

# Acquisition (Purchasing) of ERP Systems from Organizational Buying Behavior Perspective

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## ABSTRACT

Enterprise Resource Planning (ERP) systems are becoming a mature infrastructure in many organizations. Organizations purchase these systems to integrate, improve internal business processes, serve their customers better and fulfill their needs. The buying process of these systems is more complicated and it requires a lot more consideration as it can have long term effects and consequences for the organization as well as for its stakeholders. Acquisition (purchasing) of ERP systems is a complex behavior for organizations and has a lot to consider, from motives all the way to goals being pursued. Buying organizations consider several components that make up its business entity: like vendors, consumers, competitors, and regulations (Harris, 2013). Importance and relevance should be given to each one of these components as they all play key essential roles in sales organizations and their success. Typical organizations treat the purchasing process as a problem solving situation and rely on consultants or sometimes miss out on systematic buying process and the success factors to be considered vary from technicality, price, risk aversion, reputation, all the way to ethical decisions and legal regulations (Bellizzi, 2009). This research paper describe the current acquisition processes, critical success factors literature and propose integrated ERP systems acquisition model for organizations interested in buying similar systems in future.

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## 1.0 Introduction

SIM, 1995 define acquisition is a process of evaluating and selecting appropriate suppliers and completing procurement arrangements for the required products and services. It includes identification of sourcing alternatives, generating communications (such as RFPs and RFQs) to suppliers, evaluating supplier proposals, and negotiating contacts with suppliers. This section explains the key concepts related to the study. The objectives of this review are as follows: (1) to identify and justify the research context from which the research questions have been derived; (2) to use prior research, relevant to the area of this study, to establish the inter-relations between the fields of study; and (3) to position the study with respect to prior and on-going research in the related fields.

In order to arrive at an integrated Enterprise Resource Planning (ERP) implementation framework, an intensive review of Information systems journals, Information systems conference proceedings, ERP books, consultants and trade publications was conducted. The literature review sets the research background by: (1) introducing enterprise resource planning systems, (2) reviewing the concepts of ERP acquisition, (3) reviewing the concepts of ERP implementation, (4) discussing the concept of successful implementation performance, (5) discussing the acquisition critical success factors, and (6) reviewing the ERP implementation critical success factors.

Each section begins by reviewing the conceptions of subject areas held by the cited resources. In order to transcend information, further conceptions and critiques were developed to provide a more comprehensive understanding of the subject areas. Toward this end, the emergent themes strive to supplement concepts that are meaningful to the study.

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In the Enterprise Resource Planning system section, an historical perspective of how ERP systems evolved and a discussion of the characteristics of ERP with reference to traditional information systems is brought forth. In the ERP acquisition section, the concept of ERP acquisition is critiqued by reviewing the frameworks presented by ERP acquisition researchers. This is followed by a critique of ERP implementation models which leads to the articulation of the ERP implementation model relevant to the context of the study. This is followed by the critical success factors for acquisition and implementation of ERP systems. Lastly, a successful of acquisition and implementation ERP system is presented.

## **2.0 Acquisition Methodologies for Information Systems**

The introduction of ERP systems is usually aided by the use of implementation methodologies. The methodologies consist of information pertaining to how the implementation process is carried out and are developed by experts who are experienced in this area. In order to develop an integrated model for the implementation of ERP systems using implementation methodologies, it is important that implementation methodologies of information are synthesized. Since our study separates the acquisition and implementation of ERP systems, it is essential to cover the theoretical foundations of acquisition and implementation methodologies.

A methodology is defined by Maddison (1983) as a method of developing an information system, with identified phases and sub-phases, recommended techniques to use in each phase and sub-phase, and recommendation about planning, management, control and evaluation of a development project and its various phases and sub-phases. Ginberg, (1970) described two major approaches to studying implementation, the normative approach and the factor approach. Normative research is based on the field experience of a number of researchers and practitioners. These researchers study one or more cases of IS implementation in which they are involved. From their experience, they identify the implementation problems and suggest solutions. Factor study begins by identifying a group of variables relevant to implementation outcomes. The data is collected from implementation projects and is used to assess the relative importance of the different factors in implementation outcomes. Whereas Lyytinene (1987, p.25) notes that "factor models have been of little help in explaining the success in implementation. They lack an underlying theory; studies concentrate only on easily measurable variables and disregard factors that are difficult to measure; they show inconclusive patterns between selected factors and success in implementation". Ginzberg (1981) noted that the study of MIS implementation revolves around the process of change in the early 1980s.

Swanson (1988) provided a list of 55 factors and grouped them into nine groups (namely, user involvement, management commitment, value basis, mutual understanding, design quality, performance level, project management, resource adequacy and situational stability).

Next the acquisition methodologies in the area of IS and ERP are discussed.

The decision to implement an ERP system is a lifelong commitment (Davenport, 1998) which ties up a considerable amount of corporate resources. Organizations adopt ERP systems to attain seamless integration of various departments of the organization, share data, and obtain other benefits mentioned in the previous section of this chapter. Much has been written in the area of ERP implementation and the critical success factors. This could be due to the interest of researchers, failures in the implementation of ERP systems and other factors. However, acquisition and selection of an ERP system did not receive much attention from management or researchers due to the systematic buying approaches already in place within organizations to purchase various information systems. As well, the implementation process was blamed for ERP systems which failed to achieve the desired outcome. However, recently researchers have identified that the unsuccessful ERP systems could also be the result of incorrect acquisition and selection decisions. Selecting the wrong ERP system, or vendor, could impact on the implementation process and, ultimately, result in the bad performance of the system and the organization. Identifying the appropriate system for an organization is a major challenge for management. It has been observed that many implementations are doomed from the start because organizations simply choose the wrong ERP system for their business needs. In a study conducted by the Harvard Business School, 65% of executives believe that ERP systems have at least a moderate chance of hurting their business because of potential implementation problems. The cause and effect relationship between acquisition and implementation is such that if management select the wrong system, they can expect problems during the implementation (Verville, 2001). There is no way around it; while the system may be the best in its class, it may not be the best for an organization's needs.

