2009; Saatcioglu, 2009). During last decade, enormous research has been performed to identify the critical success factors of ERP implementation (Dazdar & Sulaiman, 2009; Umble et al. 2003) which should be given necessary attention in order to achieve successful implementation (Finney & Corbett 2007). However it appears that majority of literature has focused on critical success factors, with very less or no regard to different stakeholders’ perspective (Finney & Corbett, 2007). The stakeholders’ perspective can be different from each other on different issues (Gyampah, 2007). Although implementation of ERP systems has been focused, further study and insights about perspectives of stakeholders are needed (Gyampah, 2007). A closer and clearer understanding of CSFs related to various stakeholder groups would make it possible to find out if the perspectives of relevant stakeholders have been addressed in the ERP implementation or not (Finney & Corbett, 2007).

1.3 Research purpose

The purpose of this thesis is to describe and analyse the factors that contribute to the successful ERP system implementation, the stakeholders of ERP system and how these stakeholders are related to CSFs of ERP system implementation.

1.4 Research question

- Which factors contribute to successful ERP system implementation?
- How are different stakeholders related to CSFs of ERP system implementation?
2 Research methodology

2.1 Research method

Fisher (2007) suggests various methodological approaches for conducting research such as realist research, critical realism, action research and interpretivism. This research has taken on the realist research approach, in which according to Fisher (2007), although it contains “positivism ambitions”, it differs from positivism by recognizing subjectivity as part of research. Realist researcher believes that “the knowledge we acquire can give good indications of what should be done” due to the nature of research that looks for relations between “variable” and trying to figuring out the “chains of cause and effect” (Fisher, 2007, p 42). In the realist research, both quantitative and qualitative method can be used for collecting and analyzing data.

In order to achieve the purpose of this thesis, the “content analysis” method has been used. Harris and Attour state in Dezdar & Sulaiman (2009) that “content analysis is an appropriate approach, when the phenomenon to be examined is communication (statement, message, and content) rather than behavioural or physical objects”. This method helps to analyze number of published articles, chosen for this research paper.
2.2 Data collection

The data for this research is collected mainly through secondary data from different databases such as Science Direct, Emerald and ABI/INFORM Proquest available through Mälardalens högskolans library database. Since ERP itself is a vast field, a lot of articles, related to ERP have been found which later on, skimmed through in order to narrow down for this explicit research. Specific key words such as; critical success factors, ERP system success evaluation, ERP system stakeholders, ERP management, ERP users satisfaction and ERP users perception, have been developed to find identical literature related to the topic of thesis. The key words are being developed by initially reviewing the literature of the

2.3 Data analysis approach

After finding suitable and related articles, in the next stage a table was designed to illustrate the finding of those articles. By drawing this table and mapping the CSFs, the comparison between CSFs was made; differences and similarities among them were classified. This process is called comparative analysis (Dezdar & Sulaiman, 2009). In this phase CSFs with same meaning, concept or themes (synonyms, acronyms) were categorized under one same CSF name by giving them same colour for identification. So a list of standardized CSFs names was developed for further analysis.

In the next phase, table 2 was organized to prioritize the CSFs to have a better understanding about their importance. Comparative analysis method was used to gauge their importance. A comprehensive comparison was done between their number of priority given by prior researchers and straight average method was adopted to calculate and prioritize the findings of CSFs. A range of their priority list was organized to judge the best positions for them. At the end of analysis part, Markus and Tanis (2000) process-oriented ERP life cycle model adapted by Nah, et al., (2001) as described earlier in literature review has been chosen to categories the identified CSFs in their respective phase in the ERP life cycle model which can be seen in figure 3.
These findings have been analyzed and discussed in accordance to the literature review in order to draw some conclusions regarding CSFs of ERP implementation involved in the process from users perspective.
3 Literature review

The following section consists of a review of literature regarding ERP system implementation process and the perception of ERP success by various stakeholders such as users within the organization. A description of widely known "CSFs" is also provided in order to facilitate the understanding of factors involved in implementing ERP system.

3.1 ERP system implementation process

ERP systems implementation process is a complex process with a lot of factors and conditions which can potentially influence the implementation (Soja, 2006). The presence of those conditions and factors can help to produce good results for ERP, whereas the absence can have opposite effect (Soja, 2006). Gyampah (2007) have emphasized upon the need of additional research and insights within the field of CSFs. Dezdar et al. (2009) have termed the studies of CSFs inconsistent and inconclusive. Those arguments have increased the importance of study about CSFs of ERP implementation. Dawson & Owens cited in Dezdar et al., (2009) claim that authors have defined many differences between CSFs. During their research they found that researchers often bring into play different terms for same kind of CSFs, or some time make sub units of one CSF (Dezdar & Sulaiman, 2009).

A survey conducted by information week, revealed that some of the significant reasons, for ERP project failures, considered by IT managers was poor planning and management, change in Business goals during the project and the lack of Business management support. Langewalter cited in Umble et al., (2003) has claimed that, in between 40% to 60% of whole ERP implementation failed due to the above mentioned reasons. This highlights the importance of identifying the critical success factors to use them for plan, carry out and evaluation of projects hence required to consider for over successful implementation of ERP. However, as mentioned earlier, there is much criticism regarding the CSFs for implementing ERP system. Researcher such as Yu (2005) has criticized CSFs by arguing that CSFs are factor-based ERP research, which fails to match with implementation process, as CSFs are static view while implementation process is dynamic. Therefore After developing a framework of different important CSFs for ERP implementation, it is significant to sort the identified CSFs into stages of ERP implementation life cycle (Nah et al., 2001). The ERP life cycle is a process-oriented approach to ERP research with the aim to give a dynamic view of the relationship between CSFs and the different stages of the implementation
process. These stages categorize those CSFs where they come in to action, in the life cycle. ERP life cycle model, developed by Markus and Tanis (2000) cited in Nah et al., (2001) clearly illustrates that its phases are quite compatible with the stages of traditional systems development life cycle. ERP implementation life cycle model is based on four phases; chartering phase, project phase, shake down phase and onward & upward phase (Nah et al., 2001). Researchers such as Nah et al. (2001) and Parr & Shanks (2000) have synthesized the process model with CSFs in order to enhance the overall understanding of the ERP system project. This research, will categories the identified CSFs in their respective phase in the ERP life cycle model adapted by Nah et al. (2001)

3.2 Evaluation of ERP implementation

According to Chein & Tsaur, the evaluation of Enterprise Resource Planning (ERP) systems success or effectiveness is very significant to the value and usefulness of ERP investment and managerial activities (Chien & Tsaur., 2007). According to Soh et al. (2000), many large organizations had to abandon their implementation of ERP system after installing. Wu & Wang (2006) also suggest that ERP could be “the price of entry for running a business and for being connected to other enterprises in a value chained or networked economy” (p 882-883), which could explain why these firms are embracing ERP despite its system complexity and risk of failure. This view of ERP is also shared by other researchers such as Françoise et al. (2009); Dezdar & Sulaiman(2009); Nah et al. (2001) which associates ERP as a necessity for sustaining competitiveness. There are various stakeholders involved in implementing ERP system which also makes the project even more complex due to respective requirements of these stakeholders. Wu & Wang (2006) has identified three stakeholder groups consisting of “ERP package developers, developers using ERP, and ERP- system users” involved in the introduction process of the final systems in which the purchasing firm is highly depend on.

