

**Planning for Information Systems Development –  
A Framework for supporting  
the management of Success Factors**

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Submitted by Lena Aggestam to the University of Skövde as a dissertation towards the degree of M.Sc. by examination and dissertation in the Department of Computer Science.

**[2002-10-31]**

I certify that all material in this dissertation which is not my own work has been identified and that no material is included for which a degree has previously been conferred on me.

Signed: \_\_\_\_\_

**Planning for Information Systems Development –  
A Framework for supporting the management of Success Factors**

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## **Abstract**

In the information systems development process there are important success factors. By doing an extensive literature survey we have found that these factors emerge mainly from organisational issues concerning the objective of the process and the stakeholders. One factor - to discuss the system, its subsystems and to define the system's boundary - is a prerequisite for all the others. Factors emerging from the objective are mainly about the objective being well analysed and defined, being accepted among the stakeholders and meeting business objectives. Factors emerging from stakeholders are mainly about involving the right stakeholders in the process, achieving a positive attitude and taking care of their needs about knowledge and confidence. Based on this we have developed a framework aiming to guide organisations in what considerations they should make before the project begins. As a result of our framework there will be both a clear objective, which supports the business mission, as well as positive stakeholders to support the information systems development process.

**Keywords:** IS success, organisational change, information systems development, success factors, stakeholders

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So, thanks Anne, for our collaboration. A collaboration that has resulted in this thesis, but also in friendship: You, Anne, have become a dear friend to me!

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Lena Aggestam

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# 1 Introduction

Computer technology has changed the working life of more or less everybody. Today people are, directly or indirectly, influenced in their daily working life by using the technology (Bansler, 1990; Lindencrona, 2000). Comparing to the development in this area the full potential of the technology has yet to be reached (Göransson and Gulliksen, 2000). A conclusion is then that there are possibilities to make the use of computer technology more efficient. According to our opinion there is no organisation that can reject these possibilities.

Computer technology, both hardware and software, can be regarded as parts of an information system (IS) (see e.g. Avison and Fitzgerald, 1998; Avison and Shah 1997; Andersen 1994) and in that perspective we can state that information systems are not so effective as the technology allows. When organisations want to develop their IS they have a long, complicated and expensive process to go through. An IS is a part of the organisation so to develop the IS is to change the whole organisation. Every year organisations make substantial investments into developing new IS to meet their information requirements (Ewusi-Mensah and Przasnyski, 1994). Few systems are completed on time and within budget and as a result most studies investigating systems development report them as failures (Jiang et al, 2001). Despite all the studies investigating systems development there is no full understanding of why some IS development projects are successful while a substantial number of them are not (Ewusi-Mensah and Przasnyski, 1994).

Different organisations have different missions and objectives, business plans and information needs. The IS plan should reflect these factors to enable the organisation to use the IS strategically (Kearns and Leader, 2000). Different parts of organisations have often developed their own IS. The result is a number of smaller IS, we can call them subsystems. Even if each subsystem works optimally there will be no guarantee that the whole IS does that. The objectives of the wider organisation must correspond to the objectives of the smaller unit (Barlow and Burke, 1999). It is also important to match the IS with the organisational culture (Poon and Wagner, 2000). If this is not the case we can state that the use of IS in the actual organisation is not as effective as anticipated. The organisational constraints also influence the information systems development process. (Lang et al, 2000) and it is important that management is aware of this. Another important success factor for how well an information system will work in an enterprise is the interaction with potential users in the development process (e.g. Andersen, 1994; Cherry and Macredie, 1999; Pohl, 1998; Sutcliffe and Economou and Markis, 1999). To understand the cultural climate, the organisation, the future users and their tasks etc. are crucial factors for how successful the development work will be (Andersen, 1994; Dubé and Robey, 1999; Göransson and Gulliksen, 2000).

We have now discussed some important success factors in the information systems development process. If project managers are aware of such factors early they can make more effective and efficient project adjustment (Procaccino et al, 2001). Consequently, the best should be to address important success factors already before the real information systems development project begins. We consider that when an organisation has decided to go through an information systems development process, but the process has not yet started, there is time to prepare the organisation for the development process, see Figure 1. A preparation aiming to give the project the best

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starting point as possible in order to be able to handle these important success factors in an effective manner through the development process.

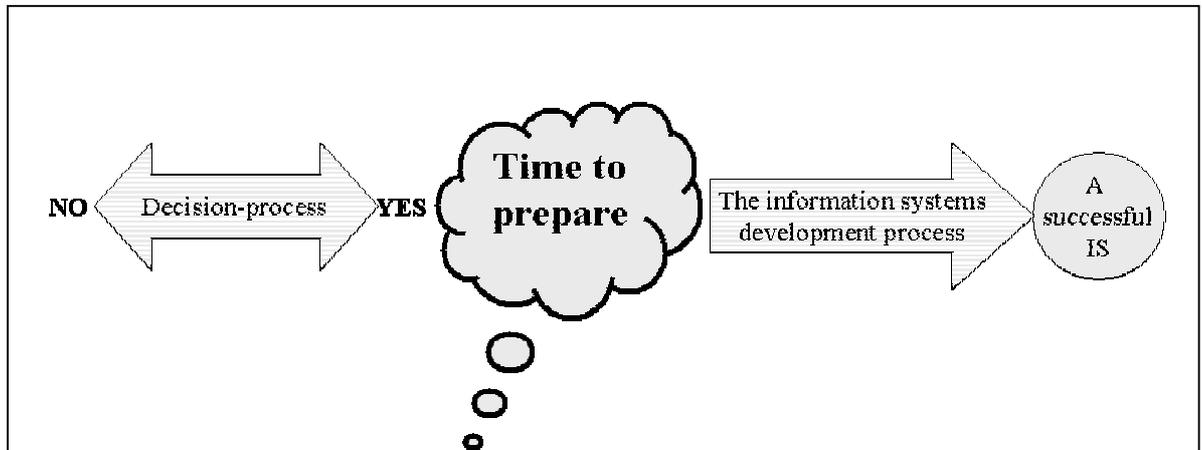


Figure 1 Our research in a holistic view

This point of view in developing a successful IS seems to be unexplored. Consequently, there is a need for this work since all work that can contribute to developing successful IS is of high value.

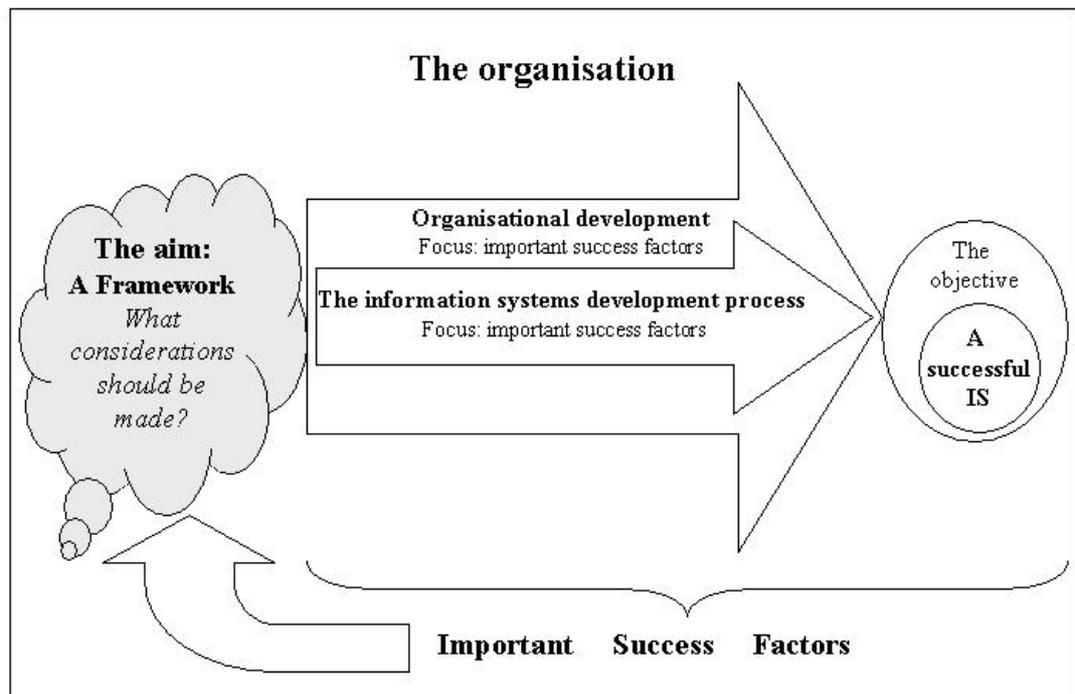
### 1.1 Aims and objectives

The aim of our work is to survey and discuss important success factors in the information systems development process and the potential use of them suggesting what considerations a target organisation should make before the information systems development process begins. Our research will result in a framework to guide target organisations in this process.

The objectives to achieve this aim are:

- To discuss and define the concept of organisation.
- To discuss organisational development focusing on important success factors in this process.
- To discuss and define what a successful system is from an organisational perspective.
- To survey and discuss important success factors in the systems development process as described in literature.
- To discuss, group and relate important success factors in order to identify what considerations a target organisation should make before the information systems development process begins.

The objectives are summed up and related to the aim in Figure 2. The aim and the objectives are written in bold style.



**Figure 2** The relationship between the objectives and the aim

We are aware that it is a philosophical question when the development process begins; is the preparation phase that we are focusing on before it begins or is it a part of the development process. We do not concern this to be a problem. Our research aims to discover what considerations the organisation should make in order to let the process have every chance of succeeding. Whether the organisation interprets this preparation process as a part of the development process or something that takes place before it begins is not interesting. In order to distinguish between the development process and the preparation phase that our framework aims to support, we place it before the information systems development process begins.

The relationships shown in Figure 2 mean that concepts used in the figure must relate to each other in a special way. The IS as a part of the whole organisation. Consequently, the organisation limits the development process and decides what system the organisation needs. An information systems development process must then also influence and develop the organisation and we consider this process as one type of organisational development. We also argue that the organisation, the IS and the development process influence each other.

What considerations that have to precede the development process depend logically on

- the organisation
- what system the organisation interprets as a successful one.
- important success factors in the development process

This is in accordance with the objectives of our research.

### 1.2 Way of working

To fulfil our aim and objectives we will use an explorative and inductive approach. Information will be gathered from different sources in order to gain knowledge about different important success factors in the development process and then come to a general understanding about the most crucial groups of factors. These groups will then be discussed and analysed in the perspective of what considerations an organisation should make before the process begins in order to handle these factors in an effective way and reach the objective; a successful IS.

The work will begin with a study of literature. We interpret the development of an IS as a special form of organisational development. Relevant material will then be collected mainly from the information systems area and from organisational theory. The sources will be consisted of books and research reports. The books will contribute to a fundamental and essential understanding of the area. Research reports and articles will give us the latest findings in the area.

In order to suggest what considerations should be made before the development process begins it is important to make a thorough analysis of the information found in our survey of literature. This analysis will result in the most important factors being grouped. These groups will in turn make up the foundation for the discussion and analysis about what considerations should precede the development process. As a result a framework will be presented.

In order to show how – and if – this framework could be used in practice we will apply it to a case. This case could be seen as a bridge between the theory – the framework – and the practice – the case. This case will function as an initial assessment of the framework and the whole research. We assume that first when the theory can be used in and contribute to practice the theory is really useful and important.

### 1.3 Results and Future Research

Our framework implies that the target organisation, after that the system's boundary has been defined, should analyse and describe the objective for the development process. The objective should be analysed and described in different frames – different points of views – and at different levels of detail – how, what and why levels. The objective must support the business mission and only when this alignment is clear the development process can continue. The next step is to motivate and prepare the stakeholders. To be successful in this process the work must be adapted to the stakeholders. In order to motivate each group of stakeholders the description of the objective has to be adapted; i.e. choose the description from the objective analysis process that fits the actual stakeholder group best. The information systems process is in many ways a communication process. The stakeholders must be prepared for this communication process. Also this preparation should be adapted according to the group of stakeholders. As a result of our framework there will be both a clear objective and positive stakeholders to support the information systems development process.

In order to test our framework in practice we have, using our framework, made recommendations to an organisation which plans to begin an information systems project. These recommendations show that our framework, so far, has the potential for being useful in practice.

## 1 Introduction

Our framework implies some future research. This research follows two main courses:

- Field and case studies in order to thoroughly test our framework
- Research that examines and analyses parts of the framework at a more detailed level in order to develop guidelines or methods to guide the target organisation.

We claim that all research that can be done in order to test, complement and develop our framework is valuable. The reason for this is that we argue that these contributions in turn contribute to developing successful IS.

### 1.4 Outline

Chapter 2 gives a background to our research. We discuss what an IS is in our research. The development process of an IS is crucial if the IS is to be successful or not. We present this process as an overview and – because of its great importance for the whole process – focus on the key activity Requirements Elicitation. An important success factor for how well an information system will work in an enterprise depends on the interaction of the users in the development process (see e.g. Andersen, 1994; Cherry and Macredie, 1999; Pohl, 1998; Sutcliffe and Economou and Markis, 1999). Users is one type of stakeholders. We discuss the concept of stakeholder and user. Implicit in the material about information system and development there are important success factors. According to the aim of our research this chapter ends with a summary of these factors.

Chapter 3 discusses what an organisation is and how it can be analysed and described. There is also a discussion about organisational change in order to get a specific type of organisational change, the information systems development, in perspective. Important success factors are in focus in our research and the chapter ends with a summary and discussion of identified factors in this chapter.

Chapter 4 discusses what a successful IS is and its relationship to the organisation. In the literature we have identified critical success factors (CSF) in the information systems development process. Chapter 4 also presents the CSFs found in our literature survey. The factors identified in the discussion about a successful IS are then related to these factors.

Chapter 5 discusses, analyses and groups all the identified important success factors found in our literature survey. These groups of factors are discussed and analysed in the perspective of what considerations a target organisation should make before the development project begins. This discussion results in a framework. The framework can be regarded as the main contribution of our research.

In chapter 6 the framework is applied to a case in order to show if and how the framework could be used.

Finally, chapter 7 discusses our framework. This chapter ends with a presentation of future research based on our framework.

All the chapters are certainly related to the aim and the objectives of our research. In Figure 3 we have complemented Figure 2 with the chapter numbers in order to clearly show this relationship.

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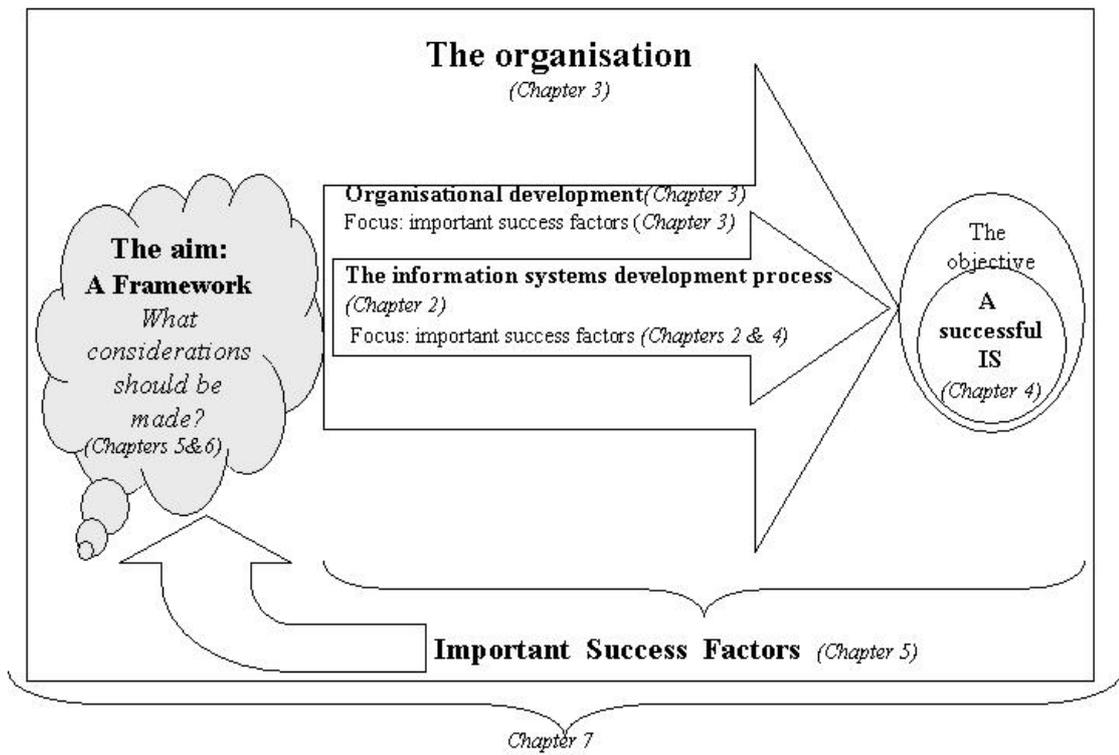


Figure 3 The outline in relation to the aim and the objectives of our research

## 2 Background

Organisations of today use Information Systems (IS). Every year organisations make substantial investments into developing new IS (Ewusi-Mensah and Przasnyski, 1994). Most studies investigating information systems development report them as failures (Jiang et al, 2001). Our literature survey aims to find important success factors in the information system development process. These success factors form the base in our research which focuses on which considerations should be made by a target organisation before starting an information systems development project. Requirements Elicitation is a key to how well the development process will succeed. Consequently we assume that we will find a number of important success factors in this phase. The objective of Requirements Elicitation is to make the hidden knowledge about the target organisation explicit in a way that everybody involved can understand, but the problem is that this knowledge is not available from only one source (Pohl, 1998). One important source in Requirements Elicitation is the potential future users and other stakeholders. How well an information system will work in an enterprise depends on the user involvement in the development process (e.g. Andersen, 1994; Cherry and Macredie, 1999; Pohl, 1998; Sutcliffe and Economou and Markis, 1999). This involvement should be an important success factor.

The remainder of this chapter is organised as follows. Section 2.1 discusses what an information system is in our research. Section 2.2 describes the whole development process as an overview and section 2.3 focuses on the first phase, Requirements Elicitation. Users and other stakeholders in the development process are discussed in section 2.4. The chapter ends with a summary of the identified important success factors in this chapter.

### 2.1 An information system

The concept of *Information System* has been subject to different definitions. Computers are considered to be a part of an IS (Avison and Fitzgerald, 1998). According to Bervall and Welander (1995) the concept of IS has more and more been thought of as a computerised IS. In this work IS means computerised IS. The concept *Information System* is composed of *information* and *system*. *Information* is interpreted *data* (Avison and Fitzgerald, 1998; Eriksson, 1986; Langefors, 1966). According to Aggestam (2001)<sup>1</sup> the consequence of this is that computers process *data* and that *data* only can be *information* when it has been interpreted by human beings. A *system* is a number of related objects (Eriksson, 1986; Langefors, 1966; van Gigch, 1997). *Systems* are related to other systems, have subsystems and they always have a purpose (Avison and Fitzgerald, 1998; Eriksson, 1986). In accordance with this purpose, the boundary of the system can be defined (Avison and Fitzgerald, 1998; Eriksson, 1986). An IS is a part of the whole organisation (Andersen, 1994; Bergvall and Welander, 1996; Avison and Fitzgerald, 1998), which means that an IS is a subsystem in the perspective of the organisation and its purpose is to support the organisation in their striving to reach their business mission, their objectives.

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<sup>1</sup> Aggestam (2001) is discussing this based on a large number of references

## 2 Background

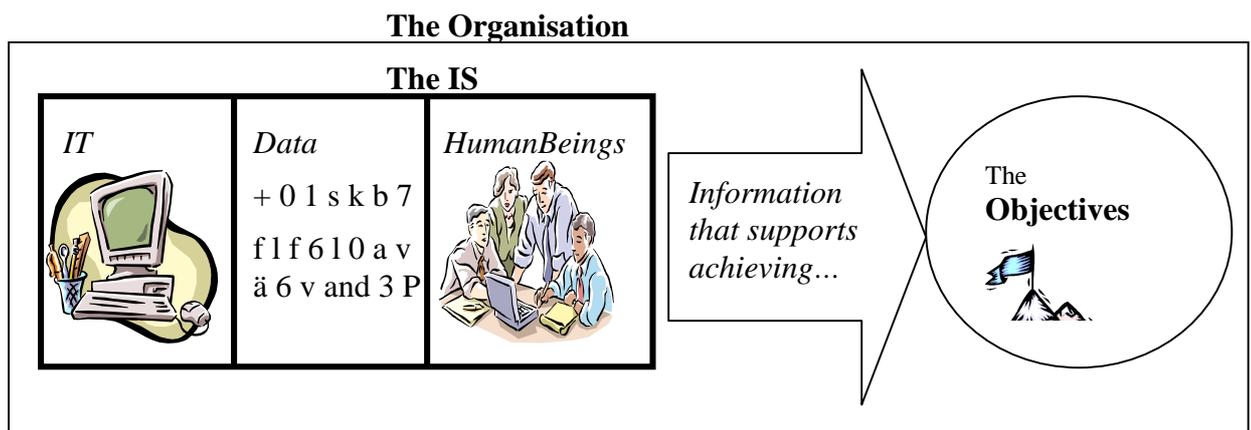
In accordance with the discussion above we can identify three components of an IS:

- Hard- and software (IT)
- Data
- Human beings

These three components agree with definitions in the literature (see e.g. Avison and Fitzgerald, 1998; Avison and Shah, 1997; Andersen, 1994). The components are also resources in the IS and consequently in the whole organisation. We can sum up the discussion by saying that

*An information system represents a computerised system comprising IT, data and human beings. The purpose of this system is to handle information in order to support the organisation achieving their objectives.*

By handle information we mean that the system assembles, stores, processes, delivers and presents the information (e.g. Andersen, 1994; Avison and Fitzgerald, 1998). This definition covers important aspects of our research and is also well in accordance with other definitions in the literature, e.g. Andersen, (1994); Avison and Fitzgerald (1998); Laudon and Laudon, (2000). The definition above is illustrated in Figure 4.



**Figure 4 The Information System (IS)**

There is a large number of types of IS today, but according to Strand (2000) they all have in common that they are closely integrated with organisations in order to support them at different levels. According to the aim of our research different types of IS are not in focus and we will therefore not discuss this further. We only acknowledge that there are different types of IS and that different types support different parts of the organisation.

### 2.2 The development process

Our research aims to discover what considerations an organisation should make before the development process begins. The whole development process will because of this only be described as an overview in order to provide a general understanding.

