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Promise and performance of ERP

(Perspective of implementers)

Paper within IT and Business Renewal

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Abstract

Organizations worldwide invest in enterprise system software to gain access to integration of transactions-oriented data and business process throughout the organization. From the vendor perspective Enterprise Resource Planning software is the enabler of the current dynamic business environment. It must be noted that this is the expectation of implementers. For this reason researchers have focus attention on the effective implementation of the ERP. The core researches have been on ERP implementation i.e. factors affecting ERP implementation i.e. critical success factor, risks and failures. In the area of promise and performance of ERP the focus is more on educational sector. This paper seeks to take a study on the promise and performance in terms budget and time of ERP software in large organizations in Sweden.

In order to answer the research questions, we conducted an empirical study of manufacturing companies in Sweden that were using ERP. Companies were identified by examining their websites; after which top management and executives were interviewed. Data was collected by means of survey questionnaires and semi-structured interview.

It must be noted that the results portrayed that companies in Sweden adopt ERP for almost similar reasons as shown by the ranking of the perceived promise which is the motivation for ERP adoption by selected companies. Again, the performance of ERP is directly related to its promise as confirmed by respondents.

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1 Introduction

This introduction/background section will help the reader to understand the research subject in this master thesis. Here, ERP will be described in a broader sense while the problem will explain why we are going to do the research and clarify the research purpose.

1.2 Background

The need to present a single face to global customers, to respond rapidly to customers demand, and to seek out economies of scale, business executives have been for some time regularly examining the capabilities offered by information technology (IT).

In the 1990s many firms turned to software packages when they replaced the older, often home built system in their application portfolios. They choose to buy, rather than build their new system.

Replacement of system had in 1990s become a priority for many firms. These organizations felt increasingly burdened by their legacy system.

Following this Deloitte and Touch (1997) stated that standard package software that supports core business processes, were the preferred method by which business replaced 'legacy system'.

In sum, the 1990s were marked by what we termed package transition in the employment of business application software. While package business software had already long been in use, it was in the 1990s with advent of ERP that it began to dominate enterprise decision throughout the world. By the close of the decade, about half of the large US and European companies had reportedly developed an ERP system (Cap Gemini Ernst & Young, 1999).

According to AMR Research, total revenue in the enterprise application and service market in 1999 was US\$18.3 billion (Gilbert, 2000). Enterprise application software implementation costs are often reported to be five to ten times the cost of software license (Davenport, 2000). This implies that organization world-wide spent something like US\$90-180bn on ES in 1999.

The world-wide market for ERP solutions to discrete and process manufacturers was \$9.10 billion in 2003 and is forecasted to be over \$12.00 billion in 2008, growing at a Compounded Annual Growth Rate (CAGR) of 5.7 percent over the next five years, this is according to a recent ARC Advisory Group study.

Meanwhile revenue from ERP related services (consulting, implementation, training, and maintenance) represent 70 percent of the total ERP revenues in 2003, and this will continue to drive the successful growth of the ERP market. While Maintenance/Support services account for a large percentage of the service revenues, more value-added services for the solution will kick in over the period of the report. In conjunction with the potential growth within the process industries, value-added services play a key role in vertical process industry solutions and fast track implementations. www.arcweb.com

The question implementer's therefore asked is: 'how can we get greater benefit from our investment in ES? According to Markus and Tunis (2000), the key question about ES from

the perspective of an adopting organization's executive leadership is question about successes. For example: will our investment pay off? Did our investment pay off?

1.3 Problem

Over the last decade organizations world wide have made billion dollar investment in IT (Gilbert, 2000). ERP market is predicted to grow from a current \$15bn to a gigantic \$50bn in the next five years. The estimated long term growth rate for ERP solution are a stratospheric 36 to 40 percent. Some estimates put the eventual size of this market at \$1 trillion.

Companies spend hundreds of millions of dollars and many years implementing ERP solution in their organization. Once an ERP system is implemented, going back is almost impossible or extremely difficult; it is expensive to undo the change ERP bring into company.

Organization put in such huge investment with the anticipation of recovering the full potential of what ERP promise. When companies come to ERP implementation, they share the common goals, a quick and smooth implementation that does not disrupt business process with implementation system glitches (Doyle, 2000). However, ERP system can't promise to live up to companies' expectation in all cases. It is important to note that ERP systems were widely recognized as both problematic and likely to overrun time and budget allocation (Darke, Parr, & Shanks 1999).

It is upon this background that we seek to look at the promise of ERP in relation to its actual performance in terms of budget and time. In our bid to do this assessment, we measure performance from what ERP promise for which it has been the motivation for investment i.e. using adopters' objectives, expectation and perception as a standard for defining and measuring success.

The importance of this study is to offer top management the opportunity to know what to expect before deciding to venture into the ERP investment arena.

1.4 Research Question

The research question of this study is to probe into the motivation for which manufacturing companies in Sweden adopt ERP and whether the performance of ERP relates to its promise.

1.5 Purpose

Considering the growth of ERP market, and the huge investment organizations are making in enterprise system, the concern is; does the investment match the return?

Therefore the purpose of this study is to look at the actual returns on investment. By this we try to compare what ERP promise and what it delivers in terms of performance.

In doing this we try to find out from implementers as to what were the motivating factors which influenced the adoption of their ERP system and compare to the performance in their judgment in relation to the promise of ERP.

1.5 Delimitation and focus

This master thesis will investigate the promise and performance of ERP in selected large companies in Sweden. The reason why we have chosen to investigate this topic is to know how large firms get greater benefit from ERP investment. Furthermore, our research will expand the definition and look more into what implementer should expect when they venture into the ERP arena.

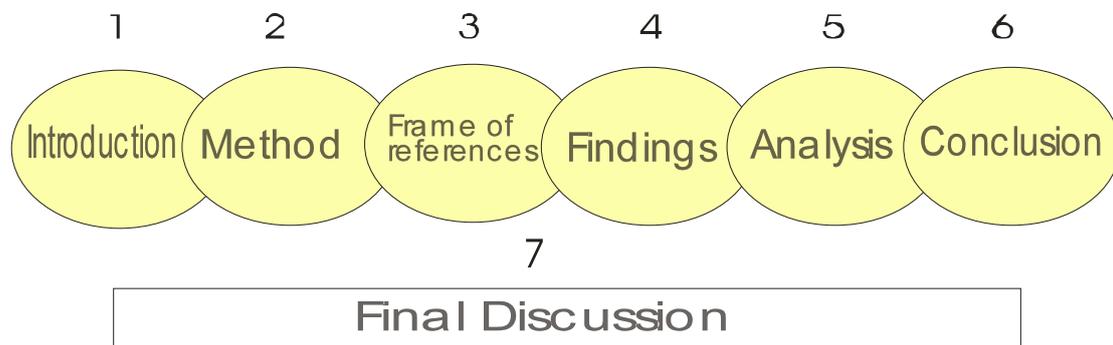
1.6 Interested Parties

The ERP community is defined as a triadic group composed of an implementing organization, an ERP vendor, and an ERP consultant (Adam & Sammon, 2000). In implementing a project, ERP vendors sought to enter into partnership with ERP consultant to assist in ERP implementation (Knight & Westrup, 2000), which makes consultants and vendors, have similar necessity. The consultants and vendors are referred as the push side and the companies are in the pull side (Collins, 2005). The consultants and vendors are placed in the push side in a sense that they play the same role in proposing the ERP software, and companies are placed in the pull side as the recipient.

This thesis on ‘promise and performance of ERP’ could be interesting for larger companies planning on implementing an ERP system. It could also be interesting for companies that already have implemented such system but still are having problems within the organization i.e. executive and top management of these organizations. Other interested parties are also ERP vendors and other parties who are interested in the implementation of ERP. Furthermore, we believe this thesis can be of interest for the scientific community as a foundation for future research.

1.7 Disposition

The diagram below will give the reader a better understanding on how different chapters in this thesis are tied together.



- **Introduction:** Our problem discussion in the beginning of the thesis formed into purpose which is going to be the red line throughout this thesis.
- **Method:** Secondly, our method is describing how we found references, collected our empirical findings and how these two parts were put together to form analysis
- **Frame of references:** This is the collection of literature which we have summarized. It is also the basis for the empirical findings.
- **Empirical findings:** This is what we gathered from our survey.
- **Analysis:** This is the interpretation of our finding.
- **Conclusion:** Here the sum of the discussion is taken.
- **Final discussion:**

1.8 Definition

ERP has been defined by various authors but with few differences. Kumar and Hillegerberg (2000) define enterprise resource planning (ERP) systems as “configurable information Systems packages that integrate information and information-based processes within and across functional areas in an organization.”

The basic architecture of an ERP system builds on one database, one application, and a unified interface across the entire enterprise. According to O’Leary (2000), ERP Systems have the following characteristics:

Packaged software designed for a client server environment

- ERP systems are either traditional or web-based.
- ERP systems integrate the majority of a business’s process.
- ERP systems process a large majority of an organization’s transactions.
- ERP systems use an enterprise-wide database that typically stores each piece of data once.
- ERP systems allow access to the data in real time.

In some cases, ERP calls for an integration of transaction processing and planning Activities (e.g., production planning)

Enterprise system (ES) are large-scale organizational system, that is system composed of people, process, and information technology, built around package enterprise application software.

Davenport (2000) puts it as software package that offer integrated solution to companies information need. Yet according to Rosemann (1999), enterprise system offer configurable business solution for typical functional areas such as procurement, material management, production, sales and distribution, financial accounting and human resources management.

Enterprise Systems are the technologies that drive corporate growth in many industries. ES software pulls together a series of complementary functions into one application. It is designed to consolidate and integrate business functions such as procurement, manufacturing control, finance, and sales management, allowing companies to more effectively monitor and control these critical facets of their businesses. Indeed, the current trend in production planning toward build-to-order in some industries would be impossible to sustain without these sophisticated systems.

The above definition and components of the ERP system suggests that ERP system is expected to generate substantial benefits such as quick reaction to competitive pressures and market opportunities, more flexible product configurations, reduced inventory, and tightened supply-chain links. However, it has been documented that ERP implementation is a difficult task and there has been reports from companies about difficulties such as enormous cost overruns, inadequate experts, customization etc contributing to an unrealistic failure rate in ERP systems implementation.

