



EVALUATING STRATEGIC VALUE IN INFORMATION SYSTEMS DEVELOPMENT PROJECTS

A case study at SKF

Abstract

On an ever more globalised market with larger and larger enterprises the competition is getting harder all the time. As a result of this IT departments are forced to become more aligned with business. When treated as any other line of business focus is changing from cost to return and this rises new demands on the methods used for managing IS/IT. In spite of being of great strategic value, soft benefits are often disregarded. Considering this, our main issue has been; *what factors are important to consider when choosing methods for evaluating strategic value in information systems development projects?* Our studies were conducted at SKF partly as a case study and partly as interviews, based on extensive literature studies. The findings indicate that the most important factor when choosing methods is awareness of their properties, both good and bad, and that the choice is a deliberate one. This makes it possible to create a portfolio of methods complementing each other and covering all aspects of strategic value.

Keywords: strategic value, soft benefits, Portfolio Management, PENG

Authors: Fredrik Hjort & Karl Rehnberg
Supervisor: Maria Bergenstjerna
SKF Mentor: Olof Berg
Master thesis

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Background

The rapid development in information technology after the Second World War has resulted in enormous amounts of information in today's organisations. This information is to be stored, updated, read and sent on a daily basis. To do this, organisations have an ever-growing number of computer applications and systems. During the 1990's this development peaked in a near insane hype were you could sell almost anything regardless of price as long as you had the two magic letters IT in your product description. The research and advisory firm Gartner was among the first to foresee the recession when they presented their Hype Cycle, figure 1 (Rafaeli, 2002), which later has been proved to fit almost all new technologies. When Gartner proved to be right and the recession in the IT market was a fact the organisations started to cut costs. This is where we are today and one of the problems is that information technology traditionally has been regarded very much as a cost instead of an investment with any direct connections to returns. This makes it easy for management to simply cut back on IS/IT costs but it makes it very difficult to make a wise decision on where to cut.

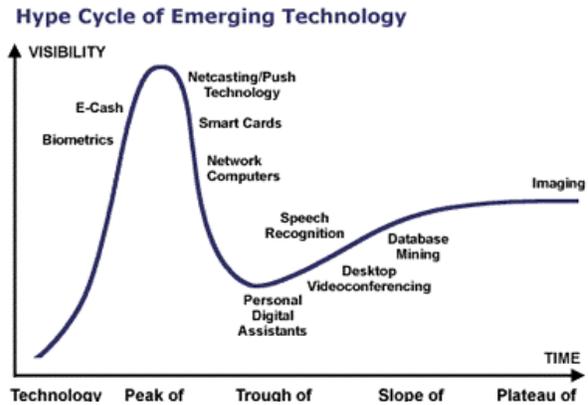


Figure 1. Gartner's Hype Cycle.

Source: Rafaeli (2002)

Lindvall (2001) summarizes the activities in Swedish companies during the 1990's with one word; change, a change that springs from new competition, new technology and new ways of organising work. According to Enquist, Magoulas, Bergenstjerna, & Holmqvist (2001), today's large, complex and globalised enterprises depend on a proactive management philosophy. Proactive in this context is the ability to secure motivation and learning in the specific developmental situation at hand and is the opposite of a more reactive use of generic methods and old habits. One drawback of the proactive management philosophy is that an enterprise cannot be guided only by intuition. In order for the enterprise to function there must be some sort of planning and sound use of methodologies. However, too rigid planning restrains innovation and agility. A number of major Swedish companies, including SKF, together with the Department of Informatics at Göteborg University have run a project called DELTA with the main issues on how to understand and improve the coordination of enterprise and IS development in complex organisations. What the DELTA project tried to find was some kind of middle way between formal methodologies, i.e. reactive management, and innovation, i.e. proactive management, were neither one nor the other puts any restraints on the other. There are three major areas of concern associated with coordinated development; lack of comprehensibility, lack of shared understanding and lack of motivation and commitment. To deal with these questions the DELTA group developed a meta architecture model (presented later in figure 5). The model's main purpose is to assist management to systemize critical factors of the development process.

META Group (2002, Dec 28) emphasizes that as IS/IT more and more becomes part of a company's business and in many cases becomes the business and that it is increasingly important to integrate IS/IT with the needs of the business and to

manage IS/IT from an investment point of view instead of just as a cost. Portfolio Management (META Group, 2001, Oct 22) focuses on cost versus return and it aids in planning life cycles for assets and projects. Portfolio Management can also be a useful approach in aligning IS/IT investments to business direction. Portfolio Management has its roots in the stock exchange, the trade with securities and the concept of organising them in portfolios in view of risks and yields. The concept was then adapted in business management where assets and projects were organised in a similar way. We have seen signs indicating that IS/IT Portfolio Management is an expanding area, perhaps somewhere in the steep rising before the peak of Gartner's Hype Cycle, see figure 1. Portfolio Management was suggested as a way of managing IS/IT by McFarlan & McKenney (1983) already in the early 1980's but it is not until now that this idea has started to spread in the business world as a way to meet the new demands of delivering returns on invested money. One of the most important parts of Portfolio Management is the ability to value assets and returns from investments. M. Ross, analyst at META Group, says (Hoffman, 2003, Feb. 10) that one of the shortcomings with the existing Portfolio Management tools is their inability to focus on the life cycle of an asset and determine the financial value of software or hardware. SKF has developed their own IT Portfolio Management Methodology (later presented in figure 10) together with META Group and UMT, one of the Portfolio Management CASE-tool suppliers. In cooperation with EDS a MS Excel tool prototype has then been developed and is now ready to be run in a pilot project. SKF is also evaluating UMT's CASE tool for the next phase of implementing IS/IT Portfolio Management.

Many companies want to measure the benefit they gain from IS/IT, but no one knows how. There are a lot of models for doing this and what they all have in common is that they are trying to find a connection between IS/IT investments and the company's financial result (Wallström 2003, Feb 3). One model trying to do this and also considering soft aspects, being aspects that are hard to measure, is the Swedish PENG (Prioritering Efter Nyttogrunder) model that springs from the realization that most IS/IT investments does not result in all benefits possible. Another aspect of the same problem is the lack of a common view of the organisation and its environment. Checkland (1989) describes management as handling the issues that results from different individuals and groups making different evaluations leading to different actions. As mentioned this is also one of the issues of the DELTA project.

Considering everything mentioned above, can the concept of Portfolio Management, supported by the right methods, be a good way to handle the new situation? If so, how can you combine this classic financial theory with a more modern view on what value actually is?

Problem area

We came in contact with the issues above when we started talking to SKF about their situation after their IS/IT outsourcing. What they pointed out as their main concern was two questions regarding control; *what leads you to decide on starting one IS/IT project and not starting another?* and; *what is the process that you apply to make sure that you have taken the right decision?* During the first month at SKF we focused on Portfolio Management, at the time being evaluated by eBITS, SKF's department for eBusiness & IT Strategy, as a way of managing their IS/IT development projects in respect of projects as assets and return on investments. A quick review of the CASE-tools available in the market showed a lack of consideration for soft benefits in the IS/IT area, a factor being increasingly important in today's tougher competition and

after the shift of systems paradigm (Magoulas & Pessi, 1998). Since Portfolio Management is based on the valuation of chosen factors and the comparison between projects, we saw the need for a method to evaluate soft benefits of IS/IT. Since we now had found our area of interest, we delimited our field of study by choosing to focus on one such method we found particularly interesting, PENG, and tried to put it in a context together with SKF's Portfolio Management model. The Delta project among other things pointed out the lack of comprehensibility and the lack of shared understanding as major concerns for coordinated development of enterprise and IS/IT. This is also described by Checkland (1989). Both Portfolio Management as a concept and PENG as a method claim to help aligning IS/IT investments to business direction and facilitate understanding between management and IT departments.

Issue and purpose

Considering all above, could Portfolio Management, being used as a way of thinking and viewing the organisation, combined with suitable methods, be a good way to meet the demands of a changing market? If so, this shows a need for a tool for evaluating strategic value and investments with consideration to soft aspects. To be able to have a realistic possibility to answer our issue we have narrowed it down to the following:

- *What factors are important to consider when choosing methods for evaluating strategic value in information systems development projects?*

In order to answer this question we will first investigate the concept of strategic value and present a definition and then based on our studies present some factors to consider when choosing methods for evaluating it. We are both software engineers with limited previous experience of management theory although we can see a need to widen our perspectives. We also hope to be able to mediate our findings in a form suitable for people with our background and to increase the interest for these questions among software engineers. As mentioned in the DELTA report as well as in the Portfolio Management and PENG related literature we have studied, the problems concerning communication between IT departments and management is a serious one and we hope that people from both sides can appreciate our thesis. The first and most obvious purpose of this thesis is of course to answer the question above but secondly and almost as important is to try and generalize the result and discuss the problem area and the issue in a wider context.

Delimitations

In our study of SKF's IS/IT environment we have chosen to focus on projects concerning applications and applications development, this does not however mean that we have not looked at aspects of enterprise development. It is important to have in mind that application development is just a part of something bigger and that business aligned IS/IT should derive from the enterprise and evolve together with it. This delimitation is made in order to keep our field of study at reasonable size. Another reason for choosing these kinds of projects is that the SKF Portfolio Management pilot concerns application development projects and we then can connect our cases to the pilot. At the time of our study SKF were evaluating Portfolio Management as a mean to control their IS/IT strategy. We will not go into the question whether or not Portfolio Management is right for SKF. We have been looking at some tools and methods for implementing Portfolio Management and measure the

value of assets and the return on investments. This is however not an inventory of the market and we will not conduct a comparison between those tools and methods and PENG. We are aware of the fact that our case study at SKF is a very simple one and we make no claims on having made an ethnographic study. This was however never a goal, the purpose of the case study was merely to get a comprehensive understanding of the organisation and the work at eBITS and the IT Governance department and to find inspiration for deeper studies like interviews.

Previous work

There are several academic theses concerning Portfolio Management but not many that covers IS/IT Portfolio Management. One that we did find interesting is the master thesis written by Gottling and Torgnysdotter (2002) at the department of informatics, Göteborg University. It concerns Application Portfolio Management at Volvo Car Corporation where they developed a model for implementing Application Portfolio Management and guidelines for handling current and future application portfolios. This we found particularly interesting since the pilot project at SKF concerns precisely Application Portfolio Management.

Enell and Freme (2002) at Göteborg University, the Department of Informatics, have written a master thesis concerning the outsourcing process at SKF. The thesis deals with outsourcing in general and the relationship between SKF and EDS in particular. There are an almost infinite number of works done regarding outsourcing. This one stands out since it describes the process at SKF, our case.

Burman and Rosendal (2000) at the Umeå University have written a bachelor thesis with the title *Handling IT investments - with or without PENG?* In their thesis they emphasize that organisations must view IT as an asset, not as a cost and they describe the PENG model. There is not very much written about PENG at all and this is what we could find with an academic view.