An IS development project can be described as a group of interrelated activities undertaken in sequence and/or in parallel in order to produce a computer-based

## 2 Background

system that will generate information to satisfy some specified organisational requirements (Ewusi-Mensah and Przasnyski, 1994). This process differs depending on whether the organisation develops the system in-house or if the organisation purchases packaged software. Comparing packaged software with the definition of an IS we find that packaged software corresponds to the software in the IT-component. Regardless of whether the software is developed in-house or purchased the two other components – data and human beings – are the same. Because our research aims to present a framework irrespective of whether the software is developed in-house or is packaged software we do not discuss this further. To develop an IS is an extensive and complicated task and there is a need for an overview of the development work, a model to refer to, in order to understand what the work is about (Andersen, 1994). The model should be general; that means applicable irrespective of environment, size of project, complexity, methods, tools and so on (Révay, 1992). As a reference model for this research the life cycle model has been chosen. The reason for this is that this model fulfils the requirements of a reference model for this work; it gives an overview of the process and through this a possibility both to understand what the work is about and to put this research into perspective.

### 2.2.1 The life cycle model

There is no consensus regarding what the life cycle model consists of and its meaning. In our research we will use a model presented in Aggestam (2001). This model is considered a relevant frame of reference in order to put this research in perspective. The fundamental ideas of this model are well represented in the literature and the model itself is based on the lifecycle models presented in Andersen (1994), Avison and Shah (1997) and Avison and Fitzgerald (1998). The model is illustrated in Figure 5. Aggestam (2001) presents the following phases in the life cycle model:

- *Feasibility analysis/Change analysis:* An analysis of problems and opportunities in the organisation, including the IS. The analysis will give management the possibility to decide if the organisation will go through with an information system development process or not.
- *Enterprise analysis:* The enterprise/organisation is analysed in order to determine in what way the IS can contribute. This phase will result in a more detailed analysis of the enterprise in the perspective of the IS.
- *Information Systems analysis:* A detailed analysis of the present system in the perspective of the enterprise analysis in order to decide the requirements of the new system. This phase will result in a requirements specification. Some of the requirements are requirements on the IT-component, some on the data component and some on the human beings, the organisation.
- *Systems Design:* The IS will be designed in order to meet the requirements in the requirements specification.
- *Implementation:* Necessary hard- and software will be purchased and developed. The new IS will be tested and the users will be trained before it will be possible to let the new IS replace the old one. This replacement can be done in only one step – “cold turkey” – or by small incremental steps – “chicken little”. The more feasible way is to decompose the system into small parts that can be migrated one at a time, referred to as “chicken little” (Wangler, 2001).

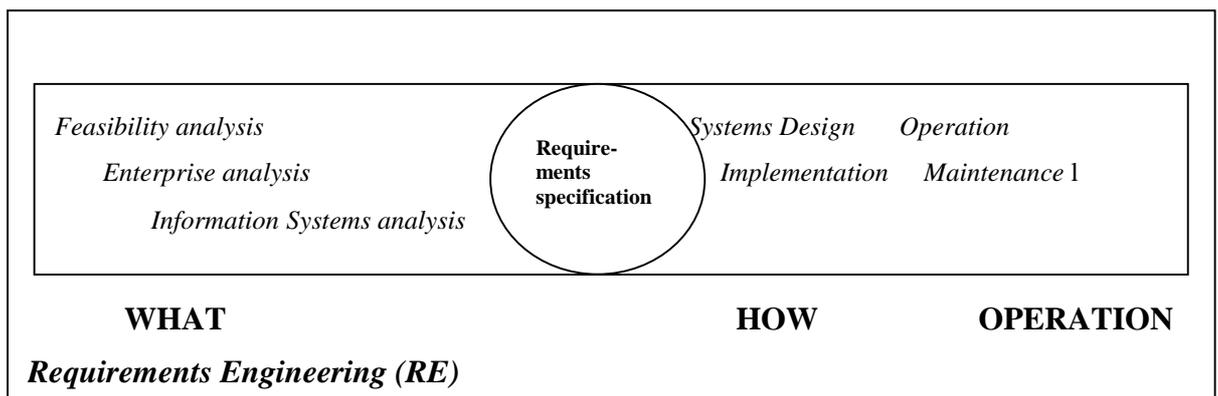
## 2 Background

- *Operation and maintenance:* The system will be maintained and some smaller improvements can be made.
- *Phasing out:* When the IS does no longer support the organisation in a proper way it will be phased out.

The different phases of the model above can, except from phasing out, be divided in three general phases, see Figure 5. The first general phase aims to decide **what** the system should do, Requirements Engineering (RE). RE is a key activity in order to successfully acquire an information system (Dahlstedt; 2001). RE is defined as

“...all the activities devoted to identification of user requirements, analysis of the requirements to drive additional requirements, documentation of the requirements as a specification, and validation of the documented requirements against the actual user needs.” (Saiedian and Dale, 1999, p. 420).

RE will result in a requirements specification for the new desired IS. The requirements specification is a central document which gives a collected description of the requirements that the target organisation has on the system (Andersen, 1994). The two following phases aim to realise the requirements specification; i.e. to decide **how** the system should be designed, implemented and – when the system is in **operation** – maintained.



**Figure 5 The Life Cycle Model** (adapted from Aggestam, 2001)

We can conclude that RE and the requirements specification is of utter importance in order for the development process to result in a successful IS. This is also well established in the literature (see e.g. Andersen, 1994; Pohl, 1998; Sutcliffe m fl 1999; Cherry and Macredie, 1999; Yourdon, 1988). One main activity in RE is Requirements Elicitation (e.g. Kotonoya and Sommerville, 1998; Loucopoulos and Karakostas, 1995; Pohl, 1998). One of the purposes of Requirements Elicitation is to understand the target organisation and its needs. We claim that Requirements Elicitation is crucial for how well the whole development process will succeed. This phase also often come first in the whole development process. The first impression of something can more or less determine how the rest will turn out. Our research aims to investigate which considerations should be made by an organisation before the information system development process starts in order to let the development process have every chance of success. As a consequence we stipulate that all considerations that could be made before the development process begins aiming to give

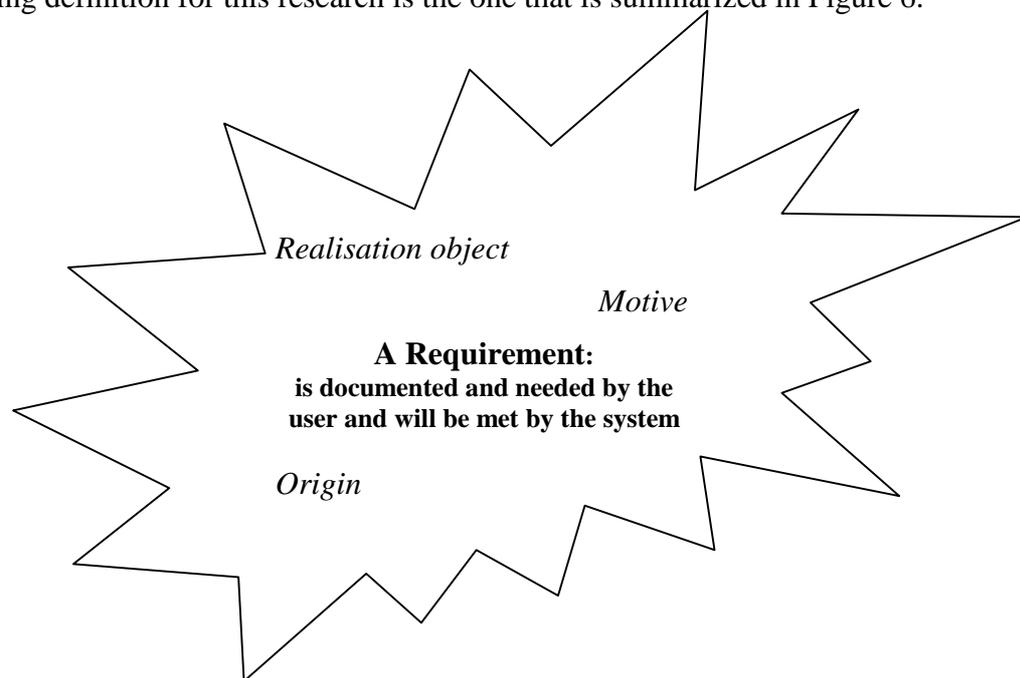
Requirements Elicitation every chance of succeeding is worthwhile. These considerations can consequently determine the success of Requirements Elicitation and hence that of the whole development process. We discuss Requirements Elicitation further in the next section.

### 2.3 Requirements elicitation

The purpose of Requirements Elicitation is to gather data, to acquire more knowledge about the target organisation and its needs, in order to specify *requirements* for the system. If we do not understand the organisation well enough we have no possibility to successfully develop an IS. Even the most brilliantly designed IS will not be useful if the requirements specification is not correct (Yourdon 1988). Kotonya and Sommerville (1997) prefer to call this activity *Requirements discovery* in order to reflect the uncertainties in the process. The identification of the relevant sources and the possibility to obtain all necessary information from them are essential (Pohl, 1998). Before *Requirements Elicitation* can be described we need to define what we mean by the concept of *requirement*.

#### 2.3.1 Requirements – a definition

There is no common definition of *requirement* and existing ones differ in their focus. The focus of our research is the phase that precedes the information system development process. Because of that it is not necessary to provide a formal exclusive definition. The main goal is to come to a common understanding about the concept. A working definition for this research is the one that is summarized in Figure 6.



**Figure 6 A requirement in the perspective of three different definitions**

Every requirement has a motive, an origin and a realization object (Karlsson, 1996). A requirement is also a documented result from a process, is needed by the user and is met by the system in order to support the organisation (IEEE-Std.610, 1991; Beyer and Holtzblatt, 1998). This definition covers all the important aspects according to our research. It is also in accordance with the definition used by Leffingwell and Widrig (2000). There are different types of requirements (Kotonya and Sommerville, 1997). We can for example talk about business requirements versus software requirements.

## 2 Background

The formulation of a requirement will depend on the level of detail (Beyer and Holtzblatt, 1998; Leffingwell and Widrig, 2000) and consequently what kind of data that have to be gathered in Requirements Elicitation. *To have the right level of detail* is an important success factor in the information system development process. This is also in accordance of the idea of van Gigch (1991), see section 3.2. In the next section we discuss Requirements Elicitation.

### 2.3.2 Requirements Elicitation

If you have to solve a problem, for example to specify requirements on an IS, the first thing you need to do is to find out more about that problem (e.g. Kotonya and Sommerville, 1997; Loucopoulos and Karakostas, 1995; Leffingwell and Widrig, 2000). The common name given to activities in order to find out more about the requirements of a system is Requirements Elicitation (Kotonya and Sommerville, 1997). There are number of techniques that can be used in order to reach this objective, for example interviewing and questionnaires, requirements workshops, brainstorming and idea reduction, storyboarding, use cases, role playing, prototyping and modelling. Requirements Elicitation is the most communication-intensive activity in RE and as a result most of the techniques do not come from computer science research (Saiedian and Dale, 2000). The favoured elicitation technique is the interview (Alvarez, 2002). There is also a number of methods in this area, but according to Kotonya and Sommerville (1997) most of the methods can only be used to support analysis after some initial elicitation. The aim of our research is not to identify important aspects in the perspective of particular methods or techniques. Methods or techniques will because of this not be discussed further.

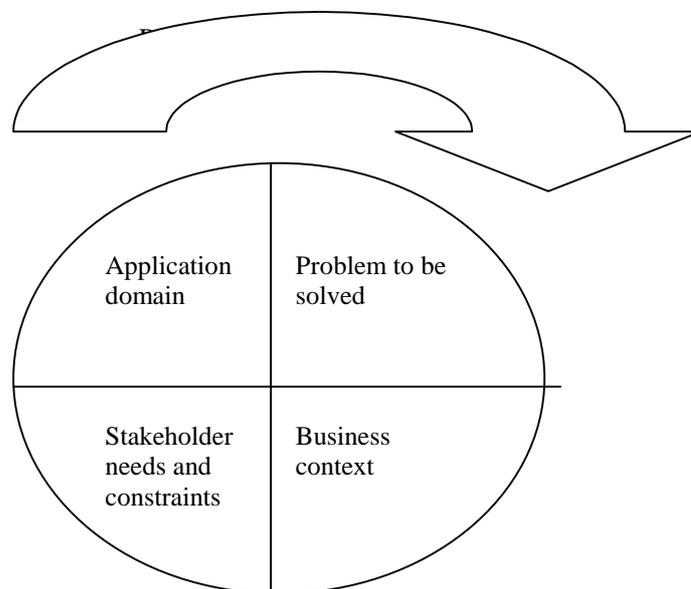
The objective of Requirements Elicitation is to make the hidden knowledge about the system explicit in a way that everybody involved can understand (Pohl, 1998). Good elicitation from the user's perspective results in them having a better understanding of their needs and constraints (Saiedian and Dale, 2000). From the developer's perspective a good elicitation results in a clear high-level specification of the problem that is to be solved (Saiedian and Dale, 2000). Requirements Elicitation can be seen as one part of the work in order to determine and specify a requirement. One of the key determinants of the ultimate success of an IS is the assessment of user needs (Browne and Ramesh, 2002). If the user's real requirements are not discovered the user will not be satisfied with the system – there will not be a successful IS – and this phenomenon explains why it is so important to run the process of Requirements Elicitation in a effective way (Kotonya and Sommerville, 1997).

Requirements Elicitation is an ongoing process (Kotonya and Sommerville, 1997; Pohl, 1998; interpret from Davis, 1993). If a presented requirement is found to be problematic the elicitation, in order to obtain more relevant information, have to start again (Kotonya and Sommerville, 1997). This process requires careful analysis of the organisation, the application domain and business processes where the system will be used and it is not just to ask involved people what they want (Kotonya and Sommerville, 1997; Leffingwell and Widrig, 2000). *To carefully analyse the organisation* is an important success factor in the information systems development process. Requirements Elicitation is about gathering/eliciting relevant data. This sounds simple, but it is a complex and difficult process (e.g. Kotonya and Sommerville, 1997; Leffingwell and Widrig, 2000; Pohl, 1998). E.g. the relevant knowledge is available in a variety of representations and distributed among many

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stakeholders, there are conflicting desires, stakeholders have different opinions about the meaning of requirements and rarely have a clear view of their requirements (Davis, 1993; Kotonya and Sommerville, 1997; Leffingwell and Widrig, 2000; Pohl, 1998). To be able to understand complex phenomena, as for example organisations and their IS, we have to study it from different viewpoints. A viewpoint, is according to Kotonya and Sommerville (1997), a collection of information from a particular perspective and by integrating the information from each viewpoint the overall requirements can be derived.

Different dimensions of Requirements Elicitation are well represented in the literature (see e.g. Beyer and Holtzblatt, 1998; Kotonya and Sommerville, 1997; Leffingweel and Widrig, 2000; Pohl, 1998). In order to further illustrate the complexity of Requirements Elicitation we present an approach suggested by Kotonya and Sommerville (1997). We consider this approach to cover the dimensions which are represented in our literature survey. According to Kotonya and Sommerville (1997) there are four components or dimensions to Requirements Elicitation (Figure 7).



**Figure 7 Components of Requirements Elicitation**  
(adapted from Kotonya and Sommerville, 1997, p. 55)

The following account about the four components or dimensions to requirements elicitation is a summary from Kotonya and Sommerville (1997).

- *Application understanding*: There must be knowledge about the general area where the system is applied. This knowledge is not collected in one place. There are number of different sources as the working people, text-books and manuals.

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- *Problem understanding*: There must be knowledge about the details of the specific problem. By getting this knowledge the knowledge about the domain will be more extended and specialised. Often the people who understand the problem are too busy and can not spend time helping the analyst.
- *Business understanding*: There must be knowledge about how the system interact and influence the business and how the system can contribute to overall business objectives. There may be factors that influence the system requirements which not are apparent to the system's end-user. Examples of this are organisational issues and higher managements.
- *Understanding the needs and constraints of system stakeholders*: There must be knowledge about the work processes that the system is intended to support and the role of the existing system in these working processes in order to understand in detail the specific needs for system support that the stakeholders have. The concept of stakeholder will be discussed in section 2.2.3. Different stakeholders may have different requirements and also express these in different ways. There could also be unrealistic demands according to existing resources and sometimes the stakeholders do not even know what they want from the system.

In order to let the development process has every chance of succeeding we consider that the organisation should *take different dimensions into consideration*. If one dimension is neglected the work as a whole will not be a success. This is in accordance with the factor *to carefully analyse the organisation*. We also in this context remind about the importance of *different levels of detail* of the requirements and their influence on what kind of data that have to be gathered and what work that has to be performed in Requirements Elicitation. If the "right" data are not gathered it is impossible to correctly document the "right" requirements, which is a prerequisite in the strive to develop a successful IS. One source in the Requirements Elicitation is stakeholders. We discuss stakeholders in the next section.

### 2.4 Users and other stakeholders

In our literature survey the concepts *user* and *stakeholder* occur frequently. *Users* and other *stakeholders* are also important sources in the key activity Requirements Elicitation. We consider them therefore to be of central importance when success factors of the information system development process are discussed. The purpose of this section is to discuss the concepts *user* and *stakeholder* and to give an overview of different types of stakeholders and their relationships in order to clarify the complexity belonging to the concepts. In our research we use the specific terms to differentiate between the roles.

People or organisations that will be affected by the system and who have a direct or indirect influence on the system requirements are system stakeholders (Kotonya and Sommerville, 1997). There are different groups of stakeholders, with different roles according to the system, and users is only one of these groups (Andersson, 2002). We can state that stakeholder is a more abstract concept in which the concept user is included. There are stakeholders in the actual organisation, but stakeholders can also be found outside the organisation (Avison and Fitzgerald, 1997). Examples are legislators, developers and competitors. This requires that the system's boundary is

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defined. In the literature there are different groups of stakeholders and each of these is categorised. Sharp et al (1998) have identified four different groups:

- *Developers*
- *Users*
- *Decision makers*
- *Legislators*

We consider this grouping to be at a high level of abstraction. There are different types of developers, users, decision makers and legislators. Despite this we concern this grouping to give a holistic view of the different types of stakeholders that can occur. Different roles may also overlap (Persson, 2001). We consider this is obvious even at this high level of abstraction; legislators can be users, developers can be decision makers and so on. Involvement with the potential users in the development process is considered as an important factor (e.g. Andersen, 1994; Cherry and Macredie, 1999; Pohl, 1998; Sutcliffe and Economou and Markis, 1999). Users are central in Requirements Elicitation. We will briefly discuss the four group identified of Sharp et al and focus on users.

- *Developers*; can be found both in the actual organisation and outside it, compare with Figure 15. The roles within this group include analysts, designers, maintainers, trainers etc. (Sharp et al 1998). To have the right developers in the team is an important aspect (Champy, 1997). Their skills, experiences and opinions are important for the resulting system. Many projects fail because developers do not truly understand or address the real requirements of the user and his environment (Saiedian and Dale, 2000).
- *Legislators*; can make rules that affect the development process and the use of the system (Andersson, 2002). E.g. laws, business rules, agreements and contracts. These rules can be compared with limitations for the project. To be aware of relevant rules already before the process starts is important.
- *Decision makers*; are present the whole development process. This group include managers of the development team, user managers and financial controllers in both the user and development organisation (Sharp et al, 1998). It is important that they all strive against the same goal.
- *Users*; it is not always clear what the concept applies to and the definition of it is problematic (Göransson and Gulliksen, 2000). There is a number of different ways to interpret the concept (Sharp et al, 1998). According to Avison and Fitzgerald (1995)

*“The term “users” is often a catch-call for anyone who works with the system who is not part of the technical team and unlikely to be an expert of computing...But there are many different types of users”*  
(Avison and Fitzgerald, 1995, p. 6)

We agree with Avison and Fitzgerald in their opinion. In reality there is a variety of types of users and it is desirable that all types of users are involved in the development process (Avison and Fitzgerald, 1995). This is in accordance with the notion that relevant knowledge about the organisation is available in a variety of representations and distributed among many users. In the literature there are different approaches to define different types of users (e.g. Faulkner, 2000; Avison and Fitzgerald, 1995).

## 2 Background

In order to show how different these types of users can be we have chosen to categorise some groups. This account is from (Avison and Fitzgerald, 1995).

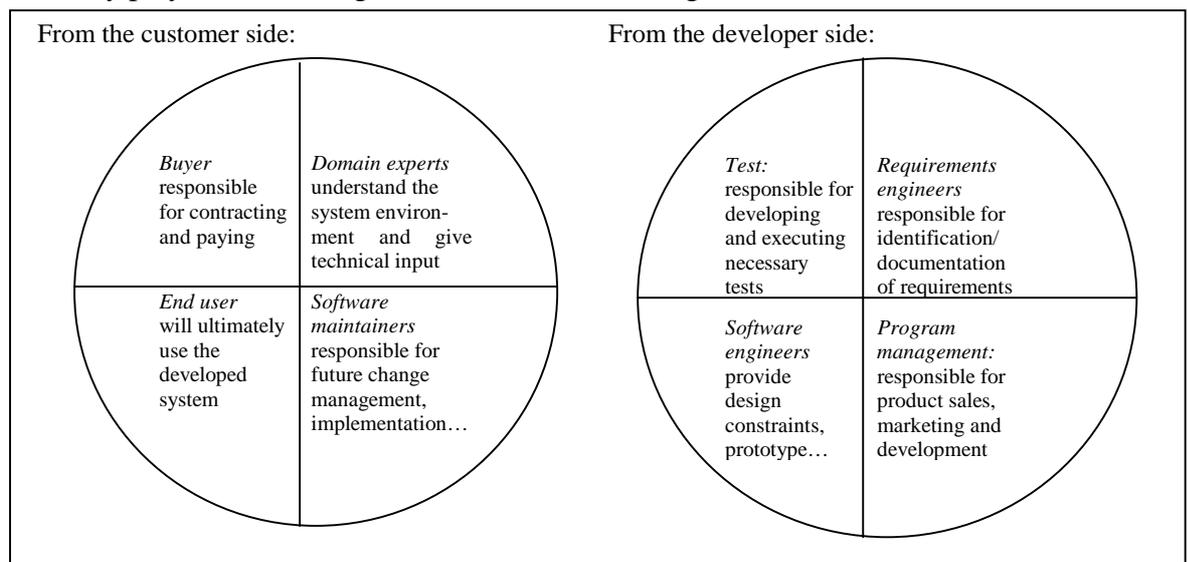
*-regular users:* Users that regularly e.g. might prepare data for input to the system or interpret results from it.

*-casual users:* This group has varied use of the system, e.g. executives, and are unlikely to train in the use of each system that they may wish to use.

*-external users:* These users are not in the organisation, an example is a borrower in a library searching through the author database in the library.

We can see that the differences in different groups of users can be as big as differences between different groups of stakeholders. In accordance with our earlier discussion we conclude that the success in acquiring the knowledge of the organisation in these groups will determine how well the future IS will succeed. In this context we want to stress the fact that ensuring that the users understand their constraints and the resulting impacts on their needs is just as important as identifying their needs (Saiedian and Dale, 2000). We conclude that number of important aspects will belong to the process of acquiring knowledge of the organisation from groups of stakeholders.