2 Method

This chapter deals with the main research approach i.e. it looks at qualitative and quantitative approaches to research. It also discusses the data collection procedure, the selection of respondents and interview for empirical study, and theoretical study. Finally the weakness of this method is discussed.

2.1 Research approach

The design of any study begins with the selection of a topic and a research methodology. These initial decisions reflect assumptions about the social world, how science should be conducted, and what constitutes legitimate problems, solutions, and criteria of "proof." Different approaches to research encompass both theory and method. Two general approaches are widely recognized: quantitative research and qualitative research.

2.2.1 Quantitative research is an inquiry into an identified problem, based on testing a theory, measured with numbers, and analyzed using statistical techniques. The goal of quantitative methods is to determine whether the predictive generalizations of a theory hold true. By contrast, a study based upon a qualitative process of inquiry has the goal of understanding a social or human problem from multiple perspectives. Qualitative research is conducted in a natural setting and involves a process of building a complex and holistic picture of the phenomenon of interest.

2.2.2 Qualitative research methods is almost opposite to the quantitative approach, meanwhile it is very different to randomized control for instance. It understands human nature; also provide vital information on attitudes and satisfaction. Findings from qualitative research can sometimes be taken on and used to base quantitative research studies on later.

The strength of the quantitative research approach is that the research results are derived by discovering exact facts and, therefore, the same research methods and the results are generalized. In other words, it can be applied to a large number of other situations because it is objective and value free.

In contrast to this approach, the qualitative research approach is verbally expressed in detail toward research aims. In this approach, the researcher is placed as a key point of research. In consequence, the researcher's personal knowledge and research experience fully influence the research.

One of the strengths of qualitative research approach is that it is able to emphasize the researcher's View point in the research process as well as on its results (Solutes, 1990).

Comparison of features of Quantitative and Qualitative approaches to research

Quantitative	Qualitative
Both are systematic in their approach	
objective	Subjective

Deductive	Inductive
Generalize	Not generalisable
Numbers	Words

It is important to stress here that quantitative approach was based upon qualitative judgment and all qualitative data could be described and manipulated numerically. And given the opinion of Steckler, McLeroy, Goodman, Bird, and McCormick (1992) quantitative study uses qualitative results to help interpret or explain the quantitative findings we chose to combine both methods, quantitative and qualitative approach. The qualitative method was chosen because we want to probe into the motivation for the adoption of enterprise resource planning. While the quantitative approach will help us manipulate the data for more comprehensive analysis of our finding.

2.2 Data collection

Basically there are two main data collection procedure that can be used for a research study. They are Primary and Secondary data.

2.2.1 Primary data

Primary data are materials which the researcher has personally collected from the field for the purpose of the study. An example of primary data include in-depth interview, direct observation etc.

In-depth interview

This can take the form of either individual interview (example face-to-face) or group interview (e.g. focus group). The data can be gathered through written notes, audio recording or even video recording.

Interviews take the form of either structured questionnaire where pre-defined questions are asked for answers in a certain order. This means that interview questions are exactly the same for all respondents, or unstructured interview which is more flexible and differs from traditional structured interviewing in several important ways. First, although the researcher may have some initial guiding questions or core concepts to ask about, there is no formal structured instrument or protocol. Second, the interviewer is free to move the conversation in any direction of interest that may come up. Consequently, unstructured interviewing is particularly useful for exploring a topic broadly. However, there is a price for this lack of structure. Because each interview tends to be unique with no predetermined set of questions asked of all respondents, it is usually more difficult to analyze unstructured interview data, especially when synthesizing across respondents.

Direct observation

This is where the researcher studies events as they happen over a period of time. The data can also be recorded the same way as interview (audio recording, video recording etc.) and also through pictures, photos or drawings. Again observation means that the situation of interest is checked and a person or some mechanical device records the relevant facts, actions, or behaviors. Accurate data about what consumers do in certain situations is provided by observation. Observation does not tell why it happens.

2.2.1.1 Empirical study

Since empirical study is based on information and data gathered from the reality, we gathered our primary data through an in-depth interview. By using a structured questionnaire we administered the same set of questions for all respondents however we allowed some flexibility for respondents to touch on certain important details where necessary while being guided by the questions. As we intended to gather a comprehensive information for our analysis, we focused on implementers of ERP and been one of the key players in enterprise system industry we believe we could gather all the details we needed to answer the question for which this study is based.

Meanwhile the interviews were conducted by the use of both telephone interviews and E-mail as we were limited by time, accessibility and other resources.

We must say that it was difficult to contact companies who were ready to help with the necessary information for the study. Perhaps this could be attributed partly to our inability to speak Swedish which is the common medium of communication and the fact that most companies are just not ready to give out information.

2.2.1.2 Selection of respondents

As stated earlier, we selected our respondents from top management and/or top executive since they influence the adoption and implementation of the system. Been part of the strategic decision makers in their respective companies, we believe they would be able to give details of the information which will be relevant for the study. Again, by choosing three respondents from three large companies from among a few large companies which use ERP system, we believe it will be quite a representative sample. Also our consideration for large company was influenced greatly by the possibility of getting people who could communicate in English as the authors are all international students who could not communicate in Swedish.

It must be noted that since we are not familiar with the Swedish companies and especially companies implementing ERP system as international students and the fact that most companies are simply not ready to give information about their companies, we started by contacting ERP vendors by mail and through telephone. We also got help from our ERP and standard software tutor Daniela Mihailescu who directed us to a website (www.dpu.se).

We must say that through this site, we were able to contact Sören Janstål the director of Data Research DPU a consulting firm based in Stockholm whose mission is to support companies and organizations in acquisitions and evaluations of computer software and hardware. With the help of Sören, we were able to contact ten companies, however out of

the ten companies; only three of these companies were ready to help with our empirical findings because of the reasons stated above.

The companies that were willing to be interviewed are: Trelleborg AB, Vattenfall AB, and DeLaval AB.

Trelleborg AB

Trelleborg is a global industrial group whose leading positions are based on advanced polymer technology and in-depth applications know-how. They develop high-performance solutions that damp, seal and protect in demanding industrial environments. The Trelleborg Group offers technological solutions that meet three principal customer needs: to damp, seal and protect. These functions have many areas of use in various industries worldwide. The Group's customer groups are to be found primarily within the aerospace, agricultural, automotive, infrastructure/construction, transportation equipment, oil/gas and other industries. The head office is located in Trelleborg, Sweden (Trelleborg AB, 2006).

Vattenfall AB

Vattenfall was founded in 1909 in Sweden. In 1992 Vattenfall was transformed from a public utility into a Swedish state-owned company. In 1996 the electricity market was deregulated. Vattenfall acts in all parts of the electricity value chain - generation, transmission, distribution and sales. They are also active in electricity trading and generate, distribute and sell heat. Vattenfall is Europe's fourth largest generator of electricity and the largest generator of heat. Their vision is to be a leading European energy company. Vattenfall currently has operations in Sweden, Finland, Germany and Poland. The parent company, Vattenfall AB, is wholly owned by the Swedish State (Vattenfall AB, 2006).

DeLaval AB

DeLaval is part of the Tetra Laval Group of Tetra Pak, DeLaval, and Sidel. It is the leading food processing and packaging group in the world. DeLaval is a full-service supplier to dairy farmers. The company develops, manufactures and markets equipment and complete systems for milk production and animal husbandry. Service and sales of a wide range of accessories are also key aspects of DeLaval's operations

DeLaval conducts business in 100 markets and delivers half of all milking equipment sold worldwide. Cutting edge technologies and strong customer focus is the foundation of the continuous development of DeLaval (DeLaval AB, 2006).

2.2.1.3 Interview procedure

As indicated earlier, our intention was to conduct a face-to-face interview which we believe would have given us more information. However due to certain constraints and difficulties the interview was conducted on phone and e-mail. We must stress here that in order to make sure the phone interview gathered as much information as possible; we used a speaker phone which gave all the authors the opportunity to be part of the interview and which helped us gather all the important information as possible. Again we asked the re-

spondents to answer the questionnaire and attached the answers in a mail to cross check the notes we gathered from the telephone interview.

Using a semi-structured interview, we were guided by our questionnaire which we had forwarded to our respondents to help them have the idea of the information we needed and to also for them to prepare for the interview. Even though we were guided by a pre-designed questionnaire, yet we gave the chance for respondents to highlight on important issues which we thought would be of importance to our study.

Each interview lasted for at least one hour which covered the background of the various companies, the motivation for the adoption of ERP and also whether the system has lived up to expectation i.e. whether the system has delivered what it promised.

2.2.2 Secondary Data

A secondary data research project involves the gathering and/or use of existing environmental data for purposes other than those for which they were originally collected. These secondary data may be obtained from many sources, including literature, industry surveys, compilations from computerized databases and information systems, and computerized or mathematical models of environmental processes.

Secondary research occurs when a project requires a summary or collection of existing data. As opposed to data collected directly from respondents or "research subjects" for the express purposes of a project, (often called "empirical" or "primary research"), secondary sources already exist. These secondary sources could include previous research reports, newspaper, magazine and journal content, and government and NGO statistics. Sometimes secondary research is required in the preliminary stages of research to determine what is known already and what new data are required, or to inform research design. At other times, it may be the only research technique used.

2.2.2.1 Theoretical study

Based on the above, we gathered our theoretical study materials of the topic from written documents such as magazines, books, journal, annual reports and the web pages of the various companies chosen for the research and other electronic sources. As language becomes a barrier for us, we made use of literature references written in English.

2.2.2.2 Reliability and validity

Joppe (2000) defines reliability as: The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable.

Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. In other words, does the research instrument allow you to hit "the bull's eye" of your research object? Researchers generally determine validity by asking a series of questions, and will often look for the answers in the research of others (Joppe, 2000). Reliability is required to make statements

about validity. However, reliable measures could be biased and hence "untrue" measures of a phenomenon or confounded with other factors such as acquiescence response set.

If the validity or trustworthiness can be maximized or tested then more "credible and defensible result" (Johnson, 1997, p. 283) may lead to generalizability which is one of the concepts suggested by Stenbacka, (2001) as the structure for both doing and documenting high quality qualitative research. Therefore, the quality of a research is related to generalizability of the result and thereby to the testing and increasing the validity or trustworthiness of the research.