Since these main areas of concern for our thesis are covered in the above works we will not go very deep into any of the subjects but refer the interested reader to the related thesis.

Disposition

The thesis is organized in five main chapters, the first being a Background including issue and purpose of the thesis. The second chapter is called Scientific Method and describes our scientific approach and the methods used for answering the question. Then follows the theoretical framework that has influenced the thesis, shaped our approach and was used to support analysis of the empirical findings. The fourth chapter, the Result and Analysis, starts with two sections; Case Study and Interviews. In the Case Study section we present our objective results of the case study at SKF and the informal as well as formal conversations we have had with people employed at the eBITS and IT Governance departments. In the Interviews section, we present the result of our objective analysis of the interviews conducted at SKF and EDS. Everything presented in this section is either said by one of the respondents or is a result of combining their opinions. We then summarize the objective results in the Conclusion. Finally we end the thesis with the Discussion chapter on first the quality of the thesis and its validity and reliability and then we finish by discussing our result in more general context and from a more personal standpoint.

SCIENTIFIC METHOD

In this chapter we present our scientific approach, the methods we have used and their most common pitfalls. We will also introduce the concepts of Validity and Reliability.

Our approach

In figure 2 we present a model to illustrate our scientific approach. We started out with an idea of what the issue should be. When we then came to SKF and discussed this

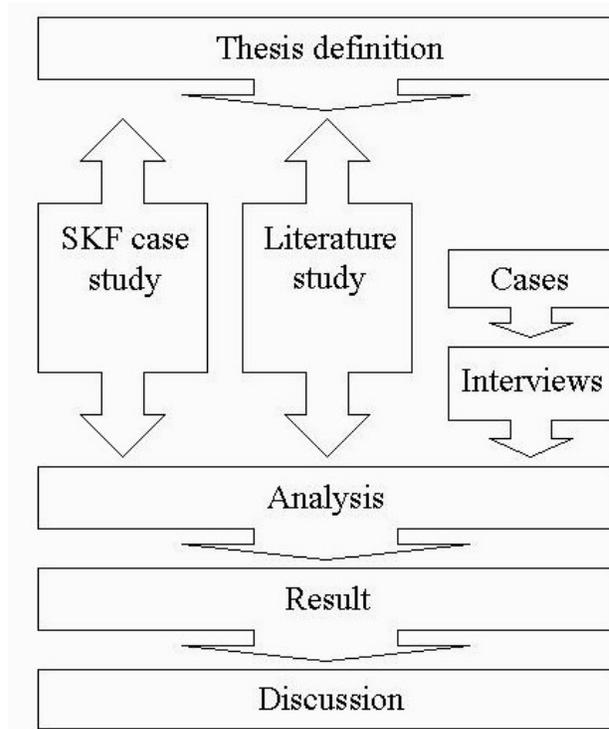


Figure 2. Our research process.

brought all this information together and tried to find any patterns that could lead to an answer to the issue. Based on this result and all information gathered we finally tried to generalise and discuss the issue in a wider context.

This approach is based on the fact that questions raised during low structured direct observations can provide valuable ideas for more systematic gathering of information (Ekholm & Fransson, 1992). We have combined interviews based on our observations and studies at SKF with literature studies that we have tried to make both deep and wide.

Literature studies

A literature study is in a way the preface of a research project and one of its purposes is to gather information about previous studies done in the problem area. Other important purposes for the literature study are to aid in formulating a meaningful,

researchable and scientific presentation of the problem area and to find shortcomings in previous works done. The success of a scientific work is dependable on how well the researcher has studied previous works and is an important element in the research and not to be omitted (Backman 1998).

Our main sources of finding interesting literature that concerns our area of interest is the fact that we have been in the heart of our case, namely SKF's IT department, and tip-offs from our supervisor at the Department of Informatics, Göteborg University. Other sources are follow-ups on references in literature read, the Internet and libraries. In order to be updated in the matter we have continuously been reading trade press and we have also been in contact with article writers for literature tips.

Pitfalls of literature studies

In any scientific study, and particularly in a qualitative, it is important to be objective. Backman (1998) says that there is a conflict of opinions in the science world. There are those who think that the scientist, through the literature study, can incorporate his or her prejudices, preconceived notion and stereotypes and fortify them. This might lead to ignorance of new discoveries and disregarding of new facts, undeliberately or deliberately. If the scientist does not keep an objectiveness in his or her literature studies it is easy to draw doubtful conclusions which blacken the results of the study.

We have used four starting points in our literature studies; SKF, trade press, libraries and our supervisor at the Department of Informatics. All of these different sources have given us valuable literature tips and created a broad knowledgebase for our field of interest thereby enabling our objectivity and assuring that no new discoveries or facts are left out.

Case studies

According to Yin (1989), the case study investigates a contemporary phenomenon within its real life context; when the boundaries between phenomenon and context are clearly evident; and in which multiple sources of evidence are used. Backman (1998), on the other hand, claims that it is not necessary that the phenomenon is contemporary since this rule out historical studies. It can be difficult to decide exactly what is a case and how and where to draw the boundaries. Case studies are explicitly suitable when the objects are complex and the study tries to investigate large systems or organisation where no other methods seem to fit. A case study does not need to be limited to just one case (Backman, 1998). According to Yin (1993), a case study can have different purposes. It can either be exploratory, descriptive or explanatory which gives six different types of case studies; exploratory single case, exploratory multiple case, descriptive single case, and so on. Our study at SKF, being there, is a typical single case exploratory study with the aim to define questions and hypotheses. The studies we have conducted on some development projects is a multiple case explanatory study presenting data and, together with the interviews, trying to find the cause-effect relationships.

When conducting a case study with historical sources it is important to be aware of a few issues: Who or whom were the originators of the documentation and can they be trusted to have given the correct information? This question aims to answer if the documentation is authentic or forged and if it is a primary or secondary source and have a crucial importance on whether or not the documentation can be used. In order to interpret the contents of the documents it is important to see in what time context

and social context they were created. Finally one must consider if the sources are usable for the purpose of the thesis; if not, do not use them (Magne Holme & Krohn Solvang, 1991). This reasoning can also be applied to literature studies in general.

Pitfalls of case studies

The most obvious problem with case studies is the problem of knowing if you have got all the facts, or in case you do not, if the picture you get from the case is in balance. There can be several reasons for any lack of information and they can be both deliberate and undeliberate from the source. This is of special importance in the kind of historical studies that we have conducted in our application development cases since we are left out to whatever material there is left and we cannot complement it with observations of our own. Apart from any errors in the primary material the same reasoning as for literature studies is applicable for case studies as well.

Interviews

We have to a great extent used interviews in our study at SKF. We have mainly had two different goals and two different approaches. The first was to understand the general situation at SKF, an understanding we mainly got from our case study, being in place with access to databases, reports and perhaps most important, the people doing the work. Here we have used many small and often informal interviews, not very structured and often in the form of normal conversations or questions, these are referred to as conversations. The other is as a complement and to further analyse the application development cases we have studied. These interviews have been much more formal and carried out in a semi structured way. We conducted five of these interviews, which lasted for about an hour and were recorded on tape as well as in writing. The reason for choosing interviews is that it seemed the best choice for the specific situation. Since the group of people of interest is quite small and we were not sure before the interviews what we really were looking for, the semi structured interview seemed to fit quite perfect since it also gave us the chance to follow any interesting lead. The questions used as starting point for the conversations is presented in the Appendix.

Pitfalls of interviews

When planning and performing an interview it is important to realise that it is not a situation where the respondent have all the answers and the interviewer's only task is to cunningly lure the respondent to answer. It is rather cooperation where the interviewer and the respondent work together to obtain information. The environment where the interview is conducted is of vital importance; it must be calm and stress free. Common errors we can do as beginners are:

- To forget to present the purpose of the interview and present one selves.
- Not listening to the respondent' s answers because we are concentrating on the next question to ask.
- To anticipate the answer by answering to the question yourself.
- Not to use pauses in the interview.
- Not to give proper credit to the respondent.

If we try to keep these issues in mind we can minimise the number of error sources during our interviews (Ekholm & Fransson, 1992).

It is always important to be objective when analysing interviews. Since we only conducted five interviews it becomes even more important since we cannot draw any statistic conclusions. To achieve this objectivity we have tried to be open-minded and

not to draw rash conclusions from the interview material. As we discussed in pitfalls of literature studies it is important not to incorporate prejudices and preconceived notions when studying literature and the same reasoning can be applied to interviews. If we manage to keep the objectivity throughout the interviews the possibility to maintain an objective analysis increases.

Validity

Validity is about whether we have studied what we intended to study or not (Patel & Davidson, 1991). An important aspect of validity is that in order to achieve total validity we must first achieve total reliability. To know what we measure, our measurements must be reliable. High reliability is however not a guarantee for high validity (Patel & Davidson, 1991).

Reliability

Reliability is simply a question of how reliable our results are or if someone else conducting the same study would come to the same results. This is a difficult question and especially so when it comes to qualitative studies like interviews and case studies. The reliability is then related to the interviewer or observer's ability. Issues specific for these methods have already been discussed in this chapter. Two ways to decrease the impact of any lack in ability is to have two parallel observers or interviewers registering the event and to record the event in a suitable way (Patel & Davidson 1991).

THEORY

In this chapter we will present the theoretical framework that has influenced the thesis, shaped our approach and has been used to support the analysis of our empirical findings.

Strategic value and Porter's Value chain

A common and useful way to assess an organisation's strategic capabilities is to view the processes that occur in a Porter's Value chain model (Robson, 1997). This model shows the organisation as a connected chain of activities, each of which relates in some different way to the provision of the organisation's products. The goal is to specify the activities that add value to the product by increasing the customer's willingness to buy it. There are nine activities that make up the business of any organisation, figure 3. Five of them are primary activities with a direct connection to the customers and the other four are support activities. These nine activities are assessed in terms of efficiency of resource use and effectiveness of resource allocation. Areas of potential improvements are identified in order to enhance the competitive position.