3.2.1 User satisfaction as success measurement

Researchers have highlighted the need for an evaluation of the success of ERP system implementation (Wu & Wang, 2006). Technological applications can not be succeeded unless users have positive attitude towards them and consider them beneficial for themselves. The main success factors for implementing ERP system are users centred (Saatcioglu, 2009). Researchers such as (Seddon & Kiew, 1994; Bailey & Pearson, 1983) have considered user satisfaction as an important surrogate measure of IS
success and lately other researchers such as; Wu & Wang (2006) and Longinidis & Gotzamani (2009) have adapted the user satisfaction to develop a mechanism for the evaluation of ERP system. Ives cited in Wu & Wang (2006) has defined user satisfaction as “the sum of one’s feelings and attitudes toward a variety of factors related to the delivery of information products and services”. User satisfaction is the level to which users consider the information systems available to them meets their information needs and demands (Wu & Wang, 2006). User satisfaction does not cause performance, however user satisfaction and performance are both originated by the level to which requirements are met. Users’ positive attitudes are important to ERP implementation and its performance (Abdinnour et al. 2003). Owing the importance of users, Saatcioglu (2009) determined user satisfaction as a measure to evaluate success of ERP implementation.

A research done by Longinidis and Gotzamani (2009) concluded that, end-users satisfaction can be influenced by three different factors. They found “Interaction with IT department” “Involvement in pre-implementation processes” and “ERP product and adaptability” are three factors which can determine the satisfaction level of end-users (Longinidis & Gotzamani, 2009). Wu et al. (2002) examined the satisfaction level of ERP system users. They focused on ERP users and divided them into two sub categories such as End-users and key users (IT related personnel engaged in interaction with consultants and others). They have developed two different sets of factors, related to satisfaction, to find results of users’ satisfaction. For key users, these factors are “system integrity, domain knowledge of consultants, consultant's project management, training, and system understanding” whereas for end-users, these factors are “ERP project team and service, ERP product, and knowledge and involvement”. Wu et al. (2002) concluded that key users and end users satisfaction levels, toward their respective factors, were not shown difference from each other. However, knowledge and involvement factor results showed difference of satisfaction level. Key users were found more satisfied about the knowledge and involvement throughout the project. However end-users found less satisfied, as they found themselves less informed and less involved.

3.2.2 Stakeholders of ERP system implementation
The stakeholders according to Wu & Wang (2006) as mentioned earlier consist of “ERP package developers, developers using ERP, and ERP- system users” (p 885). It is interesting for this research to identify these stakeholders in order to further analyze the successful ERP system implementation in regards to the evaluation of the system success from one
of these stakeholders view which limits this research to the ERP-system users. According to Wu & Wang (2006), these stakeholders have their own view on success of an ERP system implementation which differs from each other. Although, this research is concentrated on the users of the ERP system, it is worth mentioning briefly these various views of the success by other stakeholder groups.

“ERP package developers” which, according to Wu & Wang (2006) are the producers and vendors of ERP systems such as SAP, Oracle, and PeopleSoft. These stakeholder groups could also act as developers using ERP by offering users the “turnkey” solution for the ERP project (Wu & Wang, 2006, p 886).

“Developers using an ERP system” refers to internally appointed staff by the purchasing firm as well as the staff hired externally through for example consulting firms who are involved in configuring and implementing the ERP system (Wu & Wang, 2006, p 886).

The generated profit based on their sales of package is seen as success by “ERP package developers” while the efficiency and effectiveness of developing and configuring the ERP system in accordance to the user requirements are seen as success by “developers using ERP system”. However as mentioned earlier, this research will not focus on these two groups of stakeholders, instead of them it will be focusing on the “ERP system users” such as ERP purchasing firm (Wu & Wang, 2006, p 886).

It is worth mentioning here that other researchers like Chien and Tsaur (2007) have also described about different stakeholders of ERP systems and their difference of perception about success of ERP systems. Many researchers and practitioners have recognized the success evaluation as a complex concept to define, even after a lot of studies have attempted to explain and rationalize the evaluation of information system success (Chien & Tsaur., 2007). Chien and Tsaur (2007) have attempted to explain how the perception of ERP system success differs within the system's stakeholders.

ERP development projects have been commonly affected due to budget overflows and unmet user needs. Hence, in a developer’s viewpoint a successful ERP system is one which is accomplished on time and within the budget or even under budget. A high level management’s perception about successful ERP implementation system is referred to a system that decreases uncertainty of results, lowers the threats and controls the resources within the organization (Chien & Tsaur., 2007).
In order to be able to research related to the users of the ERP system, it is interesting to identify users within the purchasing organization although the purchasing firm is considered by Wu & Wang (2006) as the user of ERP. According to Saatcioglu (2009), “it is impossible to consider a technological application as a success unless people have positive attitudes about it” (p 692), thus, key success factor for implementing ERP system are people centred and thus user involvement is critical for the success of ERP implementation (Light, 2005; Chang et al. 2008).

Ifinedo (2007) has performed a research to evaluate the success perception of two users of ERP implementation, such as; business managers and IT professionals. According to Ifinedo (2007), several researchers have suggested that due to cultural differences, there might be some differing views on issues such as success of ERP system implementation from various organizational stakeholders like IT professionals and business managers. Ifinedo (2007) also suggests that researchers propose that business managers such as CEO are more concerned with the “organizational-wide issues” while IT managers are mostly concerned with technological issues of ERP system. Hence, the success of ERP system implementation could be perceived differently within the purchasing organization. However, the research conducted by Ifinedo (2007) concluded that there was “little or no differences in how business managers and IT professionals” evaluated ERP success based on the user satisfaction measures (p 278).

