

CHAPTER (1)

INTRODUCTION

1.1. Overview

Enterprise resource planning (ERP) has its roots back in the 1970s when organizations, particularly large manufacturing corporations, started to employ Material Requirements Planning (MRP) to computerize their supply chain processes. MRP software was rapidly expanded to MRP II. The new system integrated additional jobs like capacity planning, master production scheduling and sales forecasting. Finally, advances moved in the direction of ERP systems. ERP systems incorporate the business processing activities of every functional department in the whole organization. The ERP systems were subsequently extended to ERP II by including new developments. Now, the ERP II system can manage supply chain management which integrates other stakeholders into the system. They will also possibly accommodate further models like workflow management, customer relationship management, quality management, project control, and even knowledge management (Beheshti, 2006).

The ERP system is an increasingly accepted information technology (IT) platform that is being installed to assist companies in better distributing and managing enterprise-wide operational data to managers and decision makers throughout the organization (Beard & Summer, 2004). The ERP system is an integrated software solution which covers a variety of business processes that enables companies to achieve a holistic outlook of the organization (Ehie & Madsen, 2005). ERP systems help organizations to integrate their diverse functions like finance, human resources, accounting, sales, operations, marketing,

and even the supply chain and also to combine the divisions of a company in terms of information flow and exchange (Motwani, Subramanian, & Gopalakrishna, 2005). Garcia-Sanchez and Perez-Bernal (2007) defined the ERP system as an information system (IS) that combines organizational functions and distributes shared benefits to all departments. Turban, Leidner, Mclean, and Wetherbe (2006) also affirmed that ERP systems increase the capability of an organization to manage its resources via business functional integration. Similarly, a lot of organizations have been implementing ERP systems to rationalize their business functions that can concurrently share the most up-to-date information.

Over the past few years, companies around the world have implemented ERP systems because the use of ERP systems has been considered as a key determinant of competitive advantage. It is extensively accepted from empirical evidence that the ERP systems bring very considerable benefits to the adopting organizations (Shang & Seddon, 2002). Markus, Axline, Petrie, and Tanis (2000) asserted that the possible benefits of successful ERP system implementation are great and even critical for the performance and survival of the organization. ERP systems can present huge benefits that sometimes go beyond the expectations of implementing enterprises (Scott & Vessey, 2002). The majority of organizations believe that ERP systems will improve the speed and value of operations and hence decrease wasteful costs (Grabski & Leech, 2007). A lot of researchers and practitioners have marked ERP software as the most popular application system in the last few years (Beheshti, 2006). The ERP systems have become very popular due to transferring the best practices embedded within them, sharing information among functional departments through one database and integrating the company's business processes. All these benefits have encouraged analysts to affirm that in the 21st century, the ERP system is an essential requirement for success (Davenport, 2000).

The key benefit of ERP systems for adopting companies is the ability to integrate and

automate business processes, consequently sharing and utilizing real-time information in their organization with suppliers as well as customers (Nah, Lau, & Kuang, 2001). The ERP systems offer several considerable intangible benefits to the implementing companies such as improved information and processes, internal integration, and improved customer service, and they also present a number of most important tangible benefits like cost effectiveness in inventory, personnel, procurement, cash/order management, improvements in productivity, and overall profitability (Chein & Tsaur, 2007). ERP systems enable the companies to manage their businesses better through the likely benefits of higher quality data for decision-making, better data analysis, improved process flow, reduced inventories, improved supply chain coordination, and enhanced customer service (Gattiker & Goodhue, 2005).

There are various rationales provided in the literature for the adoption and popularity of ERP systems. Allen, Kern, and Havenhand (2002) stated that ERP is employed by companies to enhance speed of decision-making, improve the control of costs and operations, and improve distribution of information throughout organization. Mabert, Soni, and Venkataramanan (2001) affirmed that a principal benefit of ERP system implementation is to achieve competitive advantage. Ke and Wei (2008) asserted that due to the integration of ERP systems into core business processes or strategies, they have strategic consequence and they can have an impact on organizational performance. ERP systems also help employees to concentrate on inventive job and customer service (Ifinedo, 2007). According to Fan, Stallaert, and Whinston (2000), every one of these benefits results in enhanced business profit margins.