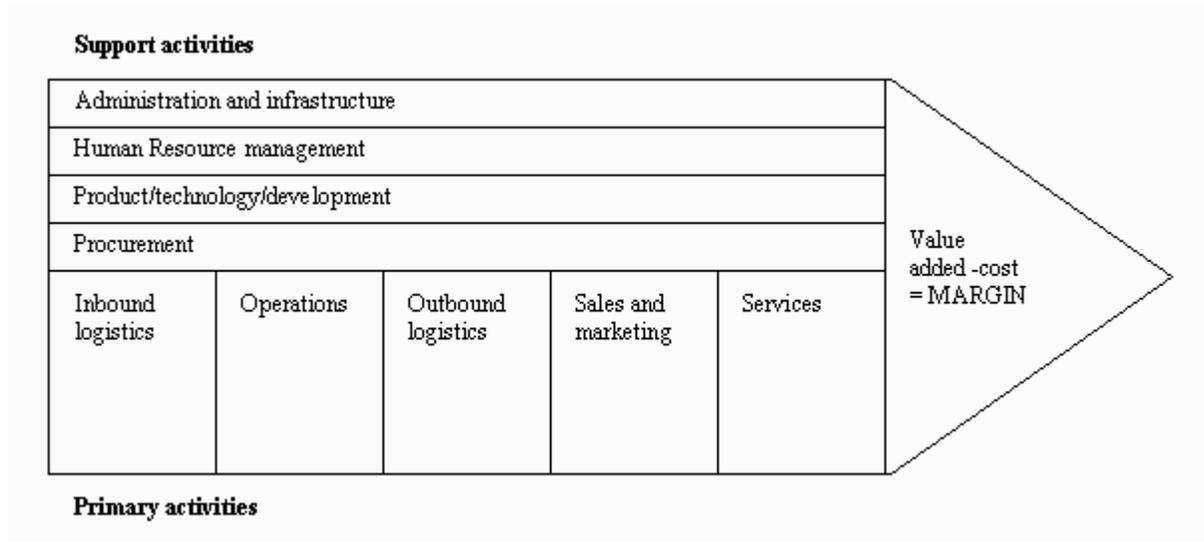


Figure 3. Porter's Value chain.

Source: Robson (1997)

Information systems paradigms

A paradigm can be described as a science basic view of its subject and defines what to study, which questions to ask, how to ask the questions and which guidelines that should be followed when you interpret the given answers. There are four different information system paradigms into which most theories and methods of IS studies can be classified; the system, the resource, the process and the networking paradigm, see figure 4. They describe the theories of different perspectives regarding the object system and the information system. These theoretical perspectives of the object system refer to the identification and discrimination of occurrences and dependencies that together creates the concept of the object system. The

perspectives of the information system refer to the theories view of the information supply problems of an organisation (Magoulas & Pessi, 1998).

The system paradigm

The most dominating paradigm of them all has been the system paradigm. The system should work as a perfect machine and be designed and governed in a scientific approach. There are countless IS theories that spring from it. The common view of these theories is that they see the organisation as one integrated system and that they are based on four concepts; goal, government, decision and information (Magoulas & Pessi, 1998).

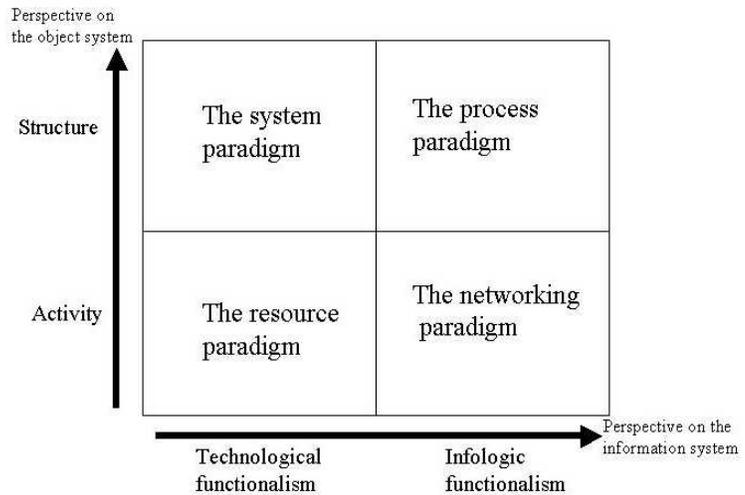


Figure 4. The four systems paradigms

Source: Magoulas & Pessi (1998)

The resource paradigm

The main principle of the resource paradigm is that the information system reflects the reality as it is. Information supply and information treatment are independent of both the organisations government structure and individual actors conceptions (Magoulas & Pessi, 1998).

The process paradigm

The process paradigm characteristics are that data and information are two different things with different significance. Data is an ordered collection of symbols that are used to represent information but one piece of data itself is not information (Magoulas & Pessi, 1998). The information system is regarded as one system consisting of autonomous units exchanging information in order to collaborate (Hugoson, 1986).

The networking paradigm

This paradigm regards the information system as a technologically implemented social system. This view is possible by regarding computer based information systems as a part of human communication through formal languages. Information systems are developed to improve and support message treatment, knowledge supply, knowledge formation and the overall business in an organization. The information system can be regarded as a network of individuals who exchange data with the support of an information system (Magoulas & Pessi, 1998).

Outsourcing

In theory there are three ways to organise an activity; the first being to do it your self, the second to buy it on the open market and the third to cooperate with someone to accomplish the activity. Outsourcing is an example of the third way, a long-term cooperation between two parties (Augustson & Bergstedt, 1999).

Augustson & Bergstedt (1999) gives a comprehensive definition of outsourcing:

" Outsourcing of an activity that in the past where performed internally, to an external supplier who charges the organization and supplies it with the current activity during an agreed time" .

During the major part of the 20th century, organisations have strived to keep all assets internally. With time, this vertical, integrated hierarchy became difficult to control and was not very profitable (Augustson & Bergstedt, 1999). It is however important to keep in mind that before the 20th century outsourcing actually did occur and Domberger (1998) says that in the 19th century it was a common way to outsource, or contract out, goods and services. But from the mid 19th century and during most of the 20th century, except for the latest twenty years, internalisation of transactions within the organization was the dominating trend. One reinforcing tendency that played an important part in this reversal was the development of production technologies, which favoured large, vertical, integrated enterprises.

During the latest ten years focus has moved from large volumes and large-scale production and vertical, integrated hierarchies towards knowledge and value creating activities. The biggest value is no longer the production process but the services connected to the product. This makes many functions that are considered to be very important, such as IS/IT, to be regarded as a burden. However, a new philosophy has grown and instead of doing all things right, organisations are starting to concentrate on doing the right thing. This, among other things, has led to the phenomenon of outsourcing since it supports the concept of concentrating on the value creating process and knowledge, in other words, concentrating on the core activities (Augustson & Bergstedt, 1999).

Outsourcing motives

Money is always a major factor when an organization decides to outsource its IS/IT environment but it is not the only reason. There are a number of advantages that arise. Increased business likeness, committing to the core competence of the business, increased flexibility and access to resources and competence that the business otherwise did not have. Another motive is that outsourcing decreases the fixed costs, related to employees and suchlike, making IS/IT costs more visible and tangible thus increasing control over IS/IT costs (Augustson & Bergstedt, 1999).

Outsourcing risks

One of the major risks with IS/IT outsourcing is losing control over the IS/IT environment. To lose control of the so-called lifeblood systems, or systems crucial for the business, is considered to be very serious. Operative loss of control is the same thing as disturbance of delivery. What used to be fixed in-house some external supplier now has to deliver. Short-term disturbances may have its cause in technical problems while long-term disturbances can be due to a supplier's financial trouble. In order to avoid long-term disturbances it is important to choose a financially stable supplier. Short-term disturbances are best taken care of by writing a good Service Level Agreement (SLA), which among other things regulates availability, response time and the consequences of disturbance (Augustson & Bergstedt, 1999).

Another major outsourcing risk is the undermining of the business' core competence. Two major issues have to be taken into consideration; do not outsource strategy and do not cut off the possibility to use other suppliers (Augustson & Bergstedt, 1999). The harder competition on a more and more open and global market forces the actors on the market to be among the best, or "world class" in all that they do. No one can be best in every area and therefore companies tend to focus on their core competence

and core activities and outsource other areas to someone focused on that area (Lindwall, 2001). But by being aware of these pitfalls, core competence can be increased. Other risks that are important to keep in mind are dependency to the supplier, hidden costs and decreased confidentiality (Augustson & Bergstedt, 1999).

What activities to outsource and not to outsource

The core competence of a company can be compared to the roots of the company. This is an asset that must be protected and therefore withheld from the outsourcing process. More peripheral, supportive competences can, and should be, outsourced. The main reason to do that is the peripheral, supportive competences in one company is another company's core competence. In this way, outsourcing contributes to increased specialisation and professionalism (Augustson & Bergstedt, 1999).

Strategic IS/IT is closely connected to business development i.e. the strategic business processes or the core competence of the company. Strategic IS/IT is unique for every organisation and it is not possible to, in a simple way, replace it with a standard solutions. This kind of IS/IT is usually kept within the company and is not outsourced. However, if a company chooses to outsource this kind of IS/IT it is done under very strict conditions. Critical IS/IT makes the business work. If it does not work the business stops, it is as important as electricity. Critical IS/IT is however not unique for a business and many companies have the same business systems. It is not a problem to outsource this kind of IS/IT if it is done with care and good Service Level Agreements (SLA) (Augustson & Bergstedt, 1999).

If a company wants to, it can outsource almost everything. The only thing that needs to be left internally is a guiding hand, someone with the competence to purchase the different parts and make them work together (Augustson & Bergstedt, 1999).

DELTA

The DELTA project, previously mentioned in the Background, with the main issues of how to improve the coordination of enterprise and IS development in complex organisations came up with a meta architecture, as seen in figure 5, in order to aid management systemizing critical factors of the development process. In short it can be described as follows; When developing a system or an application one must keep in mind that there are several stakeholders, e.g. developer, orderer, management etc, with different images of the enterprise and all with different goals for the system being developed. The only way to make these development goals common for all stakeholders is to harmonise their

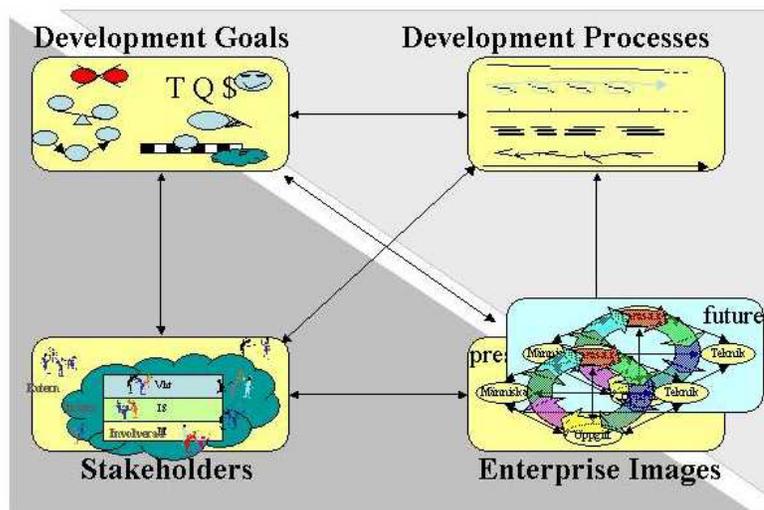


Figure 5. The DELTA meta architecture

Source: Enquist et al. (2001)

perspectives of the enterprise through a learning process. When the development goals coincide the stakeholders can agree on a unified development process. The DELTA meta architecture emphasises not only the requirement for knowledge, but also the need for managers to act proactively. Proactive management must be based on three fundamentals; A holistic architectural design of the enterprise (shared view of the enterprise and the development process), shared understanding obtained through a learning process (shared experiences) and continuous motivation and commitment through sound balancing of interests among shareholders (shared values, purpose and visions) (Enquist et al., 2001).