Zviran et al. (2005) found users of ERP systems within the organization as the most suitable group to measure Information systems success. They adopted user sanctification and perceived usefulness as metrics, to measure the success of ERP system. Zviran et al. (2005) investigated and concluded through two survey instruments that user satisfaction and perceived usefulness are validated and having strong positive correlation. They suggested that perceived usefulness is main factor which affect user satisfaction within an ERP system. Anthony (1965) cited in Sedera et al. (2003) laid down the foundations for employment group arrangement. He presented three ranks of employment in an organization;

1. “Strategic level”
2. “Management level”
3. “Operational level”

The strategic level group make decisions about the organizational objectives and allocate the resources to achieve those resources. The strategic level leadership involves difficult and irregular decision making to run the entire
organization. Management level group focus on assuring all organizational resources, human and financial are being used effectively and efficiently to achieve the goals set by strategic level leadership. Whereas, the operational level groups are involved in structured and specifically routine tasks under the supervision of the management level (Sedera, et. al., 2003). This employment group arrangement was adapted by Sedera et al (2003) in order to identify various stakeholder groups within user organization in which they measured the success of ERP system implementation from the perspective of these stakeholders.

Sedera et al. (2003) identified many stakeholder groups within the organizations, and suggested the significance of gathering views of different stakeholder groups while measuring the success of an information system. Sedera et al. (2003) found four most common stakeholders group classifications for the assessment of information systems, which are namely (1) strategic (2) management (3) end user and (4) technical staff. This definitions of stakeholder group is in some extent coincide with Ifinedo’s (2007) identified users such as business managers and IT staff. Sedera et al. (2003) Used enterprise system success model to research about the possible different perspective of success within the four respondent stakeholder groups. The validated model based on four quadrants representing four distinct but linked dimensions of ERP success.

1. Individual impact
2. Organizational impact
3. Information quality
4. System quality

Sedera et al., (2003) conducted a survey among the four classified stakeholder groups; all respondent groups did not report significant differences on System Quality dimension. The results from survey indicate that technical staff group showed significantly different view of success on information quality dimension from other three user groups. Whereas, the perception of success for these three groups was similar for information quality dimension. Regarding the individual impact dimension, all respondent employment groups showed differences from each other, having different view of Enterprise system success. In the organizational impact dimension, strategic group showed different results from rest of the three groups (Sedera et al., 2003).

Sedera’s et al. (2003) results showed that in general, there was no significant difference between management and end users view of enterprise
system success. Whereas other stakeholder groups like strategic and technical showed significantly different views of success of enterprise system. Singletary et al. (2003) has identified stakeholders of ERP system as managers, IT professionals and end-users. In this thesis, users are divided in three stakeholder groups identified by Singletary et al. (2003) and referred to as Top management, IT professionals and End-users within user organization.

3.2.2.1 Top Management

Top management support and commitment is viewed by many researchers such as Al-Mashari et al. (2003), Finney and Corbett (2007) and Dezdar and Sulaiman (2009) as the most important critical success factor for ERP implementation. According to Al-Mashari et al. (2003) Top management’s role in the implementation of ERP is highly important for the project as they “ensure an even change management and system rollout” (p 356). They are also responsible for setting the vision and business plan and to make sure to harness employees’ creativity and energy (Al-Mashari, et al., 2003). Furthermore, Al-Mashari et al. (2003) suggests that exploiting the ERP systems technological capabilities and making sure that the business performs in accordance to the plan is also key task of top management. This view is supported by other researchers such as Nah et al. (2001) claiming that top managements are responsible for approving the ERP project and aligning it with the strategic goal of the business. Other top management responsibilities according to Nah et al. (2001) consists of allocating resources such as human, time and financial resources to the implementation effort. Communicating the business vision and the role of ERP system is also seen by researchers such as Al-Mashari et al. (2003), Nah et al. (2001) and Wu and Wang (2006) to be a core responsibility of the top management in ERP implementation process. Furthermore, all mentioned researchers’ stresses for the importance of top management support in overcoming resistance of ERP implementation within organization. Hence, top management are involved in resolving conflict by mediating between groups and they are also involved in promoting project acceptance by building cooperation between various stakeholders and involving users in The ERP implementation process. According to Al-Mashari et al. (2003), it is also top management’s duty to deciding on appropriate ERP system and selecting suitable vendor of ERP system. However, top management need assessment from end-users and IT professionals in the selection process of ERP (Willcocks and Sykes, 2000). Furthermore, Al-Mashari et al. (2003) argues that constantly monitoring the progress of ERP implementation and providing direction to the ERP project team is also major duties of top management which is critical for the success of ERP implementation. In
general, although there are some variations in defining top managements duties in ERP implementation, the importance of their commitment and support is highlighted by all referred researchers.

3.2.2.2 IT Professionals

IT professionals are regarded by researchers such as Ifinedo (2007), Willcocks and Sykes (2000) and Markus and Tanis (2003) as being a great asset for modern organizations who are using IT systems in their operations. Willcocks and Sykes (2000) claims that IT professionals’ technical backgrounds are very important both during the selection and acquisition of complex IT system like ERP and for the implementation of ERP system into adopting organizations. This view is also shared by Lee and Lee (2004); suggesting that IT professional’s quality such as knowledge of the technological change and updated skills are important factors that are needed for an ERP implementation success. However, Markus and Tanis (2003) suggest that IT professional’s skills are also important at the post-implementation of ERP system as they provide support for end-users and the organization and making sure that the system runs smoothly.

The study by Lee and Lee (2004) regarding change management after ERP implementation indicates that there is a correlation between ERP success and IT assets such as IT professionals’ skills and IT department’s values. Their study supports the suggestion by Willcocks and Sykes (2000), claiming that organizations that value their IT department highly are more likely to implement ERP system successfully. Furthermore, suggesting that the involvement of IT professionals in user training is crucial for the success of ERP implementation. The findings by Ifinedo and Nahar (2009) also support this argument by concluding that IT assets are positively related to ERP systems success. This shows the importance of IT professionals in an ERP project from selection of the system through implementation process as well as post-implementation of ERP system.

The role of IT manager as the head of IT department is to develop “strategy, structures, processes and staffing to ensure the IT function delivers value for money” (Willcocks and Sykes, 2000, p 35). Willcocks and Sykes (2000) suggesting that, in a successful ERP implementation, IT managers are required to possess the ability to build strong relationships with business executive peers and they should act as a strategic partner with the organization. Furthermore, claiming that IT managers should be involved in aligning IT investments such as ERP with strategic business priorities and visions.
According to Woo (2007) many organizations have IT professionals in the project team responsible for the ERP implementation where in some organizations, IT manager is appointed to manage the project. However, Woo (2007) is claiming that the reason for ERP implementation failure for some organizations is due to top management’s failure to incorporate other non-technical members into the project team. Woo (2007) Argues that IT professionals are mainly skilled in computer languages and technological aspect of ERP system rather than various aspects of the company’s business operation. In contrast, Markus and Tanis (2003) claims that ERP project team mainly consists of non-technical members of different business units and functional area. However, IT professionals’ involvement is seen as an important aspect of successful ERP implementation process by Markus and Tanis.