The way to avoid such a situation, though, is as follows. Conduct a careful study prior to the implementation, during which many of the issues that give rise to the risks and additional costs can be addressed. Since many of the issues that should be addressed for the acquisition are also critical to the implementation of the software, attention to these issues at the time of acquisition could subsequently help to minimize or, perhaps, even avoid delays and cost overruns during the software's implementation, or worse still, the non-completion of the implementation.

It is understandable, then, with the multitude of organizations that have experienced major delays and significant cost overruns, that organizations embarking on this type of project should be concerned about the ramifications of implementing an ERP system. We believe, however, that these problems arise in part from how these projects are looked at.

Typically, organizations refer to this type of project as an "implementation project" and group all activities of the project under this general label. In doing so, the major part of the focus and attention is given to the actual implementation of the software and the other activities of the project are considered of secondary or lesser importance. Researchers have applied theories, such as the life cycle approach, to explain ERP implementation and acquisition as one of the aspects of overall implementation. There have been several examples in which companies implementation has failed and one of the important reasons, which has been referred by many researchers, is the incorrect ERP system selection.

We believe that organizations can improve the success of their ERP implementation projects by conducting a formal acquisition process. This study is a contribution in this direction and proposes an integrated framework for ERP implementation. In the following section, an examination of the literature on acquisition from IS, purchasing and IT focus is conducted.

The acquisition process for an ERP system is defined as a set of activities employed to choose an ERP system for an organization. It is the process in which an organization acquires a system for implementation. Verville and Haltingen, (2002) defined the ERP software acquisition process as a set of interrelated activities that begins with the specific commitment to the acquisition task. SIM (1995) defined acquisition as a process of evaluating and selecting appropriate suppliers and completing procurement arrangements for the required products and services. It includes identification of sourcing alternatives, generating communications (such as RFPs and RFQs) to suppliers, evaluating supplier proposals, and negotiating contacts with suppliers.

Several studies have been conducted on the acquisition of information technology in general, though very little has been done in the area of acquisition of an ERP system. While research in the area of ERP acquisition is at an initial stage, the other areas in the field of ERP have been researched rigorously. In the next few sections, the acquisition of information systems and the ERP system is reviewed.

### **2.3.1 Acquisition Methodologies for Information Systems**

In this section, literature from the various studies in the area of acquisition of information systems (SIM, 1995; Heide & Weiss, 1995; Saarinen & Vepsäläinen, 1994; Livari & Ervasti, 1993; Geisler & Wen Hoang, 1992) was reviewed due to insufficient literature available in ERP acquisition. Standard practices suggest that an effective acquisition process begins with a set of defined processes for each phase of the acquisition life cycle.

Several studies have been conducted in the area of software acquisition to meet specific needs within an organization. Geisler and Wen Hoang (1992) stated that most of the literature has not stemmed from research studies, but rather has been generated by practitioners. Their study focused on the critical issues facing managers in the acquisition of information technology and has been perceptive in nature. Janson and Subramanian (1996) proposed a packaged software selection model for small businesses which combines previous academic research in large businesses with the results of an exploratory study in small businesses. They found that the quality of packaged software selection procedures, the expertise of information systems staff, and vendor support, are critical to the success of software implementation. A survey study by Monatomic (1987) found that small business firms lack formal software selection policies. This creates an incompatibility between the user's information needs and the information services provided by the system, which in turn leads to implementation problems. In a different study, Montazemi (1988) found that end user

satisfaction is positively associated with the number of system analysts in an organization, the extent of requirements analysis performed, the level of user participation in the development process, and the computer literacy of users. Moreau (1996) proposed in his study that, in order to acquire software, organizations should pursue these activities: (1) planning an organizational strategy, (2) implementing the organization's process, (3) determining the software requirements, (4) identifying potential suppliers, (5) preparing contract requirements, (6) evaluating proposals and selecting the supplier, (7) managing supplier performance, (8) accepting the software and, (9) using the software. Rounds (1992) proposed a systematic approach to software acquisition as follows; (1) define needs, (2) develop a specification, (3) develop a request for proposals, (4) receive and evaluate proposals, (5) purchase and install the system, and (6) implement the system.

Bryce and Bryce (1987) suggested that the decision to acquire a software project requires organizations to first gather information on various software, evaluate and install the package and, finally, perform an audit. Schwab and Kallman (1991) argue that technical, political and human factors influence the decision to buy hardware and software. User support and management in the software buying decision are very critical for successful software purchase. Farbeyand Finkelstein(1991), in their study, reiterated that the acquisition of software is strategic and operational. Therefore, organizations require a structured process.

Effgen (1988) proposed a conceptual framework for the selection of packaged software. He suggested that the technical, budgetary and organizational fit of packaged software during selection enables the project team to choose the right software. Ein-Dor (1978) argues that organizational structure, degree of business policy formulation, and formal software selection policies are essential to successful software selection. The findings of his study suggest that software selection policy could include vendor characteristics, software documentation and features. Visker (1987) conducted an empirical study based on medium to large-sized Dutch companies. The findings suggest that a project team assess the package availability, information systems developmental resources, time availability, financial considerations, the fit of packaged software with existing hardware and software, and organizational fit factors, to decide on the most suitable software for their company. Anderson (1990), Livari (1990), Lucas (1988) and Welke (1982) used survey studies to model packaged software selection and suggested from 3 to 5 stagemodels. Edmundson (1984) suggested that the requirements analysis is an important phase of the software acquisition process. However, the findings of this research suggest that requirement analysis raises the user's expectations. The user in turn experiences reduced levels of satisfaction when the package fails to meet all of his or her expectations. Cooley (1987) pointed out that small companies lack personnel with expertise to select and implement packaged software, thus increasing the likelihood of failure. Montemi (1987, 1988) found that the extent of information in requirements analysis is a major factor of the implementation success. Factors such as "fit between vendor and user organization" and "fit between software features and organizational requirements" are associated with packaged software implementation success. Gross (1984) and Lucas (1988) recommend early identification of discrepancies between software capabilities and user information needs. They developed a model which can help small businesses to select packaged software to meet their needs.