After discussing these four groups we see that the area is complex. Saidian and Dale (2000) take another approach and discuss stakeholders in two different perspectives, from the customer side and from the developer side. They concern that there are different “key players” according to different sides, see Figure 8.



**Figure 8 Key-players in different perspective**

We interpret the customer as the target organisation where the development project will be running. The developer’s side is the system supplier organisation. Focus for our literature survey is important aspects in the information systems development process from the perspective of the target organisation. As a consequence the key players belonging to the customer are of most interest. When comparing the key players from the customer side with the four groups identified by Sharp et al (1998) all the relationships are not completely obvious. According to the aim of this section we do not, however, need to develop this anymore. We just want to discuss the topic and its complexity in the perspective of the focus of our research. In practice each group of stakeholder is probably a mix of different types of stakeholders. According

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to the aim of this section we also not discuss this further, we only need to be conscious about it.

There are conflicting desires and groups of stakeholders who have different opinions about the meaning of requirements and there is rarely a clear picture of their requirements (Davis, 1993; Kotonya and Sommerville, 1997; Leffingwell and Widrig, 2000; Pohl, 1998). To identify the important stakeholders and to discover their requirements are crucial for how successful the system will be (Kotonya and Sommerville, 1997). We claim that a crucial success factor in the information systems development process is *to identify and involve the "right" stakeholder*. By the word "right" we both mean the right type and the right person. If the involved stakeholders mostly are of the type external users the chances to develop a successful system are small. By having the kind of person who will not respond appropriately when the development happens, is negative and does not want to collaborate, the chances to develop a successful system are also small (Champy, 1997). As we mentioned earlier this requires that the system's boundary is defined.

We have now given a background to our research area. In this background there are some implicit success factors that we have discovered. In next section we sum up these factors.

### 2.5 Identified Success Factors – A Summary

By continuously discussing and analysing the Background we have already identified some important factors in the information systems development process. The purpose with this section is to make a summary of those factors. The factors are marked by italic in the following account.

As we have stated we assume that the most important success factors in the information systems development process should be found in the Requirements Elicitation phase. The Requirements Elicitation, and the whole development process, requires a *careful analysis of the target organisation*. All *four dimensions* according to Leffingwell and Widrig (2000); application domain, problem to be solved, business context and stakeholder needs and constraints, have to be taken into consideration when working through the Requirements Elicitation phase. Even *different levels of detail* have to characterise the work because it will affect both the real work in the Requirements Elicitation phase, what kind of data that have to be gathered and the resulting product, the Requirements Specification (Leffingwell and Widrig, 2000; van Gigch, 1991). Data in the Requirements Elicitation phase have to be gathered from different sources. Stakeholders is one of these sources. *To identify and involve the "right" stakeholders* is a prerequisite for this. Users is one group of stakeholders. This is in accordance with the established opinion that involvement of the relevant users in the development process is a crucial success factor e.g. Cherry and Macredie, 1999; Pohl, 1998; Sutcliffe and Economou and Markis, 1999).

All the factors are directly or indirectly influenced by the *system's boundary*. The boundary is e.g. crucial for the analysis of the organisation, what it is that is going to be analysed, and relevant stakeholders. Consequently, we stipulate that defining the system's boundary is a crucial factor for the whole development process.

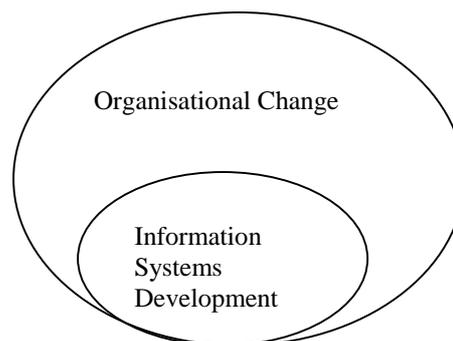
We have now summed up the factors identified so far. All these factors except *to define the system's boundary* are evident in Requirements Elicitation. These factors will be one part of the analysis in section 5.1.

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In order to acquire a more holistic view of the information systems development process and to look at it in another point of view we discuss organisational change in general in chapter 3.

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The information system is a part of the organisation (Andersen, Grude and Haug, 1994; Andersen, 1994; Bergvall and Welander 1996; Avison and Fitzgerald, 1998). The organisation limits the information systems development process and decides what a successful system is. The notion of successful system is discussed in 4.1. An information system development process influences and changes the whole organisation. It is impossible to develop an IS without developing the organisation (Andersen, 1994). This is also implicitly stated according to our definition of an IS. Consequently an information systems development process is one type of an organisational development process. Figure 9 shows the relationship between the information systems development process and the organisational change. The topic organisational change has a rich and varied history and is even the domain of the entire discipline of organisational development (Hatch, 1997). This supports the way the two concepts *organisational change* and *organisational development* are used in this research, they have the same meaning. The problem area of our research is a specific type of organisational change, information systems development. The consequence then is that some theories, instruments, frameworks etc. in organisational change could also be useful in information systems development. Knowledge about organisational theory and organisational change is then a valuable contribution to our research. It allows us to study the information systems development process from a different point of view and to get it in a perspective. The identified important success factor described in chapter 2, *to carefully analyse the organisation*, support our opinion that organisational theory gives a valuable contribution to our research. The aim of our research is to find important success factors in the information systems development process in order to discover what considerations a target organisation should make before starting an information systems development project. According to this aim there is no need to review all the work that relate to the topic organisational change. The following account is an overview given in the perspective of the aim of our research.



**Figure 9 Information Systems Development is one type of Organisational Change**

The remainder of this chapter is organised as follows. What an organisation is and how it can be described and analysed is discussed in section 3.1. Section 3.2 presents organisational change in general and a framework to use in the organisational change process. In accordance with the aim of our research section 3.3 sums up and discusses important success factors in organisational change, both in general and from an information systems development point of view. The relevance of the factors to information systems development will mainly be discussed in chapter 5.

### 3.1 Analysing and Describing Organisations

What we mean by an organisation is changing (Drucker, 1997). Section 3.1.1 discusses what the concept means in our research. According to the aim of our research and in the view of the identified important success factor *to carefully analyse the organisation* it is impossible to present a framework for organisations if we have not discussed how an organisation can be studied and analysed. Section 3.1.2 does this by presenting different frames. Section 3.1.3 discusses these frames in an information systems development point of view.

#### 3.1.1 The concept of organisation – a definition

A working definition for this research is that an organisation is

*“...an instrument in order to make it possible for a system of human beings to reach a particular objective.”* (translated from Aggestam, 2001, p. 10)

*The particular objective* is the business mission and the plan to reach it is the Business Plan (BP). A *system* is a number of related objects (Eriksson, 1986; Langefors, 1966; van Gigch 1991). A system is related to other systems, it has subsystems, a purpose and a system boundary, which will be defined according to the system's purpose (Avison and Fitzgerald, 1998; Eriksson, 1986). Because an organisation according to the definition above is a system an organisation must

- be related to other systems – a system can be an IS, a machine, a production process, a whole company or something else (Bansler, 1990),
- have subsystems – a subsystem is another system, for example an IS, a subsidiary company, a department, a machine and/or production process,
- have a purpose – the mission for the whole organisation, but also each subsystem has its own purpose. It is important that the mission of the whole organisation and of each sub-system is in alignment (Barlow and Burke, 1999). In the view of information systems development it is important that the IS supports the organisation and strive towards the same objective, the business mission, and
- have a boundary – the whole organisation has a boundary but also the different subsystem, each boundary is defined according to its purpose.

Consequently, the structure of an organisation can vary from traditional organisations to virtual organisations. A virtual organisation is from an inter-organisational perspective a network of companies (Franke, 1999).

An organisation is a social construction, a human society (Drucker, 1996; Hammer, 1997). According to Drucker (1996) its purpose is to make the strength of people effective and their weaknesses irrelevant. We concern this view to complement the view above about what an organisation is. An organisation is not just an instrument. It also bespeaks values (Drucker, 1996). We compare these values with the culture of the organisation. The longer unspecified behaviour persists the more likely the actual behaviour is to become a part of the organisational culture (Lang et al, 2000). Many quality experts have asserted the development of a quality culture as a prerequisite for an effective organisation (Pun, 2001). An organisation nourishes particular forms of culture, company cultures (Hammer, 1997), and according to Hatch (1997) the most immediate source of outside influence on the organisational culture is found within

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the organisation – the employees – who have already been influenced by multiple cultural institutions. The concept of *organisational culture* is the most difficult concept of all organisational concepts to define (Hatch, 1997). According to the aim of our research it is enough to interpret the concept

“...as a culture in its own right, as a set of subcultures,... “  
(Hatch, 1997, p. 235)

This interpretation is in accordance with the earlier discussion about the concept organisation. According to Hatch (1997) this perspective is one from which organisational members typically concern about their organisation. Consequently, the organisational culture influences the organisational change and the specific type of such change, the information systems development. This opinion is supported by Lang et al (2000). They discuss about organisational constraints as influencing information systems development. Organisational constraints are a result of an organisation’s history or experience (Lang et al, 2000). We consider organisational constraints in that meaning to be the organisational culture, or a part of it. The management of cultural dynamics and organisational complexity facilitates organisational change (Pun, 2001). *To analyse the organisational culture* is an important success factor. This requires a careful analysis of the organisation. *To carefully analyse an organisation* is an important factor both in the organisational change and – as earlier mentioned – in information systems development.

#### 3.1.2 How to analyse and describe an organisation

The ways to study and analyse organisations are divergent (Andersson, 1994). Different views focus on different aspects of the organisation and because of that the choice of view influences the received picture (Aggestam, 2001). An organisation should be examined from different perspectives (Pun, 2001). Bolman and Deal (1997b) present one way to examine organisations in different views, or frames as they say. There are other ways in the literature to do this, but this one seems to be commonly accepted. Bolman and Deal (1997b) present four different complementary frames:

- The Structural Frame
- The Human Resource Frame
- The Political Frame
- The Symbolic Frame

In our research we use the concepts view and frame interchangeably. Each frame has its own image of reality and by applying all four a deeper understanding of the organisation will be obtained (Bolman and Deal, 1997b). In Figure 10 an overview of the four frames is provided.

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	<i>Frame</i>			
	<i>Structural</i>	<i>Human Resource</i>	<i>Political</i>	<i>Symbolic</i>
<i>Metaphor for organisation</i>	Factory or machine	Family	Jungle	Carnival, temple, theater
<i>Central concepts</i>	Rules, roles, goals, policies, technology, environment	Needs, skills, relationship	Power, conflict, competition, organisational politics	Culture, meaning, metaphor ritual, ceremoni, stories, heroes
<i>Image of leadership</i>	Social architecture	Empowerment	Advocacy	Inspiration
<i>Basic leadership challenge</i>	Attune structure to task, technology, environment	Align organisational and human needs	Develop agenda and power base	Create faith, beauty, meaning

**Figure 10 Overview of the Four-Frame Model** (adapted Bolman and Deal, 1997b, p. 15)

In order to understand how an organisation and its development needs can be analysed and described each view/frame will briefly be presented.

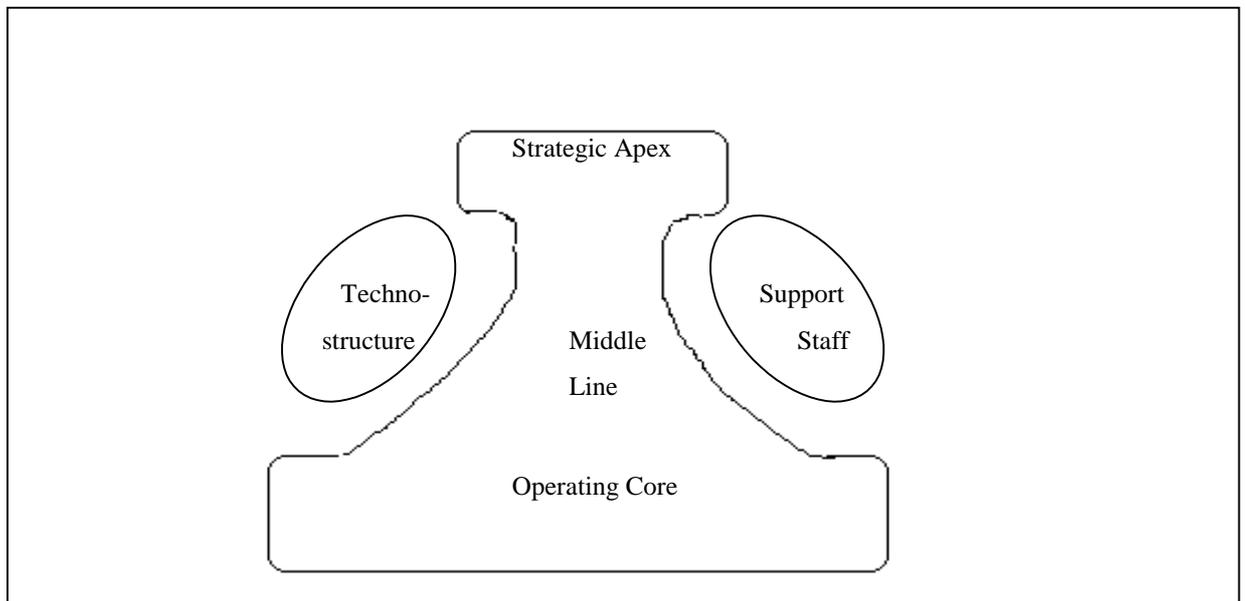
#### **The Structural Frame**

This view is about looking at the structure of the organisation. From this perspective organisations are guided by objectives and policies set at the top (Bolman and Deal, 1997b). It is about distribution of responsibilities and tasks, and shows something about who is making the decisions and how decisions will be made (Bastøe and Dahl, 1996). It looks beyond the individuals to examine the social context of work (Bolman and Deal, 1997b). Social structure cannot be avoided, because if you do not design a social structure one will emerge from the work activities and associations of people within the organisation (Hatch, 1997). Success depends not on the mere existence of a structure but on the match between the structure and business strategy (Flamholtz (1995) and a match between informal and formal structure (Bastøe and Dahl, 1996).

There are both horizontal and vertical methods of integration but according to Bolman and Deal (1997b) there is no one best way to organise. One approach of analysing and describing the organisation in a structural view is Mintzberg's five sectors (Andersson, 1994; Bolman and Deal, 1997; Bolman and Deal, 1997b). The five sectors are all included in Mintzberg's five-sector figure, see Figure 11. Mintzberg

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derives five basic different configurations from these five sectors (Andersson, 1994; Bolman & Deal, 1997; Bolman & Deal, 1997b). The five sectors and the five configurations will briefly be presented because it provides a base for understanding different types of organisations.



**Figure 11 Mintzberg's model** (Mintzberg, 1979, p.20 i Bolman and Deal, 1997b, p. 63)

The following account about Mintzberg's five sectors and configurations is a summary from Bolman and Deal (1997b).

The five sectors or components:

- *Operating Core*: Is at the base of the model and consists of actors who perform the basic work.
- *Administrative component* or *Middle Line*: Is directly above the Operating Core and consists of managers who supervise, control and provide resources for the operators.
- *Strategic Apex*: Is at the top of the model and consists of senior managers who focus on the outside environment, determine the mission and provide the grand design.
- *Technostructure*: Sits alongside the Middle Line and consists of specialists and analysts who standardise, measure and inspect outputs and processes.
- *Support Staff*: Sit alongside the Middle Line and perform tasks that support or facilitate the work of others.

The five basic configurations is derived from the presented components and each configuration creates a unique set of management challenges.

The five basic configurations:

- *Simple Structure*: This structure has only two levels; the strategic apex and an operating level. Coordination is accomplished primarily through direct supervision and there is total authority over daily operations. The virtues are its flexibility and adaptability; one person directs the entire operation. Start-up companies typically begin with this structure.

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- *Machine Bureaucracy*: This structure has all the five components. The support staff and the techno structure are large with many layers between apex and operating levels. Important decisions are made at the strategic apex, but day-to-day operations are controlled by managers and standardised procedures. For routine tasks this structure is efficient and effective. A key challenge is how to motivate people in the Operating Core. Solutions from the top may not always match the needs of individual units because top executives often rely more on generic and abstract information. The Middle Managers are more influenced by the operating core. McDonald's is a classic example of this structure.
- *Professional Bureaucracy*: The operating core is – relative to its other components, particularly the techno structure – large. The structure has a flat and decentralised profile with few levels between the strategic apex and the operating core. This structure responds slowly to changes and has problems of coordination and control. Harvard University provides a glimpse into the inner working of this structure.
- *Divisionalised Form*: The operating core consists of autonomous units which respectively can be compared with a Machine Bureaucracy. The techno structure is not very large. The support staff has few layers but is larger than the techno structure. There is a strategic apex but few in the Middle Line. One risk could be that the headquarter, the strategic apex, wants tighter oversight while the divisional managers, the strategic apex in each autonomous unit, try to evade corporate control. Another risk is that headquarters may lose touch with operations. Large multi specialty hospitals is an example of this structure.
- *Adhocracy*: Is a loose, flexible, self-renewing organic form tied together mostly through lateral means. The structure is often found in conditions of turbulence and rapid change.

According to the definition of an organisation it is possible that there in the same organisations are different types configurations.

#### **The Human Resource Frame**

The following account is a summary from Bolman and Deal (1997b). This frame stresses the relationship between people and the organisation. It emphasises malfunctions from person-organisation misalignment or from flawed handling of interpersonal and group dynamics. If people feel happy with their work they will produce better and more (Bastöe and Dahl, 1996). The frame is built on the following assumptions:

- Organisations exist to serve human needs rather than the reverse
- People and organisations need each other. People need careers, salaries and opportunities. Organisations need ideas, energy and talent.
- A poor fit between individual and system will result in one or both suffering. Individuals will be exploited or will exploit the organisation, or both will become victims.
- A good fit benefits both. Individuals find satisfying and meaningful work. Organisations get the energy and talent they need to succeed.

Poor fit between individual and organisation costs money. A set of strategies for improving human resource management has been developed. One set strengthens the

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bond between individual and organisation by paying well, providing job security, sharing the fruits of organisational success and so on. Another set empowers workers and gives workers more significance through for example participation, teaming and democracy. Success typically requires a comprehensive strategy under girded by a long-term human resource philosophy, because no strategy is likely to be effective by itself. Investing in people on the premise that a highly motivated and skilled workforce is a powerful competitive advantage is what many successfully organisations have done.

#### **The Political Frame**

The following account is a summary from Bolman and Deal (1997b). This frame interprets organisations as alive and screaming political arenas that host a complex web of interests, both regarding individual and group. According to this frame it is necessary to handle disputes, conflicts, power and decisions in organisations (Bastøe and Dahl, 1996). It is important to realise that individuals can act in order to reach personal objectives and that everybody does not act in a rational manner in order to reach the common objectives (Bastøe and Dahl, 1996). The following points summarise the frame:

- Organisations are coalitions of various interest groups and individuals who have different objectives and resources, and who each attempt to bargain with other players to influence objectives and decisions. Authority is only one among many forms of power.
- There are enduring differences among the coalition members in beliefs, interests, values and perception of reality.
- Most important decisions involve the allocation of scarce resources.
- Enduring differences and scarce resources give conflicts a central role in organisational dynamics and make power the most important resource.
- Objectives, structure, decisions and policies emerge from bargaining, negotiation and jockeying for position among different stakeholders.

According to this frame the exercise of power is a natural part of an ongoing contest where those who get and use power best will be the winners. All organisations have politics and the question is what kind of politics they will have; they can be the vehicle for achieving noble purposes but they can also be sordid and destructive. Organisational change and effectiveness depend on political realities.

#### **The Symbolic Frame**

The following account is a summary from Bolman and Deal (1997b). This frame sees life as more fluid than linear. Organisations function like complex, constantly changing, organic pinball machines. It highlights the tribal aspect of contemporary organisations. It is about what happens between people (Basøe and Dahl, 1996). The following points summarise the ideas:

- What is most important about many events is what it means, not what happened.
- Activity and meaning are loosely coupled. People interpret experience differently and events will have multiple meanings.

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- Most of life is ambiguous and uncertain, what happened, why and what will happen next are puzzles. This ambiguity and uncertainty will undercut rational analysis, problem solving and decision making.
- In the face of ambiguity and uncertainty people create symbols in order to resolve confusion, increase predictability, provide direction and anchor hope and faith.
- Many events and processes are more important for what is expressed than what is produced. They form a cultural tapestry of secular myths, ceremonies, rituals, and stories that help people find meaning and purpose.

Symbols express and embody an organisation's culture. Myths and stories provide cohesiveness, clarity and direction in the presence of confusion and mystery. Rituals and ceremonies provide ways to take action. From this perspective organisations are judged primarily by appearance. There is always hope and the world is always different. If there - for a variety of reasons - is a decision about reframing our organisation a new play called Change will be mounted. This drama allows us to resolve contradictions and envision a solution to our problem. The essence of high performance is spirit.

We have now gone through four different frames. Even using all these complementary frames we claim there will be valuable facts missing when analysing and discussing an organisation. Organisations differ also in business mission, business plan, size, ownership and so on. We concern these facts of organisations are important when analysing organisations. These facts will not be discovered in any of the presented frames. We have in the literature not found any frame or view that take these facts into consideration. Consequently, we want to complement the four frames by constructing a fifth frame. This new frame is called *the Neutral Frame* in order to stress the fact that it discovers facts which are characterised as objective. This frame can be thought of as limiting the other frames, a kind of starting point. The following account describes the frame.

#### **The Neutral Frame**

As we mention above organisations differ in many ways. This frame aims to capture the neutral perspective of the organisation. It will focus on the mission (service or manufacture), business plan, size (both turnover and number of employees), ownership (private or public) and so on. Some of these aspects will probably be touched in other frames, but we do not concern that to be a problem. The purpose with analysing and describing organisations in different frames is to get a deeper and better understanding of the organisation. This purpose will not be negatively influenced if some aspects are observed in more than one frame. We will stress one aspect in this frame that we concern is completely invisible in the other frames. There is a significant difference if the organisation is a public or a private one. Private organisations have much greater opportunity to decide their own objectives and ways for reaching them (Bastøe and Dahl, 1996). Public organisations have limited freedom of acting according to the economical, legal and political conditions that the government has decided (Bastøe and Dahl, 1996). According to Bastøe and Dahl (1996) the organisational theory literature is often written with private organisations in mind and do not often take public organisations into consideration. As a consequence the literature in the perspective of public organisations is often partly

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irrelevant (Bastöe and Dahl, 1996). This fact, as we see it, strengthens our opinion about the need of the neutral frame. We claim that an organisation first should be analysed according to this neutral frame because it can be regarded as a foundation for the other frames. The facts resulting from this frame limits an organisation and consequently organisational change. Also the other frames are influenced and limited by this frame. The following points summarise the neutral frame:

- Organisations differ in mission, business plan, size, ownership and so on. All this affects the organisation.
- There is a difference if the organisation is a public or a private one.
- This frame constitutes a form of starting point when analysing an organisation.
- The facts reached from this frame limit the organisation and the other frames.