Due to the huge benefits of ERP systems, organizations around the world have been fast to acquire this software. The ERP market is one of the fastest rising markets in the business software industry (Willis & Willis-Brown, 2002). Yen, Chou, and Chang (2002) suggested

that ERP will continue to be one of the fastest growing and most prominent players in the application software business during the coming decade. According to Richardson (2004), the ERP systems market was estimated to increase from US\$ 13.4 billion in 2003 to an expected US\$ 15.8 billion in 2008. Richardson (2004) also predicted that between the years 2006 and 2009, the ERP systems market would have a 6-7% compound annual growth rate. Bingi, Sharma, and Godla (1999) claimed that the ultimate market size for ERP systems is expected to be around \$1 trillion by the year 2010.

The ERP system is perhaps the single largest IT investment an organization can make (Teltumbde, 2000). According to a study performed on 63 companies, the average entire cost of a full ERP system was discovered to be around US\$9 million (Kamhawi, 2008). However, Beheshti (2006) claimed that this number seems quite low when comparing many ERP system implementation projects which needed more than US\$100 million. In most cases, the cost of full-scale ERP implementation in a big company can easily go beyond US\$100 million, and the implementation process usually takes at least two years to complete (Umble & Umble, 2002). To implement ERP systems, substantial financial and personnel resources should be employed. Mabert et al. (2001) claimed that large organizations usually spend 5.6% of their annual revenues, while smaller companies spend up to 50% of their annual revenues on an ERP implementation project. They also stated that for a medium-sized company, the whole implementation cost stands at tens of millions of dollars while for huge international firms it is US\$300-500 million. Furthermore, Davenport (1998) stated that ERP implementation projects in large businesses could range from US\$50 million to more than US\$500 million for the required hardware, software, training and consultation related to ERP implementation.

1.2. Problem Statement

Although implementing an ERP system in a company can be of great benefit, achieving those benefits depends on the successful implementation of the ERP system. As previous research shows, successful implementation of ERP systems is a relatively complicated job (Botta-Genoulaz, Millet, & Grabot, 2005). ERP system implementation is a very complex and time consuming process due to its broad configuration alternatives and the extent of its organizational impact. Scott and Vessey (2000) stated that while some organizations accomplish successful results in their ERP adoption, other companies experience a lengthy, expensive and failed adoption process and they cannot achieve the anticipated benefits. There have been too many ERP implementation projects that have not been completed on time and within budget. There have also been many ERP implementation failure cases reported in the literature, which indicates mostly abandoned implementation projects with major financial damage. Many companies have experienced partial failures which created various disruptions in their usual operations (Gargeya & Brady, 2005). Consequently, ERP implementation projects face different endings and experience a variety of project circumstances (Soja, 2006).

Regardless of the various benefits of the ERP system, its adoption and implementation have not been without problems. Many companies have assigned considerable organizational resources to their ERP projects, but have encountered unexpected challenges due to the compound nature of ERP systems. ERP system implementation is usually considered a high cost and high risk project that consumes a considerable share of a company's capital budget and is filled with a high level of uncertainty. A recent report illustrates that, on average, ERP implementation projects took 2.5 times longer than projected, were 178% over budget, and brought about only 30% of the agreed benefits (Zhang, Lee, Huang, Zhang, & Huang, 2005). Wang and Chen (2006) stated that over 90%

of ERP implementations have been delayed and budget needed for the additional amounts due to many changes in the original plan. Another study estimates at 31% the rate of non-succeeding projects (Kamhawi, 2008). Scott and Vessey (2002) observed that 90% of SAP R/3 implementation projects were behind schedule. Some firms have even had to close due to having made huge investments in ERP systems that did not go live. The Fox Meyer Drug Company asserted that its ERP implementation failure caused the bankruptcy of the company (Davenport, 1998). Dow Chemical, Dell Computer, and Mobil Europe are among the failure cases where hundreds of millions of dollars in investments on ERP implementation projects just ended in unsuccessful system implementation (Davenport, 1998).