Leist and Winter (1986) presented a general decision model, to evaluate the package and the general simulation result. The hypotheses were tested and the result that one business package be utilized for those complex processes that can be efficiently supported. Although propriety communication mechanisms imply high interpackage communication costs and, therefore, support homogenous solutions, multipackage configurations are superior in certain situations. They are going to become more attractive as open architecture for business package emerges. In the IS acquisition/procurement area only a few research studies have contributed. The Society of Information Management (SIM) presented a framework of IT procurement based on survey results. The study also found that the reporting structure of the IS organization, and the involvement of the steering committee both influence the final project selection.

The literature relevant to software acquisition is obsolete and cannot be replicated to ERP systems due to the nature of the study. Software selection is less complex than systems, such as ERP systems, and cannot be applied to the acquisition of an ERP system. The literature synthesis mentioned in the previous section reveals that several studies suggest a model/ framework to select software which is not a complete process for ERP acquisition.

These are but a few of them and they range from simple general guidelines through to special-purpose proposals, up to generic and complex alternatives. In any case, not one of these methods is seen to be widely

accepted and used at the moment by either academics or practitioners. Thus, without public and specific acquisition methods for ERPs, companies have to rely on generic methods or on external consulting. Using only superficial guidelines can be too risky and untrustworthy for any organization, and, in the case of SMEs, using a complex and generic method can be too effort-demanding and expensive.

### **2.3.3 Acquisition Methodologies for ERP Systems**

Although a large number of studies have recently been published addressing ERP issues, there is limited research concerning ERP software acquisition. An extensive part of the academic literature deals exclusively with ERP implementation issues, and ignores the way decisions are taken and the appropriateness of those decisions regarding the acquisition of ERP systems.

However, few studies by academics focus on the selection, evaluation, decision making and acquisition of ERP. The selection of the most appropriate solution is a semi structured decision problem because only part of the problem can be handled by a definite or accepted procedure such as standard investment calculations, or by a decision maker who needs to judge and evaluate all relevant business impact aspects. ERP research has concentrated on implementation and post implementation issues (Esteves and Verville, 2002).

Sammon and Adam (2000) proposed a model of an ERP software selection model for managerial decision making in ERP projects. The model draws on an increasing volume of organizational ERP literature published, but also attempts to draw lessons from the traditional research on the decision making process carried out over the last thirty years. Maiden (1999), using a case study approach, identified the criteria SME's use during the selection of ERP systems. The study also analyzed the differences in the ERP system selection process between SMEs and large organizations. Bernroider and Koch (2000) conducted an empirical study and suggested differences in the characteristics of an ERP system selection process between small, medium and large sized organizations. The findings of their study also suggest that the selection process for small organizations is semi-structured and only part of the problem can be handled by a definite or accepted procedure. O'Leary, D., (2000) suggested a framework for evaluation of ERP systems. His study proposes organizations intending to acquire ERP systems need to develop the business case first and then establish criteria, and their weight, for evaluation. The study also highlighted techniques organizations use for evaluating the ERP systems. Stafyla and Stefanou (2000) proposed that the selection of ERP software is becoming increasingly complex in a changing and competitive business environment. Their study explored the factors that influence the adoption of an ERP system such as the availability of ERP consultants, centralized organizational structure, extent of business networks and the time horizon of business strategy. Shakir, M. (2000), developed a six stage decision-making model for an ERP project using a case study. This study aids practitioners in understanding the decision making process throughout the lifecycle of the ERP project, and eventually helps in the better estimation of resource assignments at the planning stage. Stefanou (2000) provided a framework for the selection process of ERP systems. His study found that careful selection of vendors and system is necessary and the final decision needs to be made considering the amount of organizational change required for the adoption and the implementation of the selected ERP system. Bernroider and Koch (2000) presented the differences in characteristics of the ERP system selection process between small, medium or large sized organizations. Their research focused on the different selection criteria, the actions involved in the process, the methods employed and the characteristics of implementation. These observations lead to models of decision making for an ERP which extends currently proposed models. They suggest, firstly, that management must take a step back from the media and vendor pounding that they are subjected to, in relation to ERP, and reflect on the nature of the problems facing their organizations. Other alternative systems and modules must be considered. Secondly, the requirements of organizations must be analyzed independently of vendor documentation because the best practice built into market leading ERP packages may not suit all organizations. Thirdly, the post implementation phase of ERP packages must be given more attention, both in terms of preparation and from a managerial perspective. Finally, any ERP software selection process used by an organization can be based on a robust, unambiguous and complete set of selection criteria.