Based on the idea by Joppe (2000), we believe that our study would be reliable and valid. This is because the method used for the empirical study and theoretical study guarantee reliability and the study measures the research results. Therefore, the results of the research could be generalized (Johnson, 1997 & Stenbacka, 2001). Again since basically all companies selected are all manufacturing and are also operating on the same terrain of Sweden having homogenous conditions in terms of legal and marketing factors, it stands to reason that generalization of our findings is possible.

2.2.2.3 Weakness of the method

In spite of the effort put in the research, in our bid to come out with a quality work, we still fell there some weaknesses of our method, which are discussed below.

Degree of generalization in a research is how to be able to express the knowledge in universal conformities law. Whiles considering all the selected companies as homogenous there are some differences such as management style, and company culture which are all factors that can influence the adoption and implementation of any particular system. It is also important to note that, these same factors could influence their expectation i.e. the purpose for which an ERP system was adopted. Again theoretical generalization is limited by theory assumption, delimitation and simplification. While empirical generalization is affected by actual facts of the information gathered.

Another issue we believe could limit the strength of the study is the fact that different enterprise system software may not work the same way and therefore cannot produce the same results which is not ideal for generalization.

3 Theoretical frameworks

This chapter looks at the relevant terms to be used for the empirical study. It considers the background of the area of study, definitions of terms, explanation of concepts and theories which are useful for our analysis.

3.1 What is ERP?

In order to satisfy customer demand and stay competitive, companies in 1960s retained large amount of inventory while at the time the organizational systems focused on inventory control. Most software packages (usually customized) were designed to handle inventory based on traditional inventory concepts.

In the 1970s more and more companies realized that large volumes of inventory was a luxury and unaffordable. This led to the introduction of material requirements planning (MRP) systems. MRP had been a great improvement in the materials planning process. The computer can be used to calculate gross material requirements, since there is a master production schedule, supported by a bill of material file that identified the specific materials need to produce each finished item. In MRP net material requirement can be determined by accurate inventory record files, the available quantity of on-hand or scheduled-to-arrive materials, which prompted further improvements in, for instance, new order placement, canceling of existing orders, or modifying the existing order. The ability of the planning system to systematically and efficiently schedule all parts was a tremendous step forward for productivity and quality. With the passage of time, capacity planning was included into the basic MRP systems, since traditional production priorities and materials planning are only part of the problem in manufacturing. Some new tools were developed such as sales and operations planning, master production scheduling, and demand management. These developments resulted in the next evolutionary stage that became known as closed-loop MRP.

Following this Deloitte and Touch (1997) stated that standard package software that supports core business processes, were the preferred method by which business replaced 'legacy system'.

3.2 ERP defined

ERP stands for Enterprise Resource Planning. ERP software aids and controls the ERP management system, which is a system that integrates and automates all facets of business operations. This includes planning, manufacturing, and sales, while more recent ERP software products encompass marketing, inventory control, order tracking, customer service, finance and human resources as well.

Davenport (2000) puts it as software package that offer integrated solution to companies information need. Yet according to Rosemann (1999), enterprise system offer configurable business solution for typical functional areas such as procurement, material management, production, sales and distribution, financial accounting and human resources management. Meanwhile and for the purpose of the paper we adopt the definition of Wreden, 1999, Hill, 2000, and Loizos, 1998. According to them, Enterprise Resource Planning is a set of appli-

cations that help manage and automate a business. A large database provides access to all application programs and serves in all areas within a manufacturing enterprise. This is accomplished by exchanging information with suppliers and customers directly or through trading community portals and e-commerce links, and with outsourcing partners (Wreden, 1999). ERP incorporates all of the elements of a business, from financial processes to manufacturing and marketing activities, into a unified whole that operates more effectively and efficiently in today's competitive economy (Hill, 2000). These applications include finance, human resources, management, manufacturing, logistics, and supply chain management. Technically, any software developer or integrator that helps businesses streamline their operations can style themselves as an ERP vendor (Loizos, 1998).

3.3 The ERP Market

The ERP license market has historically been growing at approximately 20% with an increase in 1997 and 1998 to over 25% due to a Y2K-related increase. The ERP license market was \$17.5 billion in 1998, an increase of 26% over 1997. The combined market for licenses, services and maintenance grew approximately 40% in 1998 and should show positive growth in 1999. (IDC, Feb, 2001). The real unknown is what the market growth returns to post-2000. Many believe the license market will immediately return to 25%, others that it could return to over 40% since there has been pent-up demand building through 1999. AMR, (May, 2001) the most recent report from an independent research firm predicts 27% CAGR until 2005. However, if business to business, e-commerce portal market projections even come close to fruition, there will be an even greater demand for back office applications. After all, a company can not display and sell its wares on the Web without producing the wares, and managing the people and equipment that produce the goods. This phenomenon will most likely keep the back office application market close to the 20% mark instead of a gradual decrease every year (AMR, 2002)

3.4 Motivation for ERP adoption

The following review of the reasons why ERP packages may be adopted is not intended to be exhaustive. Our intention is to give a flavor or those reported to temper some of the hyperbole around ERP adoption and give an alternative interpretation.

3.4.1 The Desire for Standardization:

Whether it is to fit with 'industry standard' practices or achieve synergy across national boundaries and product lines (Bingi, Sharma, K. & Godla, 1999), the allure of standardization is a key reason for the purchase of ERP packages. In terms of diffusion, compatibility is therefore an important consideration. Rogers relates compatibility with existing values, belief, past experiences and the needs of potential adopters. Consequently, the predominant focus is upon the extent to which an innovation will be compatible with the existing state of affairs in the adoption setting. However, in terms of ERP packages, compatibility, from a standards perspective, may be broader than the existing situation may require, and thus, it is also rooted in ideas of the future. Whilst ERP packages may be procured to integrate the existing situations within and surrounding organizations, their compatibility with the existing situation is often downplayed.

3.4.2 To 'Overcome' IS Legacy Problems:

The problems associated with getting IS to work are often characterized as Legacy Information Systems – old, outdated technologies that are muddled by years of modification, degradation and general lack of attention (Bennett, 1994; & Warren, 1999). ERP packages have been widely cited as the 'solution' to the problems they may pose. The relative advantages of ERP packages in this respect are that they are argued to be: well structured and allow for maintenance and future development to be outsourced to a vendor easily operated, supported and maintained due to the ability of the implementing organization to tap into available a skills base for the software (Bingi et al., 1999; Sumner, 2000; Willcocks & Sykes, 2000); and well documented and organized (Golland, 1978; Butler, 1999). The benefits of packages in general 'over' legacy information systems are widely espoused in the IS media and by software vendors. Yet, there are potential difficulties with viewing ERP packages as relatively advantageous to legacy information systems. The ERP package was being introduced in an attempt to deal with problems associated with an existing package. Thus, adopter and diffuser misconceptions about what constitutes a legacy information system imply the treatment of ERP packages as different to legacy information systems is inherently flawed, as they are one in the same. The implication of this is that although ERP packages may have diffused rapidly because of their perceived ability to relieve legacy information system problems, they may also introduce new ones.

3.4.3 The Perception of a 'Tried and Tested' Product:

A significant attraction of packages for many organizations is related to the perception of the relative advantages of implementing what is seen as a 'tried and tested solution' (Golland, 1978; Chau, 1995). Packages are promoted as designed and tested by the vendor, and in most cases, as having been installed by other organizations allowing for reference site visits by potential purchasers in order to evaluate the product. Most ERP package vendor websites contain the lists of high profile company cases that promote the benefits of implementing their product. Moreover, ERP packages have been widely reported upon in the IS media. Thus, it is argued that the conditions for estimating the quality and usefulness of the system and the implications for work content and organization are much better than in custom development projects (Bansler & Havn, 1994). Although ERP packages are supposedly 'better built' than custom developed software it has been suggested there is a lack of rigor in the product development processes of the packaged software industry (Carmel, 1993; 1997).

3.4.4 To Attain Best Practices:

Somewhat allied to the desire to implement change is the use of packages to adopt best practices. The idea that ERP packages are tried and tested has already been discussed. Strongly related to this idea is that through this process of usage and testing, 'best practices' become inscribed into the software. The central theme is that there are advantages to be had by adopting ERP packages of over similar custom development because of the ability to 'buy into' the best practices, or best processes and functionality that are written into the software (Klaus, Rosemann, & Gable, 2000). However, questions have to be raised about possibility of the attainment of the perceived advantages to be gained from the adoption of standard best practices. The forerunner to ERP packages, MRP systems, were also sup-

posed to embody best practices and the point here, which holds for ERP packages too, is that what may be good for one adopter may not be for another (Swan, Newell, & Robertson, 2000). It appears that mass media effects and promotion of products by vendors may overstate the value of standardized best practices to the adopter population. A less pronounced advantage is that of the social prestige associated with the adoption of any so called best practices and the observability of this to others.

3.4.5 To 'Free up' the information systems Function:

Very early in the usage of packaged software, it was recognized that one of its' relative advantages over custom development was that it could lead to the release of information systems personnel to work on other projects (Golland, 1978). Additionally, a recent survey reported that 40 per cent of respondents felt that packages would allow for reductions in the in-house development team (PriceWaterhouse, 1996). Moreover, if reinvention of the innovation, in the form of customization, is performed as a consequence of adoption, some development work will still be necessary (Light, 2001). Thus, the extent of the suggested and perceived possible reductions in the information systems function may be overstated as a reason for ERP package adoption.

3.4.6 To Implement Change:

The general opinion is that when those in organizations choose to implement ERP packages there will be a need for organizational change. Very simply, organizations invariably change to some degree the ways that they work in concert with those ways inscribed into the package. Within the context of reasons for adoption therefore, it can be argued that people in organizations may choose to implement ERP packages with the explicit desire to force change, or use the ERP packages as the 'excuse' for change (Champy, 1997). This can be characterized as a relative advantage over custom development, as whilst we would also argue that custom development may be used to facilitate change, because of the pre-built nature of ERP packages the argument has the potential to be made much more strongly. However, it has been suggested that some apparent innovations may serve to reinforce the status quo, rather than bring anything fundamentally new into the adoption context

3.4.7 Cost:

In one study, 46 per cent of respondents cited lower cost than custom development as a reason for adoption (Price Waterhouse, 1996) and in another, 72 per cent, (Klepper & Hartog, 1992). It has even been suggested that cost is one of the biggest advantages due to the economies of scale companies can tap into (Chau, 1995). Moreover, the costs of acquisition, implementation and usage of packages are argued to be reliably predictable and lower than for custom developed software (Golland, 1978) Cost may also be a reason for the adoption of one product over another.