#### 3.1.3 The frames in the view of information system development

Organisational culture influences organisational change. Organisational change is discussed in 3.2. In order to examine and be conscious about the organisational culture it is important to carefully analyse the organisation. Despite the fact that organisations differ in many ways the frames are useful for analysing and describing all types of organisations. One important aspect of the organisation in the information system area is the processes in the organisation. This aspect is not obvious in the presented frames. We concern processes and their structures are examined at a high level of abstraction in the Structural Frame. Because our research focuses on the phase before the development process including e.g. analysing processes begins, we do not consider this to be a problem. Our research tries to find important success factors in the information systems development process and according to them develop a framework concerning the phase before this process begins. In this view there is no need to analyse processes in detail, because we concern that this detailed work belongs to the real development process and is consequently not in our research area.

When analysing and describing an organisation the frames are complementary. Compare this with the four dimensions of Requirements Elicitations (Leffingwell and Widrig, 2000) described in section 2.3.2. When something seems strange it helps understanding to use different frames in order to see different realities, because existing frames determine the way of acting (Bolman and Deal, 1997b). For different situations and times one frame may be more helpful than others (Bolman and Deal, 1997b). For instance if communication does not work between two departments and the reason for this is on the individual level, this reason will not be understood if the organisation is not described in the Human Resource Frame. If using only the Structural Frame the reason for the problem will be interpreted in a different way.

In our research important success factors in the information systems development process are in focus. We claim that different frames or views of the organisation have to be considered in order to handle these factors in an effective way. To analyse the identified success factors *to carefully analyse the organisation and the organisational culture* requires an analysis of the organisation in different frames. An organisation is a complex phenomenon. The ways to look at an organisation are divergent (Andersson, 1994). Consequently, it is impossible to carefully analyse it and to understand the organisational cultural if the organisation is not studied from different

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points of views, i.e. using all the frames. *To identify and involve the right stakeholders* is another important success factor. We stipulate that this is impossible if the organisation has not been analysed in different frames. Which stakeholders are “relevant” and “right” can vary depending on the frame. The importance of stakeholders and organisational culture are distinguished in identified important success factors in the information system development process. Analysis according to e.g. the Human Resource Frame stresses these human aspects.

The frames in turn will be influenced by the system’s boundary. It is different to analyse the system when it is the whole organisation compared to if it is a department for example. *To analyse the organisation in different frames* and *to carefully define the system’s boundary* are two important success factors in information system development.

### 3.2 Organisational change

The dynamic environment requires changes in organisations (Goldkuhl and Röstlinger, 1987). In order to give a foundation to the specific type of organisational development, which constitutes the information systems development process, we give an overview of organisational change in section 3.2.1. Section 3.2.2 presents a framework to use in organisational change. This framework contributes to the possibility of looking at information systems development from a holistic view. According to the aim of our research the following account is continuously discussed in the perspective of where we can find important success factors for the information systems development process.

#### 3.2.1 Organisational change – an overview

Organisational change is risky, but business risk is minimised by having the kind of persons on your team who will respond appropriately when it happens (Champy, 1997). All persons that in some way are affected by organisational change or have direct or indirect interests in it are *stakeholders* (Kotonya and Sommerville, 1997). We will use the term *stakeholders*. *The persons involved* in organisational change – stakeholders – is a critical success factor. This is supported by the important success factor *to identify and involve the right people*. According to Champy (1997) stakeholders across the organisation have two needs during organisational change:

1. To believe that the company’s management knows what they are doing, where its market is going and how it is going to accomplish change. Confidence, our remark.
2. To understand what the change means to individuals in the organisation. The challenge of this need is that in most organisational change no one knows this early in the process. Knowledge, our remark.

*These needs of the stakeholders* in the organisation is another critical success factor in organisational change. The meaning of analysing the organisation in the Human Resource frame and the Political frame are obvious. According to Champy (1997) responding to these needs requires conversation, not just communication. Many communication programs is broadcasting messages and this is not enough (Champy, 1997). According to Champy (1997) managers must have conversations with people

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across the organisation, not one-way communication. Also the Structural frame is invaluable to the management in this conversation; understanding organisational logic in terms of structural design helps management to be an effective communicator and conversator (Hatch, 1997).

Organisational change can be described as “a journey”, to many managers a journey that never ends. (Champy, 1997). According to Champy (1997) organisational change must begin by describing the journey’s destination. It is important to never lose sight of the objective (Andersen et al, 1994). When deciding this objective we consider it is important to do this in different complementary frames. The quality of the decision is very important (Vroom, 2000). There are different leadership styles, but the same manager makes different choices in different situations (Vroom, 2000). It is important to be aware of this and to analyse the situation, i.e. to analyse the organisation in different frames. Also the objective should be described in different frames. It will probably be described in different ways depending on whether it will be described in a structural, human resource, political or symbolic frame. These different descriptions will give a deeper and clearer view of the destination of the journey and the discussion itself will make it easier for different stakeholders to come to consensus and obtain a common view of the destination. Also the boundary of the system is important in this discussion about the destination. The destination, the objective, for the change process will probably vary between different levels in an organisation – that is the whole organisation vs. specific departments or subsidiary companies. We concern *the objective of organisational change should be viewed in relation to other systems* and that the present design must be critically examined. This opinion is in accordance with the system’s theory of system design (Malmsjö, 2001). System design in the context of system’s theory is based on the system approach or system paradigm (van Gigch). According to van Gigch (1991) the system approach requires an understanding of domains. The way an objective will be defined and how it will be solved depends on the domain and also on the level of inquiry at which it has been considered (van Gigch, 1991). It is easier to define an objective if the levels of inquiry differ in abstraction according to the level of domain (van Gigch, 1991). According to van Gigch (1991) an understanding of three levels of domains is needed, i.e. three levels of inquiry have to be considered. The following account about the domains is a summary from van Gigch (1991) and Malmsjö(2001).

- *Action or implementation level – “How”*  
We all live in *Reality* and this level is about appraising the nature of reality. How *Reality* will be appraised varies between different human beings and depends e.g. on preknowledge. Here we find all the ”doers” and “users”. The level can be compared with the operational level of the traditional organisational hierarchy. When understanding this domain, one needs to understand what really happens in reality and the inquiry level is a “*how-level*”; how do we perceive that the objective will look like in reality. Management must know the governance process for managing the organisational change and who will be accountable for the design and for the result (Champy, 1997).
- *Diagnostic level – “What to do”*  
When something is done models are created. The process of converting the perceived view of reality into a representation of it is what this level is about. At this level, rules are important and when understanding this domain it is for example about understanding the conditions and what considerations that need

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to be taken. This inquiry level is a “what-level; what objective do we want to achieve. Management must know the scope and scale of the change, how much of the business must change and which processes are influenced (Champy, 1997).

- *Reflecting level – “Why”*

This level can be compared with the strategic level of the traditional organisational hierarchy. This inquiry level is a “why-level”; why do we want this objective. The responses at this level explain *why* things have to be done and a high degree of abstraction is necessary. It is a reasoning process. Management must know the business case for change (Champy, 1997).

According to van Gigch (1991), the what-to-do level and the reflecting level take place at two different levels of abstraction. Basically, the reflecting level is at a higher logical and abstraction level. Many times objective discussion – and even design of information system – only take place at the action level and/or what-to-do level, but according to van Gigch (1991) all levels are necessary:

*“...leads to faulty design unless it also includes the perspective of ...”*  
(van Gigch, 1999 s. 255)

This is in accordance with Bubenko (1993). According to Bubenko (1993) the HOW part should be linked to the WHY and WHAT parts.

We have now identified three important success factors in the organisational change:

- *To have the right stakeholders involved in the team*
- *To take care of the needs of the stakeholders in the organisation*
- *To define the objective of change*

To define the objective is at a more detailed level additional three important success factors:

- *To define the objective in different frames*
- *To define the system’s boundary both for the whole system and for relevant subsystems*
- *To define the objective at three different levels of abstraction; how, what and why*

As a consequence these three factors are also important for the whole development change; it is unnecessary to make a trip to a specific destination if you do not exactly know the destination.

The importance of the different frames in this area is obvious. E.g. the Political Frame and the Human Resource Frame give valuable information when defining the objective, and the Neutral Frame and the Structural Frame when discussing the system, relevant subsystems and the boundaries.

#### **3.2.2 The framework of Flamholtz (1995)**

As we mentioned earlier there is an alignment between information systems development and organisational change. Compare for example with Figure 9. Information systems development is considered as one type of organisational change and it is hence impossible to develop an IS without developing the organisation. The

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purpose of the framework of Flamholtz (1995)– a six critical success factors model – is

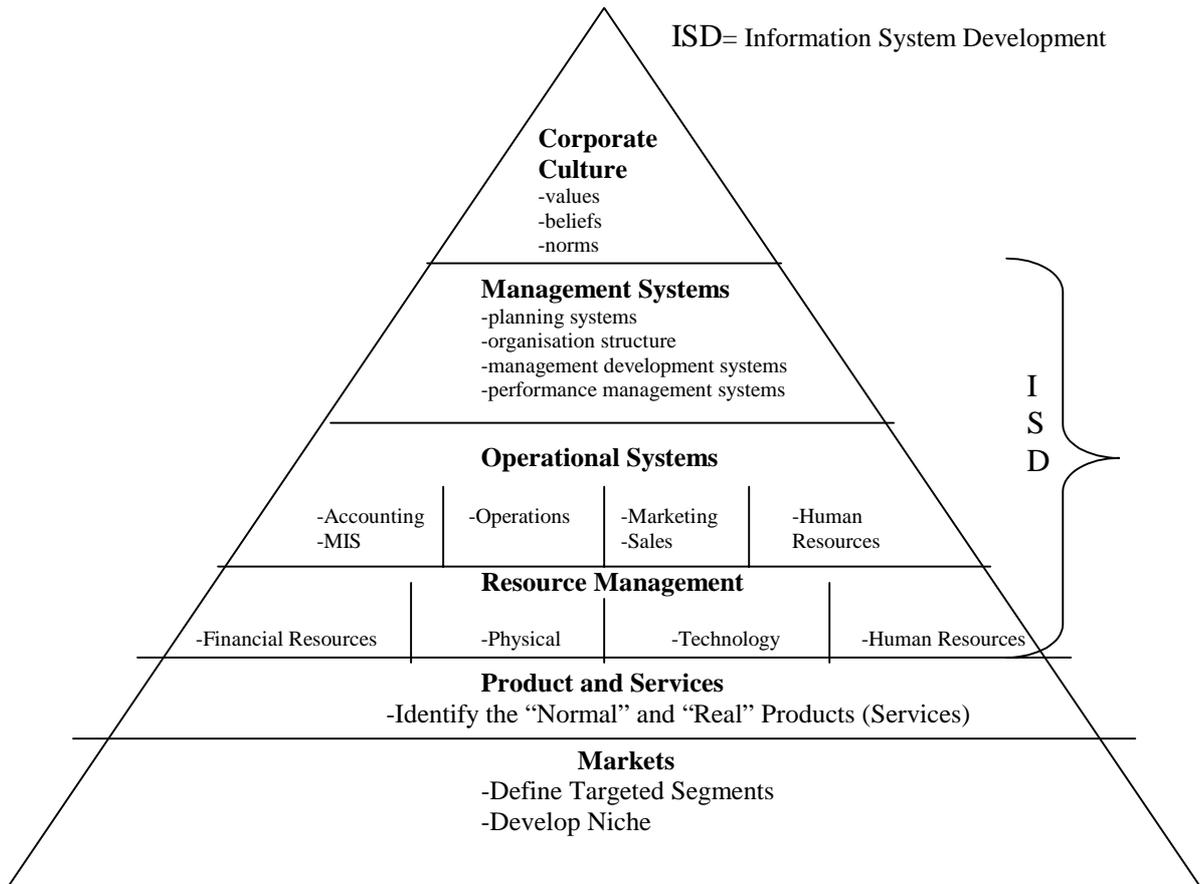
*“to understand and plan what must be done to transform an organisation successfully”* (Flamholtz, 1995, p. 50)

This framework is in accordance with our opinion about the alignment between the information systems development process and organisational change. It has also a focus on critical success factors. The framework of Flamholz must then be regarded as relevant to our research. We interpret IS as a part of the whole framework. Consequently it should be impossible to develop the IS without developing the organisation and the development of IS should be one part of organisational change. This seems to be one step further according to our opinion as seeing the information systems development process as one *type* of organisational change. If the information systems development process is *a part* of organisational change, can there then be organisational change without information systems development process? The answer is yes, but it depends on the time-perspective. The framework of Flamholtz (1995) includes a life cycle for organisations. In a life-long perspective it is impossible to perform organisational change without an information systems development process. In a shorter perspective, “a project-time’s perspective”, it is possible to perform organisational change without information systems development. In this perspective information systems development is one type of organisational change. On the contrary it is – despite the time-perspective – impossible to perform information systems development without organisational change. In the framework there is a focus on critical success factors. Success factors are also in focus for our research. In accordance with the discussion above, success factors in organisational change could also be success factors in information systems development process.

The relationship between the development of the six critical success factors in the framework and overall financial success of organisations is statistically significant (Flamholtz and Aksehirli, 2000; Flamholtz and Hua, 2002). The following presentation provides a summary of the key aspects of the framework relevant to our research. The account is from Flamholtz (1995), Flamholtz and Aksehirli (2000) and Flamholtz and Hua(2002). A more extensive discussion can be found in these articles, especially in Flamholtz (1995).

The initial model proposes that there are six key factors – critical success factors – of successful organisations. These six factors, or strategic building blocks, are well represented in the literature. For references see Flamholtz (1995), Flamholtz and Aksehirli (2000) and Flamholtz and Hua (2002). They must occur simultaneously and be designed as a holistic system. This system is called “The Pyramid of Organisational development” (Figure 12). We concern that these key factors are crucial for each system and subsystem in an organisation. They must, because of this, be analysed at different levels of detail according to the actual organisation. This opinion is in accordance with Flamholtz (1995).

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**Figure 12 Pyramid of Organisational development: The six key building blocks or critical success factors** (adapted from Flamholtz and Aksehirli, 2000, p. 491)

Each of the key factors will be discussed below:

1. *Identification of Market Segment and Niche*  
To identify a market need for a marketable service or product is the first challenge. To be successful in this step is crucial for organisational success. The identification involves the development of a strategic market plan to identify customers and their needs and the creation of a competitive strategy.
2. *Development of products and services*  
Success at this stage is highly related to the previous critical task. Unless an organisation fully understands the needs of a market it can not satisfy those needs in productisation. This process is about analysing the needs of customers in the target market, designing the product and developing the ability to produce it (Flamholtz and Randle, 2000).
3. *Acquiring Resources*  
Success in the two previous factors will create increased demand for an organisation’s products or services. As a consequence the resources in the organisation will be spread very thinly and the organisation will require additional resources. One resource is technology, for example IT. Compared to development in this area the full potential of the technology has yet to be reached (Göransson and Gulliksen, 2000). A conclusion is then that there are

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possibilities to make the use of IT more efficient and as a consequence develop more successful IS.

#### 4. *Development of Operational Systems*

This is the development of basic day-to-day operational systems.

*“Entrepreneurial companies tend to quickly outgrow the administrative systems available to operate them. Therefore, it is necessary to develop sufficient operational systems on time to build a successful organisation.”* (Flamholtz and Aksehirli, 2000, p.490).

We consider that operational systems of today are IS. As a consequence this key factor is about information systems development which – as earlier discussed – must be one part of the total organisational development. Consequently, organisational development in a life cycle perspective requires information systems development.

#### 5. *Development of Management Systems*

This factor is essential for the long-term viability of the organisation (Flamholtz and Randle, 2000). It refers to

*“the process of planned development of the people needed to run an organisation as it grows”* (Flamholtz, 1995, p. 43)

Success depends on the match between organisational structure – this structure involves the way in which people are organised and activities are coordinated – and business strategy. Success depends also on a match between informal and formal structure (Bastöe and Dahl, 1996). We concern that Management Systems very often are IS and also here IS is of great importance in order to support this key factor. We also consider IS to become more and more important for the development of management systems.

#### 6. *Developing Corporate Culture*

All organisations have cultures, they may be implicit or explicit. The cultures govern how people are expected to operate business from day to day.

As we discussed above we consider that IS should be included in number 3, 4 and 5. We have also marked this in Figure 12. By aligning the critical success factors 3,4 and 5 to IS we can view IS and information systems development in a holistic perspective. As a consequence of this discussion we claim that the *IS itself* is a critical success factor for successful organisational change in a long-term perspective. This view is supported by the way we earlier discussed the relationship between the organisation and its IS as well as between information systems development and organisational change.

All six factors in the framework of Flamholtz (1995) must occur simultaneously and are vital for the health of the organisation. According to the organisation's stage of growth the relative emphasis on each factor will vary. This relationship leads to an organisational life cycle model that complements the Organisational Development Pyramid. Each stage of growth is viewed as having a set of critical factors, critical development tasks, belonging to the Organisational Development Pyramid. An overview of this life cycle and its relationship to the critical factors in the Organisational Development Pyramid is shown in Figure 13.

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<b>Stage and Description</b>	<b>Critical Development Areas</b>
I. New Venture	Markets and products
II. Expansion	Resources and operational systems
III. Professionalisation	Management Systems
IV. Consolidation	Corporate Culture
V. Diversification	Markets and products
VI. Integration	Culture, management and operational systems, and resources.
VII. Decline	All six areas

**Figure 13 The relationship between stages of growth and key factors**  
(adapted from Flamholtz and Hua, 2002, p.75)

We concern that Figure 13 gives a good overview of the relationship between stages of growth and key factors. We have earlier identified IS in the key factor resources, operating system and management system. According to Figure 13 a consequence should be that information systems development is included in the most critical development areas for organisations that are in the stages of *Expansion*, *Professionalisation*, *Integration* and *Decline*. Because the aim of our research is in the area of information systems development these stages will be discussed at the end of this section. The life cycle for organisational change will – except for *Expansion*, *Professionalisation*, *Integration* and *Decline* – not be discussed any further.

- *Expansion*: The organisation will reach the rapid growth or expansion of number of employees, sales revenue and so on. Organisational resources are stretched to the limit and increasing sales even require more resources. The major problem is of growth rather than survival.
- *Professionalisation*: The organisation cannot cope with the growth merely by adding people, money and so on. A qualitative change is needed. The organisation needs to be a professionally managed organisation. Informal processes must be formalized.
- *Integration*: The organisation now consists of several businesses. The challenge will be to integrate the separate units into an operating whole while simultaneously allowing them to realise the benefits of quasi-decentralisation.
- *Decline - Revitalisation*: The organisation has to deal with symptoms of aging and the attempt to revitalise the organisation will strain all of its systems. Any size of organisation can be here.

These stages are important to have in mind because each stage will in turn indicate which factor is the most important at this very moment. *To identify the actual stage of growth of the organisation* must then be regarded as another important success factor. As we interpret the description of the stages above it has been done in a structural frame. We concern it to be important to have that in mind when analysing organisational change according to this framework. The Structural frame helps to identify the stage of growth of the organisation, but the other frames are necessary complements when analysing the organisation.

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In chapter 3 we have discovered some important success factors for the organisational change. Some of them have been explicit in our literature survey and some of them more implicit. In order to get an overview of the factors they will be summed up, grouped and discussed in the next section.

### 3.3 Identified Success Factors – A Summary

In order to refresh our memory and make it easier to understand the discussion we have in the following list summed up success factors identified in this chapter:

- *To understand the organisational culture*
- *To carefully analyse and describe the organisation in different frames*
- *To have the right stakeholders involved in the team*
- *To take care of the needs of the stakeholders in the organisation:*  
Confidence in the management and knowledge about the meaning of the change
- *To define the objective of change in different frames*
- *To define the system's boundary both for the whole system and for relevant subsystem*
- *To define the objective at three different levels of abstraction; how, what and why*

The following points belong to the framework of Flamholtz (1994):

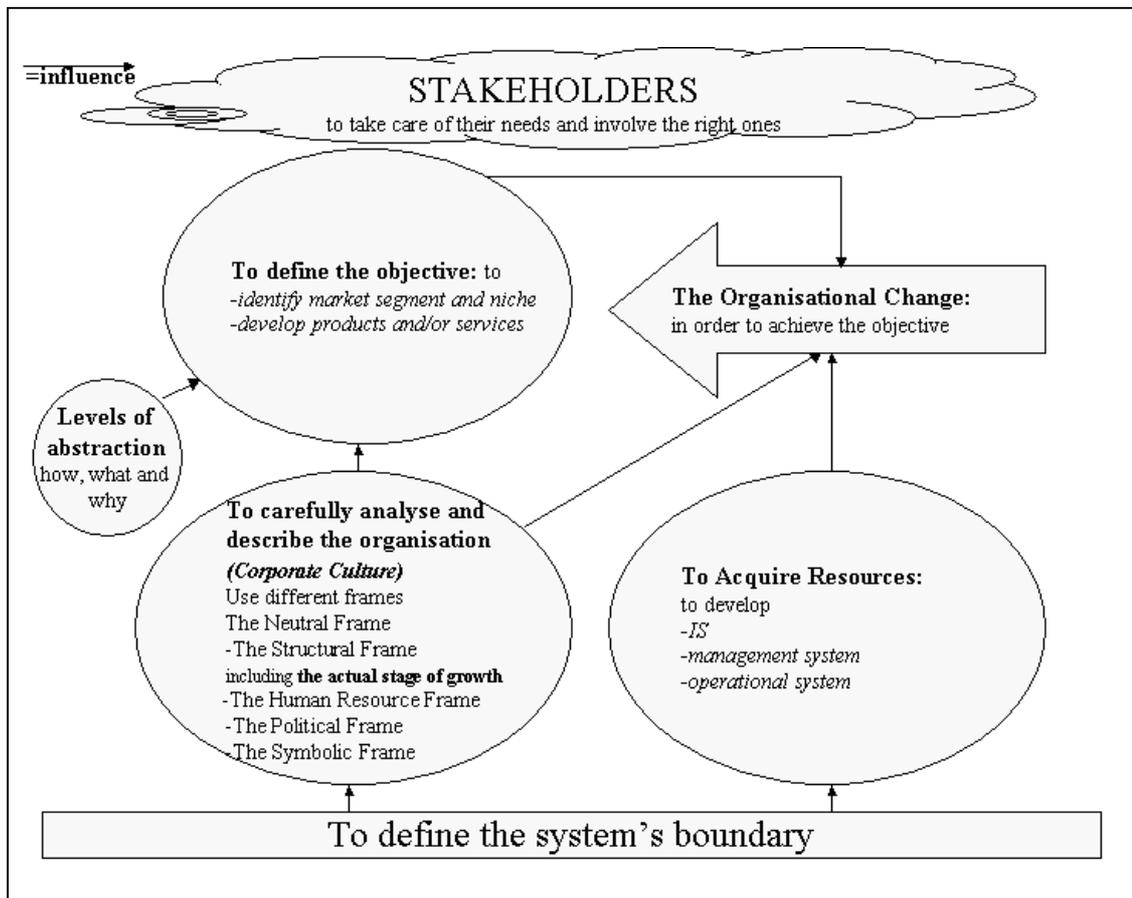
- *To define the actual stage of growth of the organisation*
- *To identify Market Segment and Niche*
- *To develop products and services*
- *To acquire Resources*
- *To develop Operational Systems*
- *To develop Management Systems*
- *To develop Corporate Culture* (Compare with the first point in the list)
- *To develop the IS itself*

There is no order of precedence in the presented list. The identified important success factors according to organisational change are at different levels of detail. Consequently different factors can implicitly be included in other factors of a higher level of detail. This fact makes it possible for us to group the observed factors when we make this summary. The advantages with grouping are that it is easier to get a holistic view, to remember and to understand the factors. The purpose of this section is not to analyse the factors in a deeper sense, more to sum up and discuss them; both in general and from an information systems development point of view.