Bozrath (2003) developed a selection methodology based on three case studies. He suggested that the comprehensive and formal ERP selection process should (1) identify all the business processes to be addressed, (2) develop comprehensive IS specifications based on the current and future needs of the business, (3) communicate these specifications to all potential vendors via RFI or RFP, (4) formally evaluate vendors with regard to how well they meet the specifications and other criteria, and (5) select a vendor

through a formal negotiation process. Ravarini, Taglivani, Pigni and Sciuto (2002) presented a methodology for evaluating ERP systems. The methodology allows the company managers to assess the suitability of an ERP system with respect to the company needs of redesigning the business processes. Shin and Lee (1996) suggested an application software package life cycle model consisting of three phases and 25 activities. Ahituv, Neumann and Zviran, (2002) proposed an ERP lifecycle model that includes selection, definition, implementation and operation phases. The activities of these four phases include: (1) Definition of project objectives, (2) Collection of information about systems and vendors, (3) Collection of information about consulting firms, (4) performance of a needs analysis, (5) investigation of vendor alternatives, (6) investigation of consultant alternatives, (7) collection of information on the technological infrastructure, (8) performance of a feasibility study, and (9) contract negotiation and signing. The main contribution of this model is that it is independent of industry, market, or a specific ERP system. Using this model, an organization could reduce ERP project risks and increase the probability of project success.

Sistachand Pastor(2002) proposed an ERP acquisition model, named SHERPA, for SMEs. The model comprises five phases and includes: (1) review the company's business strategy, (2) decide to acquire or not, (3) search for candidates and first filter, (4) investigate candidates and second filter, (5) analysis and demonstration of candidates and visit to the provider, and (6) final decision, negotiation and planning. This model does not incorporate issues related to risk management. Verville and Haligton (2003) presented a model of the ERP acquisition process that reflects the findings from the four cases examined in this study. This model comprises six main phases of ERP acquisition: planning, information search, selection, evaluation, choice, and negotiation. This high-level model depicts the principal's processes pertaining to the acquisition of packaged software. It is not, however, without limitations. The model is limited to the findings from the four cases in this study; it is not generalizable to a larger population. While no deterministic model can be developed that is a definitive representation of all acquisition processes for packaged software, the model in the study contributes to the identification of processes that are part of this type of acquisition.

In summary, the studies presented in the above on ERP acquisition are limited and less comprehensive. A structured and well planned acquisition process improves the success of the overall implementation process. It is evident from the literature that most of the models and frameworks proposed for ERP acquisition are not comprehensive, apart from Verville and Haligton (2003) and SHERPA (2002). However, these models, as well, are very specific in terms of their validation and have been developed on few case studies. Hence, to comprehensively represent the acquisition of ERP systems in the integrated framework for implementation it is important to develop an appropriate process with multiple phases and activities for the acquisition of an ERP system.

## **2.5 Success Measures for Acquisition of ERP Systems**

Success is a difficult construct to identify because it is multidimensional, dynamic and relative. Success is multidimensional because it is judged by several outcomes which are a combination of the ERP project outcome, operational outcomes and strategic outcomes (Sarkis and Sundarraj, 2000). Success is dynamic because the meaning of success is constantly changing during the lifecycle of an ERP implementation. It is relative because its assessment depends on the specific organization, organizational goals, and on the time during ERP implementation.

In the late 1960s, a large number of studies addressed the different aspects of information system (IS) success. The development that has taken place in IS success research during the last four decades, however, can be assessed via a number of key articles that have synthesized the prior research on the topic (Zmud, 1979; Ives and Olson, 1984; DeLone and McLean, 1992; Seddon, 1997; Grover, 1996; Seddon, 1999; DeLone and McLean, 2002). A large number of studies have been conducted during the past two decades to identify those factors that contribute to IS success. Success is a well established area of study in information systems literature. A number of generic success models are well-established and have been tested in recent years (DeLone & McLean, Raj, Lang & Wlker, 2002; Seddon, 1997).

As for how to define ERP systems implementation success, no agreed measure has yet been developed. White (1984) created an ABCD checklist that classified ERP implementations into four categories. He proposed successful implementation measures along two dimensions: (1) improved performance and (2) user satisfaction (Yusuf, 2004). According to the ABCD classification, success is measured from different perspectives. Zhang (2004), using the ABCD classification proposed the measure of success as meeting the

schedule, within budget, customer satisfaction and realization of business benefits. Measuring and evaluating performance is very critical for the success of any business organization and, indeed, for making Information systems, such as ERP, pay back (Al-Mashri, 2003). The amount of prior research on ERP success, on the other hand, is limited to a handful of articles. Somers and Nelson (2001) explored ERP success from the end-user point of view and proposed a socio-technical model for examining ERP software implementations. Hitt et al. (2002) investigated the effects of ERP software implementation and use through a statistical analysis of financial data. Among their findings are that firms that invest in ERP tend to show higher performance across a wide variety of financial metrics and that, even though there is a slowdown in business performance and productivity shortly after the implementation, financial markets consistently reward the adopters with higher market valuation. Dong (2000) proposes a conceptual model for exploring the impact of top management on ERP software implementation effectiveness. Rosemann and Wiese (2000) adopt the balanced scorecard approach to the evaluation of implementation and use of ERP software.

However, Smyth (2001) and Tan and Pan (2002) proposed models for the assessment of ERP success. Markus (2000) developed metrics for the measurement of ERP success that can be considered to be of particular importance for the study at hand. A more thorough analysis of ERP success has been presented by Sarpola (2003).

In the ERP context, the performance management has got the holistic view and balanced perspective. In addition to technical performance such as reliability of the system, other aspects such as flexibility, speed, timeliness, costs, etc. can also be added. The value-added contribution is in the form of the tangible and intangible benefits, covering the strategic and operational aspects of business organization (Al-Mashari, 2000). Furthermore, competitive measurement could cover the added capability provided by ERP systems to the business for 'stretching' the competitive and strategic agenda.