Portfolio Management

As mentioned earlier the development moves towards more and more complex computer and information systems. This together with the fact that it becomes harder and harder to separate an organisations IS/IT activity from the main business and the harder competition on a globalised market presents new challenges for IS/IT management. One way of handling this challenge is the concept of IS/IT Portfolio Management that suggests that IS/IT should be viewed as any other line of business in an organisation, with the same conditions and demands on returns on investments made, and not just as a cost. Another aim of Portfolio Management is to help aligning IS/IT investments to business direction.

The portfolio thinking has its roots in the stock market and was then adopted as a way of business management. The idea of managing IS/IT by means of Portfolio Management is not new, McFarlan & McKenney (1983) for example, presents the concept in their book *Corporate information systems management*. IS/IT Portfolio Management is based on the classic theories regarding Stock Portfolio Management. Swensen (2000) claims that investment returns stem from decisions regarding three tools of classic Portfolio Management; asset allocation, market timing and security selection, described below.

Asset allocation

Asset allocation is the starting point when constructing a portfolio. It involves defining the asset classes that constitute the portfolio and determining the proportion of the fund to be invested in each class. The policy portfolio describes the target allocation to each of the asset classes employed by the fund. Asset allocation exemplifies the importance of combining art and science in portfolio construction, as either informed judgment or quantitative analysis alone fails to produce consistently successful results.

Market timing

Market timing is about short run deviation from the long-term policy targets. If, for example, a fund's long-term targets are 50 percent stocks and 50 percent bonds. A fund manager who believes stocks are temporarily cheap and bonds expensive might weight the portfolio 60 percent to stocks and 40 percent to bonds to a tactical basis.

Security selection

Security selection derives from the active management of the portfolio. If a manager creates portfolios that faithfully replicate the markets, that manager makes no active bets. To the extent that a portfolio differs from the composition of the overall market, active management accounts for a portion of investment results.

It is important to use the available tools in a manner consistent with a well-defined, carefully articulated investment philosophy. Risk control requires regular portfolio rebalancing, ensuring that portfolios reflect institutional preferences and changes in the world around. This can be anything from internal changes to changes in the conditions of the market. The important thing is to value the new situation according to the preferences of the portfolio (Swensen, 2000). META Group (2002, Dec 28) agrees when they say that the key to successful IS/IT Portfolio Management is to continuously monitor existing investments and how they perform and plan for projects to adjust the portfolio if necessary. They point out that investment performance should be monitored through visibility of cost, risk, benefits/yield and alignment with goals. This requires looking back to the point in time at which the portfolio component was introduced and staying in touch with its original justification, predicted performance and any adjustments that have been made since. Depending on the type of component this implies that active Portfolio Management requires:

- **From a cost perspective**, that a component is performing within expected cost performance in terms of operating and personnel costs and that this cost structure is competitive in the context of value per dollar.
- **From a benefits perspective**, that a component is maintaining its expected yield. It is important that the element of timing is introduced since benefits are expected to accrue at a particular point in time. Value can mean a lot of different things and it is important to specify what it refers to in every case. Value must also be associated with alignment with enterprise goals.
- **From a risk management perspective**, the component of the portfolio should be diversified and managed along the lines of the amount of risk the enterprise can tolerate. Risk factors have to do with the probability of achieving the desired benefits, stability and pure technology risk. The level of risk associated with a component determines the frequency of review.

It is also important to manage the portfolio from an interaction perspective. This means taking into consideration how the components interact with each other and how they interact with the enterprise. The portfolio can consist of two types of components; baseline components, i.e. things that must be in place to support the business, and discretionary components, i.e. things that must have their own funding justification to support their existence. Ward and Griffiths (1996) make a similar classification of types of applications in substitutive, complementary and innovative.

One of the most important conclusions after the Enron liquidation is the importance of risk spreading. This concept has been used in the financial world for over fifty years and the idea of handling IS/IT investments by portfolio thinking has been known since the 1980's but it is not until now it has reached the IT departments. Some of the benefits are that managers get a better overview and get a better chance to detect redundant work and to divide resources in a good way. Focus is shifting from a pure cost perspective towards an evaluation of risks versus yield compared to other projects. Until now projects have often been approved and run independently of each other. They have not been evaluated until the annual report. When the market is changing on a daily basis the company needs to have a comprehensive perspective in order to have access to real time information about their projects (Lotsson, 2003).

One of the major benefits from Portfolio Management is that it forces a true bridging and integration between IS/IT and the business (META Group, 2002, Dec 28). Costs, business benefits and technical performance are managed within one framework and

require joint participation. The common thread is value, independent of what kind of value, and the goal for information technology is to contribute in creating that value.

META Group (2001, Sep 5) recognised some other benefits from treating IS/IT investments as a portfolio and adopt the methodologies of financial Portfolio Management to IS/IT Portfolio Management:

- It can be applied at various levels, from basic to very sophisticated, META Group e.g. has defined four stages from basic to world-class (META Group, 2001, Oct 22). Each company applies IS/IT Portfolio Management at an appropriate level of sophistication. The type of investment in the portfolio controls, in many cases, the level of sophistication; the core investments are not analysed at the same depth as venture investments.
- To adopt the management life cycle concept for each portfolio investment, with a beginning, middle and an end. An IT organisation does not always recognize that software and processes have life cycles. With IS/IT Portfolio Management they have tools to analyse the life cycle.
- IS/IT Portfolio Management encourages a regular view on the investments made.

According to META Group (2001, Sep 5) these benefits are necessary to adopt in the current economic climate, since the management of the IS/IT investments needs to be flexible. It is not enough to review the IS/IT investments every new fiscal year, it is necessary to be able to react quicker than that. Shifting investments without planning and just to react to every market blip is not good either. The IT organisation needs more flexible methods to plan and manage the IS/IT portfolio. One way to make it easier to manage the portfolio is to use triggers. For example: A stockbroker sets a trigger and when it drops below the trigger the broker can consider buying the stock. In an IS/IT portfolio the trigger can be to drop a venture project whenever it does not generate enough money to support itself.

PENG

Many companies want to measure the benefit they gain from IS/IT, but few know how. There are however many models for doing this and something they all have in common is that they are trying to find a connection between IS/IT investments and the company's financial result, Wallström (2003, Feb 3). One of these models, also

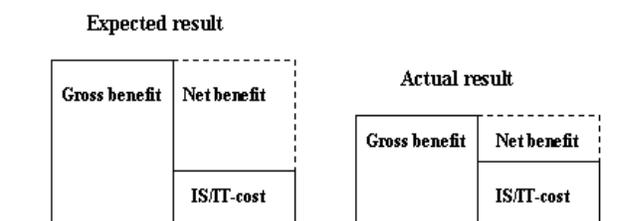


Figure 6. The joint effect of decreased gross benefits and increased IS/IT-costs can get substantial.

Source: Dahlgren et al. (2000)

considering soft aspects of IS/IT, is the Swedish PENG model that springs from the realization that most IS/IT investments do not result in all benefits possible. There was, and still is, a need for a practical tool to identify and evaluate the benefit effects, both achieved and possible. PENG was developed by Lars Erik Dahlgren, Göran Lundgren and Lars Stigberg and first published in 1997 in their book *Gör IT lönsamt!*. This book was also published in English in 1997

with the title *Make IT profitable!* The experiences in using this tool then resulted in the

book *Öka nyttan av IT!* in 2000. PENG is an abbreviation in Swedish and stands for Prioritering Efter Nyttogrunder, which in a free translation means "Prioritising on beneficial grounds". Since there is only one source available, the rest of this section is a summary of Dahlgren, Lundgren & Stigberg (2000). The main question in the PENG method is; *how can we use IT to achieve possible benefits in the business?* Even though the benefits are measured in economical terms, the goal is not to achieve figures accurate enough for accounting but rather to measure and evaluate the size of the benefits, not forgetting the so called soft benefits. These estimates give management far better basis for decisions than no figures at all. Another important aspect of PENG is the often forgotten follow-up of implemented investments: a valuation of achieved benefits. Too often, all the possible benefits are not achieved. In combination with costs getting higher than planned, this can make the actual result getting dramatically lower than planned, figure 6. The most important process of the PENG model is valuation of benefits, which can produce a number of positive effects, the three main issues being; better basis for decisions, better implementation and better basis for follow-ups, figure 7.

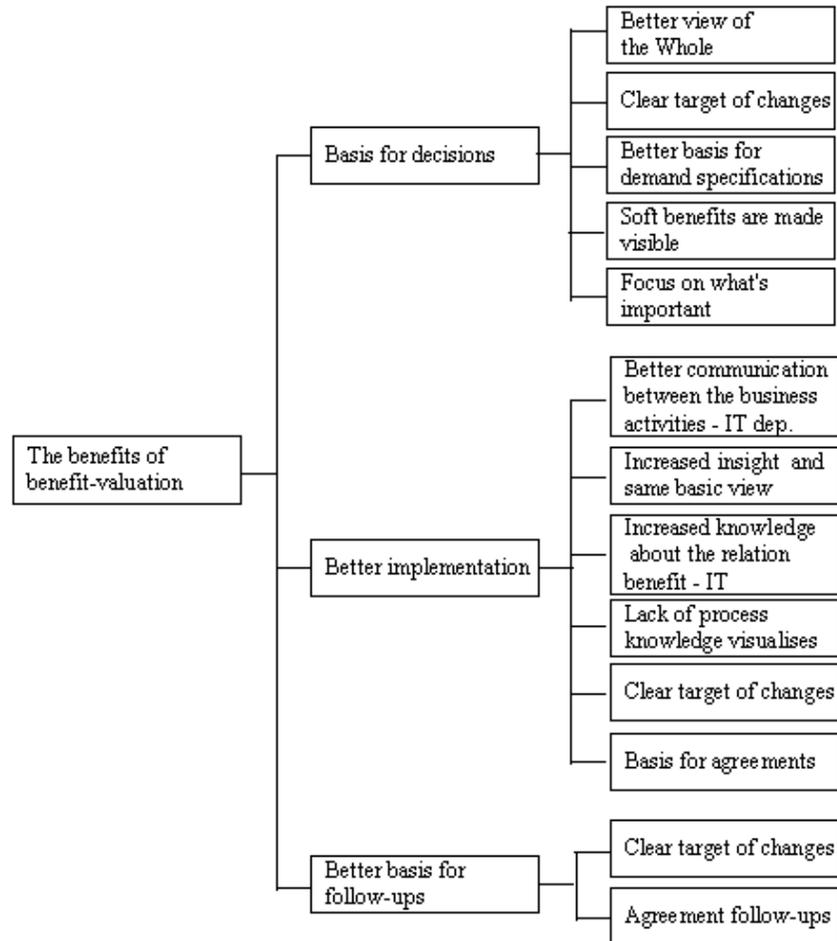


Figure 7. The benefits of benefit evaluation.

