



JÖNKÖPING INTERNATIONAL BUSINESS SCHOOL  
JÖNKÖPING UNIVERSITY

# **Influencing Factors on the Selection Process of Enterprise System(s)**

A study on the client and vendor perspectives

Degree project within IT and Business Renewal

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Jönköping June 2005

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Key words: Enterprise System(s), Selection, influencing factor, client view and vendor view

## **Abstract**

Enterprise system (ES) is being considered an important phenomenon in the corporate use of information technology, enhancing organizational cross functional efficiency and effectiveness through the integration of all the information flowing through a company. The implementation and use of this system involve high expenditure and risk and it has a great impact in every aspect of an adopting organization. The wrong selection of this system would have an adverse effect on the company performance. So the selection of this system deserves considerable attention from the practitioner and researcher.

In this study, our objective is to identify the influencing factors on the ES selection process from the existing theory and investigate them in real life situation from the client and vendor's perspectives.

To fulfil the first objective of the study, we have made a comprehensive review on ES literature and synthesized an integrated framework of influencing factors on the ES selection process. To fulfil the other objective, we have made a qualitative empirical study through multiple case study approach. To collect necessary in-depth information, we have used purposive sampling and general interview guide approach. The integrated framework has guided us in empirical study and the cross case analysis of empirical data has been performed on the basis of this framework from the view point of client and vendor.

The result of this study shows that there exists a good fit between client and vendor views about the influencing factors on the ES selection process, in spite of insignificant imbalance between them. The result also reveals that most of the influencing factors of integrated framework have been recognized both by client and vendor with some diversity. Three new influencing factors: geographical proximity, requirement specification and sales skill of vendor have emerged from the study.

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# 1 Introduction

*This chapter focuses on the general background, problem definition, purpose and research questions of this study. It gives the readers a general outline of the study. The scope, interested parties and definitions of recurrent terms have been included in this chapter.*

## 1.1 Background

Enterprise systems (ESs) are integrated computer-based information systems being considered one of the most important developments in the corporate use of information systems during the last decade (Davenport, 1998). These ESs enhance organizational cross-functional efficiency and effectiveness through the seamless integration of all the information flowing through a company. Their implementation and use have impacts in every aspect of the adopting or acquiring organization, including its business processes, organizational structure, culture, workflows and activities (Davenport, 1998). Also the use of enterprise systems could lead to strategic, organizational, tactical, operative and IT infrastructural improvements (Shang and Seddon, 2002). Major business drivers behind ES implementations are: improving productivity, providing competitive advantage, and satisfying customer demands (Somers and Nelson, 2004). ES projects have been described strategic projects with successes or failures that would have great impact on organizations (Shakir, 2000). The market for ES products and services sustains a significant segment of the software and services industry, consisting of several of the largest software vendors such as SAP, Oracle, PeopleSoft, and Baan as well as the world's largest management consulting companies (Gable, Chan & Tan, 2003). Most multinational companies as well as many public sector organizations have adopted ES and increasingly small and medium-sized enterprises have been following suit (Gable, Chan & Tan, 2003). According to Shakir (2000), ES projects are expensive and time consuming, with cost generally exceeding US\$ 100,000 and a time frame for evaluation, selection, and implementation of the system between six month and two years. One key aspect of ES project is that failed implementations can be costly for the implementing organization (Sammon and Adam, 2004a). For example, Foxmeyer (a multibillion dollar firm) paid the ultimate price as they became bankrupt after failing to implement SAP over a three year period (Kalakota & Robinson, 1999). 90% of ES implementations end up late or over budget, while reportedly, 67% of ES initiatives could be considered negative or unsuccessful (Davenport, 2000a). A successful ES project involves selecting an ES software system and vendor, implementing the system, managing business processes change, and examining the practicality of the system. However, a wrong ES selection will either fail the project or weaken the system which will give an adverse impact on the company performance (Wilson, Desmond & Roberts, 1994; Hicks & Stecke, 1995). The adoption of these types of software packages is a high expenditure activity for organizations that consume a significant portion of their limited capital budget. It's also an activity that is fraught with a high level of risk and uncertainty (Verville & Halington, 2002). Hence, selection of ES has become a major challenge for information systems practice.

## 1.2 Problem discussion

The problem areas in this study are identified and specified through extensive study of literature and in-depth discussion about each area. In the ES research, many authors have identified a lot of critical success factors for unsuccessful ES implementation but the improper selection of ES system is one of the reasons for this failure (Verville & Halington, 2002). More over, the ES research has been heavily focused on implementation or post-implementation stages of ES system (Verville & Halington, 2002). According to Sammon and Adam (2004a) it seems that attention of managers and researchers focus nearly exclusively on certain stages of ES projects, while other key points were neglected. In particular much of the literature concentrate on the implementation of these systems without paying enough attention to the reasons why organizations go for ES and to the processes whereby managers select one particular ES package instead of another. The selection process of ES was defined as a set of interrelated activities as well as many dynamic factors that begin with the specific commitment to the selection task (Verville & Halington, 2002). The selection of the most appropriate enterprise system solution is a semi-structured decision problem without agreed-on and formal procedure (Laudon and Laudon, 1998). All selection decisions are subject to various influences (Ralph, 1996). Most of the studies on ES selection process have focused on the particular influencing factors such as business fits, ease of implementation, vendor's service & support and so on (Sharks et. al, 2000). But little has been done to review and categorize the influencing factors in a more general framework (Ralph, 1996).

In these above contexts, we have decided to make an investigation on the issues of ES selection process by organization from the perspective of influencing factors. In ES study, the importance of ES community can't be ignored. The community is defined as a triadic group composed of (1) ES vendor or ES supplier, (2) independent ES implementer or ES consultant company, (3) implementing organization or client company or end user of ES (Sammon and Adam, 2004b). To date, little attention has been focused on the influence of the ES vendor over the client organization deciding to select and implement ES. When an organization selects ES, there are obvious relationships and influences forged between vendor and client company (Sammon and Adam, 2004b). This study will be carried out from the two perspectives: client or implementing company perspective and ES vendor perspective. The views of ES vendor and client companies will be examined on the influencing factors of ES selection process. So the study will concentrate on the following three research elements:

- Identification of the influencing factors on ES selection process from the ES literature survey
- Finding out the views of both client company and vendor on these influencing factors in reality

Specifically the research questions for this element are:

1. Does client company really perceive these as influencing factors in the selection process of ES? Why and how they perceive the influence of these factors in the selection process?
  2. What are the perceptions of vendor company about these influencing factors? How they deal with these factors?
- Also discovering any other factor which is not mentioned in the literature but has influence in the selection process in practice.

### **1.3 Purpose**

The purpose of this study is to identify the influencing factors on ES selection process in theory and investigate them in reality from the client and vendor perspectives.

### **1.4 Delimitation**

The study is focused on the selection process of ES. Here the process begins with the company initiative or desire to get an ES software and the process ends with the decision reached to invest necessary resources for the implementation effort.

In this study, we have focused on the views of ES client company and ES vendor in the phenomenon where the ES vendor develops the system and directly sells it to the client company.

In the study the client company has already selected the ES system.

### **1.5 Interested parties of this study**

We believe that the client companies and vendors who are working in Sweden will be interested in our study. Because the study deals with the influencing factors on the selection process of ES, the consideration of these factors will certainly ensure best selection of ES for the client company. Also the vendors will get understanding about the factors considered by client companies and thus they can develop and sell their systems according to client's needs. The study will also be a source of information for anyone who is interested to work or conduct research within the fields of ES selection. In general, the students, academics and practitioners of information system arena can use this study as a valuable source.

### **1.6 Definitions**

The followings are the frequently used terminology in this study. It will help the readers to get more clarity about this study.

**Enterprise System (ES):** ES is a set of packaged application software modules, with an integrated architecture, that can be used by organizations as their primary engine for integrating data, processes, information technology, in real time, across internal and external value chains. We have used the term enterprise system in singular and plural terms, since it carries same meaning for this study.

**Vendor:** In this study vendor refers to a large software development company who is well recognized and specialized in ES segment of software market. This company also undertakes a substantial amount of marketing, research and development, support, training in order to back its expensive ES product. The company sells ES product to its customers that is client companies.

**Client:** The client company is an end user of ES product. It buys the software from vendor directly.

## 1.7 Disposition

The disposition of this study report can be read in the following chapters:

1. **Introduction chapter:** This chapter focuses on the general background, problem definition, purpose and research questions of this study. It gives the readers a general outline of the study. The scope, interested parties and definitions of recurrent terms have been included in this chapter.
2. **Methodology chapter:** This chapter explains how the empirical study was carried out in detail, ranging from research approach to credibility of the research. It states the reasons for adopting qualitative case study method and particular research approach for this study. It also states the way of data collection from primary and secondary sources and includes data analysis strategy, reliability and validity of research process.
3. **Theoretical framework chapter:** This chapter states the existing knowledge on ES phenomenon. It is very useful to get a good understanding of ES concept, selection process of ES and influencing factors on ES selection found in the existing literature. It also includes an integrated framework of influencing factors synthesized by authors which had guided the empirical research.
4. **Empirical findings chapter:** The presentation and analysis of data collected during the case study, have been described in this chapter. This chapter has three parts. In the first two parts, the clients and vendors views on influencing factors have been presented respectively. The information on client and vendor companies investigated in this study has been also included in these two parts respectively. In the third part, the analysis of two perspectives has been described on the basis of integrated framework synthesized by the researcher.
5. **Conclusion chapter:** In this chapter, the key aspects and dimensions of analysis of empirical data, has been presented. It also describes how the purpose of the study has been fulfilled.
6. **End discussion chapter:** In this concluding chapter, we have presented our critical reflection on this study in totality. It highlights the constructive criticism on theory, research method and findings. Finally it ends with suggestion for future study.

## 2 Methodology

*This chapter explains how the empirical study was carried out in detail, ranging from research approach to credibility of the research. It states the reasons for adopting qualitative case study method and particular research approach for this study. It also states the way of data collection from primary and secondary sources and includes data analysis strategy, reliability and validity of research process.*

### 2.1 What is research?

Although research is central to all academic activities, there is no consensus in the literature on how it should be defined (Collis & Hussey, 2003). One reason for this is that research means different things to different people. According to Collis and Hussey (2003), research is a process of enquiry and investigation; it is systematic and methodical; and it increases knowledge. Grinnell (in Kumar, 1996 p. 6) defines: ‘research is a structured inquiry that utilizes acceptable scientific methodology to solve problems and creates new knowledge that is generally applicable.’

### 2.2 Research approach

Jarvinen (1999) has developed and purposed a taxonomy of research methods to categorize information systems research. He has made a study on the characteristics of research methods and has tried to structure them in a new and more natural way. He defines research approach as a set of research methods that can be applied to the similar research objects and research questions. In the development of the taxonomy, the top-down principle is applied, i.e. all the research approaches is first divided into two classes, one or both are then divided again into two sub-classes etc. (figure: 1 )

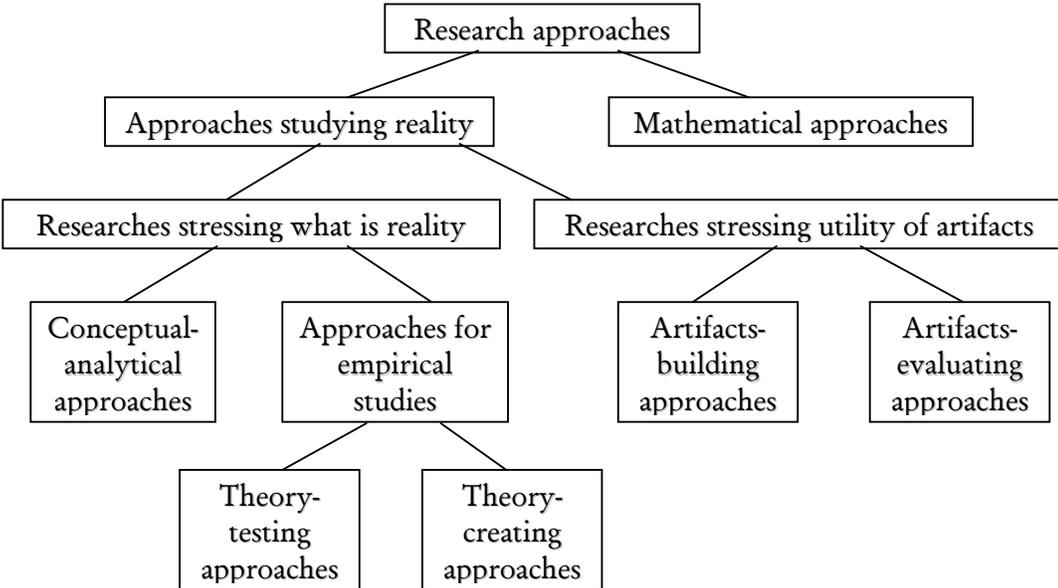


Figure 1: Jarvinen’s taxonomy of research methods (Jarvinen, 1999)

At the beginning of categorization he differentiates other methods from mathematical methods, because they concern formal languages, algebraic units etc.,

in other words, symbol systems without having any direct reference to objects in reality. From the rest of methods concerning reality, research questions are used in differentiation. Two classes are based on whether the research question refers to what is a reality or does it stress on utility of an artifact (something made by human beings). From the former he differentiates conceptual-analytical approaches, i.e. methods for theoretical development, from empirical research approaches. When the past and present are empirically studied, he differentiates the theory-testing or theory-creating methods depending on whether there is a theory, model or framework guiding the study or is a researcher developing a new theory grounded on the gathered raw data. Regarding artifacts he purposes a differentiation between to build and to evaluate them (Jarvinen, 1999).

Jarvinen (1999) states that in mathematical studies a certain theorem, lemma or assertion is proved to be true in a particular context of fundamental mathematical pre-suppositions. The research question can then be as follows: can we prove this theorem to be true? In conceptual-analytical studies normally two different approaches are identified. First the researcher can start from the assumptions, premises and axioms and derive the theory, model or framework. A researcher could ask: which kind of theory concerning a certain part of reality could be derived, if certain assumptions and premises are valid? Second the basic assumptions behind constructs in previous empirical studies are first analyzed; theories, models and frameworks used in those studies are identified, and logical reasoning to integrate them is thereafter applied. A researcher could then ask: is there any common theory, which describes and explains those phenomena (Jarvinen, 1999)?