3.2.2.3 End-Users
End-users are referred to those employees within the organization, who interacts with ERP application directly (Somers, et al., 2003). Gyampah (2004) defines end-users as non-managerial level employees across the organization. The function of these end-users in the organization according to Gyampah (2004) consists of finance and accounting, operations, customer service representatives and other functional area personnel. End-users are involved in ERP implementation through their training and education sessions (Al-Mashari, et al., 2003). Selection and execution of a plan for end-users training and education is a particular challenge in ERP implementation project (Al-Mashari, et al., 2003; Finney & Corbett, 2007). Inappropriate or lack of training of end-users has been remaining one of the important reasons behind many ERP systems failure (Gupta, 2000). Al-Mashari et al. (2003) has underlined that End-users training should cover all aspects of ERP systems.

Françoise et al. (2009) stressed for more user involvement throughout the ERP implementation project, since end-users knowledge can be used in areas where the ERP team lacks the expertise. Involving end-users in the ERP acquisition motivates and provides end-users with more knowledge about the issues and technologies concerning ERP system (Verville, et al., 2006).

The findings of a research conducted by Verville et al. (2006) showed that end-users involvement in acquisition phase of ERP system results in end-users desire for technology purchase. The end-users desire for technology acquisition according to Verville et al. (2006) was a critical factor in the success of ERP implementation as they found strong evidence that end-users
desire for acquisition of ERP system resulted in end-users open acceptance of the ERP application following the implementation. Furthermore, claiming that the end-users’ involvement must be maintained throughout ERP implementation process including the acquisition phase.

A case study that was conducted by Woo (2007) in order to find out the flaws of ERP implementation projects that didn’t succeed at the first attempt, highlighted end-user training that was not given importance by purchasing firm as a major flaw. Instead of providing training sessions for all users including end-users, these firms only focused on training of senior managers, departmental managers and key employees. The amount of training session was reduced to save costs and many employees were not allowed by their managers to participate in the training sessions. Woo (2007) claims that it is very common during ERP implementation process that organizations give very low priority to the training of end-users.

3.3 Critical Success Factors related to ERP system implementation

The identification, of critical factors, assists to ensure that those factors will be given essential importance (Finney & Corbett, 2007). In terms of ERP implementation, “CSFs are those conditions that must be met in order for the implementation process to occur successfully” (Finney & Corbett, 2007, pp 330). However CSFs has been criticized due to their approach mainly relied on the perspective of managers (Gyampah, 2004), therefore can be seen as biased (Finney & Corbett, 2007). Furthermore, Gyampah (2004) and Lin & Rohm (2009) performed studies to investigate how perceptions about CSFs differ between end-users and management level employees. They found that the identification, of CSFs, is mainly based on the perceptions of senior members within the organization. Their research also concluded that the high level of difference exist between the perception of User-managers and end-users, regarding different factors of ERP implementation (Gyampah, 2004; Lin & Rohm 2009). Hence the results of Gyampah (2004) and Lin & Rohm (2009) strengthen the criticism on CSFs of ERP implementation. Zmud (1984) cited in Finney and Corbett (2007) proposed that cross-section managements should be interviewed by researchers to collect views about CSFs, in order to avoid criticism of being biased. However Finney and Corbett (2007) suggested that there is need to consider the views from all affected stakeholder groups of ERP implementation, disregard from their level of positions within the organization. Umble et al. (2003), Finney and
Corbett (2007), Neh et al. (2001) Dezdar & Sulaiman et al. (2009) and Francoise (2009) have performed detailed studies, regarding CSFs, in order to identify and analyze them. In next following section, there is brief description of different CSFs, which have been identified and discussed by above stated researchers.

3.3.1 Top management support and commitment
The support of top management team is required according to this CSF for the successful implementation of ERP. This CSF exploits the need of top management’s involvement and open & clearly identification of the project as a top priority (Nah et al., 2001). High level leadership should provide valuable resources required for the implementation of ERP project. Top management can be involved by adopting different measures, like by indentifying top management members concerned about project, then setting up a management committee and arranging plan for monthly meeting with them.

3.3.2 ERP project team work
The composition of project team has become a centre of interest for different analysts and professionals. It is inevitable to develop a team based on people from multiple departments in order to establish multidisciplinary team (Nah et al., 2001; Francoise et al., 2009). Nah et al. (2001) has stated the ERP team work and its composition as an essential factor for the success of ERP system projects. The ERP project team should consist of key people in the organization. Most of the researchers have elaborated it as an important factor (Dezdar & Sulaiman, 2009; Finney & Corbett, 2007)

Wee, (2000) cited in Nah et al. (2001) has suggested that the ERP project should be first and main concern of ERP project team. In order to let them focus on ERP project, ERP team’s work load should be reduced. It is logical that, if ERP team would have to focus as well on other organizational activities, then there is fear of delay in project. For that reason ERP project team should be kept freed from other duties and compensation should be given (Nah et al, 2001).

3.3.3 Change management and organizational cultural
Roberts and Barrar (1992) cited in Nah et al. (2001) tell us that learning from change should be seen as precedence form the start of project and money should be spent by company on employees for their training and education. Change management is an important CSF as stated by Folkwski
ERP Implementation: Seeing through a lens

cited in Nah al., et al., (2009). Rosario (2000) cited in Nah et al., also suggested for the management of enterprise broad culture and structure change, it includes the employees, organization and culture change.

Organizations with more flexible with their culture and ready for acceptance of technology have more rate of success. The company’s prominence on quality and employees’ high computing knowledge ability and high willingness towards the acceptability adds for the success of ERP implementation process.

3.3.4 Project management and evaluation
Rosario (2000) cited in Nah et al. (2001) clearly described that for the success of ERP implementation a good project managing individual/ group is crucial. This shows the importance of this factor for the ERP. To manage a project of ERP, a scope must be developed and controlled (nah et al., 2001). The range should be clearly understandable for everyone and it should be limited. Project management is based on amount of systems applied, involvement of company units and to what extant business is needed reengineering. Assigning a power full and full time project is needed for the success of ERP. The project management should ensure that material, human resources and financial resources will be available (Finney & Corbett, 2007).