Source: Dahlgren et al. (2000)

A valuation of a new investment can have different purposes; creating a basis for prioritising between different investments, as a help in deciding whether or not to go on with the investment at all or just as a mean to increase the net benefit by creating greater awareness of the purpose of the investment.

The PENG model consists of three phases including a total of ten steps:

Preparations	1. Determine purpose
	2. Create awareness
	3. Determine area
	4. Define and describe processes/system
Benefit valuation	5. Identify effects of benefits
	6. Clarify links in an objectives structure
	7. Evaluate benefit effects
	8. Define and evaluate IT costs
Validation plus IT costs	9. Estimate reliability of the valuation
	10. Calculate net benefits

Determine purpose

The PENG process starts with defining the purpose of the benefit analysis. The purpose can be a follow-up, finding out the potential benefits of a not yet implemented investment or to create a better basis for decision making. In this phase, it is also important to narrow down the area of interest, deciding on goals and establishing points in time for reference and measurements.

Create awareness

The quality of the benefit analysis depends to a great deal on the persons participating. It is of vital importance that the right persons take part in the analysis, the right persons being people with good knowledge in the object in issue, hence possessing great knowledge of the enterprise. Some participant needs to be responsible for the estimations needed in the analysis, for example what a 25 percent increase in customers satisfaction is worth in money. In order to achieve this, motivation for participation must be created and an awareness of these needs must be established in management.

Determine area

In step one, the area of interest was narrowed down and in this step it must be defined exactly what this meant. It is also a good idea to establish points of reference and to document the values for the points in time decided on in step one.

Define and describe processes/systems

The goal is to compare the benefit between two states, the *as-is-state* and the *should-be-state*. The better the description of the processes in these two states, the better the result of the benefit analysis. Prototyping has proved to be one useful tool for this step.

Identify effects of benefits

The most common way of identifying benefit effects is bottom up, looking for benefit effects in different levels and writing them down on post-its for later organising. It is important to have some form of experienced coach in order to stay focused and make progress.

Clarify links in an objectives structure

In this step the post-its from the previous stage is organised to show the total benefit, its components and their connections. The benefits are deployed in main areas and formed into a tree structure. The structure needs to be deep enough for the benefits to be analysed and this is achieved when the benefits in the lowest level is atomic.

Evaluate benefit effects

This is the hardest part of the whole process and although it is a common opinion that certain benefit effects cannot be evaluated, the authors claim that it is possible to make a subjective valuation in almost any case. If the right person makes this valuation, it is as good as it ever can be. The tree structure from the previous step can make this a lot easier, either by a bottom up or a top down strategy. The result from this evaluation is called gross benefit.

Define and evaluate IT costs

The goal of this step is to establish an annual cost level for the benefits found. It is important to find the hidden costs that are not visible in the annual report. This can for example be hard or software problems and systems used in an ineffective way, costs that are estimated to be as much as 30-35 percent of the total IS/IT cost. With awareness of these costs solutions might be different, rendering more and greater benefits.

Estimate reliability of the evaluation

It is then essential to critically review the valuation and to discuss the results with other stakeholders. An error that is easy to make is to bring in the same benefit in more than one place. In order to categorise the benefits they are divided into the following three classes:

- Green benefits - affects the result directly.
- Yellow benefits - affects the result indirectly.
- Red benefits - Benefits that are difficult to evaluate.

The classes also represent different levels of security and an aspect of time. The green benefits are certain and arises more or less directly, a yellow benefit are less certain and does not arise until, for example, some changes are noticed by the customers, and so on.

Calculate net benefits

In the last step the result is presented in one or more diagrams. Two new concepts are introduced, *net benefit* and *benefit factor*. Net benefit is simply the gross benefit minus the costs for the benefits. The benefit factor is gross benefits divided by the costs. These figures are useful when comparing projects or deciding whether or not to go on with an investment, which is an essential part of Portfolio Management (META

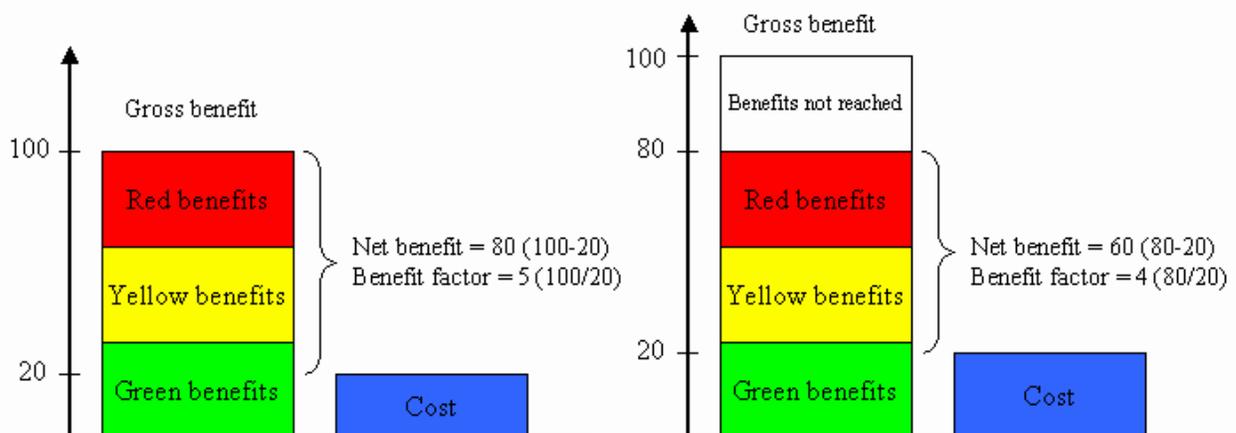


Figure 8. The benefit analysis is presented in one or more diagrams.

Source: Dahlgren et al. (2000)

Group, 2002, Dec 28). When doing a follow-up on an implemented project it is important to include the benefits possible but not reached, as shown in figure 8. When planning a project it is of vital importance to appoint someone that is responsible for every benefit effect and to make a plan to secure that the effect is reached.

The PENG base model

It is possible to do a benefit valuation on almost anything as long as it is a concrete investment. The better the situation can be described the better the valuation tends to get. It is often a good idea to use some sort of modelling technique to describe the situation since the situation often is complex and investments can create benefits in many different levels in an organization. This also makes it important to involve persons with the right knowledge even if they do not take an active part in the investment project itself. One of the experiences from the PENG analysis that have actually been done is that they often are done too late. It is important that the analysis is made in the early stages of a project in order for the result to have an impact on the specifications and level of costs. It is also important to create an insight in management that it is possible to value these benefits. The discussions concerning this and what it really is that creates benefits and what they are worth forces position takings and motives and create an awareness regarding these issues. In order to gain approval for the analysis from the management it is important that the group doing the analysis consists of at least two persons in decision-making positions. The PENG model can also be used for valuing other areas than IS/IT, which is well in line with the thinking in Portfolio Management (META Group, 2002, Dec 28); that IS/IT should be viewed as any other line of business.

RESULT AND ANALYSIS

In this chapter we will present our results, starting with the one of the exploratory case study and the interviews. We then finish with the conclusion, presenting the result of our analysis of the findings in light of the theories presented earlier.

Case study: SKF - a global process oriented enterprise

In this section we present our objective findings, to the extent that this is possible, of our exploratory case study at SKF and the informal as well as formal conversations we have had with people employed at the eBITS (eBusiness & IT Strategy) and IT Governance departments.

SKF and outsourcing

SKF's motive for outsourcing their IS/IT environment was not only to make economical benefits. The main reason was to concentrate on SKF' s core activities, described in their mission as: *"to enhance and develop global leadership in bearings, seals, related products, systems and services. The aim is to be the best in the industry at; providing customer value, developing our employees and creating shareholder value."* SKF wanted to find a partner whose core activity was IS/IT and therefore could implement new technology faster, which was one of the benefits SKF strived for in their outsourcing process. Other reasons to outsource were to make costs visible and to gain higher quality of service. Even though an internal accounting system existed prior to the outsourcing many of the costs for IS/IT were hidden. Today everything is billed from EDS, and the costs are visible to SKF.

SKF chose to outsource all IS/IT such as assets (hardware, software etc.), contracts and IS/IT staff. The parts SKF kept were eBITS, IT Governance and IT integrated in products offered to customers including research and development of this IT.

SKF anticipated a number of risks involved with the outsourcing process. To prevent the undermining of core competence, SKF chose to keep an internal IT department whose main responsibilities are to be a kind of insurance for SKF in this new situation and provide a value to the SKF business, in other words SKF' s IS/IT strategy. Staffan Brege, professor in industrial marketing, says in an interview in Computer Sweden, Åslund, B. (2002, Dec 6): *"Many companies are fooled by a stereotyped thinking about what is the core. It can be hard to discover your own resources as silent knowledge, company culture and individual persons that can disappear in an outsourcing process"* . By keeping the internal IT department SKF have taken precautions to prevent this loss of core competence.

SKF and Portfolio Management

The process of implementing Portfolio Management at SKF has been quite long and started as an idea within what today is eBITS, before the concept of IS/IT Portfolio Management was common knowledge. When what might now be a Portfolio Management hype was started by META Group, Gartner and others it meant that, together with a realization of the need for focusing on value instead of cost, an awareness of the issue was already established and the work of evaluating the possibilities began. After discussions with META Group, Gartner, EDS and UMT, a Portfolio Management CASE-tool supplier, a theoretical model was developed and this lead to the SKF Portfolio Management Methodology which is now to be tested in

a pilot project. This pilot is run in a Microsoft Excel tool, developed by EDS in a prototyping-like way which is now ready for testing. Due to the financial situation in the world after the war in Iraq there have been cut backs in new development projects and the evaluation will take more time than expected from the beginning. The focus this far has been on valuation and classification of projects and not on follow-ups and evaluation. SKF is also investigating UMT's case tool for the next step of implementing Portfolio Management.

The aim with Portfolio Management of better understanding between IT department and management through a common language is one of the things SKF views as a major benefit. They do however, view the matter from a different point of view than many others e.g. PENG, and want to, to a greater extent, measure all projects from a value based view rather than a financial one. This was for example expressed during a conversation as; *"...with Portfolio Management help management to make decisions based on non quantifiable grounds"*, which is shown in figure 9, taken from SKF's Portfolio Management Methodology.