Jarvinen (1999) also states that in the theory-testing studies such methods as laboratory experiment, survey, field studies, field experiment etc. are used. In the study where theory-testing method is used the theory, model or framework is either taken from the literature, or developed or refined for that study. The research question could then be read: do observations confirm or falsify that theory? To the theory-creating approach, the 'normal' case study, ethnographic method, grounded theory, phenomenography, contextualism, discourse analysis, longitudinal study, phenomenological study, hermeneutics etc. are included. A researcher could then ask: which kind of construct or model could describe and explain 'why acts, events, structures and thoughts occur'? According to Jarvinen (1996) there are, however, a few research methods, e.g. case study, having many variants that belong to more than one approach. The case study can be classified into either theory-testing or theory-creating approach.

For this study, we have chosen to apply theory-testing approach of Jarvinen's taxonomy. Within this approach, the case study method has been used. Because our study on "influencing factors on the selection process of ES" is directly connected to the reality of information system phenomenon and we have tried to collect information on the research element - the views of client company and vendor company on the influencing factors - from the real life situation. Also in this study, the theory, concepts and frameworks have been taken from the literature and later they are further synthesized and integrated. The integrated framework of influencing

factors on ES selection has been tested empirically. The reason for choosing case study method is explained in later section. So the process of choosing particular approach looks like the following figure:

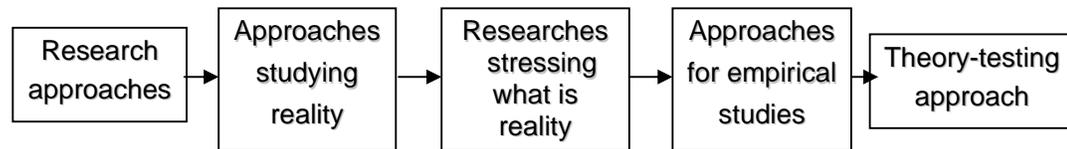


Figure 2: The path of choosing research approach for this study

### 2.2.1 Qualitative method and case study

Research can also be differentiated on the basis of the process of the research i.e. the way in which the researcher will collect and analyze data (Collis & Hussey, 2003). According to this classification, there are two types of research: quantitative and qualitative. The quantitative approach is objective in nature and concentrates on measuring phenomena. It involves collecting and analyzing numerical data and applying statistical tests. On the other hand, qualitative approach is more subjective in nature and involves examining and reflecting on perceptions in order to gain an understanding of social and human activities (Collis & Hussey, 2003). Moreover, quantitative and qualitative methods are not simply different ways of doing the same thing (Maxwell, 1996). Instead, they have different strength and logics and are often best used to address different questions and purposes. The strength of qualitative research derives primarily from its inductive approach, its focus on specific situations or people, and its emphasis on words rather than numbers. According to Maxwell (1996) there are five particular research purposes for which qualitative studies are especially suited:

1. Understanding the meaning, for participants in the study, of the events, situations, and actions they are involved with and of the accounts that they give of their lives and experiences. In a qualitative study, the researcher is interested not only in the physical events and behavior that is taking place, but also in how the participants in the study make sense of this and how their understandings influence their behavior. This focus on meaning is central to what is known as the ‘interpretive’ approach to social science.
2. Understanding the particular context within which the participants act, and the influence that this context has on their actions. Qualitative researchers typically study a relatively small number of individuals or situations and preserve the individuality of each of these in their analysis, rather than collecting data from large samples and aggregating the data across individuals or situations. Thus, they are able to understand how events, actions, and meanings are shaped by the unique circumstances in which these occur.
3. Identifying unanticipated phenomena and influences.
4. Understanding the process by which events and actions take place.

5. Developing casual explanations. The traditional view that qualitative research cannot identify causal relationships has long been disputed by some qualitative researchers. Part of the reason for the disagreement has been a failure to recognize that quantitative and qualitative researchers tend to ask different kinds of causal questions. Quantitative researchers tend to be interested in whether and to what extent change in independent variable (x) causes change in dependent variable (y). Qualitative researchers, on the other hand, tend to ask how independent variable (x) plays a role in causing dependent variable (y), what the process is that connects x and y<sup>2</sup>.

In this study our purpose is to identify the influencing factors on ES selection process in theory and investigate them in reality from the client and vendor perspectives. To fulfill the empirical purpose it requires the understanding of the events, situations and actions involved in the client and vendor's perspectives on the influencing factors. The context and circumstances for the study are unique for every individual respondent company. The purpose also requires identification of unanticipated influences, characteristics of influencing factors and the way of influencing in the selection process. As the study requires in-depth analysis and reflection on perceptions of respondents, it is focused on the specific company situations. To fulfill the research purpose, the study has been carried out through qualitative method.

The term 'case study' is strongly associated with qualitative research although it is used in a variety of ways. Indeed it sometimes appears to be used as a synonym for qualitative research (Lewis, 2003). A case study is an extensive examination of a single instance of a phenomenon of interest (Collis & Hussey, 2003). In general, case studies are the preferred research method when 'how' or 'why' questions are being posed, when the researcher has little control over events, and when the focus is on a contemporary phenomenon within some real-life context (Yin, 2003). Case studies are often described as exploratory research, used in areas where there are few theories or a deficient body of knowledge. However, this is not their only form. Scapens (1990, in Collis & Hussey, 2003) adds the following types:

1. Descriptive case studies where the objective is restricted to describing current practice
2. Illustrative case studies where the research attempts to illustrate new and possibly innovative practices adopted by particular companies
3. Experimental case studies where the research examines the difficulties in implementing new procedures and techniques in an organization and evaluating the benefits
4. Explanatory case studies where existing theory is used to understand and explain what is happening.

Case study research also includes both single and multiple case studies (Yin, 2003).

Conclusively the research has been conducted through multiple case study method with the consideration of the research questions, contemporary phenomenon of ES,

the dynamics of influencing factors and unique setting of company environment. Moreover, the study has been of mainly descriptive and explanatory nature.

## **2.3 Data collection**

This section provides explanation about types and sources of data used in this study, how they have been collected and the reasons for pursuing particular data collection method.

### **2.3.1 Data and sources**

Data refers to known facts or things used as a basis for inference or reckoning. Some authors draw a distinction between data and information, by defining information as knowledge; data which has been organized into a useful form (Collis & Hussey, 2003). There are two major sources of data about a situation, person, problem or phenomenon (Kumar, 1996). These are primary and secondary sources. Original data is known as primary data, which data is collected at source. Examples include survey data, experimental data and interview data etc. Secondary data is data which already exists, such as books, documents, articles, databases and films (Collis & Hussey, 2003). In summary, primary sources provide first-hand information and secondary sources provide second-hand information (Kumar, 1996).

For this study both the data sources and types have been used. The theoretical framework has been synthesized from the secondary data through literature study and the empirical study has provided primary data for this study. The data and information about the client and vendor companies have been collected from their websites, interviews and published documents.

### **2.3.2 Literature study**

Once we have decided on our research topic then we have started our literature search. This is the process of exploring the existing literature to ascertain what has been written or otherwise published on the chosen research topic, how previous research has been conducted and how this impacts on the research problem identified (Collis & Hussey, 2003). The key words for literature search have been 'selection', 'Enterprise Resource Planning (ERP)', 'Enterprise System (ES)', and 'factor'. The literature search has increased our knowledge of the subject area and the application of different research methodologies, as well as has helped us to focus on our research topic, develop and support it. The aim of the literature search is to identify as many items of secondary data as possible which are relevant to research topic. Examples of sources of secondary data which have been used include: book, articles in journals, conference papers, reports, electronic databases and the Internet. In this context, the term literature refers to all sources of published data (Collis & Hussey, 2003). By exploring what others have contributed to the area of interest, we have been able to find out what is already known, identify any gaps, see how our ideas compare with what has gone before, and develop existing ideas. By reviewing the literature, we have synthesized the theoretical framework for this study, which essentially has guided us in empirical study.

### **2.3.3 Empirical study**

Under this section, the sampling strategy and the interview method for collecting primary data have been described.

#### **2.3.3.1 Sampling strategy**

It is a general feature of any research to design and select sample for study. This is so whether the research is qualitative or quantitative in form. Even if a study involves very small populations or single case studies, decisions still need to be made about people, settings or actions (Ritchie, Lewis & Elam, 2003). There is a number of sampling strategy in qualitative research. Most sampling in qualitative research falls into purposeful sampling. This purposeful sampling is a sampling strategy in which particular settings, persons, or events are selected deliberately in order to provide important information that cannot be gotten as well from other choices (Maxwell, 1996). In this strategy, the selection of participants, settings, or other sampling units is criteria based or purposive. The sample units are chosen because they have particular features or characteristics which will enable detailed exploration and understanding of the central themes which the researcher wishes to study (Ritchie, et al., 2003). Selection of settings, individuals, and events that can provide the researcher with information that he needs in order to answer research questions is the most important consideration in qualitative sampling decisions (Maxwell, 1996). According to Maxwell (1996) the goals for purposeful sampling are:

1. To achieve representativeness or typicality of the settings, individuals, or activity selected. It usually makes more sense in a small scale study to deliberately select cases, individuals, or situations that are known typical.
2. To adequately capture the heterogeneity in the population.
3. To establish particular comparisons to illuminate the reasons for differences between settings or individuals.

In our study we have selected the sample of four client companies and two vendor companies purposively. Since the client company is main actor in the selection process of ES software, we have chosen more sample units of client than vendor. For selecting client companies, we have contacted Mats Dahlin, the host company coordinator of Jonkoping International Business School (JIBS) and he gave us a list of host companies of JIBS located in Jonkoping city. The list includes small, medium and large scale companies. After reviewing the information about the types of business and use of ES software through their websites and informal channels, we have decided to contact with 10 companies from the list. After getting more information about the ES environment in the companies, finally we have chosen the following four companies which have the required characteristics for this case study research.

1. Hettich Skandinaviska AB (referred to as 'Hettich')
2. NEFAB AB (referred to as 'NEFAB')

3. X company - a paper producing company in Jonkoping (the company representative doesn't want to disclose the name of the company)
4. Stora Enso Packaging AB (referred to as 'Stora')

We believe that the selected sample of four clients has been able to provide the necessary information for the research questions and they have fulfilled the above mentioned criteria and goals of purposive sampling.

During the selection of vendor companies, we have looked for who are the major ES suppliers in Swedish ES market. After reviewing the companies' websites and results from previous research, we have contacted with SAP, IFS, GARP and Oracle vendor companies. On the basis of initial discussion and availability of time for the interview, we have finally selected two of the most representative ES vendors in Swedish market by considering the sampling criteria:

1. Oracle
2. IFS AB

When selecting the respondents for the study, we have considered the relevant competence, knowledge, and experience of the respondents in the subject area especially ES software and its environment. To get best information and to bring optimal value to the research results, we have searched for the appropriate respondents who have right information for the research purpose. On the basis of these criteria we have selected the respondents from client companies and vendor companies who truly represent the views of the concerned company. The respondents of client companies are:

1. Ulf Svensson, Managing Director of Hettich Skandinaviska AB
2. Robert Knudson, IT manager of NEFAB AB
3. IT manager, X company (the company representative doesn't want to disclose his name)
4. Tommy Ljungdahl, IT manager of Stora Enso Packaging AB

The respondents of vendor companies are:

1. Joakim Driving, Business development manager in sales department of Oracle
2. Per Karnhall, Manager of Jonkoping representative office of IFS AB

#### **2.3.3.2 Method of primary data collection**

Several methods can be used for collecting primary data and the choice of method depends upon the purpose of the study, the resources available and the skills of the researcher (Kumar, 1996). One of the most important method to collect information from case study is the interview (Yin, 2003). Interviewing is a commonly used method of collecting information from people. Any person-to-person interaction between two or more individuals with specific purpose in mind is called an interview

(Kumar, 1996). Since this study requires detailed and in-depth information from the case study, the use of interview is most suitable for collecting primary data from the respondents. Throughout the interview process the researcher has two jobs: a) to follow his line of enquiry, and b) to ask actual (conversational) questions in an unbiased manner that also serves the needs of line of enquiry (Yin, 2003). According to Patton (1990) there are three basic approaches to collecting qualitative data through interviews:

1. the informal conversational interview
2. the general interview guide approach, and
3. the standardized open-ended interview

These three approaches to the design of the interview differ in extent to which interview questions are determined and standardized before the interview occurs. We have opted for the general interview guide approach. It involves outlining a set of issues that are to be explored with each respondent before interviewing begins. The issues in the outline need not to be taken in any particular order and the actual wording of questions to elicit responses about those issues is not determined in advance. The interview guide simply serves as a basic checklist during the interview to make sure that all relevant topics are covered (Patton, 1990). The interview guide is a list of questions or issues that are to be explored in the course of an interview. It provides topic or subject areas within which the interviewer is free to explore, probe, and ask questions that will elucidate and illuminate that particular subject. Thus the interviewer remains free to build a conversation within a particular subject area, to word questions spontaneously, and to establish a conversational style- but with the focus on a particular subject that has been predetermined (Patton, 1990).

To conduct the interviews properly and to get the required information from the respondents, two interview guides - one for client companies and the other one for the vendor companies - have been developed (see the appendix). The issues and open-ended questions of interview guides have been developed on the basis of research purpose, research questions and the theoretical framework. So it includes questions focusing on different influencing factors and ES environment.

### **Interview procedure**

Before making interview with the respondents, we have emailed them a shorter version of interview guide focusing on key issues along with a description of the aim of the study before one week. This shorter version and the time given to them have helped them to prepare well for the interviews. The interviews have been performed over a loudspeaker telephone. The choice of telephone interview was due to the preference of the respondents, geographical circumstances, resource and time limit. During the interviews, many questions have been raised by the researcher revolving and surrounding key issues and main questions of interview guide to get necessary information. It has helped the interviewer to get in-depth insight about respondent's view and perception. The interviews have been recorded elaborately and sufficiently by the researcher. After having properly documented and printed the interviews,

they have been emailed back to the respective respondents for approval and possible additional comments before compilation of results. The interviews have taken place in English language. As the interviewer and interviewee are well educated and have good skill in understanding, speaking and writing English language, there has been no misunderstanding between them and no misinterpretation of conversation.

## **2.4 Analysis strategy**

The main challenge to qualitative data analysis is that there is ‘no clear and accepted conventions for analysis corresponding to those observed with quantitative data’ (Robson, 1993, p.370). Many writers have emphasized the pivotal role that analysts themselves play in carrying out qualitative research analysis. It is the analyst’s conceptual skills that will be needed to read, sift, order, synthesize and interpret the data. No methods of analysis will replace this skill but are simply facilitative tools to aid the analytic process (Spencer, Ritchie & O’Connor, 2003). Yin (2003) states that at least four principles underlie high quality analysis of social science research. First, the analysis should show that the analyst attended to all the evidence. Second, analysis should address, if possible, all major rival interpretation. Third, it should address the most significant aspect of case study. Fourth, the analyst should use his own prior, expert knowledge in case study. According to Spencer et al. (2003), the analytical process requires three forms of activity. First one is data management in which the raw data are reviewed, labeled, sorted and synthesized. The second one is descriptive accounts in which the analyst makes use of the ordered data to identify key dimensions, map the range and diversity of phenomenon and develop classifications and typologies. The third one is explanatory accounts in which the analyst builds explanations about why the data take the forms that are found and presented.