The important success factors we have identified relate to and affect each other. The relationship between the identified factors and organisational change is summed up in Figure 14. The different factors in the list above have been grouped. All the factors in

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the list are in Figure 14 written with bold style. Factors belonging to the framework of Flamholtz are marked with italics. Factors at a high level of abstraction are marked as headings.



**Figure 14 The relationship between the important factors in Organisational Change (OC)**

The factors in Figure 14 are grouped according to their level of detail. In order to make this grouping clear and also to discuss their relationships a little bit further we end this section by explicitly discussing each group. In this discussion we also according to our research area look at each factor from an information systems development point of view.

- **To define the System's Boundary**

The system's boundary decides what system, organisation, we are talking about and consequently influences the analysis of the organisation. There is a significant difference to analyse the whole organisation comparing to some part of it. By identifying this boundary there will be an active discussion about what is included in the actual system, which related systems and subsystems there are and so on. Should the actual system be the whole organisation or only a part of it? Allowing small units to take responsibility for running themselves can only be done if the organisation as a whole is clear about its aim and works on a principle of shared values (Barlow and Burke, 1999). Consequently, the whole system is ideally to be analysed first and then the subsystems in accordance with the whole system. As implicitly mentioned above the boundary decides which people are affected by the organisational change and also indicates which people have to be involved in the organisational change. In Figure 14 we can see that the system's boundary

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also affects what resources that are available. It is also important to stress the fact that people is one available resource. In this circumstance it is important to stress that related systems may offer resources, perhaps in exchange for something. This discussion is in completely applicable on the special type of organisational change that information systems development is. This success factor is also in accordance with the discussion about to carefully analyse the domain in Requirements Elicitation according to different dimensions.

- **To Acquire Resources**

Resource management is about different types of resources. According to Flamholtz (1995) there are financial resources, physical resources, technology and human resources. Human resources as one type of resource is in accordance with the earlier discussion about the stakeholders as one type of resource. As two other key factors Flamholtz (1995) talks about operational and management systems. We interpret these systems as types of resources at a more detailed level. As a consequence we have put these key factors in the same group as acquiring resources. Operational and management systems are two types of IS and resources at a more detailed level than the factor IS. The factor IS is then also one type of resource. This is in accordance with our definition of IS. To acquire resources is also an important factor in the information systems development process. We discuss this further in chapter 4.

- **To carefully analyse and describe the organisation**

In order to get the most complete picture and to understand the organisation as well as possible it is important to examine the organisation from different views. Different frames will also result in different complementary descriptions. Organisational constraints – history – influence information system development. (Lang et al, 2000). If the sequence of events in an organisation's past resulted in frequent IS project failures this organisation will not develop its information system as quickly, extensively or independently as other organisations (Lang et al, 2000). Unfortunately according to Lang et al (2000) policy recommendations are difficult in this area. Flamholtz (1995) talks in this area about the key factor Corporate Culture. Corporate Culture is about values, beliefs, norms and so on. We interpret the Corporate Culture as the same thing as organisational constraints. To understand this culture, or organisational constraints, we again stress the importance of examining the organisation from different viewpoints. In this context we want to point to the meaning of the Human Resource Frame. We maintain that this frame is crucial in the work of discovering the organisational constraints. Also when the key factor **stakeholders** is discussed and analysed this frame is invaluable.

The organisational structure can influence both information flow and other aspects of information process ( Barlow and Burke, 1999). This fact supports the meaning of the Structural Frame. Another important factor, the actual stage of growth of the organisation, is also important to find out. Each stage of growth has a set of more important key factors and by identifying the stage there will be an indication of what key factors that have to be prioritised (Flamholtz, 1995). By using the Structural frame we suppose it will be possible to find out the actual stage of growth. We consider this factor about the growth not to be in our research area. In a short time perspective the organisational change does not need to include an information systems

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development process and the stage can then indicate factors that do not include an IS. We also consider this factor to be so closely related to the framework of Flamholtz (1994) that it can be only useful in this context.

To carefully analyse the organisation and to understand the organisational culture are also important factors in the information system development process. Organisational constraints influence the information system development (Lang et al, 2000) and to understand the organisational culture requires an analysis of the organisation in different frames.

- **To define the objective; in three different frames and levels of abstraction**

The objective will affect the organisational change; the destination for the change journey is crucial for how we will carry out the journey. The organisational change in turn will result in the objective, for example a successful IS. The objective is influenced by different frames and levels of abstraction. We can also see that through the frames it is influenced by the system's boundary. We want in this context to stress the importance of that the goals of the wider organisation must correspond to the goals of the smaller units ( Barlow and Burke, 1999). This fact clearly illustrates the influence from the system's boundary on the objective and that the objective can vary between system and subsystems. This is important also in the IS area. If each part of an organisation has effective IS there is no guarantee that the whole IS works optimally. As we already mentioned the objective will also vary according to frame. The objective should be discussed in different frames (Pun, 2001), e.g. the objective for an information systems development process. The objective will also vary according to level of abstraction. To understand the objective for the journey and to plan the journey, make a project plan, in order to reach the objective it is necessary to have an understanding of three levels of abstraction; the how level, what level and why level (van Gigch, 1999; Malmsjö, 2001). Without this understanding it is according to van Gigch (1999) impossible to carry out successful organisational change. In the view of information systems development this approach can be applied both when we define what a successful system is (section 4.1), the objective of the process, and to each requirement in the Requirements Specification. Even the whole information system development process can be connected to this approach: **What** do we need and **why** do we need it and **how** are we going to implement it (compare with Figure 5).

As we can see this main group is an important success factor also in the information systems development process. The more detailed factors in this group from Flamholtz (1994) concerning the market and products are not relevant to our research.

- **The stakeholders**

Stakeholders is a key factor that influence and is included in all other factors; they define the system's boundary, are in the organisation and also analyse it, is a resource, acquire resources, define the objective at different levels of abstraction and in different frames and can also be a part of those frames etc. These stakeholders will in turn be influenced by the different factors. Because of this we have chosen to have the stakeholders marked as a cloud in Figure 14. A cloud is over everything and influence everything. A cloud also consists partly of nature below it. All these aspects regarding the stakeholders are also important in the information systems development process. Stakeholders is one of the sources in the key activity Requirements Elicitation and one

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important identified factor in the information systems development process is *to identify and involve the "right" stakeholders*. This is also a prerequisite in order to develop a system with high user satisfaction (see e.g. Andersen, 1994; Cherry and Macredie, 1999; Pohl, 1998; Sutcliffe and Economou and Markis, 1999). The reason why we have chosen to make *stakeholders* a factor by itself is because of its importance. The kind of persons in the team is important, it is a critical success factor (Champy, 1997). The possibility to satisfy the needs of people across the organisation is crucial for the success of organisational change (Champy, 1997). There is also a strong link between participation and empowerment (Lyons et al, 2001). Lyons et al discuss three levels of sustainability as an outcome of a participatory development process:

1. *First level: personal*: Leads to future development initiatives. The management should facilitate for employees to take initiatives in order to favour IT (Nambisan, 1999). According to Nambisan (1999) technology users should be regarded as a source of IT innovation.
2. *Second level: project* Leads to contributions towards the sustainability of development projects
3. *Third level: community* Leads to contributions towards the broader notion of sustainability development.

We have now grouped and discussed the important success factors concerning organisational change identified in this chapter. We have also noticed that all these important success factors in organisational change, except for some of the factors in the framework of Flamholtz (1994), also are applicable in information systems development. According to this discussion and to Figure 14 we claim that the factor *to define the system's boundary* must be interpreted as a prerequisite for the other factors; if the system's boundary is not defined it is impossible to analyse the organisation, to acquire resources, to define the objective and to identify the stakeholders. This is in accordance with our discussion in chapter 2. We also claim that other crucial factors concern *the stakeholders*. They influence all the other factors and are also in turn influenced by them. In Figure 14 we can see that *the objective* is in focus and of central meaning. It is like a central point for the other factors. In chapter 4 we further discuss important success factors in the information system development process; both implicitly and explicitly found in our literature study.

## 4 Success in Information Systems Development

The aim of our literature survey is to identify important success factors in the information systems development process. These factors should then form the base to start from in the work to discover which considerations the target organisation should make before starting an information systems development project. In chapter 2 and 3 we have identified a number of important success factors in the information systems development process. Most of these factors have been implicit in our research; i.e. they have not explicitly been stated as important and/or critical success factors, but by continuously analysing the material we have discovered them. One central success factor is the objective of the whole process. A successful IS is the objective of an information systems development process. Consequently, we need to discuss and define what a successful IS is in our research. In the literature there is also a large number of explicit stated success factors in the information systems development process, often talked about as critical success factors (CSF). These factors are according to our aim important to find and discuss.

The remainder of this chapter is organised as follows. Section 4.1 discusses what a successful information system is and analyses it in order to identify important success factors. Section 4.2 presents important success factors in the information systems development process explicitly found in our survey. The chapter ends with a summary at a high level of abstraction concerning important success factors found in the information systems development process.

### 4.1 A Successful Information System

There is no common definition regarding what a successful IS is. In different research reports various success measures have been tested (Jiang et al, 2001), but as we see it there is no commonly accepted measure. A successful IS can be regarded as a function between technical quality and the users' acceptance (Andersen, 1994). In general there are different criteria for different types of systems when discussing the concept of a successful IS. E.g. Executive Information System (EIS) are difficult or impossible to justify using standard economic evaluation methods (Poon and Wagner, 2000). Poon and Wagner (2000) have chosen five criteria in order to determine the success of an EIS. They also claim that the most basic level of success is whether it is completed in the first place or not. We have complemented their list with this criterion. The criteria of Poon and Wagner (2000) are then:

- Is completed
- Access: is made available and users are given access to the system
- Use: is used by the intended users
- Satisfaction: Users are satisfied
- Positive impact: has positive impact on the executives and the organisation
- Diffusion: the number of users will steadily rise

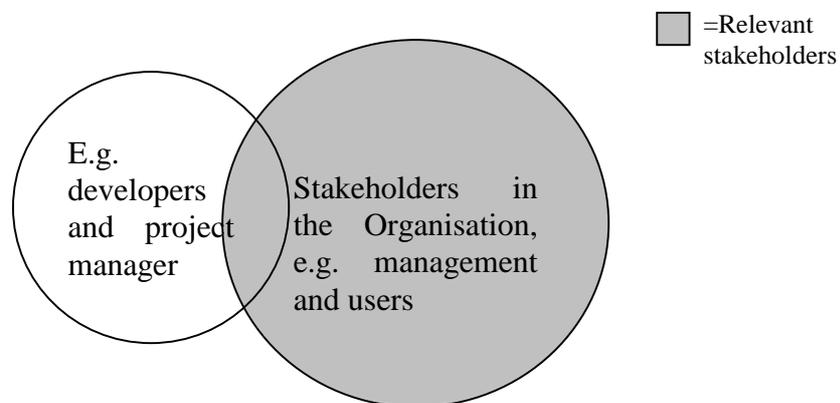
Because our research tries to find important success factors in the information systems development process in general the purpose of this section is to discuss successful systems at a high level of abstraction: This means that we will not further discuss criteria for specific types of systems. Important is to discuss what we in our research

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mean by a *successful system* and – according to our research objective – is there anything which indicates important factors in the information systems development process. The reason why we listed criteria related to EIS is that we concern them to be useful also with other types of IS. We discuss this relationship later in this section.

Successful IS projects are commonly cited as having met agreed upon business objectives and having been completed in time and within budget (Procaccino et al, 2001). Cost, time and savings are normally together defined as the success of an IS (Jiang et al, 2001). According to Jiang et al (2001) few systems are completed on time and within budget and as a consequence most studies investigating systems development report them as failures. This view represents the developer's view (Jiang et al, 2001) and an analysis in the user's view may come to a different result. If the user satisfaction is high the user probably interprets it as a successful IS irrespective of whether it has been completed on time and within budget or not. According to Procaccino et al (2001) the research of Procaccino and Verner<sup>2</sup> agrees with Glass (1999) who has noted a profound difference of opinion between managers and team members in the organisation concerning software project success. Furthermore, different groups of stakeholders have different views about what constitutes a successful system (Jiang et al, 2001; Procaccino et al, 2001). A successful IS must be successful in the view of the organisation. An IS has no value in itself. An IS should support the organisation and strive towards the same objective, the business mission.

The chosen perspective in order to define a successful system, the organisation, consequently stresses the importance of the people who work in the organisation. This is in accordance with the discussion in section 2.4 about stakeholders. We claim that the organisation *is* the people. In accordance with this view, only the stakeholders who are included in the organisation will in this research be relevant in the discussion of what a successful IS is, see Figure 15.



**Figure 15 Relevant stakeholders**

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<sup>2</sup> J. Drew Procaccino, J.M. Verner, prationer's perception of project success: a pilot study, IEEEInternational Journal of Computer and Engineering Management (2001) in press

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Relevant stakeholders, stakeholders that are in the organisation, are for example management and users. Procaccino et al (2001) refer to Standish Group<sup>3</sup> in claiming an information system to be a success for management if an IS is:

- delivered on time
- within budget
- meets specified business objectives.

This is in accordance with the EIS criteria listed above. The management's point of view is supported by the EIS criteria. Poon and Wagner (2000) concern that the EIS project has to *be completed* in the first place versus remaining in analysis, design or prototyping stages. A prerequisite for this is that IS has to be delivered on time and within budget. This is also two of the criteria that Procaccino et al (2001) mention as important for management. The remaining EIS criteria presume that an IS meets specified business objectives, which is the third factor Procaccino et al (2001) mention. This third factor of Procaccino et al (2001) presumes that business objectives are well defined and accepted. If the developed system meets the objectives but these objectives are not unambiguously defined and not accepted by all stakeholders, the developed system will soon be regarded as an unsuccessful one. These objectives have to be discussed on different levels of detail; what is the objective for the actual system and why according to the business mission is this objective important (van Gigch, 1991). From management's point of view *the organisation and its objectives* are clearly in focus when determining if an IS is successful or not.

We can also discuss a successful IS in the perspective of its outcomes: What comes out from the system, how do the users interpret it and what can be used by the users in the organisation. We concern that if we have successful outcomes from an IS we can state that we have a successful system. Lin and Shao (1999) discuss successful outcomes in terms of more IS usage, greater user acceptance and increased user satisfaction. Three terms that all focus on the user. If potential future users accept the system it will be interpreted as a successful system. This can also be compared with the criteria for EIS where Poon and Wagner (2000) discuss usage and user acceptance. The most widely used measure in the literature for system success is user satisfaction (Lin and Shao, 1999; Jiang et al, 2001). Also in this context it is important that the objectives are well defined and accepted among different users. If the system has not been developed in order to meet the user's needs how can they then be satisfied? Even from the user's point of view the perspective of the organisation is obvious: If the organisation and its users find what comes out from the system useful, they will view the system as a successful one. We also concern this to be a prerequisite for one of the criteria in the management's view; *a successful IS has to meet business objectives*. If the users do not use the system and are not satisfied with it, the system will not contribute to business objectives.

Developers can be inside the organisation or come from the outside. According to Procaccino et al (2001), Connell<sup>4</sup> claims that developers are more likely to perceive an IS to be a success regardless of whether it is completed or cancelled. He claims

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<sup>3</sup> Refers to Standish Group, CHAOS, [http://www.pm2go.com.sample/research/chaos/1994\\_2.asp](http://www.pm2go.com.sample/research/chaos/1994_2.asp) (Accessed March 5, 2001)

<sup>4</sup> S.McConell, Rapid Development, MOCrosoftPress, Redmond, 1996

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that if the IS works the way it is supposed to and developers' participation provides technical challenges and learning experiences it is a success from the developer's point of view. This seems to oppose the opinion of Jiang et al (2001), but perhaps it is not. From the developer's point of view the project can be reported as a failure because it is not completed in time and within budget as Jiang et al (2001) claim, but the individual developer can perceive the project as a success if it has been e.g. a technical challenge and a learning experience that develops new skills. Because developers do not need to be in the target organisation, we do not discuss the developer's point of view any further.

If we now try to sum up what a successful IS is we can state that a successful IS

- *is completed in time*
  - *is completed within budget*
  - *meets business objectives*
  - *has high user satisfaction* - *(mainly from the user's point of view)*
- } (*mainly from the management's point of view*)

This is in accordance with Linberg (1999). He says that the only criteria for success among all involved parties are that it meets user requirements, achieves purpose, meets time scale, meets budget, generates happy users and meets requested quality. We claim that this is in accordance with our summary.

These four characteristics constitute important and critical success factors in the information systems development process. These factors must be successfully handled if the process is to result in a successful IS. If the development process is not completed in time and within budget, the resulting system does not meet business objectives and have high user satisfaction the developed system will not be regarded as a successful system. If the project is completed in time and within budget depends on the resources and the project plan. As a consequence it is necessary to have realistic conditions, both in term of time and money, and to work out a realistic project plan. To acquire resources is an important factor in the information systems development process and the factor has also been identified in organisational change in general (see chapter 3). The important factor *to meet business objectives* is to strive towards the same objectives, the business mission. As a consequence the IS strategy should be in accordance with the business plan. This is supported by Kearns and Leader (2000). We interpret that Kearns and Leader (2000) mean the IS strategy when they talk about the information systems plan, and we will use the terms interchangeable in our research. Kearns and Leader (2000) claim that the alignment of the information system plan with the business plan creates competitive advantage for information systems investments.

*"Organisations has begun to realize that competitive advantage may be gained by implementing strategies that reflect the thoughtful fusion of business objectives and processes with information technology."* . (Kearns and Leader, 2000, pp 269-270.).

When processes and objectives have already been determined success will depend upon whether an IS can exploit technology properly (Kearns and Leader, 2000). When the IS plan reflects the mission and the objectives of the organisation, support business strategies, recognises external forces and reflects resource constraints, then the organisation more likely uses IS strategically (Kearns and Leader, 2000). IS executives should attempt to ensure that the IS strategy reflects the business plan mission and objectives, supports the business strategies, recognises business

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environment forces and reflects resource constraints (Kearns and Leader, 2000). Whether the objectives, and the future system, will be accepted by the users or not depends on the involvement of users in the development process (e.g. Andersen, 1994; Cherry and Macredie, 1999; Pohl, 1998; Sutcliffe and Economou and Markis, 1999). The success of the system is largely determined by the attention to the human dimensions of the requirements process (Saiedian and Dale, 2000). The importance of the Human Resource Frame is obvious. The success of this involvement depends in turn on how well people work and communicate (Saiedian and Dale, 2000). We interpret that Saiedian and Dale (2000) by the term *communication* mean the same as Champy (1997) calls *conversation*. According to Sarker and Lee (1999) communication was one fundamental issue a failed large development project in the USA.

As we can see, the identified factors in this section presume that the *objectives are well defined and accepted among the different stakeholders*. This is in accordance with the discussion in chapter 3. We will in this context remind about the importance of analysing the objective in different frames. The Human Resource Frame and the Political Frame e.g. focus on other views of the objective compared to the Structural Frame. If the objective is not well defined and accepted it is impossible to plan the process, to know what resources are necessary, and it will be more uncertain if the project will be *completed in time and within budget*. Also the factors *meets business objectives* and *has high user satisfaction* require *well defined and accepted objectives*. The crucial importance of the stakeholders has been obvious through the whole research: We have noticed it in our background, in organisational change and now in the information systems development process. Consequently, the work that precede the development process should carefully investigate what stakeholders are relevant ones and prepare them for the development process.

Even the important factors identified in this section are influenced by the system's boundary. The system's boundary decides what needs to be considered and what can be left outside (van Gigch, 1991). This in turn affects whether the system is a successful one or not. It is a significant difference to acquire an IS for a whole organisation compared to an IS for only one department. Consequently, to discuss what the system and its relevant subsystems are in order to correctly define the system's boundary is an important and crucial factor in the work to get a successful IS.

By discussing what a successful system is we have found the following success factors in the information system development process:

- *To correctly define the system's boundary*  
Includes the definition of relevant subsystems
- *To define the objectives well*
- *To have objectives that are accepted among the stakeholders*
- *To meet business objectives*  
The alignment between IS plan and Business Plan is important
- *To have high user satisfaction*  
Involvement and communication at a more detailed level
- *To be completed in time*
- *To be completed within budget*

The quality of the information systems development process is crucial for making the IS successful. We stipulate that awareness of these factors will help organisations to perform a process with high quality. We also interpret them as critical factors because if we do not have insight in them and can handle them in the development process we will not develop a successful IS.

### 4.2 Explicitly identified success factors – an overview

This section aims to give an overview of success factors explicitly found in the literature. Individual factors are often found in different references, sometimes presented from different points of view and at different levels of detail. In order to give this overview perspective and as a status quo description some factors that are frequent in the literature will show up more than once. The levels of detail and points of view will also vary. As a consequence there is a possibility to group the factors. Before we start we want refer to Table 1. In this table we have summed up and grouped all the factors in three main groups; organisational, technological and economic factors. This is in alignment with Ewusi-Mensah and Przasnyski (1994). If individual factors have been mentioned by more than one reference this is also shown in Table 1. We recommend to look at this table before reading this section and even to look at it now and then in order to easier understand the following account.