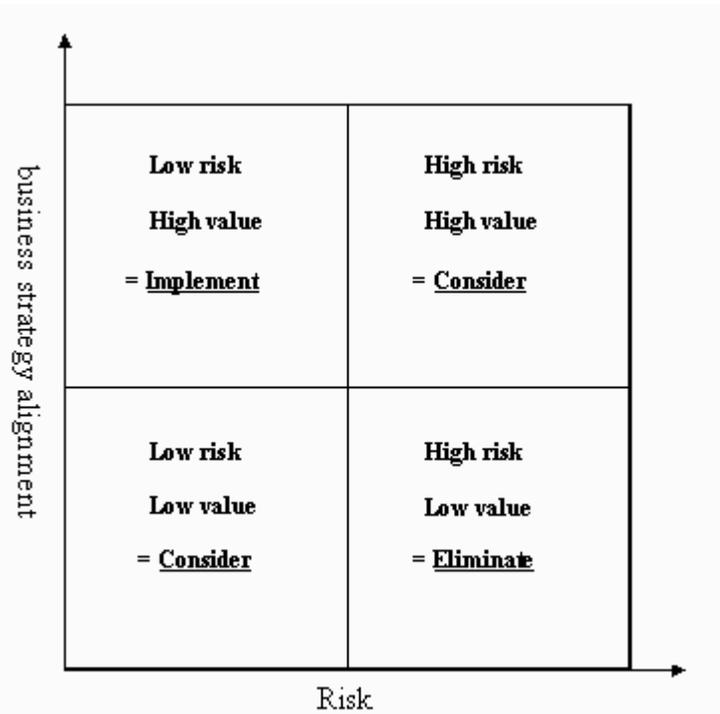


Figure 9. How risk and value affects IT-investments.

Source: SKF Group eBusiness & IT Strategy

SKF and PENG

Organisations in general and SKF, in their process of introducing Portfolio Management, in particular have a need to value the benefits supplied by IS/IT. Portfolio Management is a concept for managing your investments but it only tells you to evaluate returns and risks, not how to actually do it. When discussing this problem with IS/IT strategists on SKF we found that this is a problem considered but not handled, particularly not for the softer aspects of IS/IT investments. With this in mind we went on by studying Portfolio Management and available CASE-tools and methods for valuating IS/IT projects. When we first read about PENG it seemed like just the thing we were looking for, even though it is not specifically designed for Portfolio Management. The most appealing quality of PENG, and the thing that separates it from other methods, is its strong focus on soft benefits. The need for such a method has been emphasised during our conversations. This in turn, led us to try and implement the PENG method within SKF's Portfolio Management Methodology and the result is shown in figure 10. Based on the case study we have also tried to compile the ten steps of PENG in order to find out to what extent they are already implemented at SKF, this is of course only valid for general issues and not method-specific ones:

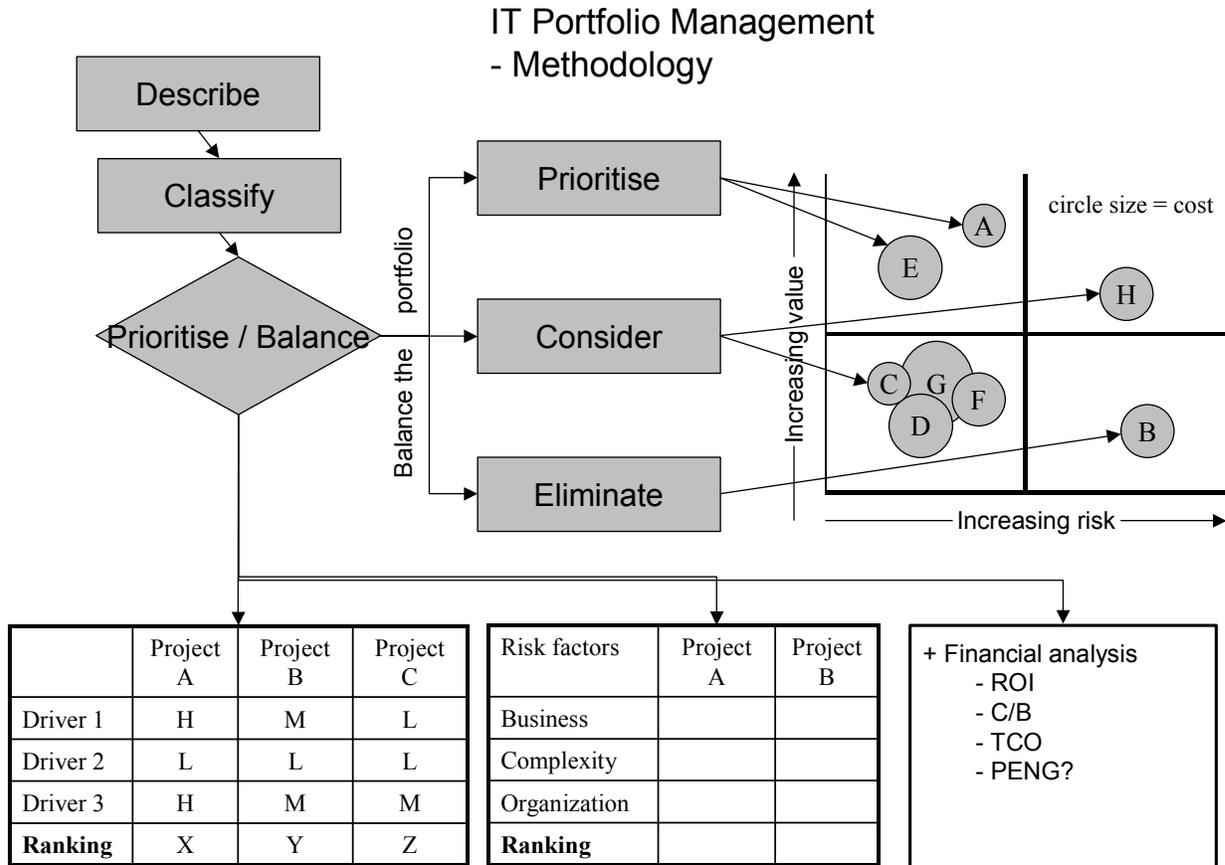


Figure 10. How PENG can fit into SKF's IT Portfolio Management Methodology

Source: SKF Group eBusiness & IT Strategy

Determine purpose

Many of the elements from PENG's first step can be found in SKF's standardised project management methods. They can of course be specified better and more formalised.

Create awareness

This step is already deeply rooted in SKF's development processes. Since IS/IT projects are started and funded by the business and there is no specific IS/IT budget it is the businesses that is in control in IS/IT projects. The steering committee that makes the decisions for a project consists of people from all the processes involved and from the business that funds the project.

Determine area

General parts of this are included in the methods used, especially factors concerning cost and time. These methods are however not always implemented.

Define and describe processes/system

We have not found any signs indicating that this is done to a great extent today.

Identify effects of benefits

This is done in some projects, but not all, and when so it is done in an ad hoc way.

Clarify links in an objectives structure

We have not found any signs indicating that this is done to a great extent today.

Evaluate benefit effects

This is done in varying ways, depending on the project. The process is not formalised and it can probably be improved.

Define and evaluate IT costs

This is a step where SKF traditionally is very good, at least when it comes to visible costs and they are extremely competent at finding and estimating costs. An example of this is the outsourcing of the IS/IT environment. There are however things that can be improved, especially regarding invisible costs.

Estimate reliability of the valuation

Parts of this are done for most projects, and then mainly risk management. The process is not formalised and it can probably be improved.

Calculate net benefits

We have not found any signs indicating that this is done to a great extent today.

Apart from this we have seen a case related report from an outside consultant where PENG probably have been used as one of many methods. We have however not been able to confirm this.

Interviews

In this section, we present the results of our objective analysis of the interviews conducted at SKF and EDS. Everything presented here is either said by one of the respondents or is a result of combining their opinions. The interviews were conducted in a semi structured way and the questions presented in the Appendix were used merely as a starting point for a conversation.

SKF and outsourcing

Today's IS/IT environment at SKF is more complex and cumbersome than before the outsourcing. Reasons for this is among other things a difference in organizations, SKF being a typical Scandinavian company with a consensus culture and quite a lot of responsibility in the employees and EDS being the typical American, top governed company. Some people think that new internal IT departments will evolve and perhaps grow. There are quite a lot of problems associated with the outsourcing and many people feel that the situation was better before although they also say that it is too soon to evaluate the situation properly and that a fair evaluation cannot be done for some years. It came to light that since SKF for such a long time have been cutting costs and trimming their organization there was perhaps not the scope for cost cuttings that EDS had expected. A drawback expressed is the loss of process knowledge. Today there are systems containing business processes that do not exist anywhere else. If these systems are outsourced the company is risking losing control over them and the people who know them. The respondents that were outsourced from SKF to EDS felt that they are now more far away from the core business. From having been a co-worker and colleague they are now just another supplier or external programmer. Many of the old SKF employees feel that they are left outside of their old fellowship and that in a situation like this it is likely that identity and loyalty problems arise.

SKF and Portfolio Management

SKF's IS/IT strategy is fairly in line with the thoughts behind Portfolio Management since IS/IT projects have to bear their own costs and they have to be in line with business. This has been made clearer after the outsourcing and now all projects come from and are run by the business that will eventually own them. Group IT is not running any IS/IT projects apart from projects supporting their own line of business. None of the respondents expressed any direct demands of financial returns; this however varies with the size of the project and with the project leader. On the other hand there is a demand from the management of financial write-off of less than 18-24 months. All projects are handled by a steering committee that reviews the project every two months, considering costs, risks and outer circumstances regarding the project. The influence of, and from, other projects are an important factor that is considered both in the planning process and in the steering committee reviews. One of the respondents thought that there are IS that contains business processes that exists only there and that they should be part of the core business.

SKF and PENG

There is a pronounced need for an aid to measure or estimate soft benefits, being benefits that "cannot be measured" and to do this in a uniform way. All respondents agreed on that there is a high level of consideration for these types of benefits at SKF although it often comes down to money in the end. Like in the case result above we have tried to compile, based on the interviews, to what extent the ten steps of PENG are already implemented at SKF:

Determine purpose

Some of the parts of this step are part of the process of defining a project and creating the standardised Definition Phase Report. Since there is a pronounced need for a method for evaluating strategic value, there is also a pronounced purpose for a prospective PENG analysis.

Create awareness

The respondents agree that SKF has implemented a strong alignment between IS/IT and business throughout the organisation. All development is initialised in the business and not in eBITS. The projects are governed by a steering committee consisting of the owners of the project and of people from concerned processes. This committee has the formal power as well as control over the funding.

Determine area

None of the respondents have mentioned anything that applies to this step.

Define and describe processes/system

None of the respondents have mentioned anything that applies to this step.

Identify effects of benefits

This is done for some projects, mainly bigger ones involving more money. No standardised methods are used. The method chosen varies with the project and its leader.

Clarify links in an objectives structure

None of the respondents have mentioned anything that applies to this step.