ERP implementation projects have consumed huge budgets while their success rate has been low. So, it is vital to uncover the way to realize benefit in ERP system adoption and discover the essential predictors which affect ERP implementation projects (Calisir & Calisir, 2004; Law & Ngai, 2007; Umble & Umble 2002). There is an urgent need to identify and understand the factors that affect the success or failure of ERP implementation (Ngai, Law, & Wat, 2008; Sawah, Tharwat, & Rasmy, 2008). ERP adopting organizations usually concentrate on the technological and monetary features of an ERP implementation project and forget to take into account the nontechnical issues. To solve this problem, many researchers have been using the critical success factors approach to study ERP implementation success (Botta-Genoulaz & Millet, 2006).

1.3. Research Questions and Objectives

The central aim of the current research is to identify the critical factors related to ERP systems implementation success. Besides, this study has the three following sub-aims:

- To propose an ERP implementation success model.
- To validate the ERP implementation success model using extensive data collection and analysis.
- To present guidelines for ensuring successful ERP implementation.

The research questions of this study consist of the following “what”, “why”, and “how” questions:

Question (1): What are the critical factors that affect the success of ERP implementation?

Question (2): Why are these factors critical for successful ERP implementation?

Question (3): How does the organizational culture of an ERP adopting company moderate the relationship between critical factors and ERP implementation success?

Question (4): How can ERP systems be implemented successfully?

This research attempts to provide answers to the above mentioned questions by achieving the following research objectives:

Objective (1): To determine the critical factors that affect the success of ERP implementation.

Objective (2): To analyze the relationship between critical factors and ERP implementation success.

Objective (3): To evaluate the moderating effect of organizational culture on the relationship between critical factors and ERP implementation success.

Objective (4): To investigate how ERP systems can be implemented successfully.

1.4. Scope of the Study

The scope of this study was limited to Iranian companies that had implemented an ERP system within the previous three years. This constraint guaranteed all participating companies had extensive ERP utilization. Therefore, it was possible to determine the success of ERP implementation. Furthermore, the individuals involved in the ERP system implementation were still available to respond to the survey. The target companies of this study included companies from different types of industries such as Manufacturing (Petrochemical, Home Appliances, Automotive, Consumer Products, Agricultural Machinery, Basic Iron and Steel, Basic Precious and Non-ferrous Metals, Detergents and Cleaning, Glass Products), the Service sector (Telecommunications, Engineering and Construction, Distribution) and Mining (Iron Ores, Coal). However, this study did not distinguish between the target companies regarding their size (small, medium, large), their ERP systems (SAP, Oracle, etc.), their industry section (e.g. manufacturing, service, etc.) and their type of their ownership (e.g. Public, private, etc.) because the number of ERP adopting companies was limited.

The lack of literature on ERP research in Iran was the most significant constraint of this research. There has not been any research conducted on the success of ERP implementation in Iran. Consequently, the researcher encountered several problems. For instance, there was no single source (sampling frame) which could show all the ERP user companies in Iran. In fact, the target population of ERP adopting companies in Iran was unknown at the time of distributing the questionnaires. The other issue concerned the ERP user companies

themselves. ERP implementation projects were high spending and long lasting projects of these companies and most of them were frightened to disclose the data relating to their ERP implementation projects. Lastly, in this research it was assumed that the respondents had proper expertise to correctly state their perceptions regarding the critical success factors affecting ERP implementation projects and that all the respondents expressed their honest opinions.

1.5. Iranian Context

Iran is situated in the Middle-Eastern part of Asia and is the sixteenth largest country in the world with an area of 636,296 sq. miles (1.6 million. sq. kms.). It shares borders with Turkey and Iraq in the west, the Sea of Oman and the Persian Gulf in the south, Afghanistan and Pakistan in the east, and Armenia, Azerbaijan, Turkmenistan and the Caspian Sea in the north. The geography and environment of Iran vary considerably and include jungles, mountains, deserts, lakes, sea and the country has four seasons.

