

# A Conceptual Model for Successful IT Investment

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## ABSTRACT

EvIT an evaluation model specially adjusted for evaluation of IT investments. The purpose of this model is to evaluate both the financial and the “softer” values of IT. According to IT's major role of supporting the business concept. “soft” values like; improved customer service, fewer complaints, more reliable deliveries and et cetera becomes very important. An interesting feature of the EvIT-model is that it promises to transform all aspects of IT into monetary terms. This makes it possible to quantifiably measure all the aspects of IT, not just the ones that can be counted for as reduced costs. This attribute makes EvIT different compared to other models that we have found. In this paper we have chosen to study how the use of EvIT affects evaluations of IT-investments, by focusing on both restricting and enabling aspects.

The studies that have been performed are mainly based on qualitative methods. We have used a literature study to see which aspects those are of most importance when evaluating IT. Further on we have studied descriptions, by the originators of EvIT, to see how an actual evaluation process is supposed to be done.

We have found out that the EvIT -model certainly has good intentions in capturing the complexity inherent in IT, by valuing “soft” and “hard” aspects and for illustrating an investment from different perspectives. The model involves a working procedure consisting of seven steps that serves as a guideline for the evaluator.

## 1. Introduction

IT has today developed to be one of the most important components of a successful business. During 2006 the Kazakhstan IT-market had a turnover exceeding 1.6 billion (USD), which makes it interesting to investigate what foundations companies use to motivate and justify their IT-investments.

When discussing these types of matters it is important to know how we define an IT investment. We have chosen to use a definition by the US. Department of Health and Human Services (2007) who describes an IT-investment as “An organizational investment employing or producing IT or IT-related assets. Each investment has or will incur costs for the investment, has expected or realized benefits arising from the investment, has a schedule of project activities and deadlines, and has or will incur risks associated with engaging in the investment”. We would here like to point out that we primarily are interested in IT-investments that, as the definition indicates, will incur costs and that has expected or realized benefits arising from the investment.

The most of us today agree about IT as an essential part of the daily business. There is however, research showing that 70 to 80 percent of all IT-investments fail to fulfill its potential benefits. This area can obviously be a subject to large improvements. We believe that the potential of IT is great, even though there historically have been several disappointments. Many problems with IT-investments are based on that IT is treated as an isolated phenomenon, separated from other parts of the organization. It is also common with unrealistic expectations of IT, which in turn are founded in the lack of evaluations or insufficient assessments of what IT can and cannot do.

This discussion has led us into the subject of how companies can evaluate their IT investments. We are interested in this subject from two different points of view, which is; how can an organization evaluate an IT-investment before the system is installed, and when the system is installed, how can the organization determine whether the investment really delivers what the organization had expected or not? The evaluations that are of interest here, is the ones that takes both the qualitative aspects and the economic standpoint into consideration. A solid evaluation of what an information system can contribute to in terms of; Improvements of effectiveness, customer satisfactions, and eventual monetary savings et cetera, will result in better data for decision-makings. It will also result in a more consistent view of what changes that can be expected and in a clearer basis to be used when following up projects afterwards.

## 2. Potential and Challenges

It is obvious that IT-investments are not an end in itself, but rather aims to support the business and increase the profitability. From this, it is quite apparent that IT-support can be hard to separate from the results of the core business. Moreover, if you try to do this, how are you supposed to value the different aspects of IT? You can of course measure increased revenues or a reduction of costs, but it is more problematic to value the “softer” aspects of IT, for example, how do you value better customer service?

When considering different tools for evaluating IT-investments we have found several models, for example; Internal Rate of Return (IRR), Return On Investment (ROI), Payback Period (PP), Economic Value Added (EVA) et cetera. We though not totally satisfied with these models, based on their lack to show qualitative aspects of IT-investments.

The purpose of EvIT model is to evaluate both the financial as well as the “softer” values of IT-investments. The EvIT-model is based on a framework consisting of ten steps where you evaluate an investment from different perspectives in terms of benefits and costs. This is interesting due that information systems imply a lot more than just monetary savings. It is commonly the “softer” aspects of an investment that constitutes the most important benefits for example; improved customer service, fewer complaints, more reliable deliveries et cetera.

Based on the above information about EvIT, it seems to fulfill our demands for evaluating both tangible and intangible aspects of an IT-investment. But does the theory about EvIT really meet up when it comes to practice. Is it really possible to put a price tag on all the intangible aspects of an IT-investment, in order to make them measurable? Many questions arise in the beginning of our thesis and in order to structure the work we have come down to the following research question. Based on the above discussion, we will during the research process try to answer the following question: How can the EvIT - model contribute to evaluation of IT-investments, focusing on both restricting and enabling aspects?