Evaluate benefit effects

The respondents share the opinion that this is done today in varying forms and that there is a great need for valuing soft benefits in financial terms. The respondents agree that a more uniform and structured way of doing this would be of great benefit since this is a very difficult area.

Define and evaluate IT costs

SKF is very aware of costs and has been so for a long time and this is something that all respondents have pointed out.

Estimate reliability of the valuation

This is done for some projects, mainly bigger ones involving more money. No standardised methods are used. The method chosen varies with the project and its leader.

Calculate net benefits

None of the respondents have mentioned anything that applies to this step.

Other results from the interviews

One thing many of the respondents mentioned were how company culture differs between SKF and EDS, SKF having a typical Scandinavian culture with a consensus philosophy and EDS being a typical centrally governed American organisation. This can lead to frustration both internally when an organisation expands in new regions and externally in relationships like the one between SKF and EDS. This was to some extent expected by SKF before the outsourcing and is not viewed as a problem by all.

All of the respondents felt that the metaphor of the overall IS/IT architecture as a city plan is a very good one although there are different opinions about details and ownership. Everyone expressed the need for such a plan, perhaps more distinct than it is today and with more clear roles, i.e. eBITS as the city planning office.

Conclusion

This section is a summary of our objective findings and impressions and it is an effort to merge the results from the case study with the one from the interviews and our theoretical studies. In order to do this we have tried to find both common ground and contradictions in the results from the studies and when interesting questions have come up we have tried to investigate them further.

Based on our studies we mean that the identification of strategic value from a management view can be aided by the use of Porter's Value chain and that the benefits of different assets or projects can vary on a scale from hard to soft where hard benefits are easily measured and verified in financial terms. Soft benefits are very difficult to evaluate by figures and any attempt to do so will be an estimate. All projects and assets can be viewed on this scale, somewhere between these extremes, but since all people and organisations have different values this view is personal and will vary with the beholder.

IS/IT becomes more and more a part of the business, as pointed out by META Group (2002, Dec 28) and mentioned in the Background. We argue that this to some extent speaks against outsourcing of IS/IT. Perhaps IS/IT should not be viewed as one

homogeneous area but rather as two parts, core activity related ones containing business processes and supportive ones, more easily outsourced.

Much of SKF's IS/IT strategy is, as already mentioned, in line with the Portfolio Management concept and we consider them to suit each other quite well. The SKF pilot implements only parts of the concept and SKF has a long way to go to reach META Groups world-class level (META Group, 2001, Oct 22). That is however not a goal and will probably never happen. SKF will more likely use selected parts of Portfolio Management as one of many ways of handling their IS/IT environment.

Our interviews and case study confirms that there is a great need for valuing soft benefits. There are already efforts made but in varying forms and levels. Some formalized and uniform method is wanted. We have been looking at the PENG model in this context and found that it could fit as one of the other financial analysis methods in SKF's IT Portfolio Management Methodology and that many of the more general parts of PENG is already implemented to varying extent.

When SKF chose to outsource their IS/IT environment they took a step from a vertical, integrated hierarchy towards knowledge and value creating activities. An outsourcing process is also a way of concentrating on the businesses core activities and core competences. It is safe to say that SKF is going through a paradigm shift, from the system paradigm to the process paradigm (Magoulas & Pessi, 1998), and the outsourcing process is an important part of this shift. When the IT department was in-house all systems were seen as one and the costs for IS/IT was regarded as a lump sum. One of eBITS tasks in the new paradigm is to communicate knowledge to both Businesses within SKF and to EDS to ensure that the high quality of IS/IT is maintained. Another major task is to make sure that the old systems thinking view on SKF IS/IT environment is replaced with the processing and service view, i.e. IS/IT is a service that a supplier makes available and the business pays for that service. In this way SKF have managed to make costs for IS/IT visible. In order to succeed with this task the persons involved must represent the core competence of the SKF business.

The Issue

In the Background chapter we formulated this question:

What factors are important to consider when choosing methods for evaluating strategic value in information systems development projects?

Our answer is that strategic value can and should be evaluated at different levels and that it is important at all these levels to make deliberate choices. To be able to do this you must create awareness. At the strategic level it is important to first define a purpose and then shape your methods to fit this purpose. IS/IT Portfolio Management can be an aid here, implemented at a level suited for the company's situation and perhaps complemented with other concepts. The important thing is to know your methods and the thoughts behind them. In order to implement IS/IT Portfolio Management or perhaps other management philosophies you need a number of carefully selected methods to measure certain aspects and evaluate benefits and risks. These measurements can then be used to base your decisions on and align them with the ideas behind your strategy. Apart from the above reasoning about awareness that also applies to the methods used it is therefore also of great importance to find methods that fit your strategy. In the case of Portfolio Management we have seen the need for consideration of the softer aspects and benefits of IS/IT

and found that PENG or a chosen subset of PENG can aid to a better asset allocation of the portfolio.

What does this mean for SKF?

As already mentioned SKF is probably not going to implement IS/IT Portfolio Management in full scale like META Groups world-class level (META Group, 2001, Oct 22). We see this as a sign of insight. As discussed it is important to understand the underlying ideas and to adjust your tools to your strategy. The need for a method to help estimate soft benefits that we suspected exist has been confirmed during our interviews and case study. Our efforts to implement PENG in SKF's Portfolio Management Methodology, see figure 10, shows that it could contribute to a better understanding together with other more classic financial analysis methods and that many parts of PENG is already part of SKF's project routines in varying degrees. We have also found that PENG can add a better base for follow-ups, an area where many respondents felt that there was much to be improved. The important thing with PENG, like any method, is the underlying ideas and just like the Portfolio Management Methodology, PENG can be adjusted to fit SKF's needs. At SKF PENG can be used for two different purposes; as we have focused on as a mean to improve the asset allocation of Portfolio Management and also as a part of the Group Project Manual to improve the net benefit of IS/IT projects. IS/IT projects at SKF vary very much in size and the analyses are proportional. Therefore the PENG analysis being part of the Group Project Manual should be made scalable so that it can be adjusted to fit the other efforts made to analyse the project. Since SKF is such a large and complex organization this complicate things further and needs to be considered when adjusting a method. We have compiled some things for SKF to consider if they would start using PENG:

The first step of *determining purpose* can be implemented by the SKF project manual defining in which cases a PENG analysis should be used. It is important that everyone involved in the PENG analysis is aware of the purpose. In SKF's case the most important part of this step is deciding on goals and establishing points of reference for measurements and follow-ups. The next step, *creating awareness*, is quite in line with SKF after the outsourcing, since people from all concerned areas are involved in projects. An important factor to consider is the risk of losing people with great process knowledge that now work at EDS. *Determining area* is an important step in order for future follow-ups to be of any value and it is an area where SKF can improve considerably as also discussed for the first step. The fourth step, *defining and describing processes and/or systems*, is to some extent always done since all projects start as a reaction on a situation and with a vision to change it. This can be more or less formalized and in order to identify all benefits it is important to do this properly and in a structured way. Step five, *identifying effects of benefits*, is important in order to find all benefits possible and possible synergy effects. There are probably several good ways to do this and the important thing is to find a suitable method that works and to use it. In the next step, *clarify links in an objectives structure*, the same reasoning as for the previous step can be applied and for smaller analyses these two steps might perhaps even be merged. The seventh step is to *evaluate benefit effects* and this is perhaps one of the hardest and most important parts of PENG. It is very important to implement this step in a conscious way and with a pronounced purpose. As mentioned it is also of vital importance to involve persons with deep knowledge in the concerned processes. A factor for SKF to consider is to what extent these people now are employed by EDS and how this effects the situation. Step eight which is to *define and evaluate IS/IT costs* is as discussed one of SKF's strong points although awareness of hidden costs and experience might improve a possible implementation

of this step even more. In order to improve the awareness of the possible benefits and make sure that they are all reached some sort of classification of benefits like the one of PENG's ninth step, *estimate reliability of the evaluation*, is very useful. This classification is also used in the last step, *calculating net benefits*, which contributes with two important things. It helps when doing follow-ups by finding the benefits not reached and thereby improve the result of the project and it gives a base for deciding or choosing on different projects that is an important feature when implementing Portfolio Management.

DELTA and PENG

We mean that DELTA and PENG share many aspects, DELTA describing the problems with coordinated development and PENG suggesting a solution. The enterprise image in DELTA's meta architecture consists of a future and a present image on different stakeholders' view of the enterprise. This is represented in PENG by the as-is-state and should-be-state of the fourth step that can aid in harmonising different views of the enterprise. The development goal of the meta architecture represents the stakeholders' different goals and also here PENG can contribute with harmonising the development goals since much attention are paid to defining and deciding the goals of a project. The perhaps most obvious connection between DELTA and PENG is the stakeholders of the meta architecture handled in PENG by focusing on the participants and making sure that all interests are represented. The discussion regarding these issues that comes with a PENG analysis can hopefully result in the fourth aspect, a harmonised development process, which is one of the goals with the DELTA project.

It is important to be humble and realize that there is no absolute truth. All management philosophies, e.g. Portfolio Management, tools, e.g. CASE-tools like UMT's, and methods, e.g. PENG, have limitations and they cover different aspects. The real key to better understanding of the business and alignment to common goals is the discussion, and the awareness it can create.

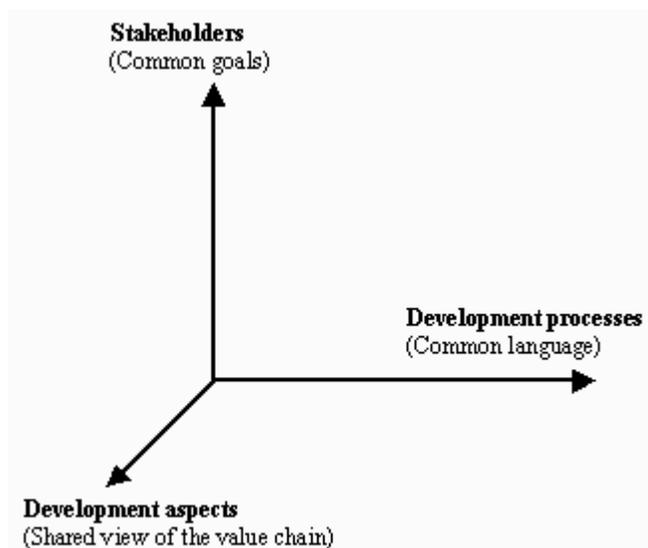


Figure 11. Three dimensions of the development process.