Iran's population is estimated to be about 70 million. Persian (Farsi) is the official language of Iran, which is an Indo-European language and is used and taught in all Iranian schools from the first grade. There are some other local languages that are spoken such as Turk and Kurdish. According to Yeganeh and Su (2008), Iran has one of the world's most varied set of ethnic groups ever brought together in one country. The Iranian people comprise Persian (56 percent), Turk (24 percent), Gilaki (8 percent), Kurd (8 percent), Lur, Baluch, Armenian, Arab and Turkoman. The religious groups are Shiite Muslims (95 percent), Sunni Muslims (4 percent), with the remainder being Christians, Zoroastrians and Jews.

Monarchy was the political model of Iran for more than 2,500 years. This aged and long monarchical practice was interrupted with the occurrence of the Islamic revolution in 1979.

Now, Iran is an under the Islamic republic which rules according to a constitution providing for the government, legislative and judicial branches. The president and the parliament members are elected by popular vote every four years.

Iran is a key player in the regional economy due to the fact that it possesses oil and gas reserves and has a large young population. It has approximately 9 percent of world oil reserves and is expected to have the second largest reserves of natural gas. Iran receives considerable amounts of oil revenue from the outside world, about 80 percent of its gross domestic product (GDP). High dependence on oil revenues may lead to economic/administrative ineffectiveness. In recent years, economic growth has not kept up with the rapid rise in the labour force, leading to a high unemployment rate (Yeganeh & Su., 2008). According to the Iranian constitution, the economy of Iran comprises three segments; the cooperative, private, and state sectors. Iran's economy is based on a mixture of traditional agriculture, state ownership of large organizations, and small private companies. The state segment consists of all major and critical industries such as oil and gas, radio and television, foreign trade, telephone services, aviation, and so on. Some main industries are managed by revolutionary foundations which possess about 20 percent of the country's assets. The cooperative division is almost insignificant and incorporates enterprises offering restricted amounts of products and services. The private sector consists of small and medium size firms concerned with manufacturing and services that complement the economic activities of the state (Khajehpour, 2000).

1.6. Research Methodology

As mentioned earlier, the aim of this research is to examine the critical factors that affect the success of ERP implementation in Iran. The target population of the study is Iranian companies that had adopted ERP systems. An ERP adopting company was defined as one that had implemented at least two ERP system modules. In addition, the ERP systems implemented should not have gone live for more than three years. Unfortunately, the target population of ERP adopting companies in Iran was unknown. Instead, a variety of subsequent sources were utilized to make a complete list of ERP adopting companies in Iran. Finally, 31 enterprises identified that their ERP systems were at the go-live phase.

A survey questionnaire was employed to collect data for this research. A seven-point Likert-type scale with anchors ranging from 'strongly disagree' to 'strongly agree' was utilized to measure all question items. Content validity of questionnaire was examined through three following steps as recommended by Cavana, Delahaye, and Sekaran (2001). First, all questionnaire items were used and verified by prior researchers. Second, five well-known ERP researchers who published frequently in prominent IS journals confirmed the research framework and questionnaire set. Third, the English questionnaire was translated to the Persian language which was the medium language of respondents. Then, the Persian questionnaire was reviewed by six expert involved in ERP implementation projects in Iran. Based on their suggestions, several changes were made in wording and format of questionnaire. Finally, the modified Persian questionnaire was translated back to English. To ensure the reliability of the questionnaire, a pilot study was conducted. The data were tested using the SPSS software 16.0 and it was found that all the variables' Cronbach's alpha values were above 0.7. Consequently, the questionnaire was considered to be reliable as suggested by Hair, Black, Babin, Anderson, and Tatham (2006).

In the data analysis phase, the first part involved the use of descriptive statistics to show the frequencies and percentages of the demographic data. In the second part of the analysis, Structural Equation Modeling (SEM) analysis was employed with the two-step methodology proposed by Hair et al. (2006). In the first step of SEM analysis, each latent variable was modeled as a separate measurement model. Some of the initial model fit indexes demonstrated a non-reasonable fit. So, based on the modification indexes, further model modification was set.