To analyze the empirical findings we have chosen to use cross-case analysis method to identify the similarities and differences which helped to identify common patterns. Our study involves both the descriptive and explanatory knowledge. Moreover the aim of the analysis is to review the empirical findings from the client and vendor perspectives. At first, the findings from the cases of client companies have been presented together and then the findings from the cases of vendor companies have been elaborated. After that, the findings have been analyzed among and between the client and vendor perspectives on the basis of integrated theoretical framework of influencing factors.

## **2.5 Research credibility**

The concepts of reliability and validity were developed in the natural sciences and they are real concerns about whether the same concepts have any value in determining the quality or sustainability of qualitative evidence (Lewis & Ritchie, 2003). But in their broadest conception, reliability meaning ‘sustainable’ and validity meaning ‘well grounded’ will have relevance for qualitative research since they help to define the strength of data. This is of particular concern in the context of generalization where the ability to transfer findings to other context or wider theory will be circumscribed by the soundness of the evidence (Lewis & Ritchie, 2003).

### **2.5.1 Validity**

Validity is the extent to which the research findings accurately present what is really happening in the situation (Collis & Hussey, 2003). The validity of findings or data is traditionally understood to refer to the 'correctness' or 'perception' of a research reading (Lewis & Ritchie, 2003). Research errors, such as faulty research procedures, poor samples and inaccurate or misleading measurement, can undermine validity. In qualitative study, it is aimed at capturing the essence of the phenomenon and extracting data which is rich in its explanation and analysis. The researcher's aim is to gain full access to the knowledge and meaning of those involved in the phenomenon (Collis & Hussey, 2003). Although the validity of 'measurement' is seen as a primary concern of qualitative research, it is widely recognized that it is an equally significant issue for qualitative research. But the questions posed are different ones and relate more to the validity of representation, understanding and interpretation (Collis & Hussey, 2003).

In the empirical study, we have assured the validity of information in terms of research approach, sampling and measurement. The case study method has been successful for this theory-testing qualitative approach. The interview guide for data collection has been developed well on the basis of theoretical background of this study. The information collected during interview has been verified by the respondents and this confirms the correctness of primary data. The interview has provided us in-depth information from respondents which has helped us to get insight about actual happenings of particular phenomenon under study. We have also gathered information from multiple sources through multiple case studies. The purposive sampling has been successful in this effort. The presentation, interpretation and analysis of empirical findings have been done on the basis of research purpose and theoretical framework. So we can conclude that the case study have ensured the construct and internal validity suggested by Yin (2003).

### **2.5.2 Reliability**

Reliability is generally understood to concern the replicability of research findings and whether or not they would be repeated if another study, using the same or similar methods, was undertaken (Lewis & Ritchie, 2003). The extent to which replication can occur in qualitative research has been questioned on a number of counts (Lewis & Ritchie, 2003). Because of such concerns, the idea of seeking reliability in qualitative research is often avoided. Instead, writers discuss similar issues using terms and concepts that are felt to have greater resonance with the goals and values of qualitative research. For example in discussing reliability a number of authors talk about the 'confirmability' of findings (Lewis & Ritchie, 2003). To ensure the reliability of qualitative research, firstly there is the need to ensure that the research is as robust as it can be by carrying out internal checks on the quality of the data and its interpretation. Secondly, there is the need to assure the reader of the research by providing information about the research process (Lewis & Ritchie, 2003).

For this study, we argue that the reliability has been confirmed by well elaborating the research process and methods applied in this study and by ensuring the quality of

data. In general the findings of the study can be replicated in another study with similar research method by considering the unique settings of different companies.

### **2.5.3 Degree of generalization**

Generalization in social research concerns the potential for drawing inference from a single study to wider population, contexts or social theory. In qualitative research, it is sometimes referred to as the transferability or external validity of research findings (Lewis & Ritchie, 2003). According to Lewis and Ritchie (2003), the generalization can be seen as involving three linked but separate concepts:

- a) Representational generalization, whether what is found in a research sample can be generalized to, or held to be equally true of, the parent population from which the sample is drawn;
- b) Inferential generalization, whether the findings from a particular study can be generalized, or inferred, to other settings or contexts beyond the sampled one;
- c) Theoretical generalization, whether theoretical propositions, principles or statements can be drawn from the findings of the study for more general application.

Although the generalization or transferability of research findings from case study is always criticized, but it can be concluded that the findings of this study, with representational sample from both the clients and vendors, can be inferred for similar clients and vendors within ES phenomena. Thus the findings of the study can be generalized in the above mentioned three categories of generalization more or less.

### 3 Theoretical Framework

*This chapter states the existing knowledge on ES phenomenon. It is very useful to get a good understanding of ES concept, selection process of ES and influencing factors on ES selection found in the existing literature. It also includes an integrated framework of influencing factors synthesized by authors which had guided the empirical research.*

#### 3.1 ES Concept

All popular phenomena receives different names and terms for good reasons, so too with enterprise systems (Hedman, 2003). The reasons might be contextual, scientific, personal, or there might be an actual needs for several terms. Related to the enterprise system, a number of other terms such as ERP (Enterprise Resource Planning) system and Enterprise-Wide IS (Information System) are, and have been used (Klaus, Rosemann and Gable 2000). More over, the terms ES and ERP have been used interchangeably in the IS literatures. The term enterprise system was coined by Thomas Davenport (1996; 1998; 2000b) and he preferred the ES instead of ERP. He also provides a descriptive definition of this term:

*“These commercial software packages promise the seamless integration of all the information flowing through a company - financial and accounting information, human resource information, supply chain information, customer information (Davenport, 1998, p.131)”*

The breadth of support that these kinds of systems provide is one of the central factors that differentiate enterprise systems from earlier systems, as they support all functions of a business, from accounting to manufacturing, from sales to service (Davenport, 2000b). Seddon, Shanks and Willcocks (2003) define ES as large-scaled organization systems, that is, systems composed of people, processes and information technology, built around packaged enterprise system software (ESS). This ESS: (1) is a set of packaged application software modules, with an integrated architecture, that can be used by organizations as their primary engine for integrating data, processes, information technology, in real time, across internal and external value chains; (2) impounds deep knowledge of business practices that vendors have accumulated from implementations in a wide range of client organizations, that can exert considerable influence on the design of process within new client organizations; (3) is a generic “semi-finished” product with tables and parameters that client organizations and their implementation partners must configure, customize, and integrate with other computer-based information systems to meet their business needs. Today enterprise systems are evolving to incorporate new technologies, such as e-commerce and the internet, data warehousing, supply chain management and customer relationship management (Shang and Seddon, 2003).

The ERP systems have evolved from packaged software for supporting material requirements planning (MRP), manufacturing resource planning (MRP II) and computer integrated manufacturing (CIM), hence the strange name: enterprise resource planning (Seddon, Shanks and Willcocks, 2003). And the term ERP can be traced to manufacturing terms and concepts. There is no universally accepted

definition of “ERP” software (Klaus et. al, 2000). Enterprise System differ from MRP, MRP II and CIM by including functionality such as financial planning, investment management, plant maintenance, and human resource management, and by providing support for business and industries that are not manufacturing-related (Klaus et. al, 2000). The ERP systems concept can be understood well by the following figure provided by Sammon & Adam (2004c).

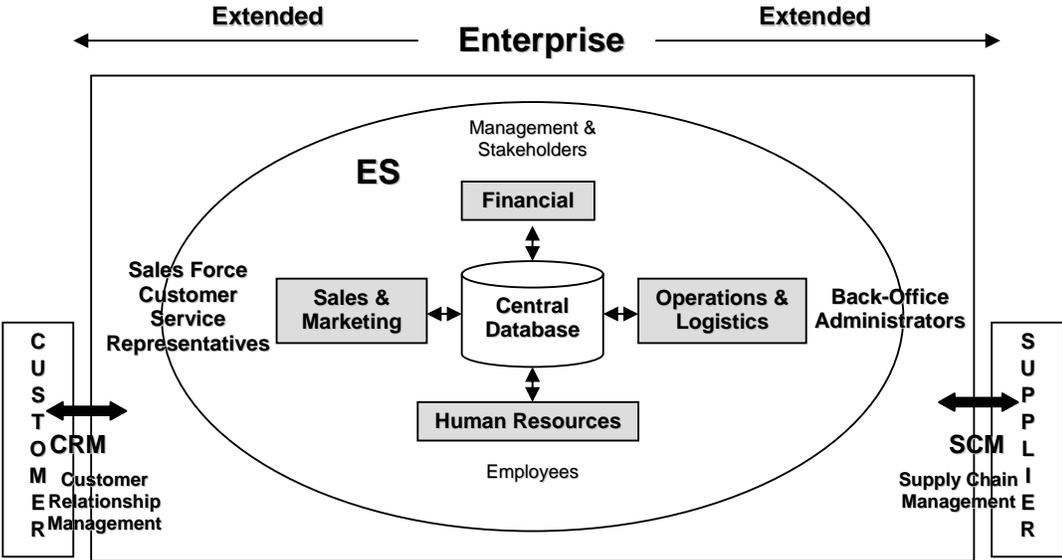


Figure 3: ES systems concept (from Sammon & Adam, 2004c)

**3.1.1 Choice of Term**

So the reason for using the term Enterprise System in this thesis is that it is more generic and not limited to a certain industrial legacy, such as manufacturing, but grabs the entire aspect of organizations and business that can be supported by Enterprise Systems.

**3.2 Evolution of ES**

In a study, Rashid, Hosain and Patrick (2002) have described the evolution of ES systems very well. The evolution of ES systems closely followed the spectacular developments in the field of computer hardware and software systems. During the 1960s most organizations designed, developed and implemented centralized computer systems, mostly automating their inventory control systems using inventory control packages (IC). These were legacy systems based on programming languages such as COBOL, ALGOL and FORTRAN. Material requirements planning (MRP) systems were developed in the 1970s which involved mainly planning the product or parts requirements according to the master production schedule. Following this route new software systems called manufacturing resources planning (MRP II) were introduced in the 1980s with an emphasis on optimizing manufacturing processes by synchronizing the materials with production requirements. MRP II included areas such as shop floor and distribution management, project management, finance, human resource and engineering. ES systems (in the name of ERP) first appeared in

the late 1980s and the beginning of the 1990s with the power of enterprise-wide inter-functional coordination and integration. Based on the technological foundations of MRP and MRP II, ES systems integrate business processes including manufacturing, distribution, accounting, financial, human resource management, project management, inventory management, service and maintenance, and transportation, providing accessibility, visibility and consistency across the enterprise.

During the 1990s ES vendors added more modules and functions as “add-ons” to the core modules giving birth to the “extended ES”. These ES extension include advanced planning and scheduling (ASP), e-business solution such as customer relationship management (CRM) and supply chain management (SCM). Figure 4 summarizes the historical events related with ES.



Figure 4: ES evolution (adapted from Rashid, Hossain, & Patrick, 2002)

### 3.3 Characteristics of ES

ES are the most complex information systems ever designed, developed, and implemented by organizations (Joseph and Swanson, 1998). One way to depict ES is to describe the key characteristics of ES. They are large and expensive software and involve long implementation period (Burns, 2002). As some characteristics, Davenport (1998) outlined commercial software packages, off-the-shelf solutions, integrated solutions, scope, configuration, generic systems and master data. In addition, Klaus et al. (2000) discuss real time data processing and process orientation as key characteristics.

The features of ES systems are as follows (Davenport, 1998; Markus & Tanis, 2000; Ross & Vitale, 2000 in Shakir & Hossain, 2002):

1. ES systems are considered to be standards of business best practice;
2. An ES system includes a set of two or more standard integrated modules, each modelling a certain business process or function;
3. Organizations can choose a minimum set of modules to implement and add other modules as necessary.

As a commercial product, ES software is offered by a range of vendors that specialize in this segment of software market. The main ES vendors are SAP, Baan, Oracle and PeopleSoft. This ES market is significant.

ES software is highly configurable to accommodate the diverse needs of users across most sectors of the economy. Because of this, currently ES software exists in three different forms: generic, preconfigured, and installed (Klaus et al. 2000):

- a) In its most comprehensive form, the software is generic, targets range of industries, and must be configured before it can be used.
- b) Packaged, preconfigured templates have been derived from the comprehensive software. These templates are tailored towards specific industry sector (e.g., automotive, retail) or companies of certain size (SME).
- c) For most users, ES software presents itself as the operational installation after the generic or pre-figured package has been individualized according to the particular firm's requirements on site.

ES software is a standard software package. All standard packages targeting anonymous market must, during the process of system development, be tailored to the specific requirements of the individual enterprise.

ES is obviously application software. Thus it can be differentiated from software like database management software, middleware or operating system. The application modules of ES are integrated across the functions supported and the data involved. ES software is based on an underlying integrated database that stores master and transactional data in a consistent way and with controlled redundancy.

The main features of ES software are the provided business solutions, which support the core processes of the business and administrative functionality. High functionality is one of the main differentiators of ES. ES purports to support all business functions of an enterprise, especially procurement, material management, production, logistics, maintenance, sales, distribution, financial accounting, asset management, cash management, controlling, strategic planning, and quality management.

Although components of the main ES solutions are at the highest level organized in different functional modules like financial accounting or sales, they all follow a process-oriented view of enterprise. Typical business processes are supported in a seamless way across functions, so that the user often does not realize in what functional module he or she actually works.

ES targets multiple industries with very different characteristics. It supports multiple industries in two ways. It can have either the ability to support different industries within one solution or offer pre-configured enterprise-individual solutions.

One of the technical characteristics is the consistent graphical user interface (GUI), across all application areas. Thus, a user perceives the ES solution as a single application regardless of the module he or she is working with. Current ES solutions

are based on a three-tier client-server architecture, in which the database, the applications and the presentation, form three logically independent levels. It generally handles large volumes of transactions. Current ES is typically ‘open’ regarding the possible software and hardware platforms. Most solutions run under Windows NT, various UNIX operating systems or Linux.

### 3.4 ES life cycle

Different perspectives of ES bring different models of the life cycle. One result is the absence of a generally accepted ES life cycle model (Rosemann 2003). We think that for the purpose of this thesis, the ES life cycle model proposed by Hedman (2003) is suitable one. According to Hedman, the proposed life cycle is based on the understanding of the key characteristics of ES artifact and on an integration of the reviewed previous life cycles of different authors. The life cycle takes place at user organizations. This process involves four phases, including selection, configuration, implementation, and use & operation. According to him, the logic is illustrated in the following figure 5 and is as follows: organizations select, configure, implement, and use & operate ES.