## 3. Theoretical framework

In this part of the paper, we will bring forth theories that are of interest in relation to the purpose. The theoretical framework is also supposed to introduce the reader to the major theories that are of importance within the subject of IT-investments and evaluations.

### 3.1. How IT investments affect a corporation

Since IT has a central role in most organizations, it obviously has effects on the organization. This need to be considered already in the evaluation-phase of an eventual implementation of a new system. Walsham (1993) has created a model that shows the information system in relation to its surroundings.

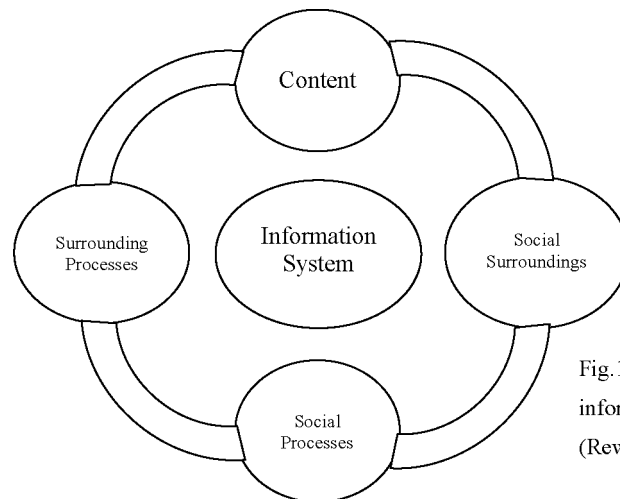


Fig. 1. Model for implementation of information system (Walsham (1993) (Reworked).

According to this model, components around the Information system can be evaluated according to different focuses:

- Content:** The organization, the business concept and the exiting problem before a new Information system is set.
- Social surroundings:** Social relationships, infrastructure of the organization, concentration of power etc.

**Social process:** Organizational culture and sub-cultures, policies, self governance, and moral.

**Surroundings/Processes:** People make actions (communication, power struggles and sanctions) based on accessible means (interpretation, resources and norms). (Walsham, 1993)

This model by Walsham shows that information systems have a great influence on people, organization and structure. The above mentioned factors, used to understand organizational implementation, are multidimensional and needs to be studied deeply and over a long time (Walsham, 1993). From this, you can see that Information systems are implemented in a very complex environment that needs to be analyzed in order to find an appropriate system to use.

#### 4. The EvIT model in theory

In this section we will introduce the reader to the EvIT-model by describing both the areas where it can be used and the sequence of work when performing an evaluation. The information that we use comes from a literature study of a book titled “Make IT-profitable” written by Dahlgren et al. (1997).

##### 4.1. Areas where EvIT can be used

The figure below illustrates the different occasions where EvIT can be useful.

Areas of Application	PRIORITISING	PRICING	EVALUATION OF A COMPANY
Benefits			
ATTAINED BENEFITS	Follow-up	Follow-up	Main information
POTENTIAL BENEFITS	Information for decision-making	Information for decision-making	Supplementary information

Fig. 2. A matrix illustrating the areas where the EvIT-model can be of good use.

To start with, we will explain the concept of attained and potential benefits. Attained benefits imply the benefits that a certain system generates right now. A benefit is however not a constant, it rather changes along with its surroundings. According to the authors this means that it can be suitable to perform a benefit evaluation yearly, if the organization is present in a frequently changing market.

Potential benefits on the other hand view the expected benefits of new or revised information system. The reliability of these benefits is lower than that of the attained benefits. The potential benefits are often dependable of that some conditions in the surroundings are realized.

The first area where EvIT can be applied is for prioritizing, that is to say as supportive information when choosing among different investments. This is supposed to help the organization to invest their money, where they will lead to most improvements. Another use of the model is to calculate how much a certain investment is worth that is to say; to see if the price of something is relevant. In this case, you use the potential benefits as the base for the decision-making. If the investment is found to be profitable, then you can follow up the potential benefits afterwards and see if they are realized. According the authors, EvIT can further be used to calculate how much a project might be worth and thereby be used when considering outsourcing. A third use of EvIT can be evaluations of companies' total IT, in order compare attained benefits of the present system to the potential benefits. If there are a large discrepancy the companies IT might not be maximally used, thereby it can be room for improvements without further investments.