Supplementary analyses were carried out. The outcomes of the convergent validity test indicated that all constructs had adequate convergent validity. Moreover, the outcomes of the discriminant validity test confirmed that all constructs shared more variances with their indicators than with other constructs. Confirmatory factor analysis (CFA) was conducted using AMOS 16.0. The results indicated a ratio of CMIN/DF to be 2.659. In addition, the comparative fit index (CFI) reported for the measurement model was 0.919. Besides, the root mean square error of approximation (RMSEA) of the measurement model was 0.066. So, the measurement model possessed an acceptable fit.

In the second step of SEM analysis, the proposed structural model was examined using package AMOS 16.0. The maximum likelihood method was employed to estimate all parameters and fit indices. Based on the results of the SEM fit indices, the proposed model provided an acceptable fit for the data. The RMSEA was below the recommended cut off of 0.08 and the CFI was greater than 0.90. Using structural equation modeling and hypotheses testing on the proposed model, it was found that 10 of the 12 hypothesized relationships (Hypotheses 1, 3, 4, 5, 6, 7, 9, 10, 11 and 12) were significant, while two hypotheses were not significantly supported (Hypotheses 2 and 8).

1.7. Significance of the Study

This research is significant because of several issues. First of all, a review of the literature indicates that ERP implementations have been high spending projects with low success rates (Kamhawi, 2008; Scott & Vessey, 2002; Wang & Chen, 2006; Zhang et al., 2005). So, it is necessary to understand the sources of ERP failures and also to find solutions leading to ERP success (Brown & Vessey, 2003; Calisir & Calisir, 2004; Haines & Goodhue, 2003; Ho, Wu, & Tai, 2004; Law & Ngai, 2007). Understanding the critical factors of the success of ERP implementation would be of benefit to both implementing companies and ERP software vendors. ERP implementing companies could achieve an understanding of the complexities inherent in ERP implementation projects to avoid possible barriers. In addition, decision makers will be able to prepare better strategies to increase the likelihood of achieving the desired results. Besides, ERP system vendors would build ERP products that keep their customers happier and consequently they may possibly increase their market share and their profits.

Second, although the adoption and implementation of the ERP systems has been studied, additional research and insights are needed. This is because ERP product life cycles have become very short, and technology is changing rapidly (Amoako-Gyampah, 2007). Plant and Willcocks (2007) affirmed that the ERP systems are changing rapidly with time and offering new problems. Moreover, while the CSFs for the implementation and use of ERP systems have been discussed and analyzed, there have been many inconsistent and inconclusive findings (Law & Ngai, 2007). Previous researchers have employed different approaches to identify CSFs for ERP systems and the studies have been fragmented in this area (Dawson & Owens, 2008). As a result, it is fundamentally worthwhile to continue studying the success of ERP implementation.

Third, the ERP vendors are now trying to extend their market to companies in

developing countries (Pairat & Jungthirapanich, 2005). Research by Huang and Palvia (2001) showed that ERP systems face additional challenges in developing countries. However, the literature on ERP implementation has a heavy emphasis on companies in the developed countries from Europe and North America. Little research has been conducted on companies in developing countries (He, 2004; Ngai et al., 2008; Sawah et al., 2008; Tarafdar & Roy, 2003; Tsai, Chien, Fan, & Cheng, 2005). Moreover, several researchers confirmed that Asian companies deal with substantially different problems in comparison with the issues faced by organizations in developed countries due to their different contexts or national differences, including management style, the business model, data formats and the extent of sophistication of IT use and so on (Chien, Hu, Reimers, & Lin, 2007; Davison, 2002; Liang & Xue, 2004; Ngai et al., 2008). Besides, most of the studies in Asia have been conducted in the Chinese environment. Consequently, there is a lack of research in other Asian countries and specifically in the Middle-East region (Kamhawi, 2008).