3.3.5 Business plan and vision
This CSF can be best described by connecting ERP project with business plan and vision. An explicit business strategy and vision should be there to guide the direction of ERP project. Without any business plan and vision ERP system cannot be implemented. So this has become a significant CSF. (Nah et al, 2001). ERP project managers should develop a link between the ERP and company’s strategy. ERP should be defined as a most significant project for the organization.

3.3.6 Business process reengineering (BPR) and customization
Françoise et al., (2009) has described it as a controversial field of CSFs, as they say that some groups consider it as vital while others don’t see it as much important. Whereas Nah et al., (2001) evaluated this CSF as an important part in ERP implementation. It is suggested to identify the boundaries of reengineering and modification of application before initiating the any kind of configuration. Besides this try to opt for minimal modification of the application because it does increase the chances of success (Françoise et al., 2009).
3.3.7 User training and involvement

This CSF covers other factors like user participation, end user involvement, user support, extensive training, and etc. all of them are seem synonyms of each other. Some time researchers have divided it into two separate CSFs, like user training and user involvement. Researchers have suggested that user’s involvement is a very important factor to deal with (Francoise et al., 2009). It involves a training plan for user, understanding of their needs, view of their knowledge capacity, and technological acceptance. Users of the systems should be getting involved in the development process of the system, so that their lacking expertise can be realized and training can be given in parallel way. While training to users, it should be make certain that trainers have a good knowledge to transfer to the users in simple and easy way (Nah et al, 2001).

3.3.8 Effective communication plan

This is another vital CSF, researchers have used terms like effective communication, communication plan, enterprise cooperation plan and etc. communication is a main factor for the success of ERP project (Françoise et al., 2009). There should a comprehensive communication plan to overcome any kind of miscommunication etc. the communication can be done by different means. Actually this tool bound different stakeholders in one sphere, and by effectively dealing with this, it ensure that all stakeholders move forward in one direction with common goal. It can be done by centralizing information for a general understanding of verdicts.

3.3.9 Software development testing & trouble shooting

It can be seen in table 2, that only three of selected researchers have discussed it in their findings, while the rest have not found it as important. Even then this CSF stands important for this research according to results. Software analysis, testing, development and trouble shooting, this kind of words have been chosen to explain this CSF. Whereas other researchers have also used names like data analysis and conversion, data management, test and problem issues etc, to mention this CSF (Dezdar, et al., 2009). Formation of competent technical support team should be a task under this CSF. There should be a clear plan and methodology for the development and testing of technology. It is very essential to be able to respond fast towards any kind of problem. If the requirements for this CSF will not be met the chance of failure of system can increase.
3.3.10 Monitoring & focused performance evaluation

For the success of a system it is essential to be capable of steer the project, to do so there should be some indicators for the visibility of progress. Every project should have a monitoring plan to requirements (Françoise et al., 2009). This CSF has been addressed by selected researchers of this paper, with the names like focused performance measures, monitoring and evaluation of performance etc. To have positive implications of this CSF, it is necessary that monitoring team should be very transparent with high ups in the company. To meet the goals and objectives of the project, it is needed to develop such kind of processes from which performance can be reviewed and correction of gap can be done. (Françoise et al., 2009)

In the next significant section of this paper, literature has been analysed from different theoretical perspectives to achieve the purpose of this research paper. The analysis part will discuss different prioritization orders of CSFs, described by prior researches. After a detailed categorization of CSFs, those will be linked to different stakeholders and ultimately with user satisfaction, which is a major dimension for the measurement of ERP implementation.

3.3.11 Project champion

It is critical to have a project in charge to produce harmony and manage the ERP implementation throughout its life cycle (Nah et. el., 2001). The project in charge and leader should champion the ERP implementation (Sumner, 1999). The project leader should be given the powers to define goals and bring appropriate changes (Nah et. el, 2001). The resolution of conflicts and management of resistance should be added into the duties of a project leader. Sumner (1999) has emphasized that the in charge of ERP implementation project should be a business leader, so that business perspective can be considered. A project champion facilitates his / her team motivation and makes them enthusiastic to achieve the common goals (Francoise, et al., 2009).

3.3.12 Business and IT infrastructure (legacy)

Business and IT legacy systems are significant in the chartering phase of the ERP project life cycle. An established and successful business set is required for ERP project implementation (Nah et. el., 2001). Researchers have determined that Success is related to business and IT systems, which involve existing business processes, organization structure, culture and information technology (Nah et. el., 2001).
4 Analysis

The critical success factors (CSFs) of ERP implementation described in the literature review represents the results from several most cited researchers in the field of CSFs of ERP implementation. The examination of the results from these researches revealed a number prioritized CSFs prioritized. Based on the priorities given by respective researcher to the identified CSFs, table 1 was prepared to summarize these CSFs. Each column of the table 1 starts with the name of the author followed by the CSFs according to the author’s priority. The last column of table 1 illustrates commonly referred CSF with priority based on the analysis illustrated in Table 2. In order to facilitate the analysis, same colours were given to similar CSF identified by the authors. Some authors had used different terms for similar factors, therefore, it was decided to identify common terms for these factors and in some cases even merge these terms in order to facilitate the analysis. However, it could be argued that merging these terms could in some cases result in the different priority than the one given by the author as some authors perhaps separate these factors due to the reason that they felt they had different priorities.

Table 2 illustrates the categorization of the identified CSFs and their suggested priority. First and second column shows the priority number and the identified CSF by this paper followed by the score of the priority number given by authors of the examined five research articles. The last column is based on straight average method which in this case calculates the sum of the scores given by these authors divided by the number of authors referred to the CSF which results in an average value. This papers priority of CSF is based on the value of those averages. The lowest average has been given highest priority in order to fit with the same principles used by the authors of examined papers. The method of calculating the priority number given by this thesis could be arguable however it is a guideline for identifying the most important CSFs agreed by majority of researchers. The common aspect of the researched articles was the importance of the preparation for ERP implementation where majority of the researches had identified factors linked with preparation, analysis and design of the ERP project.
<table>
<thead>
<tr>
<th>No.</th>
<th>CSF priority by five research articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Explicit understanding of strategic goals</td>
</tr>
<tr>
<td>2</td>
<td>Commitment by top management</td>
</tr>
<tr>
<td>3</td>
<td>Excellent project management</td>
</tr>
<tr>
<td>4</td>
<td>Organizational change management</td>
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<tr>
<td>5</td>
<td>A great implementation team</td>
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<tr>
<td>6</td>
<td>Data accuracy</td>
</tr>
<tr>
<td>7</td>
<td>Extensive education and training</td>
</tr>
<tr>
<td>8</td>
<td>Focused performance measures</td>
</tr>
<tr>
<td>9</td>
<td>Multi-site issues</td>
</tr>
<tr>
<td>10</td>
<td>Project champion</td>
</tr>
<tr>
<td>11</td>
<td>Communication plan</td>
</tr>
<tr>
<td>12</td>
<td>IT Infrastructure</td>
</tr>
<tr>
<td>13</td>
<td>Managing cultural change</td>
</tr>
<tr>
<td>14</td>
<td>Post-implementation evaluation</td>
</tr>
<tr>
<td>15</td>
<td>Selection of ERP</td>
</tr>
<tr>
<td>16</td>
<td>System quality</td>
</tr>
<tr>
<td>17</td>
<td>User involvement</td>
</tr>
</tbody>
</table>
Table 2: Analysis of CSF based on priority by five research articles