In the literature, seven measures used for ERP implementation success are:

- (1) User satisfaction (Al-Mashari, 2003; Ang, 1994; Mandal and Gunasekaran, 2002; White, 1984; Yusuf, 2004)
- (2) Intended business performance improvements (Al-Mashri, 2003; Hing and Kim, 2002; Mandal and Gunasekar, 2002; Markus, 2002; White, 1982; Yusuf, 2004).
- (3) Oliver White's ABCD Classification scheme (Burns and Turnispeed, 1991; Wilson, 1994)
- (4) On time (Al-Mashari, 2003; Hing and Kim, 2002; Malbert, 2003)
- (5) Within budget (Al-Mashari, 2003; Hing and Kim, 2002; Malbert, 2003)
- (6) System acceptance and usage (Ang, 1994; Yusuf, 2004)
- (7) Predetermined corporate goals (Al-Masahri, 2003; Umble, 2003; Yusuf, 2004).

Some of the mistakes that cause acquired software to not meet performance, schedule, and cost requirements are (1) unrealistic estimates of time, costs, and manpower requirements, (2) inadequate planning for software integration and testing, (3) including site acceptance testing, (4) allowing suppliers to do significant coding before system engineering is complete and requirements and stable, (5) supplier and/or buyer not technically competent, and (6) friction within a company causing internal services to not be used.

In summary, the success measures of IS are well established but the success of ERP implementation and acquisition has not been widely investigated.

While many conceptual models of the buying behavior of organizations have been developed, there has been a lack of research to extend and test these models (Ward & Webster, 1991). According to these authors, the lack of specificity of these models is one of the reasons why researchers have not designed follow-up research. Another reason is their generality which lends to their major strengths and weaknesses (Ward & Webster, 1991). According to Johnston and Lwein (1996), these models having been developed during the "early stages of theory development" (p.2) provided only general categories of constructs expected to influence organizational buying behavior, and as such, failed "to capture all of the concepts, variables, and relationships involved" (p.2). According to Wind and Thomas (1990), studies in organizational buying should encompass a longer term view to accommodate the reality of the buying process, such as in the case of the acquisition of IT. Doing so may lead to the redefinition of the buying process. Further, these authors suggest that organizational buying be strategy-driven due to the rapidly changing IT environment, diminishing product life cycles, and other factors having profound effects on

organizational buying (Wind & Thomas, 1990). This would necessitate a different approach by organizations on how they acquire IT and how they deal with the complexity and uncertainty associated with IT. This, according to Soekman and Gronhaug (1984), means more than simply gaining a consensus that the buying center, is the proper unit of analysis for organizational buying problems and issues. It entails the need to understand and perhaps even identify the complex issues that are dealt with by such an organizational unit.

The opportunity for additional research in the area of acquisition of ERP systems is understood by the following conceptual and methodological limitations in the literature. From a conceptual perspective, most studies in the literature infer the selection and evaluation of packaged software in the organizations. The acquisition of an ERP process is not studied in detail. As mentioned earlier, ERP systems are complex and require thorough assessment before making a commitment to purchase.

Secondly, the studies in ERP systems mainly focus on the critical success factors of implementation and do not study the CSFs of acquisition of ERP systems, which is an equally important issue of ERP systems. Thirdly, acquisition and implementation literature regards both of these processes as important but the comprehensive framework including the critical success factors and success outcome is ignored in the literature. Finally, the implementation success outcome is represented narrowly to include only the implementation success and does not encompass the success of acquisition.

The literature also has a few limitations from a methodological perspective. Firstly, the research in ERP systems has been focused on only a few case studies (Verville&Halington, 2003; Shakir, 2003). Secondly, the samples are relatively small and narrowly focused, encompassing only a few industries. Finally, besides using a single measure for the model construct, the data is often collected through interviews and site visits, instead of via a structured questionnaire. It would be more appropriate to develop a scale for each construct and item for the acquisition and implementation of ERP systems. There is a need for an integrated model which, while overcoming the weaknesses in the earlier literature, would also have a few limitations. They include the absence of critical success factors and success construct. Despite the limitation, these studies still provide a useful foundation for future studies, such as this one, to develop and validate more comprehensive models for ERP implementation, and refine the measure of the model constructs.

In conclusion, the literature review suggests several directions for advancing the research in ERP and for developing a comprehensive framework for implementation and acquisition. Firstly, the processes and critical success factors need to be operationalized as proposed by Strathman (2002). Secondly, the impact of certain critical success factors on the acquisition and implementation process needs to be studied Thirdly, there is a need to extend the model to include not only the implementation success but also the acquisition success.

### **3.0 Integrated Acquisition of Enterprise Resource Planning**

In this section, a model for this research is proposed that is derived from the synthesis of prior research in Information systems, implementation methodologies, ERP implementation, ERP acquisition, critical success factors and project success. Aladvani (2001), Robey (2002), and Esteves and Pastor (2001) suggest a process research approach or a combination of factors and process approaches, in order to improve research in ERP topics. Using a process approach, ERP acquisition and implementation may be perceived as a sequence of discrete events that lead to outcomes of particular interest. The model on which this research is based, an integrated model for the implementation of ERP systems, synthesizes previous research in that it recognizes the importance of the adoption and post-implementation phase. However, the focus of this model is on the acquisition and implementation processes, the factors critical to both processes, and successful outcomes of acquisition and implementation. There are several justifications for this focus: (1) Many problems have been documented for the successful implementation of ERP systems and these require a sound methodology. (2) The current ERP methodologies' focus is one sided, either on the implementation side (Somers and Nelson, 2003; Parr and Shanks, 2000, Esteves and Pastor, 2003) or on the acquisition side of ERP systems (Verville and Halington, 2003). The proposed model incorporates both processes, identifies the phases and their activities. (3) How the acquisition and implementation methodologies are employed by an organization and how they affect the outcomes. The proposed framework, through the survey instrument, determines how these phases impact on outcomes of acquisition and implementation. (4) Identification of success factors of ERP implementation have been well researched using case studies



but only recently has this topic received enough attention to be investigated empirically (Zhang, 2005; Somers and Nelson, 2003). (5) CSFs for ERP acquisition are not common and their need has been discussed by practitioners and researchers (Verville and Halington, 2003). Their model suggests 12 critical success factors important for the success of the ERP acquisition process through the synthesis of literature and discussion with ERP experts. (6) The relevance of CSFs alongside the process phases is important as it allows the management to plan for the resources for a particular phase or phases. The proposed model relates success factors to the phases of ERP acquisition and the implementation process. (7) Not all CSFs are important during all of the acquisition and implementation processes but identifying the factors which are more critical to both processes is important. (8) The success measures for implementation and acquisition. The proposed model is concerned with the success of acquisition and implementation of an ERP system. Project success means bringing the project in on time and budget (Parr and Shank, 2000). This concept has been recognized by many researchers such as Sarapola (2003), Parr and Shank (2000), Markus and Tanis (1999), and Ross (1998).