Fourth, Iranian companies started to employ information systems, partially because of increased domestic competition and somewhat due to the increased overseas competition that agreement to the World Trade Organization (WTO) would bring. However, studies undertaken in developed countries may not be applicable in other contexts (Chien et al., 2007; Tarafdar & Roy, 2003). Huang and Palvia (2001) claimed that if there are many cases of failed ERP implementation in developed countries that have excellent IT infrastructure, high IT maturity, and good ERP knowledge, then ERP implementation in developing countries will also meet the same numbers, because the majority of ERP systems are designed for Western companies. Despite the introduction of ERP systems since the 1990s, there has been no similar study in Iran in this domain. Consequently, this study contributes to a broader understanding of ERP adoption and the factors that affect the success of its implementation in the Iranian environment. This original research

investigates a field in Iran that has not yet been explored.

Fifth, many problems that have led to the failure of ERP implementation have occurred when trying to adopt Western-developed IT applications in many organizations in developing countries (Al-Mashari & Zairi, 2000; Al-Mashari, Ghani, & Al-Rashid, 2006; Rasmy, Tharwat, & Ashraf, 2005; Soh, Kien, & Tay-Yap, 2000; Zhang et al., 2005). Most of the ERP packages are based on designs and developments that originated in North America or Europe. So they impose a Western culture and style of doing business. Such differences are an important factor impacting on success and failure (Al-Mashari, Al-Mudimigh, & Zairi, 2003; Hong & Kim, 2002; Markus et al., 2000; Motwani, Mirchandani, Madan, & Gunasekaran, 2002; Soh et al., 2000; Zhang, Lee, Zhang, & Banerjee, 2003). However, 'organizational culture' as one of the main differences between companies in developed and developing countries has been overlooked in prior ERP implementation studies (Zhang et al., 2005).

Sixth, the prior ERP implementation success research has been fragmented (Dawson & Owens, 2008). Most of the previous researchers have employed just one or two aspects of ERP implementation success in their research (Zhang et al., 2005). This research is the first study to present and examine an integrated ERP success model consisting of organizational characteristics (enterprise-wide communication and business process reengineering), ERP project characteristics (project management and ERP team composition and competence), ERP system characteristics (ERP system quality and ERP vendor support) and organizational culture in one research model.

Seventh, the outcomes of this research are useful to researchers in Iran and other developing countries. This study develops a research framework which could be applied in other Muslim countries and also the Middle-East, Asian and developing countries to test its applicability.

1.8. Definition of Terms

Since the definition of terms in the ERP system field is not uniform, so as to avoid ambiguity, this section provides definitions of terms used frequently in this research.

AMOS (Analysis of Momentum Structures): Statistics software used for the analysis of confirmatory factor analytic and full structural equation modeling (version: AMOS 16.0).

Appropriate Business and IT Legacy Systems: Defining and evaluating the existing legacy systems to determine the nature and scale of problems that an organization may encounter during its ERP implementation project (Holland & Light, 1999)

Business Plan and Vision: Conceptualization of the ERP project goals and possible ways to achieve these goals. The goals should be explained so they are specific and operational, and to indicate the general directions of the project (Somers & Nelson 2004).

Business Process Re-engineering (BPR): In the ERP implementation context, BPR is redesigning the business processes to be aligned with the ERP software (Nah, Zuckweiler, & Lau, 2003).

Careful Selection of ERP Software: A thorough evaluation of the ERP software features before choosing the ERP system to assure that the system fits well with the firms' local needs (Wang, Ying, Jiang, & Klein, 2006).

Change Management: Change management involves the effective balancing of forces in favour of change over forces of resistance to ERP implementation project (Ngai et al., 2008).

Chi-Square (χ^2): A fit statistic to test the overall significance of the proposed model. The statistic is calculated as the difference between the actual sample covariance matrix (based on actual data collected from the sample) and the predicted covariance matrix (Hair et al., 2006).

Comparative Fit Index (CFI): An incremental fit index that compares the existing model fit with a null model which assumes the latent variables in the model are uncorrelated (Hair et al., 2006).