An organisation's history influences information systems development (Lang et al, 2000). Most organisations do not learn from their failed projects; they do the same mistakes again (Ewusi-Mensah and Przasnyski, 1995, Lyytinen and Robey, 1999). According to Ewusi-Mensah and Przasnyski (1995) organisations make no efforts to understand what went wrong or attempt to learn from their past mistakes. Instead they continue to fail and even seem to learn to fail (Lyytinen and Robey, 1999). The failure of organisations to document their projects failures and use that information to avoid repeating of similar problems is a fact that more than any single fact attests to the continuing problems of IS development projects abandonment in organisations (Ewusi-Mensah and Przasnyski, 1995). *To learn from failed project* is a CSF. We stipulate that this factor is a prerequisite and a foundation for our research, for all IS research: If we do not learn from our failures there is no meaning to investigate them. There has to be learning paradigm; organisations should allow the problems underlying the causes of the failed project to serve as a trigger for a deeper learning and understanding of the entire systems development process (Ewusi-Mensah and Przasnyski, 1995). This requires careful documentation and analysis of every project. *To carefully document and analyse every project* are CSF:s at a more detailed level. According to (Ewusi-Mensah and Przasnyski, 1995) Lyytinen<sup>5</sup> puts it briefly and exactly when he writes “A successful IS development process is more a matter of social learning. The information system is an incremental outgrowth of this learning, and it continues to evolve over time owing to new learning”. Factors which contribute to the decision to abandon an IS development project are critical success factors. Factors emerging from economic, technological and organisational issues can all contribute to the decision to abandon an IS development project (Ewusi-Mensah and Przasnyski, 1994):

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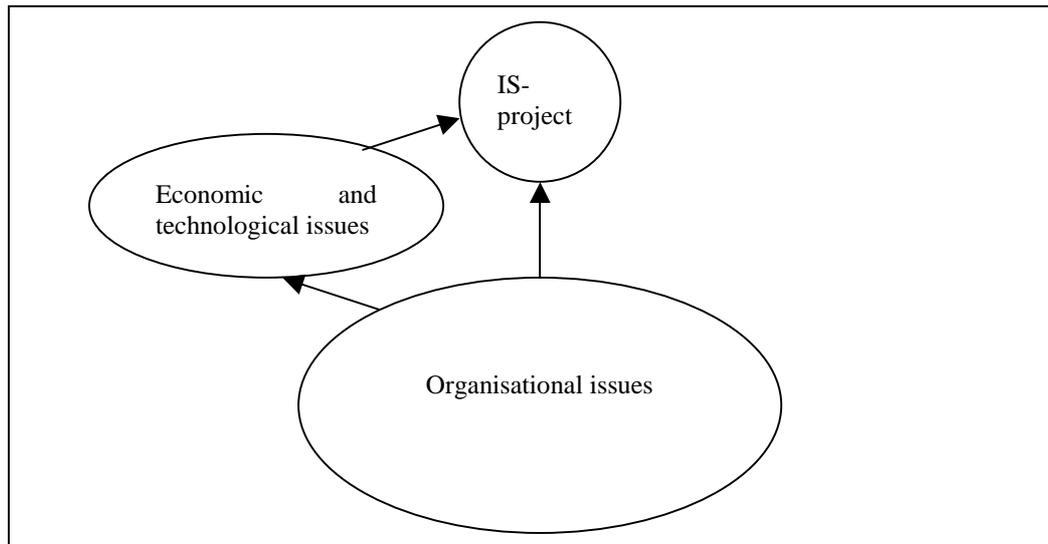
<sup>5</sup> Lyytinen, K. (1987) *Differen perspectives om information systems:problems and solution*. (p. 15) ACM Computing Surveys 19(1), 5-50

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- *Organisational factors*; for example organisational behavioural and political issues as well as end-user-related issues all might contribute to management's failure to deal satisfactorily with the varied problems stemming from these aspects of IS project development (Ewusi-Mensah and Przasnyski, 1994). If end-user participation is not sought, but is taken for granted, then potential for conflicts, disagreements and perhaps even outright resistance may arise in the course of the project's development and this may eventually contribute to abandonment (Ewusi-Mensah and Przasnyski, 1994). According to Ewusi-Mensah and Przasnyski (1994) organisation-related issues are the most widespread and dominant of factors contributing to abandonment of information systems development and they also influence other factors dealing primarily with economic and technological matters in development. We also consider the important factor *to learn from failure project* to be an organisational factor.
- *Economical factors*; project cost and time schedule are not to any large degree contributing to abandonment of IS projects (Ewusi-Mensah and Przasnyski, 1994). Escalating project cost and lengthening completion schedules contribute the most to the abandonment *decision*, but the root of this problem is the more fundamental problem of IS, i.e. organisational issues (Ewusi-Mensah and Przasnyski, 1994). This is in accordance with our earlier discussion about the objective. The importance of having available and relevant resources is clear, but when the available resources are relevant and enough is impossible to know if the organisational issue are not clear, e.g the objective.
- *Technological factors*: do not contribute in any significant way (Ewusi-Mensah and Przasnyski, 1994) The technology related factors have however an important role in the successful completion of IS development projects (Ewusi-Mensah and Przasnyski, 1994). According to Ewusi-Mensah and Przasnyski (1994) the organisation's senior management should not allow projects to be undertaken for which the organisation has not demonstrated sufficient know-how in terms of availability of the needed technology in the market-place and the expertise within the organisation to deal satisfactorily with it. Also this depends on the objective.

Organisation related factors, ranging from senior management involvement to end-user-participation, are the most dominant of the factors and they also influence factors dealing primarily with economic and technological factors (Ewusi-Mensah and Przasnyski, 1994), see Figure 16.

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**Figure 16** The relationship between organisational, economic and technical factors

Organisational, economical and technological factors are factors at a high level of abstraction. Poon and Wagner (2000) also discuss factors on a high level of abstraction, which they call meta success factors. If managed correctly they result in others going right as well. Poon and Wagner (2000) have identified three meta success factors:

- *Championship*; to have both executive and operative sponsors
- *Availability of resources*; to have people, technology and financial resources
- *Link to organisational objectives*; to establish clear benefits to the organisation and the people who work in it

We assume that the meta factors *Championship* and *Link to organisational objectives* are factors emerging from the organisational related issues, and that the meta factor *Availability of resources* is a factor emerging from economical and technological related issues. According to Poon and Wagner (2000) the three meta factors can be regarded in a time perspective: Even before a project is launched it will require strong *sponsorship* to result in its initiation and seed resources. As the implementation continues operational factors as *resource* availability become a necessary condition. Finally, as the system moves into use, while continued executive sponsorship and resources are required, a system will receive little use if it cannot *establish clear benefits*. This is the WHY level and the importance of it is supported in the literature (van Gigch, 1991; Bubenko, 1993). There should be an alignment between IS strategy and business plan (Kearns and Leader, 2000). The most fundamental part of the task is *to define the goal* (Clavadetcher, 1998). Only stakeholders who know what the system really has to do can do it, programmers guessing at requirements are pure folly (Clavadetcher, 1998). These meta factors are at a high level of abstraction. At a more detailed level Poon and Wagner (2000) also present evidence for the presence of additional critical failure factors: mismatch of the information system with the organisational culture. This is supported by Krumbholz and Maiden (2000). They discuss it in the perspective of developing an information system by acquiring software packages. According to Krumbholz and Maiden (2000) one crucial reason why projects are expensive and late is failure to adapt software packages to fit the

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organisational culture. There has to be an understanding of how organisational culture impacts on the implementation of software packages (Krumbholz and Maiden, 2000). If the target organisation develops by purchasing packaged software the *organisational culture* in relation to the culture of the supplier of the software package is an important factor to take into consideration. The organisational fit of an Enterprise Resource Planning system (ERP) has a significant effect on ERP implementation success (Hong and Kim, 2001). At a higher level of abstraction we can state that *to match the information system with the organisational culture* is an important success factor. In this context we also want to remind about another earlier mentioned dimension of the organisational culture: The organisational culture influences the whole development process.

Procaccino et al (2001) discuss project success in a developer's view. We have discussed successful IS from an organisation's point of view. We concern the factors that Procaccino et al (2001) discuss are important in the organisational view. The factors that Procaccino et al (2001) discuss are:

- *The presence of a committed sponsor.* It is important to start a project with a committed sponsor, but a project sponsor who drops out of this role in the project has a more detrimental effect than starting without a sponsor and picking one up later. It is not necessary for the project manager to be given full authority to manage the project.
- *The level of confidence* that the customers/users have in the project manager and development team. This is in accordance Champy (1997). The higher the level of confidence that customer/users have in project manager and development team, the more likely developers are to concern the project a success. The involvement of customers/users in making schedule estimates does not increase the likelihood of success from a developer's point of view.

These factors are on a more detail level. They belong to the meta factor *Championship* and are a organisation related.

Based on an extensive literature survey Milis and Mercken (2002) present eight different categories of success factors of information system and information technology projects. Even if these factors are related to a particular type of information system we concern the level of detail to imply the relevance of the factors even in other projects. The eight categories of success factors presented by Milis and Mercken (2002) are:

- *Good selection and justification:* We concern this to be the WHY-level. Selecting a bad project, or mediocre, might affect the profitability and thus the sponsor's happiness, the happiness of the users or/and the project team and the actual implementation cost and time. The field study done by Milis and Mercken (2002) indicate the importance of alignment with the business strategy. They say that this is more important than alignment with the IS-strategy. We have earlier discussed the importance of this alignment. This is in accordance with the opinion of Milis and Mercken (2002); there should be alignment if there is to be a successful IS developed. This category emerges from organisational issues. The factor affects e.g. cost and time. This is accordance with Ewusi-Mensah and Przasnyski (1994) who claim that organisational factors influence factors dealing primarily with economical and technological factors.

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- *The project definition:* A comprehensive project definition gives a joint vision, a base for cooperation, terms to refer to and, furthermore, prevents the boundaries from extending beyond the intended limits (Milis and Mercken (2002). According to Milis and Mercken (2002) the impact and quality of the project definition can be proved. The meaning of the project definition is in accordance with earlier discussion about the important aspect that there has to be identified and accepted objectives. Also this factor emerges from organisational issues.
- *The project plan:* One important task is to make a functional decomposition and order and schedule the resulted work packages to form the core of a project plan (Milis and Mercken, 2002). This is a work document and can be used as a communication tool, an effective monitoring device and furthermore in the learning process. A degree of urgency should be built in to the document and also some buffering is needed. An important part of the project plan is available resources. This factor emerges from economical and technical issues. Available resources are analysed and planned in focus of the objective of the process. The objective emerges from organisational issues which in turn influences economical and technological issues.
- *Management involvement and support:* According to Milis and Mercken (2002) there is a broad consensus in the literature that top management is a success factor. This is in accordance with material earlier presented in this thesis. Management is a part of the organisation and this factor emerges from organisational issues.
- *The project team:* The project manager should be competent and the composition of the team should be such that team members have complementary skills (Milis and Mercken, 2002). This is in total accordance with the ideas of Champy (1997). The team members should be committed to the project and cohesive and well motivated. The field study done by Milis and Mercken (2002) showed that the social skills of the project manager are more important than the management skills, and that the management skills are more important than the technical skills. According to Milis and Mercken (2002) the project manager can rely on the technical knowledge of the team members. In this view the project team emerges from organisational issues.
- *Change management:* There will be different types of change, both within the project and provoked by the outcome of the project. According to Milis and Mercken (2002) changes within the project need to be handled by the project manager. This stresses the importance of the social skills of the project manager. Changes provoked by the outcome of the project are both technological changes and cultural changes (Milis and Mercken, 2002). This is in accordance with our definition of what an IS is. Milis and Mercker present some guidelines, based on a large number of references, in order to handle changes provoked by the outcome of the project. These guidelines can be interpreted as important success factors at a detailed level, all emerging from organisational issues. The “guidelines” of Milis and Mercken (2002) are:
  - user participation:* in order to know and fulfil the needs of the users and to create commitment to the project
  - effective communication:* in order to reach advantages as for example realistic expectations, manage uncertainty, identify problems earlier and generate ideas that lead to better solutions.

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*-training*: in order to demystify the project and reach user satisfaction, training is positively associated with user satisfaction

*-support*: the project team has to be focused, committed, highly motivated, positive and supportive, they have also to pay attention to the complaints of the users

*-leadership*: is an important skill of a project manager and maybe different leadership styles need to be used at different times

*-commitment from the top*: is crucial if the project affect a large part of the organisation

We claim these “guidelines” to be important success factors in the perspective to get user satisfaction, which is a prerequisite for developing a successful IS. The importance of user participation and effective communication have already been discussed. The factor training belongs to the later phases of the project and is because of that not mentioned earlier in our research. Support, leadership and commitment from the top are three factors that we have not explicitly discussed. Implicitly we have several times mentioned these factors and consequently we regard them as important.

- *Proper project resources*: Sufficient resources should be at the disposal if the project is to be managed successfully. This factor emerges from economic and technical issues. But what is “sufficient resources” depends on the objective. By referring to Willcocks<sup>6</sup>, Milis and Mercker (2002) say that allocating resources is mainly a prioritisation problem. Scarce resources have to be withdrawn from normal activity or/and from other projects (Milis and Mercker, 2002). Consequently the importance of the involvement of the top management and also other in the organisation are obvious. Also here the influence of organisational issues is obvious.
- *Managing relationships*: There is a large number of relationships that have to be well managed if there is to be a successful IS. According to Milis and Mercker (2002) there are relationships among the project team members, with internal stakeholders and with external stakeholders. Also this factor emerges from organisational issues.

Furthermore Milis and Mercker (2002) develop a framework by regrouping these factors and distinguishing between four major categories of factors. These categories are consequently at a higher level of abstraction and show other views of the success factors. The purpose with this section is to get an overview and a holistic view of the success factors in the information system development process. Because of that we briefly present them and relate them to organisational, economical or technological issues. The factors:

- Enhance goal congruence: “*A joint vision among the major participants on the goals and the way to achieve them was perceived as being critical for the project’s success by most of the interviewees.*” (Milis and Mercker, 2002, p. 10) This category emerges from organisational issue.

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<sup>6</sup> Willcocks, L. (1996) *Investing in Information Systems: Evaluation and Management*, Chapman & Hall, London, 1996

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- Are related with the project team: “*Since the team is at the centre of the implementation, it is very important to have a **competent, committed and motivated team.***” (Milis and Mercker, 2002, p. 10) This category also emerges from organisational issues.
- Influence the acceptance of project and its result: *A **positive attitude**...needs to be created, which, in turn, influences the degree of cooperation of the functional managers and the users.*” (Milis and Mercker, 2002, p. 10) Also this category emerges from organisational issues.
- Can be described as elements of implementation politics: *The different steps...need to be **planned carefully and sufficient resources** need to be available to execute the different tasks planned.*” (Milis and Mercker, 2002, p. 10). This category emerges primarily from economic and technical issues. The influence from organisational issues is however obvious.

User cooperation is important for assessing requirements (Browne and Ramesh, 2002). In this context we point to the “*Undiscovered Ruins Syndrome*” identified by Leffingwell and Widrig (2000). It is impossible to find all information concerning requirements and it is therefore a mission that can never be completed (Leffingwell and Widrig, 2000). In the process it is so that the more we have found the more we know remain. The question is according to Leffingwell and Widrig (2000) when we with confidence can say that we have discovered enough. A study by Lin and Shao (1999) also confirms the positive contribution of user participation to successful system outcomes. Also this factor is in the area of organisational issues. A need for user participation is particularly important when the system to be developed is technically and complex (Lin and Shao, 1999).

User participation is a social process of interaction between users and designers through which both parties can learn about each other’s expectations and requirements, and hence resolve their conflicts (Lin and Shao, 1999). Lin and Shao (1999) define the concepts *user participation* and *user involvement* by referring to Barki and Hartwick <sup>7</sup>who say that *user participation* refers to the activities and behaviours that the users perform in the process and *user involvement* is more a subjective psychological state of the individual depending on their feelings. Management should also pay attention to the psychological states of the users toward the system (Lin and Shao, 1999). Organisational constraints affect user participation (Lang et al, 2000). User participation, user attitudes and user involvement form a circular relationship; getting users involved in the development process may improve their attitudes towards the system and enhance the importance and relevance users perceive about the system (Lin and Shao, 1999). Therefore, according to Lin and Shao (1999), it is important for management to foster an atmosphere that helps users enhance the importance of the system and enhance their favourable attitudes toward the system, in order to facilitate user participation in the development process.

Also Browne and Ramesh (2002) discuss the importance of the user/stakeholders. *To understand user needs* is a prerequisite for building a successful IS (Browne and Ramesh, 2002). This factor emerges from organisational issues. Many problems in Requirements Elicitation belong to human cognitive constraints (Browne and

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<sup>7</sup> Barki, H. And Hartwick, J (1989) *Rethinking the concept of user involvement* MIS Quartely 13(1), 1989, pp.530-534

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Ramesh, 2002). This aspect of Requirements Elicitation about human cognitive constraints is important and *to be aware of human cognitive constraints* is also an important factor. *To be aware of human cognitive constraints* is a prerequisite for *understanding user needs*. In this context, as we earlier have noticed, and at a more detailed level there are also communication issues. Problems in communication lead to difficulties (Browne and Ramesh, 2002). The success of the requirements definition process ultimately depends on how well people communicate and work together and as a developer it is absolutely critical that we recognise the human dimension in our discourse with the customer (Saiedian and Dale, 1999). The principal communication difficulties arise from the differing backgrounds of different stakeholders involved and in the end it is always the relationship between designers and customers that determines how well the design team understands and meets the user's needs (Browne and Ramesh, 2002; Saiedian and Dale, 1999). Leffingwell and Widrig (2000) call this the "*The User and the Developer Syndrome*": There is a big communication gap between the user and the developer. They come from different worlds, use different concepts, mean different thing by the same concepts and so on (Leffingwell and Widrig, 2000). Saiedian and Dale (1999) highlight the most common problems that hinder the identification/definition of the user's need. These problems are important success factors at a more detailed level. The factors from Saiedian and Dale (1999) are:

- *Communication*: How we communicate can be just as important as what we communicate. This is in accordance with Champy (1997). It is important that people's perception is that the developers are listening. This will make them feel more comfortable with the developers and become more open to the developers. It is also important for developers not to contradict what they intend to communicate. Communication preferences often vary from customer to customer and from one circumstance to another. It is the responsibility of the developer to be cognizant and adapt the customer's communication style. This factor emerges from organisational issues.
- *Resistance*: Resistance is a physical expression of an emotional process taking place within a person and takes the form of opposition. Being able to recognise and mitigate resistance is critical because it highlights issues that are not being addressed adequately. Some common forms of resistance are:
  - Time resistance: The person never has time to meet the developer for example
  - Overload resistance: No matter how much information is given to the person, it is never enough
  - Silence resistance: The person does not react or respond to anything said
  - Impracticality resistance: The person always reminds you that he lives in the real world.
  - Compliance resistance: The person always agree with you. Reservations are never expressed and the implications are that whatever the developer does is fine.This factor emerges from organisational issues.

## 4 Success in Information Systems Development

- *Articulation/expertise:* The use of terminology that is not understood by one of the parties is a common obstacle to communication on technical matters. Overuse of technical terminology can serve to confuse, annoy, or intimidate. Other problems can be developers “talking down” to the “dump users” and that developers concern that something is too complex to explain. Taking time to educate the customer has a number of benefits; e.g. this can help build trust with the customer and encourage them to open up to developers. This factor emerges from organisational issues.
- *Problem perspective:* Developers and customers have different perspectives. Most developers have little or no experience as end-users in the application domain for which they develop software and the customers are no experts in the process of information systems development. The users do not know what they can ask for and it is the responsibility of the developers to inform the customers about possibilities, but to always keep the focus on the benefit to their activity. Leffingwell and Widrig (2000) call this the “*Yes, But*” *Syndrome*. When the users see the system implementation for the first time there are always two immediate separate reactions: *Yes it is perfect. We can really use it, but...what about this? Wouldn't it be nice if...?* This syndrome is compounded by the development team because they rarely provide anything earlier than production code for the users to interact with and evaluate. This factor emerges from organisational issues.

We have now discussed important success factors explicitly found in our literature survey. All the factors have been related to organisational issues, economical issues and/or technical issues. They have also implicitly been related to the meta factors Championship, Link to organisational objectives and Availability of resources. All these are summed up in Table 1. Some of the factors (see Table 1) are completely the same and some of them are the same, but at different level of detail and from different points of view. In section 4.3 we group and analyse these factors and relate them to the factors we have discovered in section 4.1.

**To learn from failed projects** a prerequisite and a foundation  
(Ewusi-Mensah and Przasnyski, 1995; Lyytinen and Robey, 1999)

	<b>Organisational</b>	<b>Technological</b>	<b>Economical</b>
Poon and Wagner (2000)	<b>Meta factors: Championship Link to organisational objectives</b>	<b>Availability of resources</b>	
Poon and Wagner (2000)	To match the IS with the organisational culture (is supported by i.e. Hong and Kim, 2001; Krumbholz and Maiden, 2000)	The project plan Proper project resources  Elements of implementation politics	
Clavadetcher (1998)	To define the goal		
Ewusi-Mensah and Przasnyski (1995)	To careful document and analyse		
Procaccino et al (2001)	Committed sponsor Confidence customers, users, project manager & development team		
Milis and Mercken (2002)	Good selection and justification The project definition Management involvement and support The project team User participation Effective communication Training Support Leadership Commitment from the top Managing relationship Enhance goal congruence Are related with the project team To create a positive attitude		
Browne and Ramesh (2002)	To understand user needs Human cognitive constraints Communication issues		
Leffingwell and Widrig (2000)	The user always wants some more To know when enough has been discovered Big communication gap		
Saiedian and Dale (1999)	User cooperation Communication issues Resistance Articulation/expertise problems Problem perspective differences User participation		
Lin and Shao (1999)	User participation		

**Table 1 Overview of success factors explicitly found in the literature**

### 4.3 Identified Success Factors – A Summary

We have now identified and discussed several important success factors, both implicit and explicit, from our literature survey. We have also noticed that the factors identified in this chapter are supported by the identified success factors in organisational change (see chapter 3). The purpose with this section is to make a summary of the factors that have been identified in this chapter in order to get a clear overview.