The proposed model (shown in Figure 4.1) consists of three important concepts: the acquisition and implementation processes (methodology), critical success factors and success outcomes.

Based on the literature review, an integrated model for implementation of ERP systems is developed and is shown in Fig. 1.

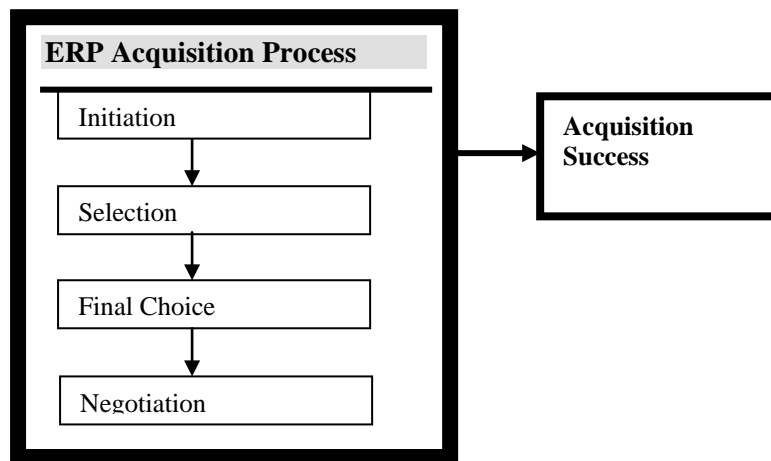


Figure 1: An Integrated Model for the Acquisition of Enterprise Resource Planning Systems

### 3.1 Acquisition Process of ERP Systems

The focus of the proposed model is on the acquisition and implementation processes of an ERP lifecycle approach which are briefly discussed here. ERP acquisition is an integral part of implementation and, therefore, it should be dealt with in a structured way. Correct acquisition of an ERP system will contribute to the success of an ERP implementation system. ERP acquisition is no different to any other major project being undertaken by an organization. The importance of an ERP system for any organization makes its acquisition a critical process, given that it reaches most or all departments and functions, and that it usually requires a significant investment in terms of implementation and maintenance. It requires a substantial investment of time and resources, the involvement of entire organizations and a considerable amount of planning. A good ERP acquisition process can help to determine user requirements, how the ERP system is selected, purchase the system according to the company's requirements and negotiate with the vendors about the terms and conditions. A good selection process is the foundation for good implementation and a successful ERP experience. The proposed ERP acquisition process builds on previous models and comprises four phases. Within each phase there are a number of activities which the team members accomplish during the project life cycle. Although these activities themselves may not exactly fit each organization type, they provide a solid basis for the overall structure and the acquisition team uses them where they feel appropriate.

ERP acquisition and implementation processes are discussed in the following sections. The ERP acquisition and implementation process may be conceived of as a sequence of phases, in which related activities occur (Robey, 2002).

### 3.3.1 Initiation Phase

The acquisition process begins once the decision to adopt the new system has been finalized. Initiation is the first phase in the proposed acquisition process. The initiation phase usually involves the formation of a project team, appointing a steering committee, defining problems to solve, defining the scope and goals of the project and planning the overall acquisition process. It also includes preparing a list of all the required resources throughout the process. Initiation is an important phase of acquisition and without proper planning the success of acquisition can be effected.

In team formation for ERP acquisition, members are selected from various functional areas who have a solid knowledge of the current system and operating environment. Employees with cross-functional experience often make the best project team members. During the acquisition process, it is expected that the members will perform functional roles based on their abilities and previous experience in similar systems (Verville and Halington, 2003). Moreover, it is important that the members possess, or acquire, different skills required during the acquisition process. Adequate training and education of the team members can be a great help in enhancing their skills that the management feels the team might be missing. An educated acquisition processes team in ERP systems will be able to perform activities such as defining system requirements, evaluating suppliers, and understanding the duration of the project.

The next activity in the initiation phase is to define the organization's requirements for the ERP system. This involves analyzing the organization's current technological, functional, technical, and organizational (business, procedural, policy) requirements. Moreover, the project team needs to analyze the existing business processes that will be affected by the new system.

Developing acquisition strategies for the new system is also an activity of this phase. The strategies are specific activities that the team uses to accomplish the task of buying ERP systems and to reduce the uncertainties associated with the acquisition. Acquisition strategies for an ERP system may include how to approach the vendors, what to include in the request for information letter, and how to organize and evaluate their demonstration of ERP systems.

Exploring perceived risks at the initiation phase is important as well. The major risks which an organization could encounter during the acquisition process may include buying the wrong system, an escalation of the system cost, not completing the project within the budget or within the schedule time.