Confirmatory Factor Analysis (CFA): A technique to determine the sets of observed variables that share common variance characteristics to define the factors (latent variables) or constructs for the model (Hair et al., 2006).

Content Analysis: The comparison of different pieces of data in order to find commonalities, differences or linkages between data (Kelle, 2000).

Content Validity: Representativeness or sampling adequacy of the questionnaire regarding the content or the theoretical construct to be measured (Cavana et al., 2001).

Convergent Validity: The extent to which the measurement items converge into a theoretical construct. It is assessed using three measures, i.e. factor loading, composite construct reliability and average variance extracted (Hair et al., 2006).

Critical Success Factors (CSFs): A number of key areas where things must go right for ERP implementation to be successful (Brown & He, 2007).

Discriminant Validity: Refers to the independence of the constructs or dimensions. To confirm the discriminant validity of a construct, the average variance shared between the construct and its indicators should be bigger than the variance shared between the construct and other constructs (Hair et al., 2006).

Enterprise Resource Planning System (ERP): A system that provides a company with a common database and software infrastructure that facilitates transactions between diverse functional areas within a company, and between companies and their customers and suppliers (Davis & Heineke, 2005).

Enterprise Resource Planning: A framework for organizing, defining, and standardizing the business processes essential to efficiently plan and control an enterprise so the company can use its internal knowledge to find external advantage (Blackstone & Cox, 2005).

Enterprise-Wide Communication: An efficient way to explain and share the goals, benefits, progress reports, user input, feedback and changes between all stakeholders of the ERP project (Nah & Delgado, 2006).

ERP Implementation: The various steps involved in installing an ERP system. Due to the vastness of the system, the ERP implementation phase is in-depth and can involve virtually all aspects of an organization (Haag, Cummings, & McCubbrey, 2005).

ERP Implementation Success: It is defined based on two dimensions, i.e. ‘user satisfaction and organizational impact’ which evaluates optimal ERP implementation success from the business benefits perspective and the ERP user viewpoint as well.

ERP System Quality: Information processing capabilities of the ERP system including data accuracy, ease of learning and use, system reliability and efficiency, and system flexibility and integration (Bernroider, 2008).

ERP Team Composition and Competence: The ERP implementation team members should be technologically competent, understand the company and its business, fully involved, highly rewarded and committed and come from departments affected by the new system (Sedera & Dey, 2006).

ERP Training and Education: The process of providing management and employees with the logic and all aspects of ERP system (Mandal & Gunasekaran, 2002).

ERP User Satisfaction: Sum of user’s feelings and attitudes towards a variety of factors related to the delivery of information products and services like being up-to-date, precise, comprehensive and so on (Gable, Sedera, & Chan, 2008).

ERP Vendor Support: Providing technical services and support at a suitable time and of a suitable quality and offering the complete training and supplementary documents required for using ERP system employing experienced individuals with domain knowledge of the industry (Ifinedo, 2008).

Expert Judgment Validity: The examination and judgment on the part of a group of experts as to whether each item of the questionnaire does measure the theoretical construct nominated (Sekaran & Bougie, 2010).

Go-Live: Known also as the cut-over date, the go-live is a point in time when an organization implementing a new system changes from their legacy system to the new ERP system (Anderegg, 2000).

Measurement Model: A sub-model in SEM that specifies the indicators of each construct and assesses the reliability of each construct for later use in estimating the causal relationships (Hair et al., 2006).

Modification Indices (MI): A chi-square statistic with one degree of freedom which is offered by the AMOS program. It suggests possible ways of improving model fit, such as uncovering new relationships among constructs (Hair et al., 2006).

Organizational Culture: A set of collective experiences, values, beliefs, and behavioural norms in an organization which facilitate the implementation process of ERP system (Hofstede, 2001).

Organizational Impact: User perception of improving in decision making, organizational communication, business processes rationalization, customer satisfaction, cost reduction, the firm's overall productivity and performance (Jones, Zmud, & Clark, 2008).

Project Champion: A high-level executive sponsor who performs the crucial functions of transformational leadership, facilitation, and marketing the ERP system to the users (Somers & Nelson, 2001).