We consider the common language and communication between IS/IT and business management mentioned by META Group (2002, Dec 28) as a part of the first of the three fundamentals of proactive management (Enquist et al., 2001). In the description of the PENG methods base model it is emphasised that there must be a discussion involving management regarding what factors in the organisation it is that creates value. The awareness resulting from this creates in itself a value. (Dahlgren, Lundgren, & Stigberg, 2000) We find this closely related to the second of the proactive management fundamentals of the DELTA meta architecture (Enquist et al., 2001). People tend to view their own part of the business as the one contributing most to the value creating

process. An increased understanding of other parts of the business and the Value chain can help in creating a shared view of the business. The stakeholders in the DELTA meta architecture and the balancing between their different interests are mentioned in the last of the three fundamentals for a proactive management (Enquist et al., 2001). We mean that this is also handled in the PENG model. Step two of the ten steps is about creating awareness. This means that during the PENG process, that shall involve persons from all concerned areas, a common view concerning the goals of a project are supposed to emerge (Dahlgren, Lundgren, & Stigberg, 2000). Hence the important issue when choosing a method is not the method itself but by what means it can encourage discussions like the ones described above. A useful aid in choosing suitable methods that complement each other is the three-dimensional method integration model of Bergenstjerna, Johansson and Wojtastik (1999). Our merged view of this model, the DELTA fundamentals of proactive management and the connections to PENG are shown in figure 11. In this diagram different methods can be plotted to show what aspects they cover and to get a clearer view of how they compare to each other.

DISCUSSION

We will now end the thesis with a discussion on first the quality of our thesis and its validity and reliability. We then discuss our results from a more subjective standpoint and a more personal view. The discussion is then widened and we bring up some interesting sidetracks we found on the way. Finally we present some suggestions for further research hoping this can help future students to find interesting subjects for their theses.

Thesis Quality

Validity

As mentioned, validity is about whether we have studied what we intended to study or not (Patel & Davidson, 1991). The issue of this thesis has grown in an iterative process and we have given it a lot of thought. We believe that we have managed to keep the thesis within its context and that our scientific approach has been deep and wide enough to capture the essential aspects of the issue. In order to assure a high validity we have checked our results and findings with various persons familiar with our problem area and issue.

Reliability

Reliability is the question of how reliable our results are (Patel & Davidson 1991). As mentioned in the presentation of our scientific approach we have tried to start our investigations from different points of view in order to get a wide picture of the problem and catch as many of its aspects as possible before we go deep into the most important parts. As discussed in the Method chapter parallel observations during a case study or interview is one way to increase the reliability. We have always both been present and recorded our findings in several independent ways. Many of our findings are supported by literature and previous studies that support that we have managed to maintain a high reliability throughout this thesis.

Self criticism

There are some circumstances of our case that might affect the outcome of the study. We have tried to handle them to the best of our ability. In order to give the reader a chance to come to his own conclusions, we present the most important ones here:

- The object of our study, SKF's IS/IT environment, is outsourced and to a great extent owned by another company. This has changed a number of conditions for the whole organisation and might affect the possibility to generalise our findings although we have not found any evidence that this is the case.
- We both lack any previous experience in scientific work and this might have effected the implementation as well as the analysis of the studies. We have tried to handle this by reading, extensive preparations and a few informal interviews as practice before the "real" ones. The most important pitfalls of the methods used are presented in the chapter *Scientific method*.
- As also mentioned in that chapter, it is important to clarify the purpose of the study to the people involved in order to avoid mistrust and suspicion (Ekholm & Fransson 1992). We have tried to do this and to emphasise that we would not mention any names or case related projects by name in the thesis.

The issue

How to implement PENG?

As stated in the result the PENG method can be used to aid the evaluation of strategic value. The next question that arises is then how to implement PENG in an organisation. We would like to treat this subject as two different cases. The first and perhaps most simple one is to use PENG on single projects or at smaller companies as a way to evaluate projects. Here PENG can be treated more or less as a stand-alone method and be implemented according to Dahlgren, Lundgren & Stigberg (2000). With time and experience, the organisation and the method can then change and develop together. The other case is what we have been studying at SKF, where PENG can be used as a subset of a more comprehensive method or strategy, e.g. Portfolio Management, to complement any lacks or weaknesses. In this case it is probably more important to select parts of PENG or to adjust the method to meet specific needs, something that demands great understanding of the method and the thoughts behind it. We regard the two major advantages specific for PENG to be its consideration of soft benefits and the focus on constant follow-ups. These two areas are neglected in many organisations although considered to be important. When the decisions are made it is however often still all about time and money and this is where PENG can make a difference.

Will IS/IT Portfolio Management hype?

Portfolio Management is an old concept that derives from the stock market and later evolved into a general business management philosophy. Already in the early 80's Portfolio Management was suggested as a way of managing an organisations IS/IT (McFarlan & McKenney, 1983) but to our knowledge it was not implemented in any great scale. Today IS/IT Portfolio Management has made something of a come back, both Gartner and META Group is recommending it, there are a lot of articles written about it in the trade press, websites like Portfolio Management Forum (<http://www.portfoliomgt.org>) have been started and there are several CASE-tools available. We consider this as clear signs of IS/IT Portfolio Management being in the early stages of Gartner's Hype Cycle. The question that arises is what is different this time?

We believe that the main difference is that since the 80's the view of IS/IT has changed dramatically, much so because of the decline in the IT market. From being regarded as an internal service and a cost it is now more and more treated either as part of the core business or as a service that can be bought in competition between external suppliers. Either way it should in some way contribute to the Value chain and bear its own costs. This way, IS/IT has been aligned with the business and can now be treated more or less like any other department or part of the business. The difference is thus that the view of IS/IT today is much more in line with the ideas behind Portfolio Management. Another important difference is that this time the initiative has come from the business world as the answer to a need and not from the academic world as a vision of a better world. We are therefore of the opinion that the conditions for a hype is present. A more moderate development than the one of Gartner's Hype Cycle would be preferred but history shows that this seldom is the case.

Soft benefits, an underestimated part of strategic value

We believe that soft benefits generally are underestimated in commercial organisations. The view from the literature is often that soft benefits are simply not considered and this is probably true for many organisations and was possibly so to an

even greater extent in the past. Our view from SKF is however that there is quite a great awareness of these matters and that it is often discussed and considered in IS/IT projects. The problem is that when it comes to the important high-level decisions the decisive factors is often time and money. We think that an organisation has to get through three stages in their view of soft benefits. The first is the most common one found in literature and the second the one we have seen at SKF. The third and last is when the soft benefits are one of the decisive factors, among others. Money must always be another one of these and this is described in an expressive way by Dennis Bakke, CEO of AES:

"Profits are to business as breathing is to life. Breathing is essential to life, but it is not the purpose for living. Similarly, profits are essential for the existence of the corporation, but they are not the reason for its existence."

A wider discussion

As mentioned, a side result from the interviews was that we noticed the difference in management culture between SKF and EDS. This attracted our interest and we have been doing some extended research in the area. The difficult balancing management is forced to perform is illustrated in its extremes by Krantz, Nilsson, Ekdahl, Elmenius, Leeman & Åhrén (2000). The book is actually about managing a Whitbread or Volvo Ocean Race project and boat but many of the issues are applicable to any form of management, the perhaps most interesting one being the conflict between different management philosophies.

"A female journalist wrote a letter after sailing with both The Card and the winning Steinlager of New Zealand. From the letter it was clear that even if many thought that I had run a hard regime on our boat it was like Sunday school compared to the leadership onboard Steinlager. She had also noticed that the crew of the winning boat had not shown any real joy over the victory after the finish. When The Card finished, she said, the crew seemed happier in spite of a poorer result. She finished: 'I doubt that the so called democratic Scandinavian leadership would ever win Whitbread.'"

Roger Nilsson

Although there are many common factors, a company has to regard issues a Whitbread skipper does not. An enterprise must for example in most cases keep its employees content since a continuing business is dependent on its human resources. It is our belief that the Scandinavian management philosophy is preferable in the long run (perhaps because that is what we are used to) even though the American way might perform better results in shorter high-performance projects.

Further research

A problem for us during the initial phase of this thesis was to find a suitable issue and an environment in which we could conduct our studies. In order to facilitate for future students we have tried to compile some suggestions for further research that have emerged during the work on this thesis.

Develop and adjust PENG to fit SKF Group Project Manual

SKF has recently developed a standardised project documentation called SKF Group Project Manual. A logical continuation of our work would be to make a general PENG

development for large, global organisations and adjust it to fit at SKF together with their Portfolio Management Methodology and Group Project Manual.

Evaluate SKF's IS/IT outsourcing

We have tried to get an overview of the result of the outsourcing and although we have gotten some indications the general opinion seems to be that an evaluation has got to wait for some years. It is however an interesting topic and in due time it could be a good issue for another thesis.

What is the core competence?

Another outsourcing related issue is the question of what parts of an organisation to outsource and what parts to keep in-house. We have come across widely different opinions in our studies and we ourselves have come up with arguments for all the different sides. This is not an easy matter and the topic could need thorough investigation. The perhaps most interesting question of this issue is what the core competence of a business really is.

Examine and compare different management philosophies

An issue we have become more and more interested in during the work with this thesis is the different cultures of different enterprises and how they affect the organisation, both internally and externally in the relation with other organisations. We have tried to find some material about this topic but due to lack of time we have not managed to get very far. It is however a very interesting topic that becomes more and more important in a world of ever growing complexity and globalisation.

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Figure sources

Figures without source are products of our work. In other cases the source is presented together with the figure.

APPENDIX - INTERVIEW QUESTIONS

We have conducted five semi-structured interviews. During these interviews we used the following questions in order to start the conversation and keep it in the right direction.

- Name, title, number of years at SKF, background, what is your own roll?
- Why did the X project start?
- Were there any demands of return on investments/profit?
- Were there any pronounced goals with the project/investment?
- Did you use any method/tool for analysing/evaluate returns/benefits/risk?
- Was any evaluation of the project and/or methods/tools made?
- If so was the evaluation connected to any goals.
- Does audits of the conditions occur during a project?
- Is the documentation standardized? (What is Definition Phase Report?)
- What persons participated in the project scope? (users, orderers, owners...)
- The items of the report (risks, consequences, costs), according to methods or how are they estimated?
- Is value discussed in financial terms or at another (higher?) level?
- According to which criterion is an IS/IT project evaluated? (Business alignment?)
- Do you think that management and people from the business are motivated to take part in IS/IT project planning?
- What do you consider to be soft benefits?
- Do you think that these soft benefits are considered?
- How are soft benefits evaluated?
- Are other projects/factors that influence a project considered?
- Was the X project a success or a failure?
- According to which criterion?
- What do you believe are the reasons?
- How do you view IS/IT? As a service or as an area of business? cost/return?)

- How do you experience the IS/IT environment in general now compared to the pre-outsourcing situation?
- What do you believe are the reasons?
- Do you see a value in making communication between management and IT department easier, either in financial terms or by a common system of valuation?
- How do you view the present/future? (in a longer perspective, 5 years, the city plan)
- How do you experience the complexity and dynamics of the development work?
- How do you experience the change of alignment/tasks? (means to control projects)
- How is coordination of development done? (IS/IT and enterprise, DELTA)
- Changes of the business? (description)
- Organisation and leadership? (SKF versus EDS)?