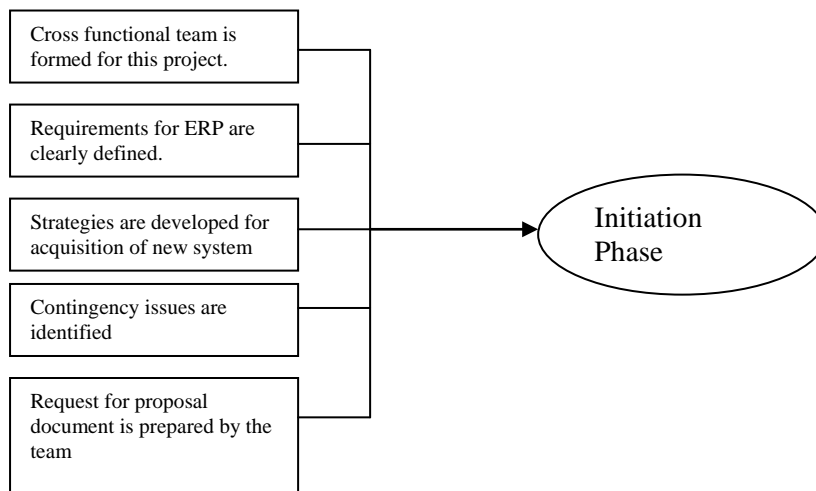


Figure 2: Important Activities of the Initiation Phase for the ERP Acquisition Process

### 3.3.2 Selection Phase

Selection is an important phase for the acquisition of an ERP system. Stefano (2000, p.988), Shakir and Hossain (2002, p.223), McQueen and Teh (2000, p.641), Hallikainen(2002, p.141), Santana (2002, p.188), Livermore and Ragowsky (2002, p.1333) have emphasized the importance of this phase in the acquisition processes of various systems. The selection in this model includes two main factors, namely, information gathering and short listing of potential vendors.

The first sub-phase involves gathering information on the ERP systems and vendors. Its importance and significance has been stated in several widely accepted models and frameworks in the organizational buying literature (Sheth, 1973; Webster, 1965). Beiser (1993), Gries&Kurpictz (1985) and Jacot (1985) suggest that information search is a significant step in the successful acquisition process of ASP.It has been reiterated in the organizational buying literature that the characteristics, types and credibility of the information, influence other phases of the acquisition process (Jackson, Keith, and Burdick, 1984; Moriarty and Spekman, 1984).

Project teams seek information on possible vendors, their products and services, existing clients, company history and the overall reputation of vendor's products.The information on ERP systems and vendors can be gathered through: (a) working with vendors, (b) presentations of vendors, (c) analysis of marketing material, (d) use of consultants, (e) design of a questionnaire, (f) relevant training, g) analysis of a prototype system, (h) analysis of relevant studies, and (i) other activities.

The second factor in the selection phase is short listing the ERP vendors based on the available information.Lee and Shin (1999), in their model, proposed that the project team analyze various vendor proposals, conduct interviews and perform site visits to short list the vendors. Using the checklist and selection criteria developed at the initiation phase, the project teamreviews the vendors and their systems through the information gathered, vendor's quotations, and through product demonstrations. The short listed vendors are asked to submit a completed request for proposal. The vendors are asked to submit a response to the items included in the RFP.A request for proposal usually includesan introduction to the organization, the objectives of theacquisition, and current technology and information on the project schedule. The request of proposal includes questions on various issues including cost, warranty, company product and services, and other related issues.

A comprehensive and formal short listing could include activities such as 1. identifying all the business processes to be addressed. 2.Developing comprehensive ERP specifications based on the current and future needs of the business. 3. Communicating these specifications to all potential vendors via an RFI or RFP. 4. Formally evaluating vendors with regard to how well they meet the specifications and other criteria. 5. Selecting a vendor through a formal negotiation process. The activities of selection phase are mentioned in figure 3.0.

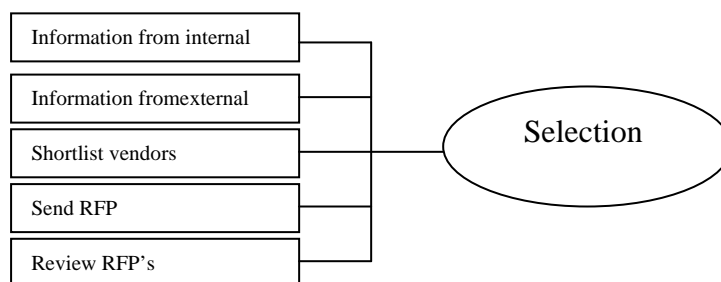


Figure 3.0: Important Activities of the Selection Phase for the ERP Acquisition Process

### 3.3.3 Final Choice Phase

This phase involves a thorough evaluation of vendors and their ERP products identified in the previous phase to choose the ERP system that best fits the organization's requirements. It has been noted in the literature that choice and evaluation are inextricably intertwined (Hawkins, 1992; Mintzberg, 1976).

According to Mintzberg (1976), the actual choice procedure requires the consideration of a large number of factors, most of them 'soft' or 'non-quantitative'; as a result; the choice procedure in practice is complicated by dynamics and uncertainty. The final choice phase involves comparing ERP systems and equally qualified vendors, none of whom can predict the outcome with any degree of certainty. Thus, it might be significant in this phase that all avenues be explored before the final decision to purchase is made since the criteria may differ from each other.

Project teams conduct thorough evaluation of vendors and ERP systems. Bozrath (2001) demonstrated how cost benefit analysis can be applied to evaluate large scale ERP projects, and that these methods can incorporate intangible benefits (e.g. user satisfaction). Stefanou (2001) proposed that the evaluation of ERP requires understanding the impact it has on the business strategy, organizational structure and role of the people throughout its lifecycle. The framework of ERP systems evaluation is significant in that it makes the managers bear in mind that ERP evaluation not only refers to the analysis of the ERP product per se. It also involves analyzing the potential operational & strategic benefits and investment required for purchasing, implementing, operating, maintaining and extending the proposed ERP system with additional applications throughout its life cycle.