#### 5. Sequence of Work

In this part we will give a brief explanation of the working method used in EvIT. The model is based on the ten following steps:

1. Determine purpose
2. Determine area (processes/systems)
3. Identify effects of benefits
4. Value benefit effects (gross benefits)
5. Estimate reliability of the evaluation
6. Define and evaluate IT costs
7. Calculate net benefits

According to the model the above mentioned steps do not necessarily need to be performed in this order and iterations of some steps can be helpful. When concerned personnel have become more experienced, it can be helpful to go back and revise some of the earlier stages of the evaluation, in order to see if any of them can be performed in a better or more consistent way. There is also a possibility that some of the steps can be performed simultaneously to increase the speed and the efficiency of the evaluation. In the following paragraphs, we will give a description of the steps.

### **5.1. Determine purpose**

A benefit evaluation can have several purposes. An example can be to perform an estimation of potential benefits of a future investment. Another purpose could be to generate data for decision-making, used to approximate the price of a certain product or service. It is also common to evaluate an already performed project in order to see if the set goals were achieved.

A more general purpose can be to evaluate the total benefits of IT in an organization in order to perform future IT-investments more strategically, i.e. to invest money in projects where you can maximize the return. The descriptions of the model indicate that it is important to determine the purpose early in the evaluation, due to that it has effects on the rest of the process.

### **5.2. Determine area for benefit evaluation**

The purpose of the benefit evaluation does partly give a hint about which area that is of current interest. The purpose can be either to evaluate a total organization or just to lift out some systems or processes that are of special interest. It is common that a particular benefit might arise from collaboration between many different systems or processes. In the process oriented world of today many companies primarily look at the processes and from that point look at the information systems involved. If the organization chooses to perform an evaluation of the total IT, it might later on be interesting for them to focus and dig deeper into some parts of the evaluation based on the results of the broader analysis. An example can be that one area, for example a system, has shown to have very low or negative net benefits. The authors mentions that it can be useful to further study this problematic area, in order to improve the benefits of the system or otherwise to terminate that special part.

### **5.3. Identify effects of benefits**

In this stage, the organization needs to engage the persons in charge and control that all parts of the firm affected by the process/systems are represented. According to the descriptions of EvIT, it is not a good idea to have only the IT-specialists identifying all the benefit effects. The evaluator also needs to be aware of that the processes/systems can influence other parts than the organization, i.e. customers or suppliers et cetera. Alternative methods in this step can be brainstorming or objectives analysis. Brainstorming means that a group with a balanced competence is assembled, i.e. competences from all different parts of the organization are represented, to search for benefit effects without restricting thoughts. Objectives analysis implies that you have a starting point in a quantifiable main goal that you subsequently compare to different sub goals. From this, the organization studies how diverse parts of a system affect the fulfillment of the sub goals.

In order to get a trustworthy EvIT-evaluation it is important to identify as many benefit effects as possible. Aspects of less importance are phased out later in the valuation process.

### **5.4. Value benefit effects (gross benefits)**

It is essential that the people in charge take responsibility for the valuation. A key issue here is the aspect of time. Shall an existing benefit be compared to the status before a certain system was introduced or shall you evaluate the benefit based on a non-existing IT support? Well, the answer is always that the EvIT-evaluation shall compare the benefit to the current situation.

A question that the organization can ask is for example; how do we benefit from this system today and what consequences would it be if the system did not exist? To make this question easier to value you can, according to the authors, think about it in terms of “how much would the organization lose every day if the system would be out of order?” The EvIT-leader can here ask questions like; is it worth 1 million – No, is it worth 500 (USD). – Absolutely, is it worth 1 million – maybe, and so on. A benefit does not always have to result in improved sales. It can rather be to maintain the sales within the same level as today or even to decrease the sales where the reduction would have been even greater if the benefit were not achieved. EvIT does not include a framework for how these numbers should be calculated; it is rather up to the persons performing the evaluation to make their own assumptions.

The values are then to be filled in to the objectives structure. This can easily be done in a calculation program, for example Microsoft Excel, in order to facilitate the calculation of the total benefits.

### 5.5. Estimate reliability of the evaluation

The identified benefits are to be classified into three different categories:

- Direct benefits
- Indirect benefits
- Hardly valued benefits

This categorization is done to illustrate the reliability of the valuation. An estimation of what IT contributes with compared to other factors, is necessary in order to reach a relevant result. A question to ask here is whether the value of the benefits is appropriate compared to the total value of the firm.