All the explicitly stated factors in our literature survey are in Table 1 grouped in three groups: organisational, technological and economical. We claim this grouping to be useful when making this overview. Consequently we want to relate the implicit important success factors from section 4.1 to these three main groups. The factors are:

- *To define the system's boundary*
- *To define the objectives well*
- *To have accepted objectives among the stakeholders*
- *To meet business objectives*
- *To have high user satisfaction*
- *To be completed in time*
- *To be completed within budget*

We discuss each factor and its relationship to the three main groups separately:

- *To define the system's boundary*: This factor is a prerequisite for the three main groups. Consequently it is impossible to put this factor into any of the groups. If we do not know the system's boundary it is impossible to know what the organisation is and which resources that are available. This is in accordance with earlier discussion in this thesis.
- *To define the objective well*: This factor emerges from organisational issues. In Table 1 we can also see that this factor also is explicitly mentioned in the literature, e.g. Clavadetcher (1998).
- *To have accepted objectives among the stakeholders*: Also this factor emerges from organisational issues and have been explicitly mentioned in the literature e.g. Milis and Mercken (2002).
- *To meets business objectives*: This factor is according to Poon and Wagner (2000) a meta factor. We have also in different contexts in our research discussed the importance of it. It is a crucial factor that emerges from organisational issues; an IS has no value in itself. It must contribute to the business mission.
- *To have high user satisfaction*: If users are not satisfied with the system they will not use it and consequently the system will not contribute to the value of the organisation. This factor emerges from organisational issues. If the future users will accept the system depends on the involvement of them in the information systems development process (e.g. Andersen, 1994; Cherry and Macredie, 1999; Pohl, 1998; Sutcliffe and Economou and Markis, 1999). The important success factor *to involve the future users and other relevant stakeholders* in the information system development process is frequently

## 4 Success in Information Systems Development

explicitly mentioned in the literature, see Table 1, e.g. by Lin and Shao (1999), Saiedian and Dale, (1999) and Milis and Mercken (2002). *To really involve the stakeholders* implies, on a more detailed level, a number of other success factors, e.g. to have effective communication, to have insight in human cognitive constraints and to handle perceptible differences. These more detailed factors are explicitly mentioned by Saiedian and Dale (1999), Milis and Mercken (2002), Browne and Ramesh (2002), Leffingwell and Widrig (2000) and Procaccino et al (2001) (see Table 1).

- *To be completed in time* and *To be completed within budget*: We discuss these factors together, because they both concern resources. If there is a lack of available resources according to the objective the project will not be successful. These factors emerge from technological and economical issues, but the influence from organisational issues is obvious. This is in accordance with Ewusi-Mensah and Przasnyski (1995).

We have now summed up the important success factors identified in this chapter. At a high level of abstraction we can state the factors – except from the factor *to define the system's boundary* – are about organisational issues or about resources (technological or economical). The system's boundary is a base or a prerequisite for all the factors, irrespectively of type.

With these three groups – organisational, economical and technological – as a starting-point we discuss, analyse and group all the important success factors found in our literature survey in chapter 5. This constitutes the base for our framework, which also is presented in chapter 5.

## 5 A framework of Important Success Factors

We have now identified a large number of important success factors in the information systems development process. Some of the factors are implicit in our literature survey and some of them are more explicit. We have found the factors by

- giving a background to the research area (see chapter 2)
- looking at information systems development from another point of view, i.e. organisational change (see chapter 3)
- discussing what a successful IS is (see section 4.1)
- more explicitly looking for important and/or critical success factors in the information systems development process (see section 4.2)

The found success factors are on different levels of detail and of different importance for the information systems development process. Our research aims to develop a framework to guide target organisations in what considerations they should make before the information systems project begins in order to let it have every chance of succeeding. Consequently, we need to discuss and analyse all the identified success factors in the perspective of the aim of our research; what level of abstraction is needed, which are the most important factors and are there factors that we are not able to, or need to, address before the project begins. In section 5.1 we do this, which also forms the foundation for our framework. The framework is then presented in section 5.2.

### 5.1 An Analysis of the Identified Success Factors

The factors emerging from a successful IS and critical success factors have been grouped in three main groups: organisational, technological and economical (see chapter 4). In order to get an overview of all identified factors in our research, these three groups are our starting-point.

#### **Factors identified in chapter 2, “Background”, and their relationship to the main groups:**

The factors are:

- *To identify and involve the right stakeholders*
- *To analyse the organisation*
- *To take different dimensions into consideration when working through Requirements Elicitation, e.g. the dimensions of Leffingwell and Widrig*
- *To have the right level of detail*
- *To define the System’s Boundary*

The last point is, as we discussed in section 4.3, a prerequisite for the other factors and consequently it is impossible to put into any of the three main groups. The four first points emerge obviously from organisational issues. *To identify and involve the right stakeholders* is a factor that in different views and at different levels of detail has been of frequent occurrence in our literature survey, e.g. Lin and Shao (1999),

Saiedian and Dale (1999), Milis and Mercken (2002), Andersen (1994), Cherry and Macredie (1999), Pohl (1998), Sutcliffe and Economou and Markis, (1999) (see also Table 1). In accordance with our literature survey we consider this factor to be a critical one. *To analyse the organisation* is a factor that also is identified in chapter 3 and 4, both in section 4.1 and Table 1. *To analyse the organisation* is a prerequisite for some of the factors, e.g. the meta factor *to link to organisational objectives* (Poon and Wagner, 2000) and *to match the IS with the organisational culture* (Poon and Wagner, 2000; Hong and Kim, 2001; Krumbholz and Maiden, 2000). *To take different dimensions into consideration when working through Requirements Elicitation* and *To have the right level of detail* are two factors we claim not are relevant according to the aim of our research. We consider these factors to be handled directly in the Requirements Elicitation phase and can hardly be prepared before the process starts. However, we argue that the factor *To take different dimensions into consideration when working through Requirements Elicitation* would be indirectly prepared if the factor *to analyse the organisation* is prepared.

### **Factors identified in chapter 3, “Organisational Change”, and their relationship to the main groups:**

The implicit and explicit factors are in the chapter summed up and grouped in Figure 14. This higher level of abstraction is useful in doing this overview and we use these main groups The main groups in this figure are:

- *To define the System’s Boundary*
- *To analyse and describe the organisation*
- *To define the objective*
- *Levels of abstraction*
- *Stakeholders*
- *To Acquire Resources*

Also here we have the factor *to define the System’s boundary* as a prerequisite and base. The last point *to Acquire Resources* belongs to the groups economical and technological factors. At this level of abstraction it is impossible to define if it is economical or technological resources. However, according to our research this is not important. Consequently, we can talk about resources on a higher level of abstraction including both economical and technological factors. The remaining factors all emerge from organisational issues. The importance of *to analyse and describe the organisation* we already have discussed. In this context we want to remind about the relationship between this factor and the next one, *to define the objective in different levels of abstraction*. In chapter 3 we discussed the fact that the objective is influenced by different views and levels of abstraction. Consequently, if we should be able to define the objective we have to do analyse it according to different frames of the organisation and relate each objective description to different levels of abstraction. There must be an alignment between the why level, the what level and the how level to enable the organisation to develop a successful IS (van Gigch, 1991; Bubenko, 1993). The IS should support the business mission. There should be an alignment between the IS strategy and the Business Plan (Kearns and Leader, 2000). The remaining factor *Stakeholders* includes a number of both important and critical success factors. At a more detailed level it is about *to involve the right stakeholder* and *to take care of their needs about confidence and knowledge about the change*

## 5 Our Framework based on Important Success Factors

(Champy, 1997). We have already in chapter 3 stated that these factors are critical. This is also in accordance with earlier discussion in this section and with our literature survey, see e.g. Lin and Shao (1999), Saiedian and Dale (1999), Milis and Mercken (2002), Andersen (1994), Cherry and Macredie (1999), Pohl (1998) Sutcliffe and Economou and Markis (1999). After we have identified and involved the right stakeholders we have to take care of their needs about knowledge and confidence. This is a prerequisite for developing an IS with high satisfaction, i.e. a successful information system.

As a red thread through our research is the crucial success factor *to define the system's boundary*. The target organisation must discuss what the system is, relevant subsystems and define where the boundary is. We have discussed and analysed it several times and consequently we can state that we in our framework must take this factor into consideration. If the organisation does not do this it is impossible for the organisation to prepare itself according to other important success factors. According to earlier discussion and analysis (see chapter 4) we know that most identified success factors emerge from organisational issues. We also know that resources, both economical and technological, are influenced by organisational issues. Consequently, according to the aim of our research, we do not discuss important success factors emerging from resources issues anymore. Considerations before the development project begins should focus on important factors emerging from organisational issues, because they influence the other factors. When examining resources in the *Feasibility analysis* the best way to give this every chance of succeeding is to pay attention to the organisational factor of objective before doing this, i.e. before the project begins. According to the aim of our research we can not discuss organisational factors at that high level of abstraction. In the chapter concerning organisational change (see chapter 3, Figure 14) organisational factors are grouped in stakeholders, the analysis of the organisation and the objective for the organisational change. To describe and define the objective requires a careful analysis of the organisation and the analysis of the organisation can be regarded as included in the area of the objective. Consequently, we here have two groups of organisational factors that can be useful in our research; *Stakeholders and Objective*. A large number of organisational factors belong to stakeholders. This group of success factors has also attracted much attention through out our literature survey. We have already categorised factors in this group as critical and consequently we must consider this group in our framework. Factors belonging to the objective are critical. The objective of the organisational change, "the journey's destination", is crucial. A link between this objective and the organisational objectives is according to Poon and Wagner (2000) a meta factor. According to Champy (1997) any organisational change must begin by describing the journey's destination. This description requires a careful analysis over the organisation in different complementary frames.

Are these two groups, *Stakeholders* and *Objective*, useful as a starting-point for our framework; do they cover all the important success factors according to the aim of our research? In order to examine this we have in Table 2 grouped all the relevant factors according to our discussion, except for factors emerging from resources and the factor *to define the system's boundary*, from chapter 2, 3 and 4 in these groups. The factors identified according to organisational change in Chapter 3 are in Table 2 not regarded in their main groups but at the level of detail at which they have been identified. This level we claim to be more in accordance with most identified factors in our literature survey and by using this level of detail we avoid the problem that there is a risk that

## 5 Our Framework based on Important Success Factors

the higher level of abstraction does not show some of the factors properly. According to Flamhotz (1994) only the three key factors in the framework that include IS have been taken into consideration. This is in accordance with our discussion in chapter 3. In Table 2 we have for each factor marked which chapters they belong to. Is it identified in chapter 4 we have also marked which references that have talked about it or if it has been identified in section 4.1. Each factor has only been mentioned once and factors at a more detailed level are marked with italics. If we consider there is any factor which not does belong to *Stakeholders* or *Objective*, we have put these factors in an own group called *Remaining*.

Main group and Factor	Chapter
<p><b><i>Stakeholders</i></b></p> <ul style="list-style-type: none"> <li>• To get high user satisfaction</li> <li>• To involve the right stakeholders</li> </ul> <p>and To take care of their needs about confidence and knowledge</p> <p><i>Effective communication</i></p> <p><i>Human Cognitive Constraints</i></p> <p><i>Training Support</i></p> <ul style="list-style-type: none"> <li>• To create a positive attitude</li> <li>• Championship, committed sponsor</li> </ul>	<p>4(4.1)</p> <p>2,3,4(Milis and Mercken, 2002; Saiedian and Dale, 1999 <i>Lin and Shao, 1999</i>)</p> <p>3,4(Procaccino et al, 2001; Browne and Ramesh, 2002) 4(Milis and Mercken, 2002; Browne and Ramesh, 2002) <i>Leffingwell and Widrig, 2000</i>) Saiedian and Dale, 1999 )</p> <p>3(Champy)</p> <p>4(Browne and Ramesh, 2002) Saiedian and Dale, 1999 )</p> <p>4(Milis and Mercken, 2002)</p> <p>4(Milis and Mercken, 2002)</p> <p>4(Milis and Mercken, 2002)</p> <p>4(Poon and Wagner, 2000; Procaccino et al,2001; Milis and Mercken, 2002)</p>
<p><b><i>Objective</i></b></p> <ul style="list-style-type: none"> <li>• Meet business objectives</li> </ul> <p>requires To analyse the organisation</p> <ul style="list-style-type: none"> <li>• To define the objective</li> </ul> <p><i>To define it in different frames and different levels of detail</i></p> <ul style="list-style-type: none"> <li>• Accepted objectives</li> <li>• Good selection and justification</li> </ul>	<p>3, 4 (4.1, Poon and Wagner, 2000)</p> <p>2, 3</p> <p>3, 4 (4.1, Clavadetcher, 1998; Milis and Mercken, 2002)</p> <p>3</p> <p>3, 4 (4.1, Milis and Mercken, 2002)</p> <p>4 (Milis and Mercken, 2002)</p>
<p><b><i>Remaining</i></b></p> <ul style="list-style-type: none"> <li>• To learn from failed projects</li> </ul> <p><i>To carefully documentate and analyse</i></p> <ul style="list-style-type: none"> <li>• The organisational culture affects the process To match IS with organisational culture</li> <li>• The user always wants some more</li> <li>• To know when enough has been discovered</li> </ul>	<p>4 (Ewusi-Mensah and Przasnyski, 1995; Lytinen and Robey, 1999) 4 (Ewusi-Mensah and Przasnyski, 1995)</p> <p>3</p> <p>4 (Poon and Wagner, 2000)</p> <p>4(Leffingwell and Widrig, 2000)</p> <p>4(Leffingwell and Widrig,2000)</p>

**Table 2 An overview of all identified success factors**

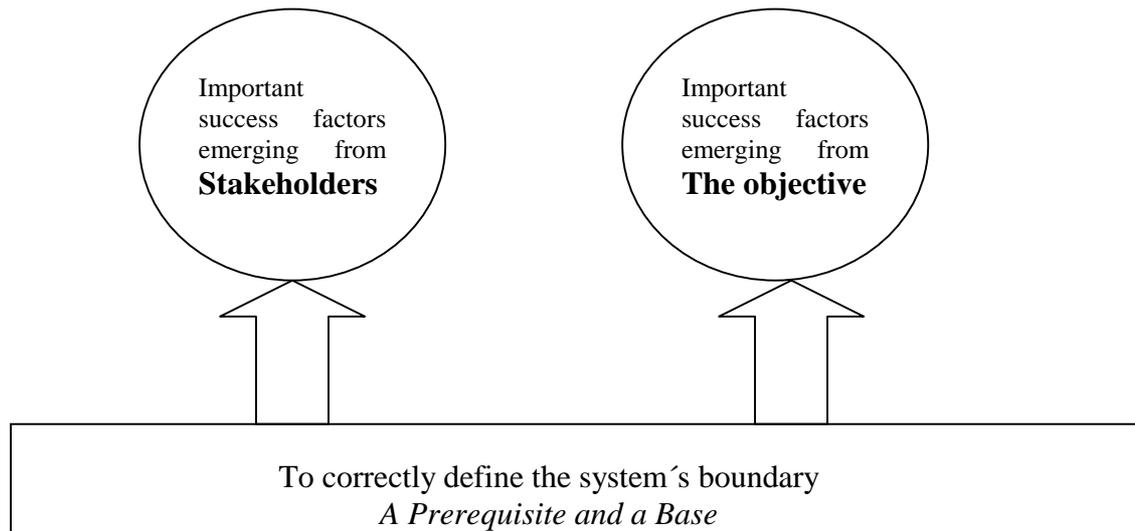
## 5 Our Framework based on Important Success Factors

We have already stated that factors belonging *Stakeholders* or *Objective* are critical ones. Consequently, we must take these into consideration when doing our framework. Before we discuss the factors in these two groups further we assume it is important to see if there is any factor in the group *Remaining* that we must pay attention to when doing our framework.

- *To learn from failed project:*  
Our framework does not aim to learn organisations this, it more requires it. Consequently, we do not take this factor into consideration when constructing our framework. Hopefully, our framework can be a valuable tool in the process by learning this.
- *To carefully documentate and analyse:*  
This factor aims to the whole process. According to our opinion even to the phase before it which is of focus of our research. However, this is implicitly included in the main group *Objective*. It is impossible to define the objective in different frames and levels of detail without documenting and analysing it. We do not need to handle this factor separately.
- *The organisational culture affects the process:*  
By analysing the objective in different frames there should be an awareness of the organisational culture. This awareness is the best preparation for this factor. It is impossible to do anything more before the process begins and consequently we do not need to handle this factor separately.
- *To match IS with organisational culture:*  
This factor belongs more to the implementation phase. The considerations an organisation should made before the process begins according to this factor is discussed in the point above. We can state that we do not need to handle this factor separately. However, if the target organisation should acquire packaged software there could be some considerations the organisation could make. Our research is about information systems development in general, but because there is a trend towards component based packaged software (Andersson and Nilsson, 1998) we in Appendix 1 discuss packaged software in the view of the aim of our research.
- *The user always wants some more and To know when enough has been discovered:*  
These factors should be handled in the development phase. We claim that the only considerations that an organisation can make according to these factors are included in the factors belonging to *Stakeholders*.

According to this discussion we can state that there is no factor in the group *Remaining* that we need to take into consideration when constructing our framework. Consequently, at a high level of abstraction, we can state that important success factors in the information systems development process requires a system's boundary and emerge from stakeholder issues or objective issues, see Figure 17.

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**Figure 17 Important success factors – an overview at a high level of abstraction**

What do we then mean by *Important success factors emerging from the Objective* and *from Stakeholders*? To know this is a prerequisite to develop a framework. In order to answer this we discuss and analyse these groups further. If we again look at Table 2, but now in the perspective of this question, we can see a pattern in each group.

- *The objective:*  
The factors in this group are mainly about having an objective that is well analysed and defined, meets business objectives and are accepted among the stakeholders. The last factor in the group, *Good selection and justification*, depends also on the resources. Resources are not a part of the foundation for this work and consequently also not this factor.
- *Stakeholders:*  
The factors in this group are mainly about involving the right stakeholders in the process, to get a positive attitude, and to take care of their needs about knowledge and confidence. The last factor about championship and committed sponsors has another focus. According to Poon and Wagner (2000) *Championship* even is a meta factor, because if a project does not have sponsorship before it is launched it should not be initiated. Procaccino et al (2001) also pay attention to this success factor, but they claim that a committed sponsor that drops out of the project has a more detrimental effect than starting without a sponsor and picking up one later. We claim that there must be commitment from the top in the target organisation if there is to be any project at all. This is also in accordance with Milis and Mercken, 2002). This commitment does not need to be the same as having a committed sponsor *in the project*. In that perspective this discussion refers to the objectives discussion; the factor *accepted objectives* includes also management.

The relationship between these two groups and the Requirements Elicitation phase is clear, exactly as we expected.

We have now discussed, analysed and grouped all identified important success factors in our literature survey. This grouping forms the foundation for our framework. Our framework should consequently take this into consideration:

## 5 Our Framework based on Important Success Factors

- To discuss what the system is, including a discussion about important and relevant subsystems, and define the system’s boundary is a prerequisite for the two groups of factors emerging from *the Objective* and *Stakeholders*.
- To get a well defined and accepted *Objective* that meets business objectives
- To get a positive attitude and to take care of the *Stakeholders’* needs in order to prepare and motivate *them* for their future participation and involvement in the information system development process.

In section 5.2 we present the framework.

### 5.2 The Framework

The aim of our framework is to give the target organisation a guide for what considerations the organisation should make before the information systems development project begins. The framework is not a method or a detailed description and should consequently be developed in a high level of abstraction. The framework is illustrated in Figure 18.

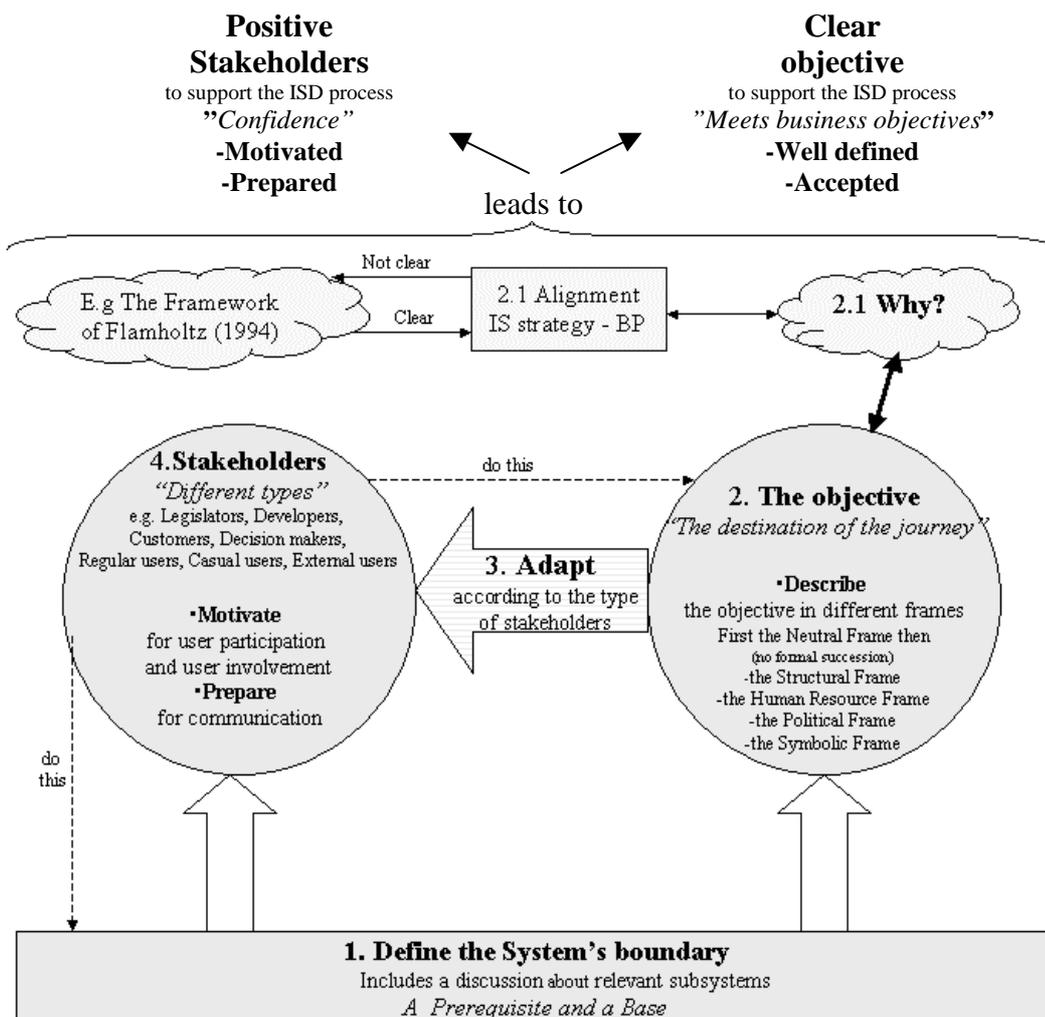


Figure 18 A Framework to support the Information Systems Development process

## 5 Our Framework based on Important Success Factors

The first thing the target organisation should do is *to define the system's boundary*. According to the definition of a system this includes also a discussion about relevant subsystems. Then it is possible to discuss and define the objective and to identify relevant stakeholders.

*The objective* should be well defined, analysed and described in different frames and levels of detail. This gives a deeper and more clear view of the destination for the journey. Also the discussion in itself makes it easier for different stakeholders to come to consensus and obtain a common view of the destination. The why level is important in each frame of this analysis. An information systems development process must have an objective that support the organisation if the process should have the possibility to result in a successful IS. Consequently, the objective must in every frame support the business objectives, the mission, which in turn prerequisite an alignment between the business plan and the IS-strategy. If the objective not clear support the business objectives and the alignment between BP and IS-strategy neither is clear, the organisation must change focus and analyse the IS-strategy of the target organisation in the view of the business mission and the BP. One way to handle this is to use the framework of Flamholtz (1994). In this context we want to remind about the factor *to define the actual stage of growth of the organisation*.