3.4.8 Bravado:

The adoption of ERP packages for the purposes of impressing others is not widely reported in the literature. The subject does appear, but it is not treated as worthy of study in its own right. For example, a reason for the adoption of an ERP package in one study was “To be able to show the big boys” (Adam & O’Doherty, 2000) and in another, it was because many other chemical companies were implementing it (Ross, 1999). A reason for adoption might also be that the organization wants to obtain the kudos of being perceived as at the cutting edge (Oliver & Romm, 2000). What is clear is that there are distinct links here between theories of management fashions and adopter behavior. However, although ERP packages display the characteristics of fashions, they become too embedded within organizations to decline in the way that ‘true’ fashions might (Westrup, 2002), platformed shoes for instance. However, the processes and reasons for adoption are often fuelled by bullishness and ideas of being fashionable. Thus, the promotional effects of change agents, mass media and pressures from the social system to adopt, ‘or die’, become clear, if not necessarily sensible reasons for adoption. To add further weight to this, one survey highlighted that 66 per cent of respondents agreed that “without this package we would be at a competitive disadvantage in our industry” and 50 per cent were motivated to adopt because “we were one of the first in the industry to adopt this package” (Swanson, 2003, p. 65-66).

3.4.9 The Role of Selling:

As the innovation literature points out, selling may occur via mass media communication channels or via the ‘supply push’ effects of change agent promotion efforts. Oliver and Romm (2000) suggest that packages could not be a solution to organizational problems unless vendors were selling them. What this means is that organizations may select ERP packages as a result of an approach by a vendor or other implementation intermediary that has actively sought them out to sell them a product. In scene one of the case of Metallica, this process is amply illuminated, although not explicitly discussed. The Head of Systems Development and the Chief Trainer have to explain to the CEO what the software package they are proposing is, the benefits of implementing it, allay fears about the product in question and the potential problems that might be encountered in implementation such as migration and training issues. Therefore, those in organizations may be ‘sold’ the idea of ERP packages and, due to the market orientated nature of this strategy, a particular product. Moreover, this selling activity may be linked with ‘over adoption’ where an ERP package is chosen where it was not necessarily the best choice. Interestingly, the determinant of best choice in the innovation literature refers to the ‘eyes of the expert’. In ERP package terms, we would therefore think of these people as adopters in organizations, but also implementation intermediaries, such as consultancy groups, as well as the package vendors themselves. However, it is unrealistic to assume that the ‘sellers’ only have the adopters interests at heart, and that adopters are a homogenous group.

3.5 Critical success factors in ERP implementation

A critical success factor is something that the organization must do well to succeed. In terms of information system projects, a critical success factor is what a system must do to accomplish what it was designed to do. The proposed methodology of studying CSFs behind ERP implementations is very similar to the approach used in a variety of studies in In-

formation Technology (IT) implementation research. Some of these proposed factors are the one that have been found to be significant in other IT implementations.

Referring to the previous research, we generalize 6 CSFs into 3 categories: strategic factors, tactical factors, and operational factors.

3.5.1 Strategic factors:

- Top management support – earlier studies (Sumner, 1999), Mabert & Vincent (2001) have shown that the ERP implementation was in general a top-down decision, and the success of such an implementation depended on the alignment of the ERP adoption with strategic business goals.

3.5.2 Tactical factors:

- Effective project management – in order to successfully accomplish the decision to implement an ERP system, the effective project management comes into play to plan, coordinate and control such an intricate project
- Re-engineering business processes – it is very important to consider the extent to which the company needs to re-engineer its current business processes in order to be compatible with the ERP software.
- Suitability of software and hardware – management must make a careful choice of an ERP package that best matches the legacy systems, e.g. the hardware platform, databases and operating systems.

3.5.3 Operational factors:

- Education and training – when the ERP system is up and running it is very important that the users be capable to use it, hence they should be aware of the ERP logic and concepts and should be familiar with the system's features.
- User involvement – participating in the system development and implementation, the users go through a transition period that gives them time to better understand the project's consequences.

- **Top management support**

Duchessi, p., Schaninger C. and Hobbs, D. (1989) concludes that commitment from top management and adequate training is critical success factors for implementation.

The commitment of top management should be emphasized throughout an organization. In particular, no more important factor than the support of the management is critical in the project's life. The roles of top management in IT implementation include developing an understanding of the capabilities and limitations of IT, establishing reasonable goals for IT systems, exhibiting strong commitment to the successful introduction of IT, and communicating the corporate IT strategy to all employees. Senior management must be involved, including the required people and appropriate time to finish and allocate valuable resources to the implementation effort.

The shared vision of the organization and role of the new system and structures should be communicated between managers and employees. Policies made by the manager will come

with the new systems in the company. In case of conflict, the proper mediation will be based on that standard.

- **Project management**

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements. Project management is accomplished through the use of the processes such as initiating, planning, executing, controlling, and closing.

Project management goes beyond one single factor because management is required through all the implementation. If we look at the ERP as a large project, we have some areas that we should consider, such as integration/plan, scope, time, cost, quality, human resource, communication, risk, and procurement. Usually if we balance and control all the factors correctly, the project will be successful.

- **Business process reengineering (BPR)**

A process is a logical set of related activities taking input, adding value through doing things, and creating an output. There are many ways to complete the job in business. Information systems are significant in collecting data, storing it efficiently, generating useful report to the management, and archiving data for future reference. There are two kinds of business process: operational and infrastructure. Operational processes help accomplish typical business functions including product development, order management, and customer support. Infrastructure processes are more administrative such as establishing and implementing strategy and managing many aspects of the organization including human resources, physical assets, and information systems (Olson, 2004).

Business process re-engineering (BPR) is defined by Hammer and Champy (2001) as

“the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, service and speed”. BPR analyzes the process of an organization’s business in order to identify the best way of doing things.

- **The Suitability of Software and Hardware**

Today there are many ERP vendors in this market, including traditional large vendors called the BOPSE group (the initial letters of the five vendors). Now BOSPE has become BOS, since Peoplesoft recently acquired J.D. Edwards, and was then merged into Oracle.

- **Education and Training**

In ERP implementation process many projects fail in the end despite of millions of dollars and hundreds of hours due to lack of proper training. Usually the end-user can get used to the ERP system within one year. Earlier researchers, (Ang, Yang, & Sum, 1994) found that lack of training led to difficulties in MRP systems implementation. A thorough training program is necessary to make the user comfortable with the system. This factor is too often ignored. It is a challenge for a company implementing such a system to find an appropriate plan for the training and education of the end-user. In most cases, consultants are included during implementation process, and while all the aspects of the system should be explained and transferred the end-users, the main goal of ERP training is that the users understand the various business processes behind the ERP application. (Al-Mashari, Al-Mudimigh & Zairi, 2003).

- **User Involvement**

The functions of the ERP system rely on the user to use the system after going live, but the user is also a significant factor in the implementation. There are two areas for user involvement (Zhang, Lee, Zhang & Banerjee, 2002).

1. User involvement in defining the company's ERP system needs and
2. User participation the implementation of ERP systems.

3.6 Benefits of ERP

ERP applications provide several benefits including:

- Solutions to the problems of legacy systems.
- Reduced development risk.
- Increase global competitiveness.
- Business efficiency.

However, ERP packages have also many drawbacks such as:

- Implementation complexity.
- Integration problems.
- Customization problems.
- Over budget and late projects.
- Organizational change and resistance to change.
- Problems with business strategy and competitive advantage.

3.7 Risk Factors

This refers to the negative indicators which will presage ERP system implementation failure. Often the negative re-statement of a critical success factor (for example a well documented CSF is top management support, and a well-recognized risk is viewed as lack of top management support), a risk is a potential problem which could threaten the success of a project (Wiegers, 1998) or "a negative outcome that has a known or estimated probability of occurrence, based on experience or some theory" (Willcocks, Margets, 1994). However, In order to maximize the probability of success and performance, the associated risks of implementation must be identified for the company to know how to address them. Some of the risks identified are.

3.7.1 Lack of Top management support and project champion

Top management refers to executive level support (Ewusi-Mensah, 1997; Jurison 1999; Parr & Shanks, 1999; Sauer, 1999; Standish, 1999). This may be indicated by "the level of commitment by senior management to the project in terms of their own involvement and willingness to allocate valuable organizational resources" (Holland & Light, 1999, p.4) and to a willingness and ability to undertake the cultural, political and structural change which may be necessary for successful ERP system implementation. The role of a project champion or executive sponsor is to provide strategic input for the project team and to market

the benefits of the project back to the business to provide a point of overt authority for the project within the organization and lobby management for all required resources.

3.7.2 Insufficient training and re-skilling

Users have to learn only those functions that are related to their tasks in addition to the understanding the new processes and procedures. However, the importance of training and re-skilling cannot be neglected and it is not something that should be conducted only before or after the implementation but rather it has to be present in each part of the ERP life cycle (O'Leary, 2000).

3.7.3 Lack of ability to recruit and retain qualified ERP system developers

Many organizations find it difficult to recruit and retain good ERP specialist because market rate for these people are high. Management must understand and appreciate the criticality of high-tech workers turnover, recruitment, and retention issues. Due to such situations most organizations collapse after ERP implementation.

3.7.4 Insufficient training of end-users

Most firms emphasized making a major commitment to training end-users in system uses. This meant re-skilling the end-users in new technologies and applications and supplementing 'generalized' user training with training in the use of specific application modules. Several firms emphasized user training in reporting applications, including the use of report generators to design and generate custom reports. When the ERP system is up and running it is very important that the users will be capable to use it, hence they should be aware of the ERP logic and concept and should be familiar with the system's features.