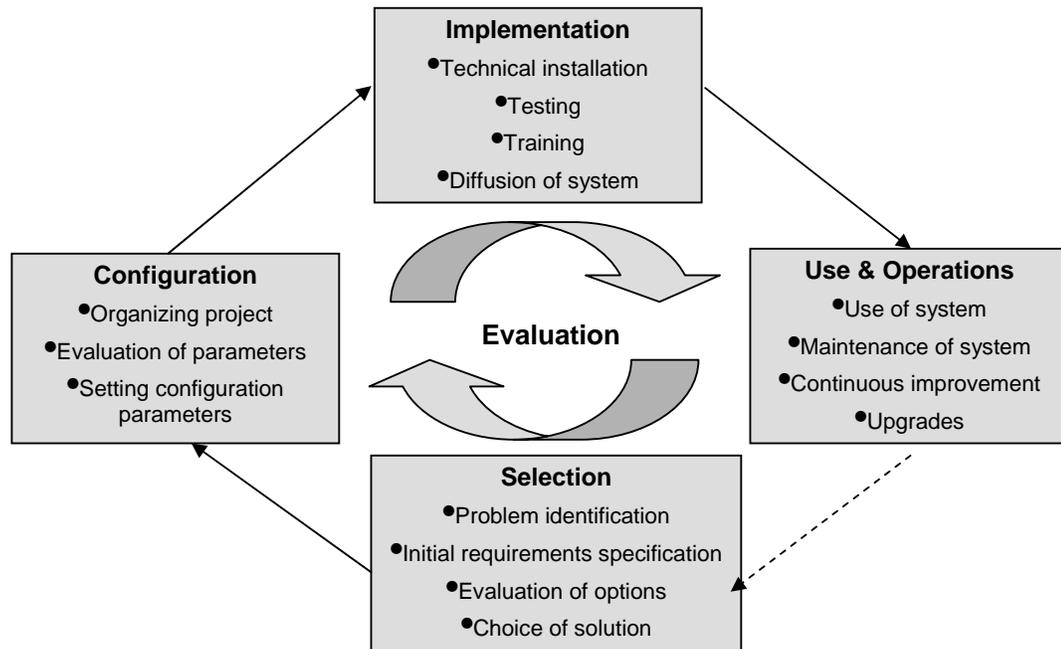


Figure 5: ES life cycle (from Hedman, 2003)

Each phase can involve iterations and there can also be iterations between phases. The task and procedures of each phase are described below:

**Selection phase:** the selection phase involves activities for determining the need for a system, assessing and evaluating different solutions, and the acquisition. The starting point is the identification of problems that may be solved by the implementation of the ES system, another task is the requirements specification, which is used to assess and evaluate different solution against each other. Selection can be based on factors such as functionality, price, training and maintenance services.

**Configuration phase:** the configuration phase involves every activity from acquisition to implementation. Funding the project including financial and internal resources (time and people), and managing it are central to this task and are prerequisites for the project. The main tasks are configuration and customization of the system. This is usually done with the help of external consultants and internal super users.

**Implementation phase:** The implementation phase involves the technical installation, testing, training of most end users, and the diffusion of the system into the organization. Implementation may involve several strategies, depending on the scope of the implementation and the organization. A consequence of this phase is either the introduction of information systems or a replacement of information systems.

**Use & Operation phase:** The use & operation phase involves the use and administration of the system until it is terminated and replaced by another solution, this can include the implementation of additional functionalities including integration with other information systems, e.g. data warehouses, customer relationship management, supply-chain management, and electronic commerce.

### 3.5 Selection process of ES

In their study, Bernroider and Koch (2002) have presented a framework for the ES selection process based on academic literature and the results of an empirical study. The framework is based on the general purpose decision making model.

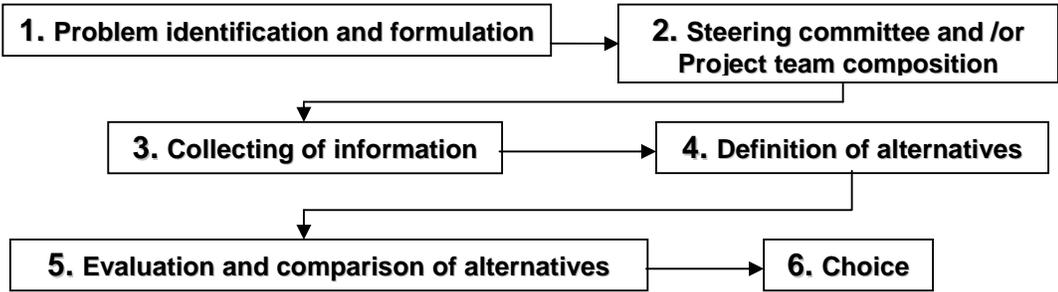


Figure 6: General model of ES selection process (adapted from Bernroider & Koch, 2002)

The rational decision making of ES selection process begins with the statement of problems and situational goals. In the second stage, composition of steering committee and/or project team has been done by recognizing the complex technical and organizational aspect of ES selection and implementation. Generally either this committee or project team (if committee is not available) is responsible to make decision about the ES selection. In the third stage all information relevant for the problem identified is collected. It may be necessary to restate the problem formulation. In the fourth stage all relevant alternative solutions to the identified problem are conceived using the collected information. It may not be possible to conceive all relevant alternative solutions with the information collected. Also the problem formulation may be incomplete. In the fifth stage every alternative solution

is to be analyzed in order to allow a comparison. During analyzing it might occur that the problem is not well defined or that information may be missing or that other alternatives must be found. In the last stage the selection is made within the various solution alternatives (Bernroider & Koch, 2002).

### 3.6 Benefits of Using ES

There are a lot of benefits which can be reaped by the company using ES. Shang and Seddon's (2002) study of manager's perceptions of ES's benefits reported five categories of benefits. They are operational, managerial, strategic, organizational and IT infrastructural benefits. In other study, Sammon and Lawlor (2004) have identified 16 intended benefits as organizational requirements for ES software selection. The benefits identified by Shang & Seddon (2002) have been described below.

Table 1: Framework of Benefits (adapted from Shang and Seddon, 2002)

Dimension	Subdimension
<b>Operational</b>	<ol style="list-style-type: none"> <li>1. Cost reduction</li> <li>2. Cycle time reduction</li> <li>3. Productivity improvement</li> <li>4. Quality improvement</li> <li>5. Customer services improvement</li> </ol>
<b>Managerial</b>	<ol style="list-style-type: none"> <li>1. Better resource management</li> <li>2. Improved decision making and planning</li> <li>3. Better performance control for improvement</li> </ol>
<b>Strategic</b>	<ol style="list-style-type: none"> <li>1. Support business growth</li> <li>2. Support business alliance</li> <li>3. Build business innovations</li> <li>4. Enabling e-commerce</li> <li>5. Build cost leadership</li> <li>6. Worldwide expansion</li> <li>7. Generate product differentiation (including customization)</li> <li>8. Build external linkages (customer and suppliers)</li> <li>9. Generating or sustaining competitiveness</li> </ol>
<b>IT Infrastructure</b>	<ol style="list-style-type: none"> <li>1. Build business flexibility for current and future changes</li> <li>2. IT cost reduction</li> <li>3. Increased IT infrastructure capability</li> </ol>
<b>Organizational</b>	<ol style="list-style-type: none"> <li>1. Support organizational changes</li> <li>2. Facilitate business learning</li> <li>3. Empowerment</li> <li>4. Better employee morale and satisfaction</li> <li>5. Build common visions</li> </ol>

	6. Change employee behavior
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**Operational benefits:** Since ES automate business processes and enable business process changes, one would expect ES to offer benefits in terms of (1) cost reduction, (2) cycle time reduction, (3) productivity improvement, (4) quality improvement, and (5) improved customer service.

**Managerial benefits:** ES with their centralized database and build-in data analysis capabilities could provide decision and planning benefits to management. From the table it is shown that informational benefits may help an organization (1) achieve better resource management, (2) improved decision making and planning, and (3) better performance control in different operating divisions of the organization.

**Strategic benefits:** ES with their large-scale business involvement and internal/external integration capabilities could assist in achieving the following strategic benefits: (1) business growth, (2) business alliances by efficiently and effectively consolidating newly acquired companies into standard business practice, (3) business innovations, (4) cost leadership by reaching businesses' economies of scale, (5) product differentiation, (6) external linkages with suppliers, distributors, and related business parties, (7) worldwide expansion, (8) E-business by attracting new or by getting closer to the customers through the web integration capability.

**IT infrastructural benefits:** ES system with their integrated and standard application architecture provide an infrastructure that supports (1) business flexibility for future changes, (2) reduced IT costs and marginal cost of business units' IT, and (3) increased capability for quick and economic implementation of new applications.

**Organizational benefits:** The integrated information processing capabilities of ES could affect the growth of the organizational capabilities by (1) supporting organization changes in structure and processes, (2) facilitating business learning and broadening employees' skills, (3) empowering workers, (4) building common visions in the organization, (5) changing employee behavior with shifting work focus and (6) increasing employees' morale and satisfaction.

The 16 benefits mentioned by Sammon and Lawlor (2004) are replacing existing systems, reduction of IS costs, Y2K, increasing system flexibility, single instance, real-time data availability, stronger system to cope with increasing business complexity, integration, increasing organizational flexibility, improving value chain, strategic capabilities, business process reengineering, meeting competitive goals, globalization, improving decision making and standardization/ common processes.

### 3.7 Factors influencing ES selection

In a study, Wei and Wang (2004) have given a comprehensive framework for selecting an ES system. The framework can be used for integrating the evaluation of objective professional data and subjective internal interview data for selecting a suitable ES project. They have mentioned 11 stages for selection process of ES system. In their framework, they have talked about establishing the attribute

hierarchy for selecting ES. According to Wei and Wang, the attributes can be classified into the following three categories:

1. **Project factors:** these attributes are involved in project management, such as total cost, implementation time, benefits and risk.
2. **Software system factors:** it involves strategic fitness, and function & technology factors of ES. Here the strategic fitness includes goal and vision-fit and meeting the local environmental requirements. The function & technology factors of ES include reliability, quality, user friendliness, expansion aspect, upgradation and functional fit.
3. **Vendor’s factors:** the main attributes that pertain to vendors are ability and reputation. The criteria for evaluating vendor’s ability are R&D technology, implementation & service ability, consulting service and training support. The vendor’s reputation means its good financial condition and good credential & reputation in the market.

Shanks, Parr, Hu, Corbitt, Thanasankit & Seddon, (2000) conducted a comprehensive survey of successful ES implementations, and they discovered that ES selection is based on the following factors in order of importance:

1. Business fit
2. Ease of implementation
3. Vendor’s service and support
4. Special industry or applications capabilities
5. Product affordability
6. Compatibility with existing systems

Based on extensive review of research literatures on information systems and the practitioners’ views on the ES project life cycle, Somers & Nelson (2004) have identified a number of critical successful factors. The study involves a survey of 116 organizations that have completed ES implementation experience. For this study they have used a six stages model of ES implementation consisting of initiation, adoption, adaptation, acceptance, routinization and infusion. The first 2 stages actually form the selection phase of ES system. In their study they have identified 22 factors in order of importance for initiation and adoption phases. (See Table 2, adapted from Somers & Nelson, 2004)

Table 2: Importance of players and activities in the selection process (adapted from Somers & Nelson, 2004)

Initiation	Adoption
Use of steering committee	Change management
Vendor support	Use of vendors tools

Careful selection of package	Top management support
Architecture choice	Vendor support
Use of vendors tools	Business process reengineering
Clear goals and objectives	Use of steering committee
Interdependent communication	Clear goals and objectives
User training on software	Project management
Change management	Interdepartmental cooperation
Project champion	Dedicated resources
Top management support	Data analysis and conversion
Business process reengineering	Project team competence
Partnership with vendor	Project champion
Project management	Use of consultants
Project team competence	User training on software
Minimal customization	Interdependent communication
Dedicated resources	Partnership with vendor
Interdepartmental cooperation	Education on new BPR
Use of consultants	Careful selection of package
Management of expectations	Management of expectations
Education on new BPR	Minimal customization
Data analysis and conversion	Architecture choice

In a study of enterprise system critical successful factors, Hedman (2003) has identified 95 factors on the basis of an extensive literature survey. But he synthesizes these factors into 28 factors and grouped them according to organizational, project and technical categories.

Table 3: organizational, project and technical factors (from Hedman, 2003)

<b>Organizational factors</b>
1. Business plan and vision including clear goal and objectives, definition of scope and overall planning and control
2. Top management support including commitment and leadership of management
3. Communication internally to inform people and manage expectations
4. Selection of system to ensure organizational fit
5. Training on software and new processes
6. Organizational and cultural changes including business process reengineering, cultural and structural change during the entire life cycle
7. Change management involving commitment to change, degree of process adaptation

8. User acceptance 9. Expect problems 10. Staff retention 11. Evaluation of performance changes and provide feedback
<b>Project factors</b>
12. ES strategy including clear implementation plan with goals 13. Project management must include empowered project manager and decision makers 14. Project team competence involving a balanced team with hybrid competence based on the best and most dedicated people 15. Minimum BPR and customization 16. Cross functional steering, and interdepartmental cooperation 17. Champion 18. Managing consultants 19. Vendor relationship and consultants from one firm 20. Project plans with the deliverable data 21. User involvement 22. Cross functional implementation 23. Rapid implementation 24. Smaller scope
<b>Technical factors</b>
25. Vanilla ERP and fit between ES and organization 26. Appropriate business and IT legacy systems with correct data and the right architectural choice 27. Software configuration and system integration with completed testing 28. Project methodology and vendor tools

### **3.8 Observations and synthesis of influencing factors**

As the selection of ES involves huge investment and time for the client company, so obviously the question comes: what sorts of benefits can business achieve from using ES? To answer this question, Shang and Seddon (2003) have presented framework of business benefits the organizations may be able to achieve from their use of Enterprise Systems. So the expected benefits for using ES would certainly influence the selection process of ES and these benefits should be considered as influencing factors in the selection of ES. From the analysis of the influencing factors mentioned previously in different authors' studies, we can make a number of observations. Several of the factors refer to the same aspect but using different terms, and general term can be used to accommodate some specific terms. For instance, Managing consultants (Hedman, 2003) and use of consultants (Somers & Nelson, 2004) carry the same meaning. Change management (Somers & Nelson, 2004) is a broad term and it can include organizational and cultural changes, commitment to change and user acceptance (Hedman, 2003). So it is possible to synthesize the different

influencing factors. More over, the factors can be categorized in five categories: the business benefits factors, project factors, organizational factors, system or technical factors and vendor's factors by synthesizing the criteria used by Hedman (2003), Wei & Wang (2004) and Shang & Seddon (2003). We can also observe that some factors have strong dominants and direct relationship in the selection of ES. Moreover, the IT infrastructural benefits mentioned by Shang & Seddon (2003) can be restated by other similar factors which have been mentioned in other studies. By considering these observations, we are proposing the following synthesized integrative framework of factors influencing the selection process of ES.

