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IDENTIFYING SITUATIONAL FACTORS FOR IS DEVELOPMENT PROCESSES: APPLYING THE METHOD-IN-ACTION FRAMEWORK

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Abstract

There are a large number of Information Systems Engineering methods available. The aim of these methods is to support the development process. In doing so, they become subject to the forces, which have an impact on the development process. The paper applies the method-in-action framework on four different cases in order to describe the adaptations, which are made when utilising a method. The situational factors and methodological issues identified in this project show that *the method-in-action framework may be used in order to extend the area of use for situational factors. We have also identified some factors, which supplement the characteristics of the sets of factors in the method-in-action framework.*

Introduction

The overall aim of this paper is to describe the Information Systems Engineering (ISE) process in general and to describe and analyse some of the forces, which have an impact on how the process is carried out. These critical success factors have to be managed within the project. There are a large number of ISE methods available. The aim of these methods is to support the development process. The ISE method chosen may be perceived as a means for managing the project and most ISE methods contain some kind of project management workflow. In fact it has been proposed that IS-project management method may a better name than IS-development method (Fitzgerald, 2001). During its application the method becomes subject to the factors, which have an impact on the development process. The concept of method may be described in various ways. We have identified a number of definitions, which will be briefly described and merged into an understanding of the concept of method to be used in this research project. The general understanding is that the development process is supported by a method. In order to further investigate this we will:

a) describe how methods are assembled and adapted to form the actual development process, and
b) apply the method-in-action framework (Fitzgerald, 1998) in order to classify and describe a set of forces, which were identified in four empirical studies.

The application of a method is dependent on and adapted to the situation in which it is used. Brinkkemper et al. (1998) and Fitzgerald (1998) claim that IS methodologies are not effectively applied in real world development projects. The application of a methodology must be adapted to the actual situation of use. Fitzgerald (1998) refers to this as 'method-in-action' whereas Brinkkemper et al. (1998) and Ralyté & Rolland (2001) term it 'Situational Method Engineering' (SME). In SME methods are constructed by assembling reusable method chunks. The common notion of these approaches is that methodologies need to be tailored in order to fit the situation at hand. Furthermore, there is the question of selecting the right method component for a certain situation. In order to select the situation needs to be characterised. These characteristics have been termed situational factors in e.g. (Euromethod, 1996; Persson 2001; Stirna 2001).

In the paper, four case studies describe the development process in three different companies and in one development project within a virtual cooperation project. The four cases will be presented with respect to what the project managers identified to be the most influential factors, which have an impact on the development process.

The remainder of the paper is organised as follows: Firstly, the method-in-action framework is briefly presented. Secondly, the four cases are described. Finally, the method-in-action framework is applied to the cases described and some concluding remarks are presented.

Theoretical Background

Information systems have to be developed and then maintained throughout the entire life cycle. This process is referred to as Information Systems Engineering (ISE). ISE requires many different competencies, such as knowledge of: organisational issues, computer science, economics, cognitive science, mathematics, and logics. The life cycle of a system can (roughly) be described in the following terms (Alter, 1999):

- Initiation – This is the process of defining the need of change in an existing system.
- Development – The development process consists of acquiring and configuring the hardware, software, and other resources necessary to implement the IS.
- Implementation – This process aims to make the IS operational in the organisation.
- Operation and maintenance – This phase is the ongoing operation of the IS. Operation and maintenance require that someone see to it that the system operates according to the needs of the organisation. There is also a matter of managing the changes that new demands from the organisation impose on the IS.

There are a number of methods, which aim at supporting the process of developing information systems. They typically have a great deal in common but they may stress different aspects of the development process and the system to be developed.

The concept of method-in-action as presented by (Fitzgerald, 2001; Fitzgerald, 1996; Fitzgerald, 1997; Fitzgerald, 1998) provides one way to describe how methods are used. Fitzgerald (1996) discusses the application of a formalised method (in the sense of a brand-named or published development methodology) and states that method usage is rather to be described in terms of method-in-action since developers and developing organisations use methods in different ways. This is described in the "Framework for ISD Method-in-Action" (Fitzgerald, 1996).