### 5.6. Define and evaluate IT costs

Costs of IT can arise within many different parts of the organization. The EvIT-model has three different types of costs:

- Local hidden costs
- Local visible costs
- Central costs

The hidden costs are, as the name states, the hardest ones to identify. Examples here are the time spent by the personnel on adjusting the applications, in addition to the ordinary use of the system. Another example is the data communications costs, which often disappears in other types of telephone expenses. This is a complex stage, where the organization needs to shape their own norm for calculating the IT-costs. The organization has to be very careful when creating the norms so that every cost is calculated in the same way.

### 5.7. Calculate net benefits

The final and the least complicated step is to calculate the net benefits. Here you reduce the gross benefit by the IT-costs, see below.

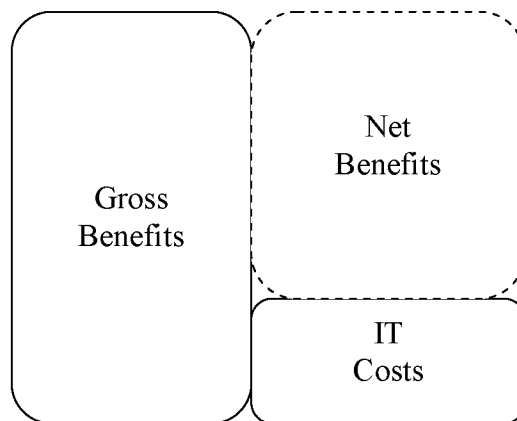


Fig. 3. - Net benefits = gross benefits reduced by the IT-costs

An interesting business ratio that can be calculated here is the benefit factor, that is to say the gross benefit divided by the IT-costs. A frequently calculated benefit factor, according to the authors, is five, that is to say the gross benefits are five times the size of the IT-costs.

## 6. Conclusions

First, we have found out that IT-investments are very complex in relation to other types of investments. This implies that the model used for these kinds of investments, have to be adjusted for the particular circumstances. The EvIT-model certainly has good intentions in capturing the complexity inherent in IT, by valuing “soft” and “hard” aspects and for illustrating the investment from different perspectives. The model involves a working procedure consisting of ten different steps that serves as a guideline for the evaluator. However, the model lacks a clear framework describing how the actual work in each step shall be performed.

The model generates in a clear and easily understandable result that can be understood throughout the organization, this mostly due to the use of money as the unit of measurement. The results of the evaluations have also shown to be very precise, in terms of “hard” aspects of IT. However, the quality of the result largely is dependent on the judgments of the persons involved and to reach an accurate result, a lot of time and effort has to be put in.

Even though that the EvIT-model is based on many arbitrary decisions, we can see that it can be useful for discussing IT and in order to illustrate the implications of an investment. The model shall though not be used for comparisons between different companies or maybe not even between diverse systems, i.e. if it is not the same persons performing the evaluation. Nevertheless, we can see the usefulness of EvIT when comparing different kinds of IT-investments, in order to see where the money can be of best use. This is also one of the purposes behind the EvIT-model. We further believe that the model can be used in any type of organization; even though it may be better suited for the public sector, where “soft” benefits are highly valued and an important part of the business concept. The model does also have an important synergy-effect, by merging people from all levels of the organization and letting them unite under the same strategies and objectives.

## References

- [1] Answers.com. (2007). IT. Retrieved 2007-09-26 from <http://www.answers.com/topic/itabbreviation?cat=health>
- [2] Bannister, F. (2004). Purchasing and financial management of information technology. Rochester: Genesis Typesetting Limited
- [3] Beekman, G., Rathswohl, E. J. (2001). Computer Confluence. New Jersey: Prentice-Hall
- [4] Ghauri, P., & Gronhaug, K. (2005). Research Methods in Business Studies – A Practical Guide (3<sup>rd</sup> edn.). Harlow: Prentice Hall
- [5] Leavitt, H. (1965). Applied organizational change in industry: structural, technological and humanistic approaches. In March, J.G (ed.) “Handbook of organisations”, Rand McNally, Chicago
- [6] Pearlson, K. E., & Saunders, C. S. (2004). Managing and Using Information Systems – A Strategic Approach (2<sup>nd</sup> edn.). New Caledonia: John Wiley & Sons, Inc.
- [7] Robson, C. (2002) Real world research (2<sup>nd</sup> ed.). Oxford: Blackwell.
- [8] Saunders, M., & Lewis, P., & Thornhill, A. (2007). Research Methods for Business Students (4<sup>th</sup> ed.). Harlow: Pearson Education Limited.
- [9] US. Department of Health and Human Services. (2007). Glossary of Key Enterprise Terms. Retrieved 2007-09-23 from <http://www.hhs.gov/ocio/about/terms/index.html>
- [10] Walsham, G. (1993). Interpreting information systems in organisations. John Wiley & Sons Ltd



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