Bryce (1987) proposed that during this phase, the project team conducts evaluation using the following criteria: whether the vendor (a) holds a good corporate reputation for reliability, (b) has a professional attitude and a high credibility rating in the industry, (c) has financial stability, (d) provides staff with in-depth knowledge and background, (e) provides professional corporate facilities, (f) is able to provide a demonstration of the product, (g) practices what it preaches, (h) has an intimate knowledge of their own products, (i) is totally committed to the support of the product, (j) provides additional services to support the product, (k) is easily accessible and available to clients, (l) maintains effective communications with users, and (m) has long range plans for the support and development of the product. In another study Bozrath, (2001), suggested that respondents evaluated the ERP system based on vendors' characteristics, their history, financial stability, similar implementation, references experience and confidence.

We propose in this phase that the project team conduct a thorough evaluation of ERP systems and vendors. The evaluations would cover the functional, technical and financial aspects. The project team could invite the vendors to demonstrate their systems onsite. Moreover, information gathered from the various sources is useful at this phase. With respect to the functionality aspect, project teams could evaluate the systems on types of modules available, special target module, adaptability and specific support. In the economic aspects, the ERP system would be evaluated on the pricing method of the system, implementation cost, maintenance charges etc. Functional and technical evaluations are carried out partially during the selection process and then more extensively during this phase. Vendor evaluation includes verification of financial stability, reputation, market share, cost of training, after sale support, warranty, financing, implementation strategy, reputation of the vendor of the system, type of support available during implementation and post-implementation support. While evaluating the ERP from technical aspects, the project team could evaluate the ERP based on technical criteria such as system architecture, platforms interface, database integration, integration with current systems, development language, support service, and source code availability. The technical evaluation has been discussed in several studies (Lee and Shin, 1999, Cecil and Bozrath, 2001) and included assessing the rigor, capacity and performance of the new system and all aspects of technology supporting the applications, including the platforms, the operating systems, database management systems, and all of the system management aspects.

After the thorough evaluation of ERP systems, project teams submit their choice of vendor to the management. The choice of vendor could differ among the various members of the team due to the use of various evaluation methods such as economic, scoring analysis, technical and functional techniques. However, management will have access to all the data and analysis which has been used to reach the final decision. The final recommendation is made by the top management and they may look into additional factors or ignore the evaluation.

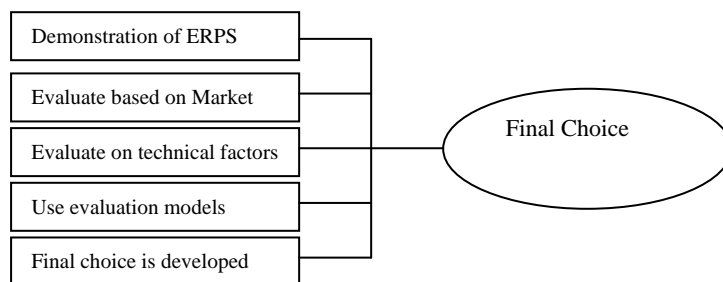


Figure 4: Important Activities of Final Choice Phase for the ERP Acquisition Process.

### 3.3.4 Negotiation Phase

The final phase of the ERP acquisition process, according to the model shown in Figure 4.1, is negotiation with vendors.

The acquisition team finalizes the vendors and systems and sends their recommendations to the steering committee for approval. The negotiation phase is important for ERP acquisition and can be informal or formal. Informal negotiation usually takes place between the project team and vendors on various issues. It can include discussion on product support, user training, pricing and other issues. If the project team has chosen the right vendor, then negotiation will be no more than a formality. If the team has selected a less desirable vendor with limited integrity, the task may prove difficult enough to force the team to return to the number two choice. Legal negotiation with the vendor includes discussions on ownership of the code, cost, implementation support, warranties, deliverables, financing, third party right, and, in case of bankruptcy, of the vendor’s responsibilities before the final contract is signed. The project team or the steering committee could review the contract provided, submit the contract to the organization’s legal staff and clarify any questionable contract points with the vendor. Attention should be paid to the terms used in the final contract. The content of the contract may vary from vendor to vendor but it is likely these items will be included: payment profile, ownership of the software, intellectual rights, entitlements of additional service, license fee, liability, software errors, new releases and cancellation of license. The negotiations must resolve any open issues and provide a solid basis to begin the implementation process.

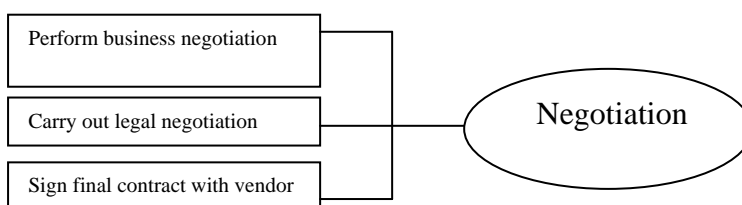


Figure.5 Important Activities of Negotiation Phase for the ERP Acquisition Process

## 4.0. Conclusion

The objective of this study was to investigate whether ERP implemented organizations perceive phases of acquisition identified for this study an important. The issues of question were investigated by means of a survey carried out among Australian companies utilizing the research questionnaire constructed earlier.

All the four phases of ERP acquisition process are considered important. Each phase consisted of multiple activities and found to be important for the acquisition process. The hypothesis aimed at determining and validating the four phases described in the model. The significance of this study lies in the fact that no previous research has empirically investigated these activities. In the information systems and organizational behavior literature, more or less similar activities have been identified for the acquisition process. ERP systems are complex and involve a major investment. In order to choose the right system

acquisition teams spend a lot of time, effort and resources evaluating various systems. As has been discussed in the model development, applying a structured approach to acquire information systems risk and increases substantially the probability of acquisition success. Therefore, buying organizations consider initiation, selection; final choice and negotiation as important phases of ERP acquisition process.