Project Management: A set of critical activities consisting of establishing the project scope and implementation plan, defining milestones, allocating responsibilities to various players, coordinating all tasks, tracking vendor activities, and finally evaluating project progress (Nah, Islam, & Tan, 2007).

Root Mean Square Error of Approximation (RMSEA): A descriptive measure of overall model fit that corrects for model complexity by including degrees of freedom in the denominator (Hair et al., 2006).

SPSS (Statistical Package for Social Sciences): Statistical software used for Primary data analysis (version: SPSS 16.0).

Structural Equation Modeling (SEM): A powerful methodology for capturing and explicating complex multivariate relations in social science data. It is a hybrid technique including aspects of confirmatory factor analysis, path analysis and regression (Gefen, Straub, & Boudreau, 2000).

Structural Model: The set of dependence relationships which link the model constructs (Hair et al., 2006).

Top Management Support: Top management's willingness to become involved and to allocate valuable resources to every step of the ERP implementation effort (Nah et al., 2001).

Technology Acceptance Model (TAM): A model for understanding an individual's intentions to use an information system based on perceived ease of use and perceived usefulness (Davis, 1989).

Use of ERP Consultant: Employing qualified external expertise in an ERP implementation project to provide a wide range of skills that are change management, risk management, business process reengineering and also technical implementation knowledge (Davenport, 2000).

User Involvement: User contribution at the stage of definition of the organization's ERP system needs, and user participation in the implementation of ERP systems to increase user satisfaction and acceptance (Zhang et al., 2003).

1.9. Organization of the Thesis

This research is presented in six chapters. This chapter (1) provides overall information and motivation for the research in the area of ERP systems implementation. The rest of the thesis is organized as follows.

Chapter (2): This chapter provides a broad picture of the ERP system including the concept and definitions of the ERP system, the anatomy of ERP systems, the benefits of ERP systems for adopting firms, the costs of ERP implementation, and diverse approaches of ERP system implementation. This chapter reviews the relevant research found in the literature. The critical factors that contribute to ERP implementation success and also the proper success criteria are argued. Content analysis is employed to scrutinize the literature and find a comprehensive list of critical factors for successful ERP implementation. In addition, frequency analysis is utilized to show the relative importance of each ERP implementation CSFs and success measure. Furthermore, comparative analysis is carried out to compare the outcomes of content analysis with the findings of prior studies. Finally, each of the ERP implementation CSFs will be explained in detail. The second section of this chapter addresses issues related to the dependent variable of ERP implementation success. Using content analysis, frequency analysis and comparative analysis, the success measures of ERP implementation projects are identified. In addition, each of the ERP implementation success measures will be clarified.

Chapter (3): This chapter details the research design of the study. The target population and sampling method selected for this study are described. Next, based on an analysis of

the prior research and objectives of this study, an ERP implementation success model is outlined. The operational definitions, the measurement of variables and hypotheses development are also included in this chapter. Moreover, a survey questionnaire is developed and the structure and content of the questionnaire are illustrated. Furthermore, the validity and reliability assessment of the questionnaire through expert judgment and pilot test are described. In addition, the process of distributing and collecting the questionnaire is explained. Finally, the data analysis techniques used are discussed.

Chapter (4): This chapter describes the process of data analysis. First, collected data are prepared for analysis. Then, a range of descriptive statistics including frequency distribution, measures of central tendencies and dispersion of variables is presented. Next, the structural equation modeling (SEM) technique is employed for data analysis, using two steps: the measurement model and the structural model. A number of goodness-of-fit measures are utilized to assess the results. Furthermore, discriminant validity, convergent validity and confirmatory factor analysis are discussed. Finally, the hypotheses are tested.

Chapter (5): This chapter provides the key findings of the study and also presents discussions of the findings. The findings are compared with the results of similar previous research. The potential managerial and theoretical contributions are presented. Some of the limitations of the research are also discussed. Several recommendations are outlined based on the research findings. Finally, a number of additional areas of study that may be valuable to build based on this research are recommended.