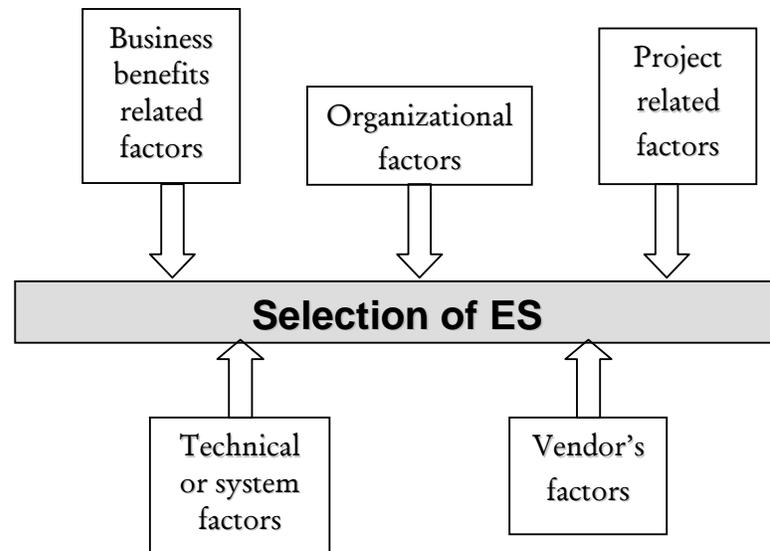


Figure 7: Integrated theoretical framework of influencing factors

#### 1. Business benefits related factors:

The following factors in this category have been adopted and synthesized from the framework of business benefits of using ES perceived by business managers. The framework has been developed by Shang and Seddon (2003) and described in earlier section (See Chapter 3.6).

- **Operational benefit:** ES is expected to offer different operational benefits for adopting organization by automating business processes and enabling business process changes.
- **Managerial benefit:** ES can provide informational benefits to management for making better decision, planning and control with its centralized database and build-in data analysis capability.
- **Strategic benefit:** Organization can achieve different types of strategic benefits by using ES as this system has the capability of internal/external integration and large-scale business involvement.
- **Organizational benefit:** The integrated information processing capabilities of ES can affect the growth of organizational capabilities by empowering workers, changing employee behavior, building common vision etc.

## 2. Organizational factors:

- **Top management support:** Top management support is needed throughout the ES life cycle. The ES project must receive approval from top management and align with strategic business goals (Bingi et al., 1999). On successful ES projects, management establishes a steering committee and one or more project teams. Top management delineates the functions of both steering committee and the project team(s), and establishes regular reporting mechanisms (Parr, et al., 1999). Top management needs to publicly and explicitly identify the project as a top priority. Top management must be committed with its own involvement and willingness to allocate valuable resources to the selection and implementation efforts (Holland, Light & Gibson, 1999). They ensure smooth change management and system rollout (Bingi et al., 1999). Top management needs to constantly monitoring the progress of the project and providing direction to the implementation team (Al-Mashari, et al., 2003).
- **BPR (Business Process Reengineering):** An issue with packaged software is the potential for incompatibility with the organization's needs and business processes. It is suggested that improvements in organizational performance requires the restructuring of organizational business processes to fit the embedded business model of the software (Somers & Nelson, 2004). Many businesses have used adoption of new software as a chance to change their basic business processes, reengineering their organizations to match the "best practice" processes in the ES software (O'Leary, 2000). BPR is achieved through an exhaustive analysis of current business processes to identify the potential chances of reengineering, rather than designing an application system that makes only the best of bad processes (Scheer and Habermann, 2000).
- **Change management:** ES systems introduce large-scale change that can cause resistance, confusion, redundancies, and errors if not managed effectively. Many ES implementations fail to achieve expected benefits possibly because companies underestimate the efforts involved in change management (Somers & Nelson, 2004). Implementation of ES requires a massive change in an organization's structure and affects the way people use to do work and interact (Al-Mashari, et al., 2003). Clearly ES implementations may trigger profound changes in corporate culture. If people are not properly prepared for the imminent changes, then denial, resistance, and chaos will be predictable consequences of the changes created by the implementation (Umble, et al., 2003).
- **Business plan and vision:** ES systems are essentially considered as process oriented IT tools for improving business performance. One of the most fundamental elements in business improvement is having a clearly defined business plan and vision and the formulation of right policies / strategies that can serve as a blueprint for any organizational success (Mitchell and

Zmud, 1995). The vision and plan can serve as ‘the precursor’ for putting in place enabling IT strategy, based on mapping and determining the key requirements (Al-Mashari et al., 2001). Alignment of IT strategy with the organization’s business strategy is considered a fundamental principle that has been advocated for over a decade (Rockart, Earl & Ross, 1996). In ES selection and implementation the principle of IT and business strategic alignment applies. If an organization strives to install a system without establishing a clear vision and understanding of the business propositions, the integration efforts can quickly turn into a disaster, no matter how competent is the software package selected (Davenport, 1998). So the company usually considers the ability of ES system’s strategy to meet the business strategy and goals during the selection (Wei & Wang, 2004).

### 3. Project related factors:

- **Steering committee:** The steering committee generally consists of senior management from different cooperate functions, senior project management representatives and ES end users. It represents an effective means of ensuring appropriate involvement and making ES succeed. The committee is usually involved in system selection, monitoring during implementation, and management of outside consultants (Somers & Nelson, 2004).
- **Project team competence & Project champion:** The ES project team competence is important throughout the ES life cycle. The team should be a balance team with hybrid competence based on the best and most dedicated people (Hedman, 2003). The team should have a mix of consultants and internal staff so that the internal staff can develop the necessary technical skill for design and implementation. Both business and technical knowledge are essential for the success of ES. Team members need to be assigned full-time to the implementation (Nah, Lau & Kuang, 2001). The success of technological innovations has often been linked to the project champion who performs the critical functions of transformational leadership, facilitation, marketing the project to the users and accepting the technology (Somers and Nelson, 2004).
- **Rapid implementation and smaller scope:** An ES can be implemented quickly or slowly, depending on how ambitious the company’s goals are, how pressing any deadlines are, and how well implementation proceeds. A fast implementation might take as few as six months; a slow one can take up to five years or more (Davenport, 2000b). ES project with smaller scope in terms of geographical or business unit phasing is likely to be more successful (Parr, Shanks, and Darke, 1999). In the geographical phasing the assumption is that not all geographical locations within a company need to have their ES implemented at the same time (Davenport, 2000b). Some business units are central or isolated than others and it may be useful to begin an implementation in a business unit that is relatively small or non-core to the main business (Davenport, 2000b).

- **User training and education:** The role of training and education on software and new business processes is critical for successful ES selection and implementation (Somers & Nelson, 2004). A particular challenge in ES implementation is to select an appropriate plan for end user training and education (Al-Mashari, Al-Mudimigh, & Zairi, 2003). The full benefits of ES cannot be realized until end users are using the new system properly (Umble, Haft & Umble, 2003). It is however important to stress that the main goal of ES training should be the effective understanding of the various business processes behind the ES applications. ES training should address all aspects of the system, be continuous and based on knowledge transfer principles wherever consultants are involved (Al-Mashari, et al., 2003). Executives often underestimate the level of education and training necessary to implement an ES system as well as the associated costs. Top management must be fully committed to spend adequate money on education and training and incorporate it as part of the ES budget (Umble, et al., 2003).
- **Minimum customization of software:** Organization should be willing to change the business to fit the software with minimum customization. Software should not be modified as far as possible because customization in terms of changing software code is usually involves longer implementation time, high IS cost, the inability to benefit from vendors software maintenance and upgrades (Somers & Nelson, 2004; Nah, Lau & Kuang, 2001).
- **Cross functional implementation:** Since ES systems are modular, organizations can choose to implement different modules that meet their needs (O’Leary, 2000). Some business processes are more important than others to the success of the business. One ES implementation strategy is to implement modules for core processes first and ancillary ones later. However it doesn’t normally make much sense to implement some core modules and not others, since a primary reason to employ an ES in the first place is to achieve integration across business processes and functions (Davenport, 2000b).
- **Use of independent consulting firm:** Organization frequently use outside consultants for selection, installation, and customization of their software availing themselves of the consultants’ experience, comprehensive knowledge of certain modules, and experience with the software application (Somers & Nelson, 2004).
- **Cost of the project:** Despite significant benefits that ES systems can provide, they are very expensive even under ideal circumstances. The cost of an ES software itself can range from hundreds of thousands of dollars to several million dollars. This cost can further be escalated when considering hiring consultants to help in the selection, configuration, and implementation of the system. Other cost may include the human resources needed to work full-time on the implementation project. Additionally an organization may need to install new hardware to run the ES software, and a new database to

store the ES data. Furthermore integrating the ES system with other types of applications is usually a necessity. It's also important that end user training and change management costs be considered in the equation (Al-Mashari, et al., 2003).

#### 4. Technical or system factors:

- **Architecture choice:** Architecture choice and planning deserve thorough consideration during the selection phase. Key architecture considerations and choice revolve around additional software, such as data warehouses (Somers & Nelson, 2004). Current ES solutions are based on a three-tier client-server architecture. ES is also typically 'open' regarding the possible software and hardware platforms (Klaus et al., 2000).
- **Software configuration and system integration & interaction:** Although ES is a standard set of applications, individual company can tailor their ESs to their particular business environment through configuration. Configuration refers to the adaptation of the system to organizational requirements. A configuration table enables a company to tailor the functionality of the system to the way it chooses to do business. It also involves setting parameters in a separate parameter file. It brings flexibility and customers don't have to rewrite software (Davenport, 2000b). The rich configuration potential of ES software derives from the range of preconfigured alternatives and the number of alternative processes and transaction (Klaus et al., 2000). The application modules of ES are integrated across the functions supported and the data involved (Klaus et al., 2000). Maintaining the integration mix requires an excessive and ongoing expenditure of resources (Bingi et al., 1999). Although ES systems are designed to function independently of other systems, now they are required to be linked to or integrated with a range of other systems within or outside the organization. Making ES compatible or interactive with other systems increases the complexity and resulting risk, in some cases, leading to disastrous consequences (O'Leary, 2000).
- **Data analysis and conversion:** A fundamental requirement for the effectiveness of ES system is the availability and timeliness of accurate data. Data-related challenges include finding the proper data to load into the system and converting disparate data structures into a single, consistent format before system use. As the system is operational, feedback from system users is needed when corrupt system data are detected (Somers & Nelson, 2004).
- **Special industry or applications capabilities:** ESs are generic systems in the sense that most organizations can implement and use them. However, different business and industries do not have the same requirements for information processing and functional support. In order to match different industry requirements, most ES vendors have developed industry solutions. Each solution is adapted to the unique requirements of an industry.

Furthermore, ES vendors provide solutions for small and mid-sized firms (Hedman, 2003).

- **Quality of system:** According to American Society for Quality (2004), quality is the ability of a product and service to satisfy stated or implied needs. For this study, the quality of ES system has been dealt in terms of the reliability, upgradeability, expandability, and user-friendliness of the system. There are at least two issues that relate to upgradeability - how often new versions become available, and how easy it is to upgrade to new versions (O'Leary, 2000). Over time, ES systems have been expanded in a number of directions. The expansion can be done by adding new features, functions, new modules, or by extension in supply chain (O'Leary, 2000). Firms always prefer easier-to-use systems and ES vendors are increasingly trying to increase their systems' 'user-friendliness' by providing good user interface (O'Leary, 2000).

#### 5. Vendor's factors:

- **Vendor support and service:** Vendor support and service in the form of consulting service, training support, vendor's tools for rapid implementation, support for upgrades and maintenance, emergency maintenance are always considered important with ES software (Somers & Nelson, 2004; Wei & Wang, 2004; Shanks et al., 2000). The vendor tools include business process modeling tools; templates for industry-specific business practice, and bundling of server hardware with ES software (Somers & Nelson, 2004).
- **Vendor-customer relationship:** Vendor-customer partnerships are important to successful ES project. The relationship between the software buyer and vendor should be strategic in nature with the ES provider enhancing an organization's competitiveness and efficiency (Somers & Nelson, 2004).
- **Vendor's capability:** The vendor's capability in R&D technology, and to support the system implementation and maintenance is usually considered in the selection of ES software vendor (Wei & Wang, 2004). More specifically, the capability of the vendor in improving its system is considered (Davenport, 2000b).
- **Vendor's reputation:** The vendor's reputation means its good financial condition, and credential and reputation in the market (Wei & Wang, 2004).

## **4 Empirical findings**

*The presentation and analysis of data collected during the case study, have been described in this chapter. This chapter has three parts. In the first two parts, the clients and vendors views on influencing factors have been presented respectively. The information on client and vendor companies investigated in this study has been also included in these two parts respectively. In the third part, the analysis of two perspectives has been described on the basis of integrated framework synthesized by the researcher.*

### **4.1 Client's view on influencing factors**

#### **4.1.1 Case sample description**

The four client companies that participated in the study are the followings:

##### **1. Hettich Skandinaviska AB**

Hettich Skandinaviska is the subsidiary of a German company Hettich. It is located in Jonkoping city. The company is the supplier of furniture fittings. They sell the product produced by the mother company in Nordic counties. The company is using "Jeebes" ES solution since 1997. The vendor of this solution is Jeebes located in Stockholm. The company is using purchasing, accounting, selling, and CRM modules. The name of the respondent is Ulf Svensson, managing director of the company. He was directly involved in the selection of ES solution. The company used a committee comprising of IT manager, managing director, sales manager and accounting manager for the selection of the solution.

##### **2. NEFAB AB**

NEFAB AB is a multinational company which delivers complete packaging solutions to international industrial groups, primarily within the telecom and automotive industries. NEFAB companies are located in Europe, North and South America and Asia. Invoiced sales in 2004 amounted to slightly above SEK 1.3 billion. The company is manufacturing and selling the packaging solutions. It's headquarter is in Jonkoping city. The name of the respondent is Robert Knudsen, IT manager of the company. The company is using ES solution named 'Movex' from the international ES vendor 'Intentia'. They are using most modules of 'Movex' ES solution in manufacturing and service category. The 'Movex' has been used since 1996. They have formed a steering committee consisting of the IT manager and managers from different functional departments for the selection of ES solution.