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Top management support</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>9/5 = 1,8</td>
</tr>
<tr>
<td>2</td>
<td>ERP Teamwork</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>16/5 = 3,2</td>
</tr>
<tr>
<td>3</td>
<td>Change management &amp; organizational culture</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>5</td>
<td>2</td>
<td>21/5 = 4,2</td>
</tr>
<tr>
<td>4</td>
<td>Project management</td>
<td>3</td>
<td>6</td>
<td>5</td>
<td>2</td>
<td>7</td>
<td>23/5 = 4,6</td>
</tr>
<tr>
<td>5</td>
<td>Business plan and vision</td>
<td>1</td>
<td>8</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>23/5 = 4,6</td>
</tr>
<tr>
<td>6</td>
<td>Business Process Reengineering (BPR)</td>
<td>-</td>
<td>3</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>20/4 = 5</td>
</tr>
<tr>
<td>7</td>
<td>User training and involvement</td>
<td>7</td>
<td>4</td>
<td>-</td>
<td>6</td>
<td>12</td>
<td>29/4 = 7,25</td>
</tr>
<tr>
<td>8</td>
<td>Effective communication plan</td>
<td>-</td>
<td>11</td>
<td>4</td>
<td>8</td>
<td>6</td>
<td>29/4 = 7,25</td>
</tr>
<tr>
<td>9</td>
<td>Software development, testing and troubleshooting</td>
<td>-</td>
<td>3</td>
<td>10</td>
<td>11</td>
<td>8</td>
<td>32/4 = 8</td>
</tr>
<tr>
<td>10</td>
<td>Monitoring and focused performance evaluation</td>
<td>8</td>
<td>-</td>
<td>11</td>
<td>-</td>
<td>9</td>
<td>28/3 = 9,3</td>
</tr>
<tr>
<td>11</td>
<td>Project champion</td>
<td>-</td>
<td>10</td>
<td>6</td>
<td>12</td>
<td>10</td>
<td>38/4 = 9,5</td>
</tr>
<tr>
<td>12</td>
<td>Business &amp; IT infrastructure (legacy)</td>
<td>-</td>
<td>12</td>
<td>7</td>
<td>15</td>
<td>11</td>
<td>45/4 = 11,25</td>
</tr>
<tr>
<td>13</td>
<td>Vendor support</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>10/1 = 10</td>
</tr>
<tr>
<td>14</td>
<td>Use of consultant</td>
<td>-</td>
<td>7</td>
<td>-</td>
<td>14</td>
<td>-</td>
<td>21/2 = 10,15</td>
</tr>
<tr>
<td>15</td>
<td>Selection of ERP</td>
<td>-</td>
<td>15</td>
<td>-</td>
<td>13</td>
<td>-</td>
<td>28/2 = 14</td>
</tr>
<tr>
<td>16</td>
<td>System quality</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>16</td>
<td>-</td>
<td>16/1 = 16</td>
</tr>
<tr>
<td>17</td>
<td>Post-implementation evaluation</td>
<td>-</td>
<td>14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>14/1 = 14</td>
</tr>
</tbody>
</table>
According to Markus and Tanis (2000) process oriented ERP life cycle model as cited in Nah et al. (2001), ERP implementation project consists of four phases such as chartering phase, project phase, shake down phase and finally onward and upward phase. As mentioned in the methodological section, this paper has adopted Nah et al (2001) approach by placing identified critical success factors in the phase they come into action in the life cycle. Figure 4 illustrate the classification of these critical success factors in the phase they belong to.

**Figure 4: Process-oriented ERP Life cycle model**

1. Top management support
2. ERP Team
4. Project management
5. Business Plan & Vision
7. User Training & involvement
8. Effective Communication Plan
11. Project champion
12. Business & IT infrastructure
13. Vendor support
14. Use of consultant
15. Selection of ERP

3. Change management & org. culture
6. Business process reengineering (BPR)
9. Software development, testing
16. System quality

10. Monitoring & performance evaluation

Source: Adapted from Markus & Tanis (2000) as cited in Nah et al. (2001), p. 290
According to the figure 4, the most important phases of ERP implementation project are first chartering phase followed by the project phase. Most of the CSFs identified in this paper come into play in these two phases of ERP life cycle, showing that all researched articles agreeing on the importance of both chartering and project phase. Factors such as top management support, ERP Team and project management were considered as most critical factors by majority of researchers which play a great role throughout the ERP implementation project. Almost none of the researcher’s part from Dezdar and Sulaiman (2009) had mentioned factors such as vendor support linked with maintenance stage. Vendor support, identified by Dezdar and Sulaiman (2009) was placed in chartering phase by this paper due to the fact that it is important throughout the whole ERP life cycle and it is mentioned repeatedly by Dezdar and Sulaiman (2009).

The finding of this thesis is supported by previous research conducted by Nah et al., (2001) where they recognized the importance of these two phases. Having said that, factors such as Business process reengineering and effective communication plan was not mentioned in the research by Umble et al. (2003). The reason could be said that they only focused on nine factors which could have been influenced by their case study of successful implementation of ERP by Huck International, Inc.

An interesting fact from the findings in this paper is that the most recent research conducted by Dezdar and Sulaiman (2009), Francoise et al. (2009) and Finney and Corbett (2007), consist of more identified critical success factors than the older research by Nah et al. (2001), and Umble et al. (2003). This raises a question whether the reason for these differences is because of ERP plays a greater role in the organizations in recent years and more organization from various industries with various needs has started to implement ERP giving researchers a broader insight or simply there is more research material available in recent years regarding ERP implementation.