3.7.5 Lack of a proper management structure

Without central project leadership, there is excessive duplication of effort. The hardware manufacturer put someone 'in charge' and centralized the management structure of the project in order to avoid duplication of effort. In implementing a 'centralized' system, a centralized management structure should exist. In a situation, where several senior executives in a company have equal authority over a project implementation, it thus contributes to conflicts and lack of problem resolution.

3.7.6 Insufficient internal expertise

When a company did not have the needed expertise internally, most firms brought in the consultants they needed to overcome technical and procedural challenges in design and implementation. It is important to obtain consultants who are specialists in specific application modules within various operating units.

3.7.7 User involvement and change management.

In an ERP system implementation the focus is very much on people, and in particular users, as well as on processes and technologies. Training with a focus on the new business processes, technical aspects of the system and end user needs is a key part of successful ERP system implementation (Parr & Shanks 1999). Establishing a sound change management strategy, seeking input from potential system users and regular, comprehensive communication to provide information, assist in the change management process and manage expectations are key activities of both the organization and the project team (Jurison 1999, Parr & Shanks 1999, Willcocks & Griffiths 1994; Standish 1999; Sumner 1999).

3.7.8 Good fit of system to organizational environment.

This refers to an organization's structural (centralized, decentralized, federal), cultural and political environment and its compatibility with the basic premises on which an ERP system is built (centralized data, consistent practice, shared procedures, established software user roles and authorities) (Lyytinen & Hirschheim, 1987, Sumner, 1999; Willcocks & Griffiths, 1994). These factors and risks are important at different phases of project development, from planning through to implementation stabilization and improvement (Parr & Shanks 1999) and will vary in importance depending on the scope of the ERP system implementation including the number and complexity of the business modules to be implemented.

3.8 Costs and Return of Investment

The large ERP providers have made many promises, but many user companies are still asking, "what's the payoff?" The answer is still unclear. Implementing wall-to-wall software is not a matter of powering up the computer and installing a program from a CD-ROM. Enterprise Resource Planning is a huge investment in time and money. It can take years of work by numerous managers and cost millions, or in some cases hundreds of millions of dollars. The cost of implementing an ERP application depends on the scope of the effort, size of the enterprise, the ERP application selected, and the Information Technology environment required. Cost for a large system can run to several hundred million dollars. Many large corporations are currently spending between \$5 million and \$200 million to implement an ERP system (McKinney, 1998).

There are as many success stories as there are failures related to the implementation of ERP systems. In one failure case, Dell Computer cancelled their ERP contract in January 1997 after spending \$115 million dollars the original cost of the project was estimated at about \$150 million. Dell determined that the system could not deal with the needed sales volume. Likewise, Mobil Europe spent hundreds of millions of dollars on its ERP system only to abandon it when its merger partner objected to the system, and FoxMeyer Drug stated that its ERP system helped drive it into bankruptcy.

On the positive side, Autodesk, a leading maker of computer-aided design software claims a success on an ERP implementation. It used to take an average of two weeks to deliver an order to a customer, but now Autodesk ships 98% of its orders within 4 hours. IBM's Storage System division used an ERP to reduce the time required to reprise all of its products from 5 days to 5 minutes, the time to ship a replacement part from 20 days to 3 days, and the time to complete a credit check from 20 minutes to 3 seconds. Fujitsu Microelectronics reduced the cycle time for filling orders from 18 days to a day and a half, and cut the time required to close its financial books from 8 days to 4 days, using an ERP system. Companies are anticipating immediate returns on efficiencies in production and inventories, with additional returns in other areas being realized over the long term. The greatest return will be one that cannot be easily quantified. This is an integrated system that provides timely information, better customer support, and a competitive edge; it addresses strategic goals and objectives, and takes a company into the 21st century. Only time will tell if there are great improvements possible in the bottom line, in strategic competitiveness, in employee and customer satisfaction, and in overall benefits for shareholders/stakeholders.

3.9 Measurement of success

The definition and measurement of ERP implementation success is a thorny issue. Markus and Tanis (2000), state that success means different things depending on who defines it. Success depends on the point of view from which you measure it. People meant different things when talking about ERP success. That is to say implementation Consultants, defines success in terms of completing the project plan on time and within budget. However implementers i.e. adopters of ERP system looks at success in terms of achieving business result tended to emphasize having a smooth transition to stable operations with the new system, achieving intended business improvements like inventory reduction, and gaining improved decision support capabilities.

Seddon et al. (1999) recommended that anyone seeking to evaluate an IT investment should have clear answers to Cameron and Whetten's (1983) seven questions.

As stated earlier, the goal of this paper is to compare the performance to the promise of ERP from Top management perspective or what Hammer and Champy (1993:102) term 'process owners'. Process owners are senior middle managers responsible for what is described as management control and tactical planning.

Below are Cameron and Whetten's seven questions and our answers to them in our attempt to measure organizational performance.

7 questions for measuring organizational performance	Our answers in this study for evaluating investment in ES
1. From whose perspective is effectiveness being judge?	Process owners (Top management)
2. What is the domain of activity?	Enterprise system
3. What is the level of analysis?	Budget and Time
4. What is the purpose of the evaluation?	Compare Promise to performance
5. What time frame is employed?	Months after the ES went live.
6. What type of data is to be used?	Return on investment
7. Against which reference is effectiveness to be judged?	The promise of ERP which is the motivation for its adoption

Source: Cameron and Whetten (1983:270-274)

Another important issue in the measurement of success is comparing adopters' objectives, expectation and perception as a standard for defining and measuring success In this case the adopters' criterion is used to compare an actual performance/achievement.

4 Empirical findings

In this chapter, the empirical findings from 3 respondents are interpreted. The companies Trelleborg AB, DeLaval AB and Vattenfall AB talked about the factors that motivated the companies to adopt the ERP system and the performance of their systems so far.

4.1 Trelleborg AB

Trelleborg is a global industrial group whose leading positions are based on advanced polymer technology and in-depth applications know-how. They develop high-performance solutions that damp, seal and protect in demanding industrial environments. The Trelleborg Group offers technological solutions that meet three principal customer needs: to damp, seal and protect. These functions have many areas of use in various industries worldwide. The Group's customer groups are to be found primarily within the aerospace, agricultural, automotive, infrastructure/construction, transportation equipment, oil/gas and other industries. The head office is located in Trelleborg, Sweden and other business units in Norway, Moscow, US and UK etc.

The Group has annual sales of approximately SEK 24 billion, with about 22,000 employees in 40 countries with about 100 employees in Sweden. Trelleborg's President and CEO is Peter Nilsson and Anders Narvinger is Board Chairman. (Trelleborg AB, 2006-05-10).

Our respondent at Trelleborg group is Leif Anderson a controller and financial Director in charge of the financial administration. Trelleborg uses NeuVis as their enterprise system software. NeuVis is used to support their production and distribution process. The roll out of the software was done in 1993 in a 'Big Bang'. According to Leif, NeuVis is the first package software the company is using and it is to ensure the total integration of their processes.

On the motivation for the adoption of the system, Leif ranked the under listed proposed perceived promise of ERP which is depicted on the graph below. It must be noted that one (1) is strongest motivation and eight (8) the weakest.

1. Replace aging legacy system. **(2)**.
2. Modernized company IT environment **(1)**
3. Provide better management tools. **(4)**.
4. Increase customer satisfaction **(3)**
5. Improve efficiency **(5)**.
6. Easy access to information for decision making **(8)**
7. Increasing revenue and reducing costs **(7)**
8. Solve the Y2K problem **(6)**

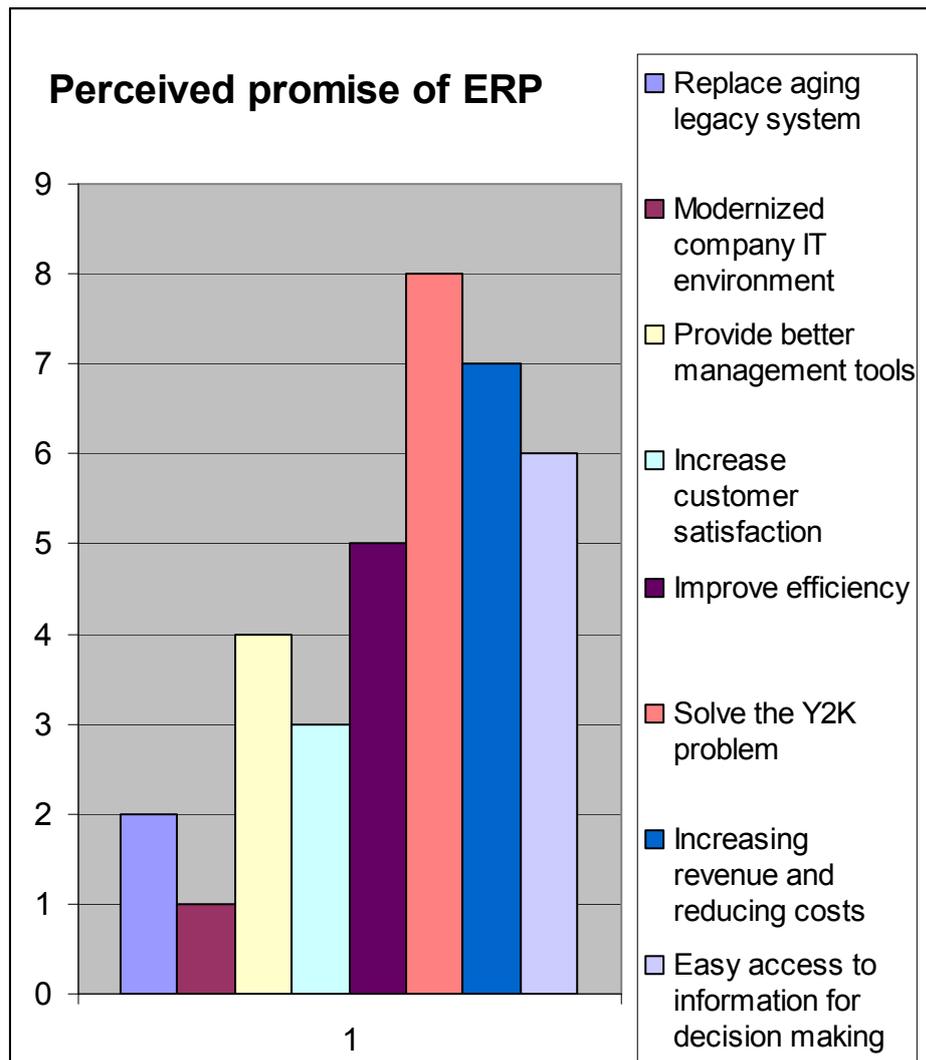


Figure 1

As depicted in fig. 1, Leif identified ‘modernized company IT environment’ as the first motivation for which the company adopted the system. According to him IT is not only an enabler but also strategic to modern business environment. He stress that the three other most important factors which influence the adoption of their system were ‘Replace aging legacy system’, ‘Increase customer satisfaction’ and ‘Provide better management tools’ as the old system could not integrate the core business process. ‘Improve efficiency’, ‘Easy access to information for decision making’, ‘Increasing revenue and reducing costs’, ‘Solve the Y2K problem’ were in order of less important factors.