##### **3. X company**

This company is producing paper and located in Jonkoping. The respondent is the IT coordinator of the company. He has been working for 6 years in this company.

The company is using the ES solution called 'Movex', from the vendor 'Intentia'. They are using all the modules of 'Movex' which are specially made for paper and pulp industry. The system has been used since 1999.

##### **4. Stora Enso Packaging**

Stora Enso Packaging is a subsidiary of the Stora Enso Group. It is producing and selling corrugated packages and boxes. The company is using ES solution called 'CPMS' from the German vendor 'WITRON'. They are using all the modules of the solution since 2002 and the modules include sales, manufacturing, logistics and transportation applications. The respondent is Tommy Ljungdahl, IT manager of the company. He has been working for ten years and was involved in the selection of ES solution. The company used a committee called 'small project team' for selection and implementation of the ES solution. The committee was composed of IT manager, financial manager and the owner of each business process like sales, manufacturing and logistics etc.

#### **4.1.2 Influencing factors on ES selection**

##### **1. Business benefits related factors:**

**Operational benefits:** In all of the cases operational business benefits has influence the selection process. According to Knudson, they have looked for getting increased efficiency in the operational activities (personal communication, 19<sup>th</sup> May, 2005). Reducing cost of doing work and increasing the productivity of the employees have been mentioned by all respondents to be reasons for this influence. Moreover, providing better and flexible customer services (considered by Hettich) and cycle time reduction in operational activities (considered by X company and Stora) were the other reasons. Hettich claims that the company is not getting cost reduction benefit after implementation of ES solution (Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005). But Stora is getting all the operational benefits from the solution (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

**Managerial benefits:** This influencing factor was present in all the client company cases. To get improved decision making and improvement in performance control at different departments like manufacturing and finance had been the reasons for this influence in all cases. As Svensson (personal communication, 18<sup>th</sup> May, 2005) states, 'I'm getting every necessary information like order incoming, invoice, sales information from the ES solution and I do not need to contact with IT manager to get this kind of information as I had to contact before the implementation of ES. Also this kind of information is helping me to control the performance in financial and manufacturing department'. In the context of decentralized organization like NEFAB, better decision making have been highly considered by the subsidiary of the company. Stora experiences that it is not getting the improved decision making benefit as expected (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

**Strategic benefits:** External linkages with customers and suppliers, facilitating e-commerce were the main drivers to get strategic benefits for all the cases. The case companies thought that this would bring business growth and economies of scale. Also the subsidiary company like Hettich emphasized on the linkages with mother company.

**Organizational benefits:** This factor was mentioned by three companies (Hettich, NEFAB and Stora) focusing on common vision and employee morale and satisfaction. Ulf Svensson states: 'Hettich employees feel empowered and satisfied as they are getting the required information from the system and are very happy by

using the system. They can communicate with each other very easily by this system and it facilitates to create common vision in the organizationa culture' (personal communication, 18<sup>th</sup> May, 2005). Tommy Ljungdahl states: 'The system provides the users better tools for doing things and the result is that employees are getting better morale and satisfaction' (personal communication, 26<sup>th</sup> May, 2005).

## 2. Organizational factors:

**Top management support:** Top management support was crucial for the selection of ES solution in all the cases. According to Svensson, without the support from the Board of Directors, the ES project can not be initiated. And the top management supported the selection of the system as they were informed about the problems with the old system in the company (Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005). The respondent of X company states that the ES system project had got all kinds of supports from the top management but benefits of the system had to be shown to top management for getting money (personal communication, 13<sup>th</sup> May, 2005). Top management support is necessary in giving guidance and resources during ES project life cycle and also for bringing changes in the organization i.e. change management (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

**BPR:** All the companies gave strong emphasis on the BPR to get a very good fit between the business process and ES solution. In the case companies, BPR took place to a different extent. Hettich made very small changes in the business process and got a very good fit between the business process and the software (Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005). The other three companies had to make a lot of changes. Stora made new routines in the process and adopted best practices from the business model of the ES software (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). The X company has implemented 'best practice' processes from the software and they had to change the business processes (personal communication, 13<sup>th</sup> May, 2005).

**Change management:** Among the case companies, change management has been considered by two companies (Stora and NEFAB) and considered very little by Hettich. According to Tommy, Stora had a plan to handle the changes. They made workshop for user to show the software and discussed with them about the changes in the business processes. It helped them to get user acceptance easily (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). NEFAB believes that employees always resist the new system but eventually the company has to manage this kind of resistance and the company managed it (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). On the contrary, X company believes that the employees would certainly welcome the system (personal communication, 13<sup>th</sup> May, 2005). Regarding Hettich, there was no resistance in accepting the system from the users. Their attitudes were very positive for the system because they needed a new system as they had problems with old systems (Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005).

**Business plan and vision:** Stora, NEFAB and X company have considered the business plan and vision in the selection of ES. According to Tommy, "there was a strategic direction for software in the company's business plan. The plan was

committed to use standard package of software, not to build in-house software and also to use the software on the basis of industrial suitability. That is why we are using ES solution from the vendor". (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). X company had a clear business plan and vision to get the integration and the streamlining of all the business processes (personal communication, 13<sup>th</sup> May, 2005). NEFAB had IT strategy under business plan but Hettich has no IT strategy (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005 and Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005).

### 3. Project related factors:

**Steering committee:** For the three case companies (Hettich, Stora and NEFAB), the steering committee was the final decision maker in the ES selection. In Stora the committee evaluated all the necessary information and they had quite good knowledge and experience in the selection of ES system (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). NEFAB's steering committee carried out the evaluation of the system by the end user (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). Respondent of X company also mentioned about the importance of user involvement in the selection process and it was ensured by the presence of user representatives in the committee (personal communication, 13<sup>th</sup> May, 2005).

**Project team competence & Project champion:** The respondents from Stora, NEFAB and X company mentioned that these factors have influenced the selection of ES but Hettich thinks that they had no influence. For NEFAB the external consultant was the project champion and the project team was consisted of the representatives from parent company, vendor and subsidiaries. In the team, mostly the business expertise existed rather than the system expertise (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). According to Tommy, company's project team competence ensured the business as well as system expertise. They had very broad knowledge and they were committed to select the right ES (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

**Rapid implementation and smaller scope:** Out of four case companies, three (Hettich, NEFAB and Stora) have considered these factors. In Hettich the system took 3 months for the implementation (Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005). Out of 35 subsidiary companies, NEFAB implemented the system in one company at a time. Depending on the success of this implementation, they copied the system in another subsidiary company. Generally the implementation has taken 6 months to one year (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). In regarding smaller scope, Stora had gone for pilot implementation, i.e. they implemented the ES system in one factory at the beginning. Depending on success, they went for implementation in other factories just like the 'rolling out' the system in other factories. In first case, the implementation took one year (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). X company believes that rapid implementation and small scope were not matters for the company because they needed the system anyway. The implementation took 3 years for this company (personal communication, 13<sup>th</sup> May, 2005).

**User training and education:** All the case companies have considered this factor as very important. For Hettich and Stora, this has been included in the whole package of the system provided by the vendor. In Stora, the vendor trained and educated key persons of different processes about the software and new business process. These persons trained and educated other users (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). However NEFAB thought that it involved a lot of cost (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005).

**Minimum customization of software:** Minimum customization has had a lot of influence for the all case companies. Hettich has not changed the software. NEFAB made five percents customization in the transport module. X company believed that the customization of software would cause a lot of problems. Stora has made few changes in their solution. They tried to implement standard software for easy upgradation. Due to some changes in the solution, they have faced problems in software and it took more time for implementation. Anyhow the system is now working well (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). Tommy emphasized the use of standard software without customization. “Our strategy is to convince our vendor to implement our specific requests/requirements as standard into the ES software. This means that we don’t have to put in a lot of extra resources every time when we upgrade, in order to take care of our unique functionality” (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

**Cross functional implementation:** All the four cases revealed the influence of this factor in the selection process. Hettich has gone for cross-functional implementation with purchasing, accounting and selling modules. NEFAB has gone for the implementation of the full ES system suite from production to transport modules because of the demand of their nature of business (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). X company implemented all modules of Movex system because the company needed the necessary integration of all the business processes. In the pilot study, Stora has not considered the cross functional implementation. They have gone for one by one module: at first sales, then manufacturing and then logistics. After the successful pilot study, they have gone for cross functional implementation in other factories (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

**Use of independent consulting firm:** NEFAB, Stora and Hettich have used independent consulting firms during the selection process. It is observed that the consultants have played a vital role in the selection process. According to Svensson, they have taken a lot of help from the external consultant company during the selection process as they have more experience and knowledge in the system (Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005). Consulting firm has influenced the selection process of NEFAB as they have more experience and knowledge with the ES system than the company’s (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). From time to time, Stora has used independent consulting firm in selection and implementation. The top management was also assisted by consulting firm (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). X company has not used the external consulting firm in their selection but they have used supplier’s

consultancy in the implementation. They considered the consultancy as a part of vendor (personal communication, 13<sup>th</sup> May, 2005).

**Cost of the project:** Three case companies (NEFAB, Stora and Hettich) have considered the cost of the project during the selection. Hettich spent about half a million SEK on ES. Svensson has mentioned “always extra cost to be considered” although they had a budget for the project (Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005). NEFAB thinks that cost is a big matter in the selection as it is a long term investment (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). Tommy states “Of course it has to be considered” and Stora had a budget for this project. Actually the project was a part of large IT project. They faced a small overrun in the budget during the implementation. The cost of the project is always a little higher than budget (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). X company thinks that being a large company, the cost of the project is not important in the selection for it. Because it wanted the ES system and they have easily afforded the product (personal communication, 13<sup>th</sup> May, 2005).

#### **4. Technical or system factors:**

**Architecture choice:** All the case companies have considered this factor. X company has considered three-tier client server architecture for the system (personal communication, 13<sup>th</sup> May, 2005). Stora has ensured the right architecture of solution so that it could be suitable for up to date technical platform. They have avoided the use of older technical platform for the system (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). NEFAB has given emphasis on multi-company solutions architecture but centralized hosting (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005).

**Software configuration and system integration & interaction:** Software configuration and system integration are very much considered by all companies. System interaction with other existing systems has been identified as influencing factors by three companies (Hettich, NEFAB and Stora). The system in Hettich is very flexible and highly configurable and the company has been successful to configure the templates according to their business needs (Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005). NEFAB has considered the flexibility of software configuration. The software used by Stora is highly configurable. They believe that the software would grow and follow with the business change. The system integration is also good and they are using the system from the same vendor for integration (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). According to Svensson, for his company, the compatibility with existing systems means the new system must be compatible with SAP system of their mother company. And the ‘Jeebes’ system is very successfully in interfacing with SAP (personal communication, 18<sup>th</sup> May, 2005). NEFAB experience is that the system is not very much compatible with the existing system. It’s a big problem for the company and they want to change it but this is more expensive (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). X company did not considered the system interaction because they didn’t have any legacy system (personal communication, 13<sup>th</sup> May, 2005). The system of Stora is standard one and compatible with existing

system. The expense of making compatibility is not much (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

**Data analysis and conversion:** This factor has been considered by only two companies (X company and Stora). X company put all the old data into the system manually. Stora has made data conversion and analysis (verify and correction) more or less manually.

**Special industry or applications capabilities:** All the four case companies considered it most important factor. 'Jeebes' system used by Hettich is suitable for the industry where it is doing business. NEFAB finds that the system is suitable for its industry. The system of X company is specially made for paper industry in which it works. Stora believes that its vendor is best in developing the software for its industry and for this reason the company is not using ES from the SAP company (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

**Quality of system:** Quality in terms of reliability, expansion, upgradation and user friendliness has been always considered. Quality of the ES system in Hettich is very good and the company has already made two upgradations of the system. And in 2001, CRM has been successfully included in the system (Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005). NEFAB experiences that the system is very reliable but the upgradation with maintaining the compatibility with existing system is very expensive (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). X company has considered the reliability of the system and their system is very reliable. But upgradation and expansion were not considered (personal communication, 13<sup>th</sup> May, 2005). The system is very reliable and expandable for Stora. In every second year, the system has been upgraded successfully in larger scope although smaller upgradation has taken place frequently (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005). According to Svensson, the system used in his company is very user friendly and easy to handle and use for the employees. He also mentioned that the ES system from SAP, which is installed in the mother company, is not very user friendly. So they considered this factor in the selection process (personal communication, 18<sup>th</sup> May, 2005). NEFAB has considered the user friendliness because the old system was not user friendly (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). X company considered the user friendliness of the system but ultimately they find that the system is semi user friendly (personal communication, 13<sup>th</sup> May, 2005). The ES system in Stora is very user friendly. It is easy to use and makes the user happier and more efficient. For giving emphasis on it, user involvement was used in the evaluation of the system (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

## 5. Vendor's factors:

**Vendor support and service:** Vendor support and service are crucial for the client company as claimed by the respondents. Svensson states that to get vendor's support in terms of consultancy, training, and vendor's tools is very important for the whole life cycle of ES system and Hettich has got this kind of support from the vendor (Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005). NEFAB realizes that consulting service from the vendor or its agent is not good enough (Robert Knudson, personal

communication, 19<sup>th</sup> May, 2005). X company had taken and are still taking the consultancy and training service from the vendor and they have used some vendor's tools for the implementation (personal communication, 13<sup>th</sup> May, 2005). Stora has used the consulting and training support from vendor during implementation but no vendor tools (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

**Vendor-customer relationship:** Three companies (X company, NEFAB and Stora) considered this factor during selection. NEFAB has a strategic partnership with its vendor Intenia and it has increased deeper cooperation between client and vendor. It also influenced the selection of ES (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). X company claims that there should be good relationship with the vendor but they didn't mention about the strategic partnership with the vendor. Stora has very close relationship with vendor. They can discuss the problem with vendor very frequently and easily. They always share knowledge with vendor about the business process and the upgradation of the system (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

**Vendor's capability:** It has been considered by the all companies. Hettich thinks that its vendor is very capable in R&D technology as they have made successfully two upgradations of the system and are also waiting for the third one in a very short time (Ulf Svensson, personal communication, 18<sup>th</sup> May, 2005). The vendor of X company has good research and development capability and also good at implementation and service ability (personal communication, 13<sup>th</sup> May, 2005). The vendor of Stora is very capable in implementation and service ability and it is also good at upgradation (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

**Vendor's reputation:** All companies have emphasized on this factor very much. According to Svensson, the vendor of Hettich has very good reputation in the market. The value of the vendor's stocks is increasing which presents a good financial condition. Hettich got good reference of its system from other client companies through informal sources when they were collecting information of the system for the selection purpose (personal communication, 18<sup>th</sup> May, 2005). Good reference from other ES clients has been used by NEFAB to judge the vendor's reputation and the company also considered the stability of the vendor (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005). According to X company, its vendor is a stable company in the market (personal communication, 13<sup>th</sup> May, 2005). Tommy states that the vendor of Stora is one of the best vendors in the world for the company's industry. The vendor has good reputation and long term commitment to the clients. Stora also got good reference from other customer about this vendor (Tommy Ljungdahl, personal communication, 26<sup>th</sup> May, 2005).