As mentioned earlier, the first two stages of ERP implementation process is seen as the most important stages by majority CSFs researchers while the shakedown phase has only been mentioned briefly where evaluation of ERP system take in place. Other researchers such as Ifinedo (2007) and Sedera et. al (2003) that have focused on evaluating success, draw attention to shakedown phase due to the fact that the evaluation takes place in this phase. This highlights the existence of a gap between CSFs leading to successful implementation of ERP system and the evaluation of success by users.
It can be observed from the literature of this thesis, that there are various stakeholders involved in ERP system implementation that perceives success differently, which is validated by the results form the research of Sedera et al (2003), and Chien & Tsour (2007). An interesting observation drawn from the literature review is that Ifinedo (2007) opposed the above mentioned argument as his research concluded that there were no differences between business managers and IT manager’s perception of success even though he used similar model for measuring ERP implementation success as Sedera et al. (2003). It could be argued that the reason for such a diverse result from these two researchers was due to several factors; Firstly, Sedera’s et al. (2003) research was based on public sector organizations while Ifinedo’s research was based on firms from private sector which highlight an important fact that ERP implementation success can be perceived differently in different sectors. Second reason for this diverse result could be due to the exclusion of end-user in Ifinedo’s research that could have affected the result if taken into consideration. Researchers such as Chien & Tsour (2007) and Sedera et al. (2003) are arguing that end-users have a great impact on the implementation of ERP system and that if their perception is positive towards the ERP system during the implementation process, it could lead to perceived ERP success after implementation. Thus, the end-user view of ERP success could be different form management, which the research from Sedera et al. (2003) resulted in supporting this argument in some extent. The end-users are concerned about the effect that ERP system has on their job which could create uncertainties for both end-users and the organization if not taken into consideration which also adds to different perception of ERP success from managers.

Based on the observation, it can be said that different perception of ERP implementation success exists between different stakeholder groups and if Ifinedo (2007) had included end-users in their research, the result could vary and could in some extent be aligned with Sedera et al. (2003) and Chien & Tsour (2007) results. However, this is only an assumption and highlights the need for further research in the field of user perception of success and its relation to “CSFs”.

Another significant observation that leads towards a conclusive discussion of this paper is that, a number of researchers like Häkkinen & Hilmola (2007), Wu & Wang (2006), Delone & Melean (2003) and Zviran et al. (2005) have identified user satisfaction as an important dimension to measure the ERP implementation success. Researchers such as Sedera et al. (2003) and others have also classified different stakeholder groups to measure the ERP implementation success. However a detailed literature review has supported
this research to recognize three stakeholder groups based on users of ERP system within user organization, such as top management, IT professionals and End-users. In figure 5, a simple relation can be determined between ERP implementation success, user satisfaction and division of users within three groups.

![Figure 5: different user groups related to user satisfaction and ERP implementation success.](image)

Tables 1 and 2 have a detailed description and prioritization of CSFs based on other researchers categorizations. Those categorizations have provided immense knowledge of CSFs. This complete narration of CSFs has enabled authors of this paper to assess and correlate different CSFs with the classified three groups of stakeholders within the user organization of ERP system. The findings from literature review reveals that all these stakeholders are involved in the implementation process and the quality of their effort has a positive effect on the implementation of ERP system.

Researchers such as Al-Mashari et al. (2003), Finney and Corbett (2007) and Dezdar and Sulaiman (2009) consider the support and commitment of top management as the most critical success factor for ERP implementation. This shows a clear correlation between top management and the CSF recognized as "top management support and commitment". Other CSF related to top management consists of “Change management and organizational culture” which is supported by Al-Mashari et al. (2003) suggesting that the role of
top management in the ERP implementation is to “ensure an even change management and system rollout”. Wang et al. (2008), Nah et al. (2001) and Al-Mashari et al. (2003) associated change management with overcoming resistance of ERP implementation within organization and related this task mainly to top management in the ERP implementation. However, Willcocks and Sykes (2000) stated that IT professional are also involved in change management by engaging in relationship building with business managers and other stakeholders of ERP.

The CSF “Business plan and vision” is strongly related to both Top management and IT professionals. Al-Mashari et al. (2003) and Nah et al. (2001) claimed that top management are responsible for setting the vision and business plan and approving the ERP project which, they should align it with the strategic goal of the business. While other researchers such as Willcocks and Sykes (2000) claimed that IT managers should be involved in aligning ERP investments such ERP with strategic business priorities and visions.

"ERP Team work” is mainly associated with IT professionals as the literature review only revealed Woo (2007) whose research related ERP project team with the responsibilities of IT professionals. However, Woo (2007) criticized his finding by arguing that the reason for ERP implementation failure for some organizations was due to top management’s failure to incorporate other non-technical members into the project team. There was some indication that End-users could be involved in ERP team work supported by the argument from Francoise et al. (2009) stating that End-users could possess knowledge that could be used in areas where ERP team lacked the expertise.

Other high prioritized CSF by researchers is “Project management” which is related to Top management’s duties in the implementation of ERP. Nah et al. (2001) suggested that allocating resources such as human, time and financial resources to the implementation effort as part of project management was the responsibility of the top management. “Project champion” is also directly related to Top management as Sumner (1999) has stressed that the in charge of ERP implementation project which refers to project champion should be a business leader so that business perspective can be considered.

User training and involvement is seen by researchers such as Al-Mashari et al. (2003), Woo (2007), Willcocks and Sykes (2000) and Francoise et al. (2009) to be crucial for successful implementation of ERP system. Gupta
(2002) associated some ERP system failure with lack of training of end-users which highlights the importance of user training and involvement in the implementation of ERP system. The literature revealed "User training and involvement" as CSF which is related to all three identified stakeholders. Willcocks and Sykes (2000) claimed that IT professionals’ involvement in user training was critical for the success of ERP implantation, highlighting the relation between IT professionals and user training. Other researchers such as Al-Mahsari et al. (2003) suggested that En-users are involved in ERP implementation through their training and education sessions, supporting the End-users relation with user training and involvement as CSF. Although the literature review didn’t recognized the relation between user training and top management, their involvement in user training is inevitable as they are considered to be responsible for the project management as well as change management which also encompass user training and involvement.

End-users, IT professionals and Top management are all considered to be related to the CSF “Selection of ERP” based on the suggestions by researchers such as Verville et al. (2006), Willcocks and Sykes (2000) and Al-Mashari et al. (2003). Based on the findings from their research, Verville et al. (2006) argued that the acceptance of ERP system following the implementation was highly related to End-users desire for acquisition of ERP where the desire could be obtained by involving End-users in the acquisition of ERP. Willcocks and Sykes (2000) claimed that IT professionals’ technical backgrounds are very important both during the selection of ERP system and the implementation of the system into adopting organization, highlighting the relation between IT professionals and the selection of ERP. The relation between Top management and "Selection of ERP" is supported by both Al-Mashari et al. (2003) and Willcocks and Sykes (2000) claiming that it is the duty of Top management to deciding the appropriate ERP system and selecting vendor.