On the budget devoted for the project, he said about one million Swedish Kronor was earmarked for the roll off of the project where about 50% was for consultancy, 30% for software and 20% for training.

In the area of system performance, Leif describe the system as been running well, has contributed to the reduction of cost and has increase efficiency. However he mentions that the system is not able to support current demand and the company is planning an upgrade of

the same system or a replacement with different software (Leif Anderson, personal communication, 2006-05-10)

4.2 Vattenfall AB

Vattenfall was founded in 1909 in Sweden. In 1992 Vattenfall was transformed from a public utility into a Swedish state-owned company. In 1996 the electricity market was deregulated.

Vattenfall acts in all parts of the electricity value chain - generation, transmission, distribution and sales. Vattenfall delivered electricity primarily for industry. Major clients included the railways and the Swedish metal and forestry industries. Serving 1.3 million customers across the industrial and household sectors in the Nordic countries, Vattenfall is the largest electricity generator, distributor and district heating company in the region. Their market share is 20 % of the Nordic electricity market. Vattenfall's head office is located in Stockholm. Vattenfall employs 32,231 in full time, generates 169.1 TWh electric power per year, and produces and sells 34.1TWh of heat per year.

Vattenfall currently has operations in Sweden, Finland, Germany and Poland. The parent company, Vattenfall AB, is wholly owned by the Swedish State

In Sweden they focus on generation, distribution and sales of electricity and heat. They also offer their private customers telephony - more than 100 000 customers now have telephone contracts with Vattenfall. For industrial customers we also provide customized energy solutions, as well as consulting and contracting services. (Vattenfall AB, 2006-05-10).

Gunnar Norström was our respondent at Vattenfall who is a member of the Chief Information Officer's team on strategic issues for IT governance. SAP is the ERP system software for Vattenfall which was implemented in 1998. Gunnar said the software is been adopted as an integration solution for the company and is the first package software for the company. The system was implemented in a 'Big Bang' in areas like Human resources, Finance, purchasing and sales processes.

He ranked the perceived promise for ERP as shown in the diagramme below.

1. Replace aging legacy system **(1)**
2. Modernized company IT environment **(4)**
3. Provide better management tools. **(3)**
4. Increase customer satisfaction **(8)**
5. Improve efficiency **(2)**
6. Easy access to information for decision making **(5)**
7. Increasing revenue and reducing costs **(7)**
8. Solve the Y2K problem **(6)**

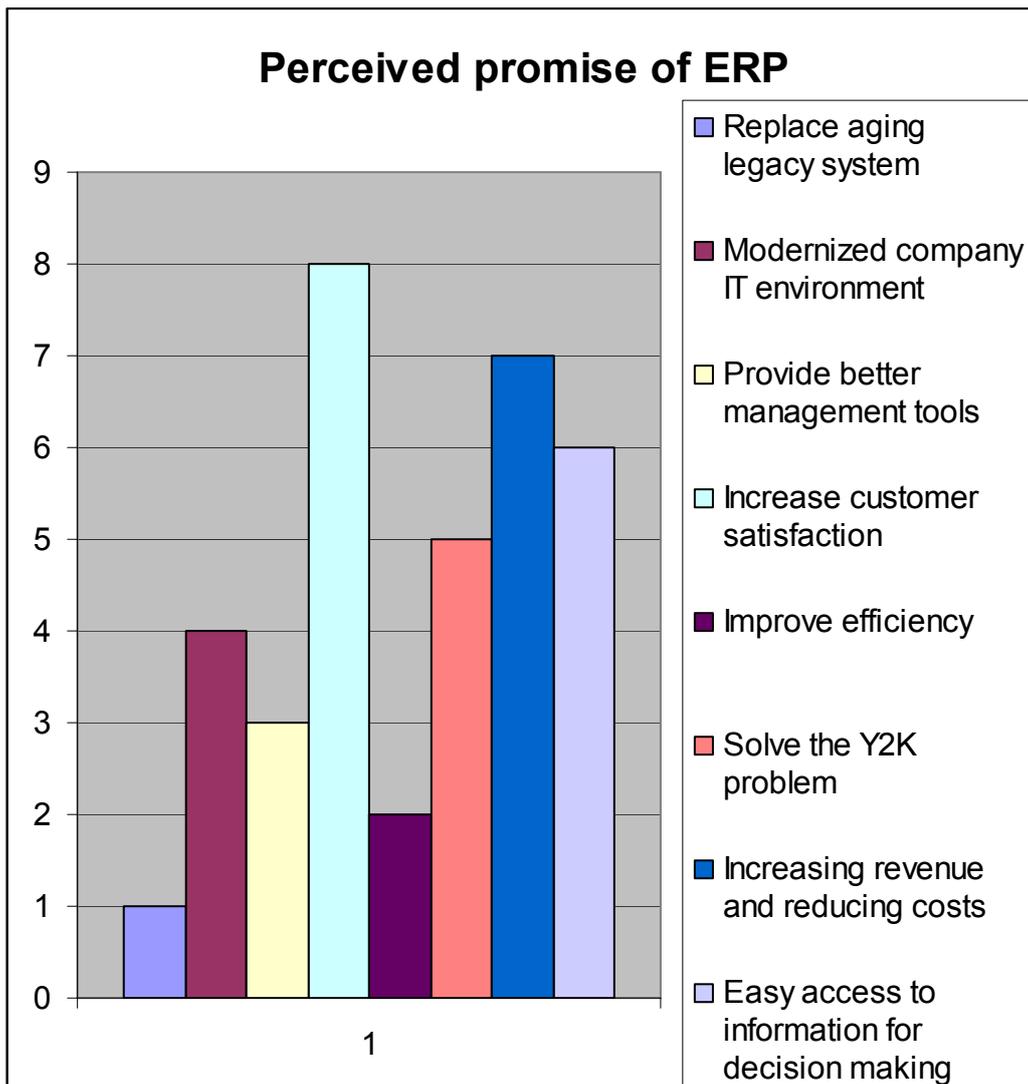


Fig. 2

As depicted in the diagramme, Vattenfall was motivated by the fact that they wanted to replace aging legacy system, improve efficiency, provide better management tools, and Modernized Company IT environment in order of importance. Other factors he considered of less importance are; ‘Solve the Y2K problem’, ‘Easy access to information for decision making’, ‘Increasing revenue and reducing costs Increase customer satisfaction’

According to Gunnar, 500 million Swedish Kronors was devoted for the ERP system implementation. He gave the break down as 40% for consultancy, 35% for the software and 25% went into training.

For performance of the system, he said “even though we implemented below budget and time, however we expected more than what we have received from the system so far” (Gunnar Norström, personal communication, 2006-05-10)

4.3 DeLaval AB

DeLaval is part of the Tetra Laval Group of Tetra Pak, DeLaval, and Sidel. It is the leading food processing and packaging group in the world. DeLaval is a full-service supplier to dairy farmers. The company develops, manufactures and markets equipment and complete systems for milk production and animal husbandry. Service and sales of a wide range of accessories are also key aspects of DeLaval's operations

DeLaval conducts business in 100 markets and delivers half of all milking equipment sold worldwide. Cutting edge technologies and strong customer focus is the foundation of the continuous development of DeLaval.

Research and development has been essential to the company's steady progression. This is especially emphasized in product development, where the team works in close contact with a worldwide network of farmers, academics, dedicated research facilities, scientists, sales teams, authorized dealers and other agricultural experts.

DeLaval has long maintained a strong emphasis on milk quality, hygiene and animal welfare. The company supplies highly efficient system solutions for milking, herd management, animal traffic control, feeding, cooling, manure handling, and ventilation and energy recovery. Additionally, DeLaval provides milking equipment installations, preventive maintenance programmes, breakdown services and mobile shops to approximately one million customers across the globe (DeLaval AB, 2006-05-10).

At DeLaval our respondent was Jens Ruffer Service Manager-Information Services, responsible for Back Office activities. DeLaval uses three different enterprise system software, these are SAP, SCALA and BPCS. The SAP support administration, SCALA supports sales and BPCS is for production process which he said will be replaced by SAP soon. He stressed that SAP which will soon take over from SCALA and BPCS is seen as the market leader and also support complex process. The roll out of the SAP was done in 1996 in a 'Big Bang'. According to Jens, the other two systems have been in operation for some time now even before the adoption of SAP.

As to what motivated DeLaval to decide on these software Jens ranked the following perceived promise where one is the strongest, and eight the weakest as depicted in fig 3 below.