## 6. New factors identified by the client companies:

**Geographical proximity** between vendor and client has been identified by X company and the company bought the system from the Stockholm Office of Intenia for this reason (personal communication, 13<sup>th</sup> May, 2005).

**Requirement specification** for system has been identified by NEFAB. Knudson states that the requirement or demand specification was based on process mapping of business processes (Robert Knudson, personal communication, 19<sup>th</sup> May, 2005).

## 4.2 Vendor's view on influencing factors

### 4.2.1 Case sample description

The two vendor companies that participated in the study are the followings:

#### 1. Oracle

Oracle is one of the major players in the ES market all over the world. It is the world's second largest software vendor for information management. The company is based on California, USA and is now working in over hundred countries including Sweden. The interviewee is Joakim Driving, business development manager in the sales department of Oracle, based in Goteborg, Sweden. The person has been working for 6 years in the company and responsible for Swedish market. The former ERP vendors PeopleSoft and J.D Edwards have been merged with Oracle. Oracle offers many ES solutions in almost every industry like manufacturing, service etc.

#### 2. IFS AB

IFS is a Swedish ES vendor based in Linkoping. It is a leading global business applications' vendor with sales in 45 countries. The name of the ES software is 'IFS Applications'. It has many different kinds of modules like human resource, financial, distribution etc. IFS usually develops software for manufacturing and service industries. The interviewee is Per Karnhall, manager in representative office of IFS located in Jonkoping. He has been working for the company since 1998.

### 4.2.2 Influencing factors on ES selection

#### 1. Business benefits related factors:

**Operational:** Both the case companies think that getting efficiency of operational activities like cost reduction is the prime consideration by client company in the selection of ES system. According to Driving, Oracle products are giving such kind of efficiency (personal communication, 19<sup>th</sup> May, 2005). Karnhall states that through workshop and discussion meeting arranged for clients, they show and focus on cost reduction benefits of their systems (personal communication, 23<sup>rd</sup> May, 2005).

**Managerial:** Both respondents agree that improved decision making and planning and performance control criteria are used by the client in the selection of ES. Driving claims that Oracle has special application like business intelligence software which makes customized reports and in turn it facilitates better decision making and control in financial performance. Also the human resource module is used for better managing the human resource (personal communication, 19<sup>th</sup> May, 2005). According to IFS, their products are well developed for improved decision making and manufacturing planning (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**Strategic:** Oracle believes that the strategic benefits like making external linkages and developing new market are considered by the client company but IFS doesn't think so. Oracle products like e-business suite, supplier's portal, CRM solutions facilitate e-business and close relationship with supplier and customer (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). IFS claims that its products are well

suitable for the external linkages with customers and suppliers and e-commerce (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**Organizational:** Only IFS mentions that the client company often discusses about the organizational benefits like employee satisfaction and common vision with the vendor in the ES selection process. IFS believes that its modules facilitate these things (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

## 2. Organizational factors:

**Top management support:** Both the case companies recognized that top management support is essential for selection of ES software. Driving states that as a vendor Oracle doesn't have influence on this factor (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). IFS finds that the top management lacks in experience and fails to recognize the importance of ES system. This leads to the inadequate support from the top management (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**BPR:** Both vendors agree with the influence of BPR factor in the selection process of ES in client company. According to Kanhall, the client company does a lot of business process reengineering to implement the 'best practices' business processes from the software. IFS has a special tool called 'business modelling' to help client in BPR (personal communication, 23<sup>rd</sup> May, 2005). According to Driving, they generally employ external consultant like Cape Gemani to provide help customer for implementing BPR (personal communication, 19<sup>th</sup> May, 2005).

**Change management:** IFS and Oracle perceive that change management is considered by the client company. According to Karnhall, this issue is handled by the client company and the company doesn't really mention about the change management during the discussion with the vendor (personal communication, 23<sup>rd</sup> May, 2005). Oracle helps its client company for managing changes through providing external consultant to customer (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005).

**Business plan and vision:** Only Oracle recognizes this factor but as a vendor it has nothing to do with business plan and vision (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). Regarding IFS it is mentioned that this factor is not communicated with the vendor by client company (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

## 3. Project related factors:

**Steering committee:** From the responses of vendors, it is obvious that steering committee is the final decision maker of choosing ES. According to Driving the steering committee collects and evaluates the information from different sources for the selection of ES. The influence on this committee by vendor depends on the degree of its previous competence, knowledge and experience with the system. The vendor can't influence the selection process if the committee has good experience and knowledge with the system. But the vendor can build good understanding and relationship with the steering committee by providing necessary information. To this effort, the success case of ES implementation is generally referred by the vendor (personal communication, 19<sup>th</sup> May, 2005). IFS tries to influence the committee

through seminar, meeting in the business negotiation process. The company believes that most of the steering committees are not so experience to make ES selection decision. Sometimes they found very good experience and knowledge in some steering committees. They also believe that the influence on steering committee by vendor depends on the committee's experience (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**Project team competence & Project champion:** In the selection process client company always considers and gives high priority on these factors - project leader and team competence for ES implementation (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**Rapid implementation and smaller scope:** The experience of two vendors is that client company always seek for rapid implementation of the system in smaller scope. According to Driving client company wants rapid implementation with minimizing risk. Generally the implementation takes between 2 to 24 months for Oracle applications but it depends on the customer's requirements. The implementation can be done in 1 month for start up company depending on requirements. On the other hand, for the big company like Telia, the implementation has taken 2 years (personal communication, 19<sup>th</sup> May, 2005). IFS believes that the rapid implementation depends on the size of business and scope of the system. Generally the implementation time of three modules (finance, distribution and manufacturing) in a small company with smaller scope is 3 months (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**User training and education:** The client company always considers user training and education for the ES project (IFS and Oracle). Oracle believes that the user training and education should be considered very important in the selection but the reality is that the client company always tries to cut cost of the project by reducing the scale of training and education. Oracle also finds that the customer unsatisfaction is mainly due to the lack of user training and education (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). The IFS company provides training and education for the client company and for this purpose, it is also using E-learning method. The cost of training and education is a big part of ES project (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**Minimum customization of software:** Both the vendors recognize the influence of minimum customization of software. According to Driving, minimum customization varies from company to company but is it is generally preferred by clients. They have a client (a large construction firm) which has gone for more customization of software and ultimately the software didn't work due to this (personal communication, 19<sup>th</sup> May, 2005). Oracle recommends clients to use the standard software if they look for standardization of business processes according to industry needs. In other cases if the company is looking for competitive advantage, they can make customization of software. In reality the client has to make a balance between customization and BPR for the ES implementation (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). According to Karnhall, though client looks for minimum customization, yet the client always tries to make customization during the implementation. IFS recommends minimum customization because it

helps IFS in providing easy upgradation and customer support (personal communication, 23<sup>rd</sup> May, 2005).

**Cross functional implementation:** Both the case companies argue that cross functional implementation is not considered very much by client. The Oracle experiences that company generally looks for one or two modules for implementation at a time. They don't want to implement full software suite (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). According to Karnhall, the client company doesn't consider very much cross-functional implementation of full suite with all available modules. Instead generally they consider two modules for implementation at one time from IFS. They normally buy the finance and manufacturing modules (personal communication, 23<sup>rd</sup> May, 2005).

**Use of independent consulting firm:** Use of independent consulting firm is always considered by the client company in the selection process for getting experience and knowledge from them (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005). But the influence of the consulting firm in the selection process depends on the client's experience and knowledge (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). According to Karnhall, the vendor company can influence these consulting firms as they are well known to each other. Vendors have some relationship with such consulting firms which are few in number in the market (personal communication, 23<sup>rd</sup> May, 2005).

**Cost of the project:** According to both respondents cost of the project is an important factor considered by client in the selection process. But, according to Oracle, cost of the project is becoming less important in the later stages of the ES project (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). According to Karnhall, every client company has always a budget for the project whether the company is big or small. But IFS can negotiate with the client company about the cost of the project (personal communication, 23<sup>rd</sup> May, 2005).

#### **4. Technical or system factors:**

**Architecture choice:** According to Driving in some cases, the client company considers the architecture choice and in other cases it doesn't matter which architecture they are going to use (personal communication, 19<sup>th</sup> May, 2005). But according to Karnhall client company looks for open architecture choice so that the system can grow in future (personal communication, 23<sup>rd</sup> May, 2005). Driving states that there are three schools in the architecture of system: open architecture, Microsoft school and IBM school and the Oracle product is suitable for any architecture choice but best for open architecture (personal communication, 19<sup>th</sup> May, 2005). Karnhall claims that 'IFS Applications' are very much flexible for open architecture and IFS recommends client company to use Oracle system as platform (personal communication, 23<sup>rd</sup> May, 2005).

**Software configuration and system integration & interaction:** Both the vendors agree that software configuration, system intergration and interaction are the most important technical factor considered by the client company. Oracle claims that its products are very flexible for configuration and integration. Accounting module has a lot of parameters and it is very flexible to use (Joakim Driving, personal

communication, 19<sup>th</sup> May, 2005). IFS system is quite configurable and easily integratable (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005). Oracle believes that realization of compatibility or interaction with other existing systems is very costly (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). 'IFS Applications' are compatible with other existing systems and they also ensure the connectivity with the systems out side the company (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**Data analysis and conversion:** Both of the respondents believe that the client company doesn't consider this factor for selection of ES. But Karnhall claims that this is an important issue to be considered. IFS tries to demonstrate how well and easily data analysis and conversion can be done for its solutions (personal communication, 23<sup>rd</sup> May, 2005).

**Special industry or applications capabilities:** Driving believes that some client companies look for special industrial capabilities of ES system but most of the clients are not interested in this factor. Oracle offers different solutions for different industries (personal communication, 19<sup>th</sup> May, 2005). On the contrary, Karnhall claims that client considers it very much (personal communication, 23<sup>rd</sup> May, 2005). IFS has solutions focusing on different industry needs. In promotion, IFS always mention good reference cases from the same industry to potential client company (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**Quality of system:** The reliability, expandability and upgradability of systems are very much considered by client company and it is agreed by both respondents. They also claim that their systems address these issues very well (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005 and Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005). Driving thinks that due to the ever increasing importance quality of the system to clients, it is very difficult for small vendors to compete with large vendors like Oracle and eventually the small vendors would be disqualify from the market (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). According to Karnhall, user friendliness of the system is also considered by client and IFS is trying to provide user friendly system (personal communication, 23<sup>rd</sup> May, 2005). Driving also observes that some client companies involve the end users in the evaluation of the system to check its user friendliness. But he also observes that some companies don't consider the user friendliness as an important factor because these companies think that the users have to be adaptable to use the system since the users of other peer companies are using this kind of system (personal communication, 19<sup>th</sup> May, 2005).

## **5. Vendor's factors:**

**Vendor support and service:** Both of the respondents perceive that the influence of vendor support and service availability is significantly recognized by client company in the selection of ES. According to Driving, as vendor Oracle has to show the client about support activities like consulting service, training etc. Oracle is using its own consultants and other consultancy firms for this kind of support activities. Oracle is also offering vendor's tools for rapid implementation but it's not very much considered by the client company (personal communication, 19<sup>th</sup> May, 2005). IFS has a special organization for providing support and service. The vendor is providing the process modeling tools for BPR. The vendor is also making response to customer's

inquiry through internet and telephone which is called 'second-line support' (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**Vendor-customer relationship:** IFS and Oracle believe that the vendor-customer relationship like partnership is not considered by client company during the selection of ES. But the good relationship in general level like trust between client and vendor is considered. Oracle is trying to build good relationship and partnership with their potential and existing customers for business development (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). IFS is also trying to make agreement with clients to develop software for them with required functionality (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**Vendor's capability:** The influence of vendor's capability in the client's selection process of ES is recognized by IFS and Oracle. Oracle is making huge investment in R&D technology to increase its capability (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). IFS believes it has the capability to provide tools for easy implementation and upgradation (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

**Vendor's reputation:** The respondents of both vendors agree that the good reputation of the vendor is becoming more and more important for the client company and the client always considers vendor's reputation in terms of market reputation and financial condition in the selection process of ES. According to Driving, the client is always looking for good reference about the vendors from other customers. Oracle believes that they have a very good market reputation and financial condition due to the consolidation of Oracle, PeopleSoft and J.D Edwards (Joakim Driving, personal communication, 19<sup>th</sup> May, 2005). IFS always try to show the potential and existing clients that the company has a good future but its efforts don't always yield the expected result (Per Karnhall, personal communication, 23<sup>rd</sup> May, 2005).

#### **6. New factors identified by the vendor companies:**

Driving pointed out the 'soft' factor which have great influence on the selection of ES by the client company. He has mentioned that sales skill of the vendor always influence the selection process of client company. Vendor use this technique to persuade the client in the selling process (personal communication, 19<sup>th</sup> May, 2005).

### **4.3 Analysis of two perspectives**

In the following sections, we have made cross case analysis of two perspectives. The analysis has addressed the comparison among the views of client companies as well as the views of vendor companies. It has also addressed the comparison between these two perspectives. These three aspects of analysis have been done together to get an overall view on the empirical findings of this multiple case study. The synthesized integrated framework of influencing factors has been the basis of this analysis.

#### **Business benefit related factors**

In the integrated theoretical framework of influencing factors, operational, managerial, strategic and organizational benefits have been identified in this category.

From the empirical study, it is found that *operational benefits* have been considered by the all client companies and it has been also justified by vendor companies. Most of the client companies have considered cost reduction and productivity improvement as the major ways for getting such benefits while the vendors view is more focused on cost reduction. Although vendors claim that their products are capable for providing such benefits, the clients have mixed experience. Regarding *managerial benefits* both client's and vendor's view confirm that improved decision making and better performance control in different operating divisions have influenced the selection process. It is also revealed that some client companies are getting such benefits but some are not getting as expected earlier; although the vendors claimed that their softwares have the feature of such benefits. The empirical study shows that *strategic benefits* like building external linkages and enabling e-commerce have influenced all the client companies' selection process with the expectation of getting business growth and economies of scale. Only one vendor has agreed with this client's view and the vendors' products are claimed to be suitable for such benefits. Most of the client companies have been influenced by *organizational benefits* factor as they have expected for better employee morale and satisfaction and building common vision in the organizations from the use of ES system. But only IFS agrees with this influencing factor. It is interesting that a match has been found between vendor's claim and client's expectation about this benefit.