"Effective communication plan" is mainly considered to be related to Top management based on the literature review. Researchers such as Al-Mashari et al. (2003), Nah et al. (2001) and Wang et al. (2008) arguing that communicating the business vision and the role of ERP system is the core responsibility of the Top management in the ERP implementation process, which supports the relation between effective communication plan and Top management. However, although the literature review didn’t provide direct reference regarding IT professionals’ relation with the effective communication plan, it showed that IT professionals were involved in aligning business vision with the ERP system. It could be argued that aligning business goals with ERP system needs an effective communication
plan which IT professionals are involved in. hence, relating IT professionals with "Effective communication plan”.

Al-Mashari et al. (2003) and Willcocks and Sykes (2000) related the responsibility for "System quality” with Top management and IT professionals. Arguing that exploiting the ERP systems technological capabilities and ensuring that the business performs in accordance to the plan is key task of Top management and IT professionals. However, End-users are also arguably contributing to system quality by being involved in the selection of ERP system as mentioned earlier.

"Monitoring and focused performance evaluation” is considered by Al-Mashari et al. (2003) to be the duty of Top management which is critical for the success of ERP implementation. While, "Post-implementation evaluation” is considered by Willcocks and Sykes (2000) to involve IT professionals, claiming that organizations that value their IT department highly are more likely to implement ERP system successfully.

Nah et al. (2001) argue that Business and IT legacy systems which encompass existing business process, organization structure, culture and information technology has direct relation with ERP implementation success. The literature review didn’t provide any direct reference relating the CSF “Business and IT infrastructure” with any of stakeholders. However, it could be argued that the establishment of the business and IT legacy system that is compatible with ERP system is a complex and important task that need the attention of Top management and IT professionals. Moreover, as described earlier, researchers consider Top management and IT professionals to be responsible for managing the project, change management, system quality and business plan and vision which are related to the establishment of business and IT legacy systems. Therefore, it could be said that “Business and IT infrastructure” is related to the duty of Top management and IT professionals.

The summary of the above discussion related to the relation between CSFs and stakeholders is illustrated in figure 6 which shows that the majority of CSFs are related to Top management and IT professionals. The observation of the figure 6 and the discussion prior to the figure 6 regarding relationship between CSFs and stakeholders, raises an argument regarding the identified CSFs. It could be argued that the authors of CSFs have identified critical success factors mainly from top management and IT professionals’ perspective and have not taken End-users perspective into consideration when conducting their research. This is supported by Gyampah (2004)
arguing that identified CSFs are based on management level perspective and End-users are neglected. This highlight the need for further research in the field of CSFs focused on the End-users perspective.
5 Conclusions

The finding of this research has revealed that there are various stakeholder groups involved in ERP system implementation which has been categorised as “Top management”, IT professionals” and “End-users”. These stakeholder groups have their own perspective of success in the implementation process of ERP system which varies to some extent. Some researchers have used user satisfaction as a main dimension of measurement for evaluating ERP implementation success which is related to the perception of these stakeholder groups described by this research thesis.

There are vast numbers of literature regarding implementing ERP successfully. In this research thesis, seventeen CSFs for ERP implementation have been identified and categorized in accordance to their priorities made by researchers. The research revealed that researchers have nominal differences within their results regarding categorization of CSFs. Furthermore, different names with similar meanings have been used by researchers in order to identify CSFs. Also, a number of CSFs has been divided in sub units which restrained this research in categorizing these CSFs in accordance with their exact priority number. Twelve most important CSFs identified by the majority of researchers have been described in more detail. Even though, these CSFs are labelled as important, their static view has been criticized by other researchers arguing that they don’t explain their influence throughout the implementation process, which is dynamic. Therefore, in this research, in order to combine the static CSFs and the dynamic ERP implementation process, all the identified CSFs has been categorized into the phase in the ERP process life cycle where they come into play. Using Markus and Tanis (2000) process-oriented ERP life cycle model.

An analysis has been made by this research in order to find possible relation between CSFs and stakeholders of ERP implementation. The result revealed that several CSFs of ERP such as user training and involvement, ERP teamwork and selection of ERP are directly related to End-users. However, research has shown that there are organizations that give low priority to End-users and reduce their training session for cost saving reasons (Woo, 2007).

Top management are related to majority of CSFs such as top management support and commitment, change management, business plan and vision, system quality, project management, effective communication plan,
selection of ERP, monitoring and focused performance evaluation, project champion, and business and IT infrastructure. Highlighting the argument raised by Gyamah (2004) stating that identified CSFs are based on management level perspective where End-users are neglected.

The result from analysis also showed a correlation between IT professionals and several CSFs such as selection of ERP, system quality, user training and involvement, post-implementation evaluation, business plan and vision, change management, ERP teamwork, effective communication plan, and business and IT infrastructure.

Based on the analysis, it can be concluded that different perception of ERP implementation success exists between different stakeholder groups within user organization. In addition, CSFs identified by researchers have a connection to user satisfaction through stakeholders, highlighting the CSFs importance in successful implementation of ERP. However, prioritizing these CSFs can be criticized as all these identified CSFs are collectively contributing to a successful ERP implementation and also, they are interrelated. It is worth mentioning that, this research is purely based on analysis of literature and doesn’t include any empirical data from organizations that have implemented ERP or developers involved in implementing ERP systems. Therefore, further research can be done by gathering empirical data from user organizations that have implemented ERP system. The research could focus on End-users perception of ERP implementation and factors that contributing to the ERP implementation success. Another subject for further research could be to find out how different perception of ERP success, in different stakeholders mind can influence the effectiveness of ERP system?
6 Managerial implications

The implementation of ERP system is a complex and costly process which requires the attention of business and IT managers responsible for the implementation project. The identified critical success factors for ERP implementation success is proved to be important and needs to be taken into consideration by business managers when planning and designing the implementation project. However, research has concluded that different stakeholders could perceive success differently; therefore, while practically implementing an ERP implementation system, it is necessary to understand and consider different CSFs that contribute to the user satisfaction of different stakeholder groups. End-user involvement in ERP implementation is highlighted by vast number of researchers to be critical for the success of the ERP implementation. Business managers responsible for the implementation of ERP can exploit end-users by giving priority to end-users training and involvement in the selection of ERP system.
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