1. Replace aging legacy system. (1)
2. Modernized company IT environment (6)
3. Provide better management tools. (7)
4. Increase customer satisfaction (5)
5. Improve efficiency (3)
6. Easy access to information for decision making (2)
7. Increasing revenue and reducing costs (4)
8. Solve the Y2K problem (8)

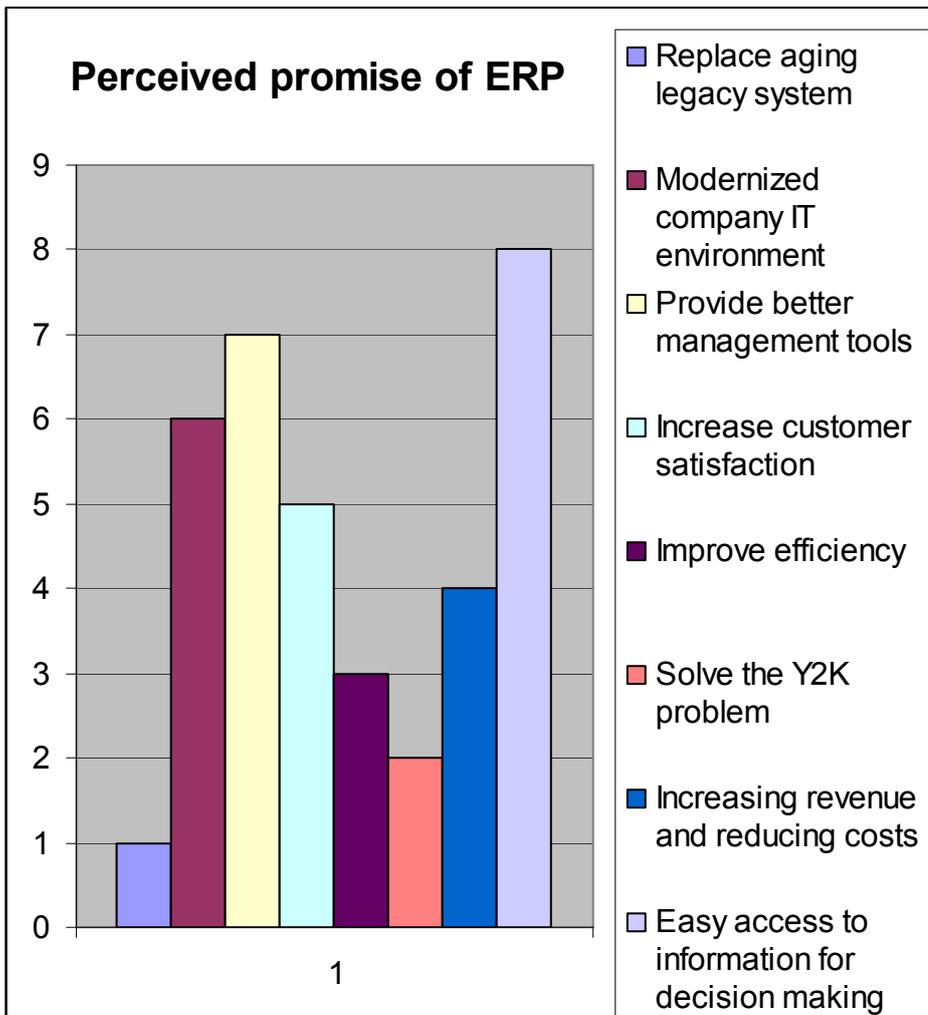


Fig. 3

From the diagram, Jens mentioned that ‘Replace aging legacy system’, ‘Solving the Y2K problem’, ‘Improving efficiency’ and ‘Increasing revenue and reducing cost’ respectively are the most important motivation for ERP adoption. He identified ‘Increase customer satisfaction’, ‘Modernized company IT environment’, ‘Provide better management tools’, ‘Easy access to information for decision making’ in that order as the factors of less importance.

On the budget devoted for the project, he could not give figures as to how much was devoted for the project, however he said about 60% was for consultancy, 25% for software and 15% for training.

When asked as to the performance of the system, Jens said, “I must say we exceeded budget and time, but we’ve been able to bring down IT cost and have achieve our expectation based on the reasons for system adoption” (Jens Ruffer, personal communication, 2006-05-10)

5 Analyses

This chapter is aimed at analyzing the empirical finding in order to answer the question for which this paper is based. First we try to review the results from our findings i.e. interpreting the motivation for ERP adoption and as to whether companies were successful in achieving their aim.

5.1 Perceived promise of ERP

The rationale for implementation varies between companies and provides an indicator of the type of implementation envisaged. This study did not report anything much different from the general motivating factors for ERP adoption. Again the expectation for which companies in Sweden adopt ERP is more or less related to the reasons for its adoption. It must be noted that there are several reasons for implementing an ERP. The chief reason is the need for a common IT platform. Other reasons include the desire for process improvement and best practices (Klaus et al., 2000), data visibility, operating cost reductions, increased responsiveness to customers and improvements in strategic decision-making. Although some firms in the study gave the need for Y2K compliance as a motivation, but viewed this as simply the impetus for the replacement of a mix of aging legacy systems (Holland & Light, 1999) with a common platform. Replacement of legacy systems with a common platform had become imperative for two reasons: a mix of aging legacy systems had led to high cost support and the firms expected business benefits such as process improvements and data visibility to result in cost reductions.

Below is the summary of the ranking of the eight perceived ERP promise by the various companies (Trelleborg AB, Vattenfall AB, DeLaval AB).

As already stated, we used figures from 1-8 for the companies to rank those factor, where 1=the strongest motivation and 8=weakest motivation.

The table and the chart below show the aggregation of the perceived promise of ERP from the various companies under study. This means the lowest figure from the table (4) which depicts the shortest bar on the chart happens to be the strongest motivation and the highest figure (20) and which also shows the tallest bar on the chart is the weakest motivation.

	Perceived promise of ERP	Trell.	Vatte	DeLa	Total
1	Replace aging legacy system	2	1	1	4
2	Modernized company IT environment	1	4	6	11
3	Provide better management tools	4	3	7	14
4	Increase customer satisfaction	3	8	5	16
5	Improve efficiency	5	2	3	10
6	Solve the Y2K problem	8	5	2	15
7	Increasing revenue and reducing costs	7	7	4	18

8	Easy access to information for decision making	6	6	8	20
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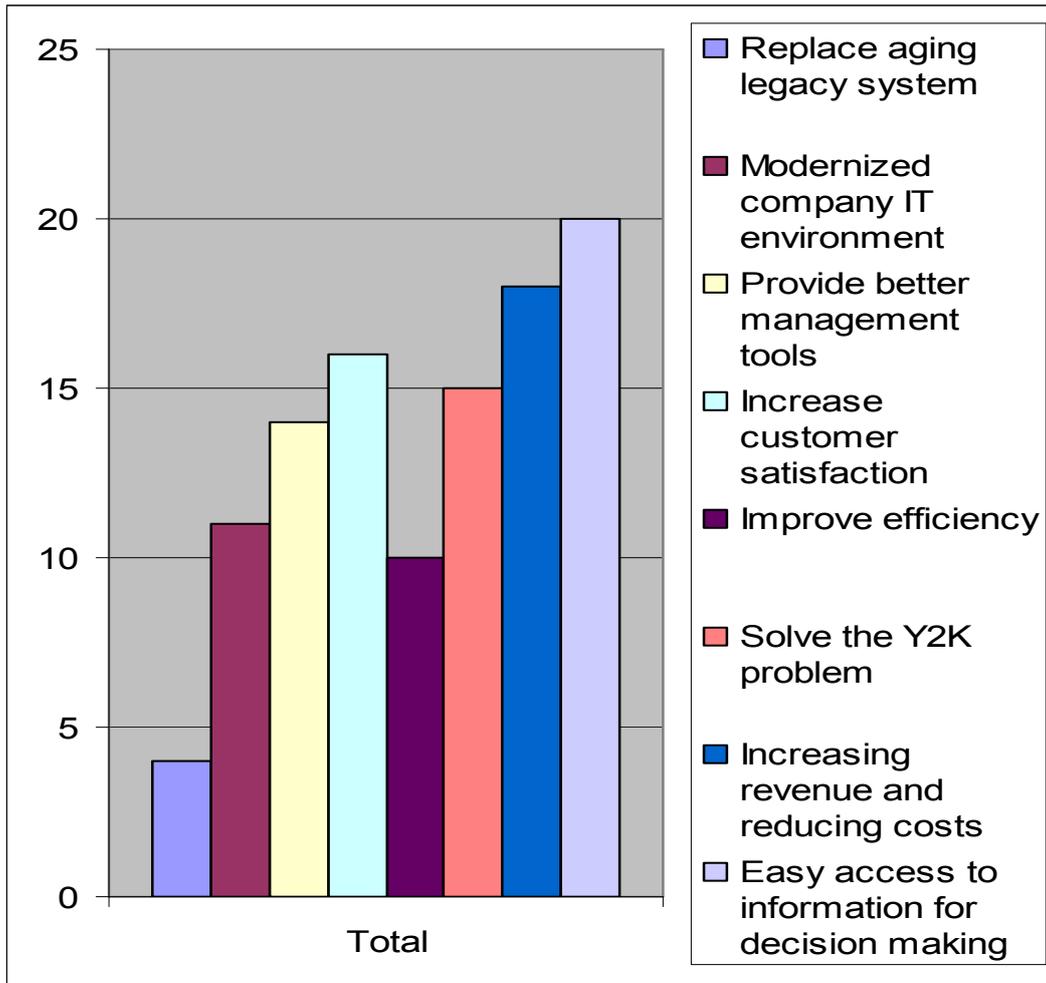


Figure 5.1

5.1 Perceived promise of ERP

Replace aging legacy system (score-4)

Replacing aging legacy system recorded the least score which implies that it is the most influential motivating factor for the adoption of ERP. According to respondents from Vatzenfall and DeLaval who ranked this factor first (1), they believe the problems associated with getting IS to work are often characterized as Legacy Information Systems, old, outdated technologies that are muddled by years of modification, degradation and general lack

of attention. They stressed that ERP packages are the ‘solution’ to the problems they may pose. The relative advantages of ERP packages in this respect are that they are argued to be: well structured and allow for maintenance and future development to be outsourced to a vendor easily operated, supported and maintained due to the ability of the implementing organization to tap into available a skills base for the software (Bingi et al., 1999; Sumner, 2000; Willcocks & Sykes, 2000); and well documented and organized (Golland, 1978; Butler, 1999). The benefits of packages in general ‘over’ legacy information systems are widely espoused in the IS media and by software vendors.

Improve efficiency (score-10)

Efficiency improvement is next on the ranking as recording the least figure. The respondent from vattenfall AB even ranked this factor as the second motivation. Generally it was considered an important factor for the various companies. “There has been tremendous improvements in the way things are done”, a respondent said. ERP package brings about business efficiency (Markus & Tanis, 1999).