When the objective is carefully analysed and defined in all the frames and the alignment to the business mission is clear in each description the work can go on. The relevant stakeholders should now be motivated and prepared for their future participation and involvement in the information systems development process. Each group of stakeholder is probably a mix of different types. This fact should be taken into consideration both in the motivation and preparation process.

*The motivation process* should focus on the needs of the stakeholders about knowledge and confidence. By describing the objective in such a way that the individual stakeholders get knowledge about why the organisation should perform this project and how will it affect him or her, the stakeholders will also feel confidence and consequently there will be motivated and positive stakeholders. The best description according to relevant type of stakeholders should be chosen when describing the objective, all in order to motivate them. Sometimes in a complementary purpose there is a need to use more than one description for respectively group.

User participation and user involvement is in a more detail level a communication process. *The preparation process* should focus on this; i.e before the process starts up there should be education in different terms and concepts in order to make the communication easier and more effective. This is in total accordance with Browne and Ramesh (2002). This process should be adapted to the according to relevant type of stakeholders.

The motivation and preparation process aim to fulfil the stakeholders needs about confidence and knowledge about the change. This in turn will contribute to positive stakeholders and confidence which is a prerequisite for user involvement and participation and consequently for reaching user satisfaction with the developed system.

## 5 Our Framework based on Important Success Factors

We can see that using the framework results in

- a clear, well defined and accepted objective to support the information systems development process
- positive, motivated and prepared stakeholders to support the information systems development process

This is in accordance with earlier discussion and analysis about what the framework should take into consideration.

The destination, the objective, and relevant stakeholders for the development process can vary between different levels in an organisation – that is the whole organisation (the system) contra specific departments or subsidiary companies (the subsystems). In this perspective the framework can be used several times in an iterative process. First the framework is used in the whole system's point of view, then it is possible to use it according to relevant subsystem's point of view. In a subsystem's point of view the why level has to be the system's objective. If the organisation uses our framework in this iterative manner depends on a large number of factors; the complexity and heterogeneity of the organisation, the size of the project, the time resource, the need according to motivate and prepare the users and so on. A framework is on a high level of abstraction and should be adapted to actual situation. Consequently we do not discuss this further.

A framework that is not useful in practice has no real value. In chapter 6 we apply our framework to a case in order to show that it is a valuable contribution to the area of information systems development. In chapter 7 we then discuss the framework, both in general and according to the case, and we also discuss possible future work.

## 6 The Case

We start this chapter by a brief presentation of the target organisation involved in the case. Then we discuss how our framework can be a valuable contribution to their information systems development process.

### 6.1 The target Organisation: the Municipality of Vara

The municipality of Vara lies on the vast plain in the middle of Västergötland in Sweden. In the municipality of Vara there are eleven communities (Vara, 2002). Approximately 16 200 people live in the municipality of slightly more than 700 square kilometres (Vara, 2002). Agriculture still forms a large part of the local economy but in addition an industry has been established. In the municipality of Vara there are today totally over 700 enterprises (Vara, 2002).

The following account is based on discussions with representatives of the municipality of Vara. The management of the municipality of Vara consists of six parts, administrations. Each administration is then divided in a number of result-units in varying size. Each of unit has the complete responsibility and is formally autonomous. However, there is a large number of rules, paragraphs etc. that each unit has to follow, so in practice the freedom is limited. The overwhelming problem in the municipality of Vara is that the number of people on sick leave among the employees has increased very much. On the side of all the suffering, both for those who are influenced directly and indirectly, this phenomenon costs a large amount of money and the management of the municipality of Vara has to do something about it. The management of the municipality of Vara has except this total increase of people being on sick-leave also seen an increase in the group of academics and leaders of the units. This is a problem because almost everything stops when the leader is not present. One main reason for the increased number of people on sick-leave is the working environment. Each unit has less resources and the tasks that each employee has to do have increased, so the rate is – comparing to earlier years – extremely high. Another aspect referring to the working environment is that the administrative tasks have increased at business expense. Each leader of a unit is for example doing administrative tasks to a great part of their time and there is too less time for doing the “real” work. This is of course very stressing. We can state that the management of the municipality of Vara has to do something about the working environment in order to “find time” in the enterprise which can make it possible for the employees, both leaders and others, to decrease their workload and stress and – despite this – have time to do the real business tasks.

To be able to “find this time” the whole enterprise in the municipality of Vara has to be examined and analysed in order to identify which routines – and in that case how – can be changed. One thing that the management of the municipality of Vara already know is that the use of IT is extremely ineffective. For example, the same data are put in to the system several times instead of only once. The municipality of Vara needs a new IS, both with regard to IT and the IS as a whole. In other words, the whole enterprise and all routines have to be analysed and questioned according to the mission of the enterprise in order to render a more effective enterprise. For example, routines have to be examined – which routines have to be changed, which are unnecessary or can be carried out more effectively by using IT. The use of tools has to

be examined – are employees using the most effective tools or are there others that are better?

As we see it this quest for making the organisation more effective has to be accomplished in parallel at two complementary levels at least:

- Leader level: The employees must have time for the leadership tasks. The objective is that administrative tasks will take no more than 10% of their time.
- Operational level: The employees must have time to do “real work”. The work at this level also needs routines that make the work proceed even if the leader not is there.

The work towards achieving these goals has to be accomplished through a number of parallel processes. One of these sub-processes, as the management of the municipality of Vara see it, is to make it possible for each leader of the units to study their own enterprise from an “outside” perspective using dedicated project funds. This will enable them to question and analyse both their own work and the work in the whole unit. This work will be one important input to the analysis of the whole the organisation.

The aim of the municipality of Vara can be illustrated at three different levels. These levels can be compared with the levels of van Gigch (1991):

- “Why”: A perfect working environment with healthy and happy employees (which makes it possible to use all resources in the enterprise.)
- “What”: Decreasing sick leaves and creating a better working environment
- “How”: To operate the daily work effectively

To reach this aim one tool is to develop the IS. If we look at the IS as a product we can see that also here there are objectives at different levels:

- To have an IS that also supports the strategic level
- To have an IS that also supports the tactical level
- To have an IS that supports the operational level

At this time there has not yet been a decision whether to go through the project or not. The reality is that there is a couple of persons; let us call them *initiators*, that are convinced about the necessity of the project. In order to let the information systems development process has every chance of succeeding these initiators have both to get the project committed from management and to motivate and prepare other stakeholders. To develop a new IS is a long, expensive and complicated process. Its success requires a well defined and well accepted objective that supports the business vision and an approach that involves the various stakeholders. In order to make the preconditions for this information systems development process as optimal as possible and to get the project committed by management, the initiators have to make a number of considerations before the project begins; e.g. use our framework. In section 6.2 we discuss how our framework can be applied to the municipality of Vara.

## 6.2 Our Framework in the Perspective of the Case

The first thing the initiators should do is to discuss and define the system's boundary and relevant subsystems. The municipality of Vara is a large and heterogeneous organisation. The whole system and each subsystem probably do not have the same objective. In that context it is valuable to discuss if there are any subsystems that are more important than others and hence need to be further analysed. This further analysis should be made according to our framework, but by each subsystem as the whole system. It is probably not possible to identify all important subsystems at this moment, but it is important already now to concern about it in an active way.

The initiators have already a general idea about the aim of the project at a why level. The vision is to have a perfect working environment with healthy and happy employees. However, this is not enough. Now they have to discuss and analyse the objective of the municipality of Vara in different frames. They should start with the neutral frame and then there is no formal succession. Each objective description should be analysed at a why level; support the objective the business objectives, the mission. If there is any objective description that not obvious support the business objectives the alignment of BP and IS strategy has to be analysed e.g. according to the framework of Flamholtz. In the municipality of Vara the fact is that the initiators also are working on a suggested new IS strategy. It is important that this is in alignment with the business plan and that the objective of the project is supported by the business mission, business plan and IS strategy. We claim that the initiators should work this IS-strategy out before they go on with the information systems development process. Our literature survey also supports this.

When the objective analysis is finished it is time to prepare and motivate the stakeholders. In this particular case we claim that the initiators should give priority to motivate the management, because they must have a sponsorship before it is launched or it should not result in an initiation. In parallel they have to work with other relevant stakeholders in order to prepare and motivate them for project. The objective description has to be adapted to each group of stakeholders and the communication preparation should also differ according to relevant stakeholder group.

Because the municipality of Vara is so complex, their subsystems and their stakeholders have different objectives and interests etc., we claim that this analysis would not be enough. In an organisation with so widely different types of subsystems as the municipality of Vara there must also be analysis of each important subsystem. This analysis should also be done according to our framework. The stakeholders and the objective for each subsystem have to be discussed and defined in order to get a clear view. The why level can in this context be compared with the defined objective for the whole system, the whole municipality of Vara.

Our recommendation to the municipality of Vara can be summarised as follows:

**I:** Work out the IS strategy first; use e.g. our framework or the framework of Flamholtz (1994).

**II:** Use our framework in an iterative manner. The following account describes the first turn and how the other turns should begin.

1. Discuss the system's boundary. Where is the project going to happen? Which subsystems are there and are any of them more crucial than others for the success of the project. This process to identify crucial subsystems should accomplish the whole work according to our

framework. These crucial subsystems should later be analysed according to our framework. According to our discussion with the initiators we claim the education management, the schools, to be a crucial subsystem and should therefore be analysed further.

2. Discuss and analyse the objective of the project in different frames. The why level is important: Why, according to the mission of the system, is this objective important? How does it support the mission of the municipality of Vara?  
First in the neutral frame, then in the others.
3. Motivate management: Use the best objective description/s according to management.
4. Motivate and prepare relevant stakeholders: Motivate by using the best description/s according to the type of stakeholders and prepare by adapting this process to actual type of stakeholders. In the preparation process focus on relevant concepts and make cognitive constraints obvious. This process should run in parallel with point number 3.

Start from number 1 again, but let a crucial subsystem be the system. The why level must be in alignment with the objective for the whole system. We suggest to start with the school.

Repeat this as long as you have identified important subsystem that you have not analysed in a system's level.

Because the municipality of Vara is heterogeneous and complex, we claim it is of extreme importance to use this framework and the ideas of adapting the way each group of stakeholders is motivated and prepared. By first using our framework for the whole system and then for each sub-system as the initiators regarded as most important, we claim that it should be possible for the initiators to get a well defined objective and a clear alignment to the business, both for the whole system and for relevant subsystems. To allow small units to take responsibility for running themselves requires that the organisation as a whole is clear about its aim and works on a principle of shared values (Barlow and Burke, 1999). We also claim that this will make it possible to both get commitment from the top for the project and to motivate and prepare the relevant users, and to get an accepted objective. We consider in this case that it is necessary to use our framework both for the whole system and for relevant subsystems if the project should have any chance of succeeding. The initiators must have the stakeholders' confidence – have satisfied their needs as well as commitment from the top. Then the project should have the possibility to be a success. This is in accordance with the meta factors of Poon and Wagner (2000).

We have now seen that our framework could be useful in practice. The framework is at a high level of abstraction and consequently the recommendations to the municipality of Vara must be at a high level of abstraction.

## 7 Discussion

In accordance with the objectives and the aim of our research we have made an extensive literature survey focusing on important success factors. We have analysed and identified and grouped factors and then using these groups as a foundation when we have developed our framework. We claim that we have fulfilled the objectives of our research and consequently our aim.

Starting out, we stated that we wanted to give a contribution to the information systems development area. If we now analyse our framework in this perspective, we must ask ourselves if we have been successful or not. Does our framework contribute to developing successfully IS? By applying our framework on a case we have seen that it is applicable and useful, so the answer at this very moment must be yes. However, because the municipality of Vara has not yet carried out their development process we cannot be certain about this. What we can do at this moment is to discuss our framework from this “contribution” perspective.

Information systems development projects continue to fail at an alarming rate (e.g. Lyytinen and Robey, 1999). Few systems are completed on time and within budget and most studies report them as failures (Jiang et al, 2001). According to Lyytinen and Robey (1999) the reasons for this are deeply rooted in the organisation. We have also found in our research that the most important and critical success factors emerge from organisational issues. To change this negative trend there must be a learning paradigm; organisations must learn from their own experiences and not do the same mistakes over and over again (Lyytinen and Robey, 1999; Ewusi-Mensah and Przasnyski, 1995). This learning implies that the success factors are relevantly addressed and managed. We can see that we have two interrelated aspects; organisations must learn from their own experiences and they must manage success factors. We claim our framework to be a valuable contribution in this area. According to Lyytinen and Robey (1999) the organisation must become smarter and not continue to do the same failure. We concern our framework helps an organisation to be “smarter”. By using our framework an organisation will hopefully not persist in the same approach and will not continue to do the same failures. By using our framework we claim that the myths and irrational beliefs that according to Lyytinen and Robey (1999) teach the organisation to fail will be questioned and one step towards a smarter organisation should be taken.

Our framework is based on important and critical success factors. An awareness of these factors early on in the systems development process makes it possible to do more effective and efficient project adjustments (Procaccino et al, 2001). Our framework aims to prepare and take care of these factors early, already before the development process begins. To manage important success factors is one key determinant of the ultimate success of an information system. A conclusion must be that our framework is a valuable contribution to the process of developing successful IS. Our case supports this statement.

The framework stresses the stakeholders and the objective. According to our literature survey the stakeholders and the objective are also important dimensions to Requirements Elicitation. This is in accordance with our expectations that we should find a number of important success factors in this phase. Consequently, the question is brought up again whether our framework is a part of the development process or if it takes place before the development phase begins. We still consider it not to be interesting if our framework is a part of the process or not. Our case has even shown

that the framework can be used before there is a decision about performing the project. The main issue is that the target organisation uses our framework and derives advantage from it. If the stakeholders and the objective are important dimensions also to Requirements Elicitation does our framework then contribute with anything new? We claim that it contributes with a new approach, a new point of view, that is not available today. From that point of view we can state that it is a valuable contribution irrespective of whether the target organisation uses it before the development process takes place or during the process.

The framework concerns information systems development in general. We claim it to be useful in all types of projects, but it should be adapted depending on situation, organisation, size of project and complexity. When the target organisation is complex and heterogeneous we suggest to use it in an iterative manner: First the whole organisation has to be analysed and then relevant and important subsystems, perhaps also subsystems to the subsystems etc. We also claim that our framework, as in our case, can be used by initiators before a decision to perform a project is made. In that case it can be regarded as a tool in order to get commitment for a project. Consequently, the framework can be used by stakeholders that for different reasons are convinced that an information systems development project is necessary. Often these stakeholders are in management position in an organisation, but this is not a prerequisite. In this area by discussing who and when our framework can be used, we want to point to the fact that we concern it to be useful even when the project is about developing a new IS strategy. An IS strategy should support the business mission and be well defined and accepted by relevant stakeholders. This is in alignment with our framework.

Our research stresses the central meaning of the objective, the destination of the journey. In this context we have noticed a difference between literature in the information systems development area compared to literature in the area of organisational change. With a few exceptions, e.g. Bubenko (1993), the literature in the information systems development process address the objective at a detailed level, it discusses the requirements. The requirements are of crucial important if there is to be a successful IS, but we claim that the objective of the complete IS must be analysed first. It is close to impossible to define relevant sub-goals if the main goal is not identified. By directly analysing the objectives at a more detailed level, requirement level, we concern there is a great danger that the meta level is missed, the why level. We also concern there is a risk that even if each objective, requirement, is well defined and accepted, there is no consensus about the whole IS, or there is even no whole at all.

Our framework does not explicitly take into consideration the political aspects of an organisation. However, we claim that in an implicit way it does. By discussing, analysing and describing the target organisation in different frames these aspects will also be mapped, particularly by using the political aspect. We claim that in a framework with our focus and at that level of abstraction, it is not valuable to take this aspect into consideration at a more detailed level.

By developing this framework further, research questions belonging to the framework have come up. These questions are described in the section about future research.

## 7.1 Future Research

Future research will most likely follow two main courses:

- Field and case studies in order to thoroughly test the framework
- Research that examines and analyses parts of the framework at a more detailed level in order to develop guidelines or methods to guide the target organisation.

### **Field and Case studies:**

Our framework should be used and tested in practice. This can be done in different complementary ways:

- A case, e.g. the municipality of Vara, should be followed through their whole information systems development process, from using our framework to the implementation, in order to examine the effects of the framework on the process. It is desirable to have another similar case not using our framework as a reference.
- An inquiry examining how experienced stakeholders in the area of information systems development interpret the framework, their opinions about it can be used for potential improvements.
- There are a number of case studies in the information systems development area. Most of these studies report development projects as failures. Analysis in order to investigate our framework according to some of these case studies should also provide information about how our framework could be used in reality. One useful case study in this area is done by Sarker and Lee (1999).

### **Research that examines and analyses parts of the framework:**

At a more detailed level our framework offers a large number of interesting research questions. These questions will in turn further improve our framework if they are satisfactorily answered.

- Leadership styles and their influence on our framework: E.g. Vroom (2000) discusses different leadership styles and their influence on the decision, both the decision process and the decision itself. We n it to be valuable to examine our framework in this view: How do different leadership styles influence the framework and its outcomes? Is any style “better” than another?
- The organisation and the objective should be analysed in different frames and related to the business mission, the business objectives. This is the what and why levels. How should this analysis be done? To examine this how level would be a valuable contribution to our framework and consequently to the information systems development process.
- The stakeholders are central in our framework. Also here the how level needs to be further examined. How do we identify the relevant stakeholders? To work out guidelines in order to help the target organisation in this work is an important research topic.

## 7 Discussion

- Groups of stakeholders are often heterogeneous groups. To examine stakeholders and different constellations of them in the perspective of our research would be interesting and valuable. Perhaps this could result in new stakeholders groups being incorporated into the framework.
- The stakeholders should be prepared according to our framework. How should this process look like at a more detailed level, i.e. in the how level.

All research that can be done in order to test, complement and develop the framework is valuable because it will in turn contribute to developing successful IS.

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## Appendix 1

### Acquire Packaged software

Packaged software can be regarded as a packaged solution and is in reality an existing IS which already has been used (Brandt et al 1998). We concern that Brandt et al (1998) mean “an existing *software*”. Packaged software is built up by more or less complete software which can be used immediately in contrast to system developed in-house which has to be built up from the very beginning (Andersen, 1994; Andersson and Nilsson, 1998). Software packages encapsulate the supplier’s reusable best business process and software, customers purchase the package and then adapt it in order to fit their own organisation (Krumholz and Maiden, 2000). The system offers its own working model irrespective of whether it fits the actual organisation or not (Beyer and Holzblatt, 1998). Often there is a mismatch and the customer has to change its own processes. According to Krumholz and Maiden (2000) the change both impacts the organisational culture and is constrained by it. This is a main reason why many package software projects are expensive and late (Krumholz and Maiden 2001). We can state that this factor, *the relationship between the customer’s culture and the supplier’s culture*, is important to take into consideration when acquisition software packages. The importance of *the organisational culture* is also discussed in the context of a successful system. In addition to this social aspect there is also a technical aspect belonging to the environment of the customer and supplier. Packaged software can run in different technical environments but very often belongs to special platforms (Andersson and Nilsson, 1998). This technical environment is another important factor to take into consideration when purchasing packaged software.

Before an organisation can purchase packaged software there has to be a process when packaged softwares have to be examined according to different factors or criteria (Brandt et al, 1998). Brandt et al (1998) mention both factors belonging to the packaged software itself and to the environment. For the packaged software itself it is according to Brandt et al (1998) important to analyse technology (for example operating system), application (for example functions) and the product in general (for example the documentation). For the environment Brandt et al (1998) discuss the supplier’s environment, for example service and support. According to our discussion above we want to stress both the importance of the organisational culture and technical environment. Brandt et al (1998) have made a checklist on a more detailed level according to the factors belonging to the supplier’s environment and the product in general. This list can be found in Brandt et al (1998) p.113. We claim that an organisation should take these factors in account when it is going to buy packaged software. We also concern that already before the acquisition process begins the organisation should reflect on these factors. The reason for this is that we concern – even if the factors more belong to the real purchasing of the packaged software – these factors limit and influence the whole development process. Because of this it is very important that the organisation already before the development process starts up is aware of and reflects over these factors. The aim of our research is to identify important factors in order find out what work has to be done precede the development process. Even if this is in a more detailed level compared to our framework, we concern this to be an important contribution.

Packaged software can be grouped and classified according to different criteria or factors. The choice of factor will determine the outcome of analysing a system. Packaged softwares can be grouped according to

## Appendix 1

- *Freedom:*  
The possibilities of the users have to adjust the packaged software in order to meet their needs (Andersen, 1994; Brandt et al, 1998). This factor we concern is in the area of the organisational culture discussed above.
- *Governing or following the way of working in the organisation:*  
The degree to which the system governs or follows the way of working in the organisation (Andersson and Nilsson, 1998). According to Andersson and Nilsson (1998) this reflects two different implementation philosophies on the part of the suppliers. This factor we concern is in the area of the organisational culture discussed above.
- *Accessibility in the market:*  
How the packaged software is accessible in the market and how it can be acquired (Andersson and Nilsson, 1998).

We consider an organisation also should take these factors into account when acquisition packaged software. The organisation should reflect on them already before the development process starts. The reason for this is the same that we have discussed, namely that we consider these factors to limit and influence the whole development process.

We have now identified the some important success factors when packaged softwares are going to be acquired. As we mentioned earlier Brandt et al (1998) have divided their identified factors in two main groups, the environment and the packaged software itself. As we see it the identified factors are on different levels of detail. We concern it is possible to use Brandt et al (1998) two main groups and split all the factors above in these two groups. By dividing the aspects in two main groups it is more obvious what type of factors we are talking about and the holistic view is clearer. It is also easier to recall the factors above if delivered in only two groups (Baddeley, 1999).

Factors that affects the purchase of the software packages:

- **The environment:** *To analyse*
  - the organisational culture of the supplier and customer
  - the technical environment of the supplier and customer
  - the service and support from the supplier
  - the accessibility in the market
- **The product:** *To analyse*
  - the application
  - the product in general
  - the possibilities of the users have to adjust the packaged software
  
  - the degree to which the system governs or follows the way of working in the organisation

The two last factors in the product group are implicitly included in the environment group. We consider they corresponds to the organisational culture.

## Appendix 1

In a high level of abstraction we claim that there are only two important success factors when acquire a packaged system:

- *To analyse the environemnt in different aspects*
- *To analyse the product in different aspects*

The other factors above can be regarded as different aspects of these two important factors. Before the information system development process begins it could be valuable to investigate the market according to these factors in order to early identify what relevant suppliers of software package that are available in the market.