### **Organizational factors**

In our integrated framework the organizational factor category includes top management support, BPR, change management and business plan and vision. The empirical study reveals that top management support has been essential for the selection of ES solution in all the client companies and it has been recognized by the vendors. It is found that *top management support* exists in giving guidance, resources and facilitating change management in the ES project and top management needs to be persuaded by showing the benefits of solution. The vendors argue that top management generally lacks in knowledge and experience to deal with ES selection. Regarding *BPR* clients and vendors strongly agree with its influence on selection. All the clients have made BPR to different extent (small to large) to get a good fit between business process and ES solution. The vendors generally help the client companies to perform BPR with special tools and consultancy service. Only two client companies out of four have been found for having given emphasis on *change management* during the selection but both the vendors' perception is positive to this factor. It is found that client company manages the user acceptance and resistance to new system by arranging workshop and discussion meeting. There also exist different perceptions among the companies about the user resistance to system and new business process. Vendors generally help the clients to manage change if the clients require. Most of the client companies have clear *business plan and vision* for selection of ES but only one vendor believes that it has been considered on the selection. It is revealed that client companies generally have business plan and IT strategy regarding the integration of business processes and 'make or buy' software. There is no influence on the client companies' business plan from the part of the vendors as claimed by the vendor companies.

## Project related factors

The integrated framework contains steering committee, project team competence & project champion, rapid implementation and smaller scope, user training and education, minimum customization of software, cross functional implementation, use of independent consulting firm and cost of the project in the project category. For all the client companies the *steering committee* has been the main influencer in the selection, even three companies' steering committees have made the decision of ES selection. The vendor companies also confirm the influence of the steering committee. The clients' perspective is that this committee has evaluated the necessary information from different sources and also ensured user involvement in the selection. The vendors' influence on this committee depends on the degree of its competence, knowledge and experience with the system. Vendors generally try to influence the committee through seminar, meeting in the negotiation process. Although client companies claim that the committee has good knowledge and experience in the selection but the vendors have found that most committees lack in experience and knowledge. Most of the client companies have considered the *competence of project team* in terms of business and system expertise during the selection process. They also considered about the *project champion* because the successful implementation of ES depends on good project leader and project team competence. Only IFS has been found to agree with this indirect influence. Out of four, three client companies have considered the *rapid implementation and smaller scope* during the selection. Both vendor companies experience that the client companies are always consider rapid implementation and smaller scope. It is found that rapid implementation depends on the requirement specification, size of business and scope of the system. More or less the actual implementation time taken by client companies conforms to the required implementation time suggested by vendors. We have seen that some client companies have used the 'rolling out' implementation method for different factories to implement the system in smaller scope with minimizing risk. It is interesting to find that one client company didn't consider rapid implementation and smaller scope because they badly need the system for process integration. The study reveals that *user training and education* have been considered important by the all client companies and the vendors also recognize this. It is found that for some client companies it was included in the whole packages of the systems provided by vendors and it involved a lot of cost. Also from the vendors' view it is found that the clients always try to reduce cost of the project by decreasing user training and education and also most of the unsatisfaction of clients is due to lack of this. Both vendors and clients recognize that *minimum customization of software* has a lot of influence on the selection of ES. All the clients of this study have made few or no changes in the software because they think that customization of software will create problems in upgradation and implementation. Even some companies have given emphasis on the use of standard software and convincing the vendor to include their specific requirements in the software as standard. Though the vendors generally claim that their products are very suitable for particular industry and need no customization, the vendors of this study admit that in reality, clients have to make a balance between customization and BPR. The degree of customization depends on the client companies' business needs. Vendors always

recommend for using the standard software for easy upgradation and customer support. In this study, the client companies reveal that *cross functional implementation* has been considered in the selection because the nature of business and the integration of the business process demand it. But the vendors' experience is that client companies don't consider this factor very much and they usually implement one or two modules at a time. Most of the client companies have used *independent consulting firms* during the selection process and they have played a vital role with their experience and knowledge. The vendors also claim that client companies use the consulting firm for getting experience and knowledge from them. The consulting firms' influence depends on the client companies' experience and knowledge. It is also found that as vendors and these consulting firms have good relationship with each other, vendors can easily influence these independent firms. *Cost of the project* has influenced the selection process of most of the client companies as they have to maintain the budget. And it has been supported by the vendors in the study. It is observed that cost always overruns the budget for the client companies. Vendors claim that cost becomes less important in the later stages of the project and cost can be negotiated with the client companies.

### Technical or system factors

The synthesized integrated theoretical framework includes 5 technical factors: architecture choice, software configuration and system integration & interaction, data analysis and conversion, special industry or application capabilities and quality of system. The *architecture choice* has been considered by all client companies and the vendors opine that some clients also look for right architecture choice for the system. It is found that client companies consider three-tier client server architecture and open platform for the system. Vendors also state that the architecture choice doesn't matter for some companies and generally clients choose the open architecture choice for their systems. The vendors' products are suitable for any architecture choice. Most of the client companies in the study have considered *system configuration, integration, and interaction* with other systems as the most important technical factor. The vendors also agree with the clients' view. The system used by each client company from the respective vendor is found very flexible, highly configurable and integrated. Actually they are following one vendor policy. The system interaction with other existing systems is found good and expensive for some client companies. On the other hand vendors claim that their systems are very much configurable, integratable, and compatible with other systems but realizing compatibility is costly. Only two client companies have considered *data analysis and conversion* in the selection of ES. But vendors believe that client companies really don't consider it although it should be considered. It is found that client companies have made the data analysis and conversion manually. All the client companies have considered the *special industry and application capabilities* of ES systems in the selection process. The vendors' view about this factor is found mixed. Every client company claims that its system is suitable for its particular industry. Vendors also claim that they are developing solutions by focusing on different industry needs. The study reveals that the importance of *quality of system* has been highlighted by the client companies during selection. Vendors also recognize the

clients' view. Most of the client companies have considered the reliability, expandability, upgradeability and user friendliness of the system. It is found that generally the client companies have good experience with these aspects of quality of system. It can be stated that the vendors' claim of providing quality system to clients is also justified.

### **Vendor's factors**

The integrated framework also identifies vendor's category which includes vendor support and service, vendor-customer relationship, vendor's capability and vendor's reputation. The empirical study shows that *vendor support and service* availability is crucially considered by the client companies. The perception of vendors also confirm to clients' view. Most of the client companies have got expected consultancy service and training support from the vendors and some companies have used vendor's tools from the vendors. Vendors claim that they have to provide consultancy service, training support and vendor's tools to satisfy their clients. Three client companies have considered *vendor-customer relationship* as a factor for choosing ES system. One company also has strategic partnership with its vendor and another company has the relationship of sharing knowledge with its vendor about business processes and upgradation. Vendors' view is that relationship in general level not the partnership is considered by the client companies but the vendors always try to build partnership with clients for their business development. Regarding *vendor's capability*, all the clients' and vendors' view agree with each other about its influence on the selection of ES. Client companies' experience shows that their vendors are very capable in R & D technology, upgradation, implementation and service. Also the vendors claim that they have good capability to provide implementation service and upgradation. The study reveals that client companies always consider the *vendors' reputation* and the vendors also think so. All the client companies claim that their vendors have good market reputation and good financial condition. Most of them term their vendors as stable companies. Also the vendors believe that they have very good reputation in the market and have a good future.

### **New factors identified**

In the empirical study three new factors have been discovered. These are: geographical proximity between vendor and client, requirement specification for ES system and sales skill of vendor. The first two factors have been emerged from clients' view and the later one from vendors' view. The client company believes that the geographical proximity helps the company to get necessary vendor support and service quickly. The client company has to make process mapping of business processes to identify the requirement specification for ES system. The vendor company believes that good sales skill always help the vendor to persuade the client companies to buy their software.

## 5 Conclusion

*In this chapter, the key aspects and dimensions of analysis of empirical data, has been presented. It also describes how the purpose of the study has been fulfilled.*

In this study, our purpose was to identify the influencing factors on ES selection process from the theory and investigate them in reality from the client and vendor perspectives. To fulfill this purpose, we have made theoretical and empirical study.

By extensively reviewing the ES literature and reflecting on them, we have identified and synthesized 25 influencing factors on the ES selection process. These factors have been classified into five categories and thus we have synthesized an integrative framework of influencing factors. This framework has essentially guided us throughout the empirical study. As one of our research elements was to find out the views of both client company and vendor on these factors in reality, the empirical study was based on this integrated framework.

The analysis of empirical findings has revealed that most of the factors of integrated framework have been recognized, in general, both by client and vendor.

- Out of 25, the influence of 12 factors on the selection process has been completely agreed by all the clients and vendors under this study. These are: operational benefits, managerial benefits, top management support, BPR, steering committee, user training and education, minimum customization of software, architecture choice, quality of system, vendor's support and service, vendor's capability and reputation.
- It is also found that the influence of strategic benefits, organizational benefits, business plan & vision, special industry capabilities, project team competence and champion, rapid implementation and smaller scope, use of independent consulting firm, cost of the project, system configuration, integration & interaction and vendor-customer relationship have been recognized by most of the clients and vendors in this study.
- Cross functional implementation and data analysis and conversion factors have been recognized by clients, but not by vendors. Though the influence of change management has been emphasized by both vendors, but not all the clients have considered it very much.

From the empirical study, three new factors have emerged. These are: geographical proximity, requirement specification and sales skill of vendor.

From the analysis, we have found a good fit between client and vendor views about the influencing factors although there exists insignificant imbalance between these two views. By analyzing the underlining reasons and explanations of these influencing factors from client perspective, the empirical study has revealed a good perception and insight about clients view. The analysis has also pointed out the vendor's thinking about the dynamics of ES selection in the client companies, and their ways and efforts to deal with these influencing factors.

Conclusively we are claiming that the findings of theoretical and empirical study have fulfilled the research purpose.

## 6 End discussion

*In this concluding chapter, we have presented our critical reflection on this study in totality. It highlights the constructive criticism on theory, research method and findings. Finally it ends with suggestion for future study.*

### 6.1 General reflection with criticism

We believe that we have tried to review sufficient ES literature with covering all the aspects of our study. We have synthesized integrated framework of influencing factors on ES selection process, which has a strong theoretical background. In literature study we have found that many factors identified by the previous researchers have influence on the whole life cycle of ES and sometimes it is problematic to separate them between selection and implementation phase. Also we have found that there are very few studies from the perspective of vendors and most of the study has carried out in the context of client company.

We think that the findings of the empirical study deserve well appreciation. Although the findings of this qualitative case study can not be generalized like quantitative survey study, the essence and key dimensions of findings have a general application in wider context. The most generally recognized factors and general perceptions of client companies of this study have a general implication for all the Swedish companies using ES. Also the common perceptions and views of vendors found in this study carry the general representation of vendors working in Sweden.

During the empirical study, we have observed some shortcomings which can be minimized if we do it again. If we could make 'face to face' group interview with more respondents who were involved in the selection of ES in the same client company, the interviews would provide more in-depth information. The same is also true for vendor companies. We could not apply these things because of time and resource limitation and difficulties to get all the related respondents together. From the empirical study we have discovered three interesting new factors. This finding has fulfilled one of our research questions and will contribute in further study.

After completing this study, we have gained a lot of theoretical and practical experience about ES phenomenon. We have also observed that there exist differences between academics and practitioners about the ES concepts and terms. We had to explain about these concepts and terms during interviews to make them clear to respondents.

### 6.2 Future study

During theoretical and empirical study, many questions, which deserve further investigation, have raised in our minds. We think that the future study only can answer these questions. So we are suggesting the followings for the future study:

1. A new quantitative study on influencing factors on the selection process can be carried out with more samples. The study should involve the client and vendor perspectives.

2. Another study can be to identify key influencing factors in order of importance from client and vendor perspective.
3. In our study, we have not considered the views of implementing organizations (independent consulting firms) who are also major players in the ES market. The future study should include their views.
4. The future study should also consider the size of company (that is small, mid-sized and large companies) because their settings and environment differ from each other.
5. In the literature survey, we have seen few studies on the selection process of ES. So it could be considered in future study.

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## **Appendix - Interview guide**

### **The interview guide for the client companies**

#### **Information about company and ES environment**

Name of the company

Name and role of the respondent

Type of the company's business

Name of ES software/solutions being used

The vendor of the ES software/solutions

The modules of ES being used

How long the company has been using the ES software/solutions

Has the company used any committee for the selection of ES software/solutions and who has been involved in the committee?

Has client company considered/perceived the followings as influencing factors on the selection of ES software or its modules when this company has gone for selecting and implementing this software? Why and how has it considered? What are the other unidentified factors considered by the company?

#### **3. Business benefits related factors:**

Operational

Managerial

Strategic

Organizational

#### **4. Organizational factors:**

Top management support

BPR

Change management

Business plan and vision

#### **5. Project related factors:**

Steering committee

Project team competence & Project champion

Rapid implementation and smaller scope

User training and education

Minimum customization of software

Cross functional implementation

Use of independent consulting firm

Cost of the project

#### **6. Technical or system factors:**

Architecture choice

Software configuration and system integration & interaction

Data analysis and conversion

Special industry or applications capabilities

Quality of system

**7. Vendor's factors:**

Vendor support and service

Vendor-customer relationship

Vendor's capability

Vendor's reputation

## **The interview guide for the vendor companies**

### **Information about company and ES products**

Name of the company

Name and role of the respondent

How long has the respondent been working in the company?

What type of ES software and its modules the company offers

Do the company agree with these as influencing factors for selection of ES by client company? Why does the company agree and how does it handle these issues? What are unidentified factors considered by vendor?

**1. Business benefits related factors:**

Operational

Managerial

Strategic

Organizational

**2. Organizational factors:**

Top management support

BPR

Change management

Business plan and vision

**3. Project related factors:**

Steering committee

Project team competence & Project champion

Rapid implementation and smaller scope

User training and education

Minimum customization of software

Cross functional implementation

Use of independent consulting firm

Cost of the project

**4. Technical or system factors:**

Architecture choice

Software configuration and system integration & interaction

Data analysis and conversion

Special industry or applications capabilities

Quality of system

**5. Vendor's factors:**

Vendor support and service

Vendor-customer relationship

Vendor's capability

Vendor's reputation