Modernized company IT environment (score-11)

“Package software and for that matter ERP is about the best way we can change and bring modernity into our IT system” (Leif Anderson, personal communication, 2006-05-10).

The general opinion is that when those in organizations choose to implement ERP packages there will be a need for organizational change (Glass, 1998). Very simply, organizations invariably change to some degree the ways that they work in concert with those ways inscribed into the package. Within the context of reasons for adoption therefore, it can be argued that people in organizations may choose to implement ERP packages with the explicit desire to force change, or use the ERP packages as the ‘excuse’ for change (Champy, 1997). This can be linked to the fact that even though not widely reported in ERP literature, one study showed that a reason for the adoption of an ERP package was “To be able to show the big boys” (Adam & O’Doherty, 2000)

Provide better management tools (score-14)

Provision of better management tools is another important factor most of the respondents cited. “You see ERP package affords the central management opportunity to take decision since there is easy access to information as information is centralized” (Gunnar Norström, personal communication, 2006-05-10). Infrastructure processes are more administrative such as establishing and implementing strategy and managing many aspects of the organization including human resources, physical assets, and information systems (Olson, 2004).

Solve the Y2K problem (score-15)

As indicated by the ranking and the chart, this factor was in overall ranked fifth. However DeLaval considered it as the second most important factor for their ERP adoption. According to our respondent they needed to guide against the treat of Y2K (Jens Ruffer, personal communication, 2006-05-10)

Others

Increase customer satisfaction (score-16), increasing revenue and reducing costs (score-18), Easy access to information for decision making (score-20) were ranked 6th, 7th, and 8th respectively. The consensus was that all these three factors are by-products as the above factor have been achieved.

5.2 Implementation budget and Time

On the question of budget for the ERP implementation project, respondents were asked whether their project stayed within their original budget, and from the responds the pattern was not different as the majority (~60%) of project cost is devoted to setup, installation and customization of the software, services typically provided by outside consultants and between (20-30%) on the software and the rest on training and development.

As it has been a general fact that most ERP project exceeds budget and Time. This was not different from the case of Trelleborg AB and DeLaval as these two companies according to our respondents exceeded budget and time. The reasons most of them cited as been responsible for exceeding budget included underestimated consultancy fees, and unrealistic budget to begin with. It is however interesting to note that far from the normal, Vattenfall AB according to Gunnar Norström, implemented their ERP project below budget and time. "I must say we implemented this project below budget and time" (Gunnar Norström personal communication, 2006-05-10). According to him, their ability to implement their project below budget and time is the fact that they did work on their project management i.e. they spent much money and time on pre-implementation work which is critical to the success of ERP implementation.

5.3 Performance of ERP

In the area of ERP performance, Companies have spent fortunes on ERP software and implementation only to find that business performance has not improved at all. These large investments and negative ROIs have created a whirlpool of controversy, rampant company politics and even a number of lawsuits. However there has been other favorable report of good performance of ERP (Davenport, 2000).

This study as mentioned earlier seeks to compare promise to performance of ERP and see whether companies achieve their expectation. We must say that generally the software according to our respondents was able to solve most of the problems for which they were adopted.

One respondent, Leif, the Controller and Financial Director from Trelleborg AB describe the system as running well, contributed to the reduction of cost and has increase efficiency. However he mentions that the system is not able to support current demand and the company is planning an upgrade of the same system or a replacement with different software (Leif Anderson, personal communication, 2006-05-10). On his part Jens, Senior Manager (information service back office) said, "I must say we exceeded budget and time, but we've been able to bring down IT cost and have achieve our expectation based on the reasons for system adoption, you know ERP implementation demands dedication and commitment e.g. there should be a total top management support, Sumner (1999), Mabert et al (2001), education and training Ang, et al (1994) and user involvement (Zhang, et al. 2002), " (Jens Ruffer, personal communication, 2006-05-10).

Meanwhile Gunnar Norström, Chief Information Officer's team on strategic issues for IT governance, Vattenfall AB, maintain that, even though the company implemented below budget and time, they expected more than what they have received from the system so far. "We expected real payoff like increasing business efficiency (Markus & Tanis, 1999).and increase in profitability"

6 Conclusions

The conclusion sums up the analysis which is typically based on the empirical findings. It also looks at whether the companies were successful in the adoption and implementation. Lastly the chapter considers discussion and observation from the study.

The adoption and implementation of ERP are largely influenced by the perceived promises and benefits that are likely to be derived. Oliver and Romm, (2000) suggest that packages could not be a solution to organizational problems unless vendors were selling them. What this means is that organizations may select ERP packages as a result of an approach by a vendor or other implementation intermediary that has actively sought them out to sell them a product but implementers may end up not been satisfied.

After using the various methods to gather our empirical finding, reviewing the literature articles and analyzing empirical case studies, we can conclude that:

All the three companies for the study, adopted ERP for similar reasons and this is evident in their ranking that is basically factors like replacing aging legacy system, improving efficiency, modernizing company IT environment and providing better management tools were the most influential factors while other factors such as Solving the Y2K problem, Increasing customer satisfaction, Increasing revenue and reducing costs and Easy access to information for decision making were of less importance since they were to be realized once the earlier factors are in place.

Again, we can say that the trend of budget spending is not different from the already documented theories which always peg consultancy as taking the chunk of the budget as high as 50-60%. Also companies can implement ERP project within budget and time if they do more on preparatory work before implementation.

Also it is evident that success is not achieved only after recourses have been devoted for ERP project but more so when there is much effort and commitment. This is because there are critical success factor such as top management, BPR (Olson, 2004), suitability of software and hardware, project management, user involvement (Zhang, et al., 2002) etc as there are also critical risks which are more or less the opposite of success factor.

It must be noted that, to realize the full benefit of the ERP project, companies must be aware of all these factor and strike a balance between them.

In sum the study portrayed that the performance of ERP reflects its promise. This is evident in the survey, that is comparing the promise which also serves as the motivation for system adoption to the performance of the system and that companies for the study adopt ERP for similar reasons and the trend of budget and time is not far from documented theories.

6.1 Discussion

From our study it has been noted that a company may adopt and implement ERP software for one reason or the other and expect the return in other areas. Again, some companies also have higher expectation than even the software can deliver and if the expectation is higher than performance, no matter how successful the project would be, there will still be dissatisfaction.

Another important factor we realized was that, companies do not normally have a reference point or do not set standards for their measurement. This therefore makes it difficult to measure the return on investment.

Again companies should be able to link input levels and process performance to output in measurable ways.

Lastly, matrix should be set in advance of project implementation, and pre-implementation benchmarks should be measured; then project success can be accurately judged. It must be noted that some companies in their rash to implement ERP under the treat of Y2K did not set a matrix against which to measure the success of their implementation. Meanwhile the success of ERP system goes beyond simple measure of efficiency.

7 Evaluations

This chapter considers the aftermath of the study. It is introduced to reflect over the study, thoughts on likely limitations and finally, implication for future research.

Implementation of ERP systems requires a substantial investment in time, money and Internal resources and is fraught with technical and business risk. The question has always been whether ERP perform what it promises?

The result of this study investigates the promise and performance of ERP.

7.1 Limitations

When we set out to take this study, our aim was to interview at least five companies, which would have give us more insight into the study. However we could only interview three because of reasons mentioned earlier.

Another limitation we encountered was language. As international student we would have been comfortable with the English language which we believe would have helped in getting more information. Also of importance are the limited time and other resources which is a limitation.

In spite of all these limitation, we believe our research results have fulfilled the purpose for which we conducted this study.

7.2 Implications for future research

This study is based on scientific study which could be a base for future research as scientific methodology was used.

The qualitative and quantitative research framework was chosen as a methodology because it gives us the ability to probe into the motivation for ERP adoption and whether companies enjoy return on investment based on the promise of ERP.

Further research can be conducted on matrix or pre-implementation benchmarks for which ERP should be measured as most companies invest in ERP for one reason and expect the return in other areas.

To sum up, the future research concerns about the detailed aspects in the evaluation of the promise and measurement of performance of ERP.

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Appendix

Questionnaire

As part of our master programme, students of **Jönköping International Business School** are suppose to write a master thesis as a part fulfillment of our course. We have therefore decided to write on ERP and the topic is: '**Promise and Performance of ERP**' the perspective of Implementers.

This questionnaire is designed to enable the authors answer the question above. It is thus to ascertain the motivation for the adoption of ERP and whether ERP actually lives up to expectation from the perspective of implementers.

Again, it is design to be administered to company's top management and executive and which covers: the background of the companies, the motivation for the adoption of ERP system, and the pay off or otherwise on investment. This therefore means the questionnaire is designed purely for academic purpose.

1. Please can you give a brief background of the company?
2. Please what is your position and role in the organization?
3. Which enterprise system software are you using in the company?
4. Why did you choose that software?
5. When did the company implement the system?
6. Before the adoption of this software, was the company using any other ERP

Software? Yes No

7. If yes, why did you change that system?
8. How was the ERP implementation done?

1. 'Phased' (applying modules one after the other)

2. 'Big Bang' (applying all modules at ones)

9. What was the planned implementation period or how long do you expect the ERP project to be completed?

10. The list below is factors perceived to be the promise of ERP. Can you rate them according to your reason for adopting ERP, by assigning values 1 to 7 where one (1) is the Strongest and eight (8) weakest.

	Perceived promise of ERP	
1	Replace aging legacy system	
2	Modernized company IT environment	
3.	Provide better management tools	
4.	Increase customer satisfaction	
5	Improve efficiency	
6	Solve the Y2K problem	
7	Increasing revenue and reducing costs	
8	Easy access to information for decision making	

11. How long has the system been in operation?

12. Would you please make an estimate of the original budget established for ERP project?

13. Can you please give the break down under the following?

- Software.....
- Training and
- Consultancy.....

14. Who was responsible for the project cost?

15. From whose perspective is performance to be measured, (e.g. CEO, Management, or contact workers)?
16. How is performance to be measured?
17. What is the purpose of performance measurement?
18. What was the length of time before key performance indicators achieve normal or expected level?
19. What can you say about project cost relative to budget and completion time relative to schedule?
20. Has the company achieved business results expected for the ERP project e.g. Reduced IT operating cost and inventory carrying cost?
21. Does your company feel the ERP effort was successful and how do you know?