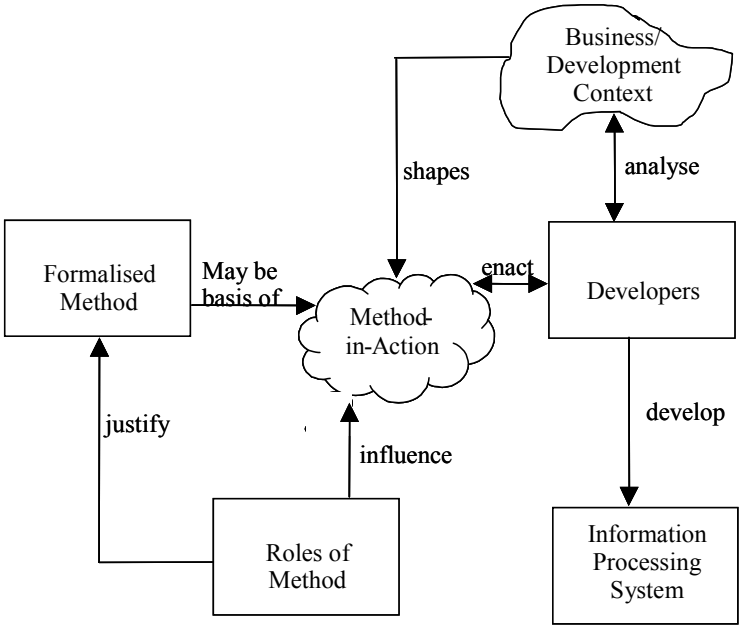

Figure 1. The Method-in-Action Framework (From Fitzgerald 2001)

Figure 1 gives an overview of the method-in-action framework. The framework is aimed to facilitate the understanding of practice. As can be seen, method usage is influenced by a number of different types of factors, one of which is the formalised method (Fitzgerald, 2001):

- *Business/Development Context:* There are a number of factors within the business context, which shapes the process carried out. One important such factor is over-riding policies, e.g. certain software must be used. There is also the question of productivity versus rigour and the implication of certain project profiles (e.g. maximum 6 months project time). Furthermore, there are 'over-riding policies' in the method market, i.e. customers may require a certain method to be used

- *Developers:* The concept of developers includes the actual developers as well as the clients and users. Different people have different skills and capabilities, which has an impact on their performance. These factors include technical skills and experience as well as commitment and motivation.

- *Information Processing System:* This item concerns the actual IS developed. We have to recognise that ISE is fundamentally concerned with technology. There are different families of systems, e.g. safety critical systems, 'bread and butter systems', and unique high-tech systems. They all call for different capabilities and project structures.

- *Formalised Method:* The concept of formalised method is not to be confused with formal methods. Formalised methods are commercial and/or brand named methods, e.g. SSADM (Weaver et al., 1998).

- *Roles of Method:* The roles of the method can be classified into two different sets: rational and political. The rational roles are to facilitate project management by improving visibility and reducing risks. Another important feature is to divide labour between project participants. Furthermore, methods may serve as a means to standardise knowledge and reduce complexity. The political role of a method (why do we actually use methods) is to serve as a comfort and legitimacy factor, e.g. CMM (Paulk et al., 1993).

- *Method-in-Action:* The method-in-action is always uniquely enacted depending on the different situations that arise, different developers, and other situation dependent factors.

Euromethod (1996, p. 141) defines *situational factors* as " those properties of the problem situation that can be used to determine the most appropriate problem solving strategy. This includes those properties that can have an impact on the type of uncertain events which may occur and their adverse consequences." The situational factors are classified into the two dimensions: domain factors and knowledge factors. Furthermore, the domain factors are divided into two categories *target* (i.e. the organisation for which the IS should be adapted, further divided into information system and computer system.) and *project* (i.e. the organisation which performs the adaptation of the IS). These two dimensions correspond to the concepts of business/development context, developers, and information processing system in the method-in-action framework.

The concept of knowledge has two characteristics in Euromethod (1996): complexity and uncertainty. Complexity is regarded as the difficulty encountered in managing the available knowledge. Whereas uncertainty is regarded as lack of knowledge.

In order to provide a better idea of the notion of situational factors some examples are listed (Euromethod, 1996).

- Examples of target domain factors (information system): complexity of business process, complexity of information, strategic importance, attitude of actors, and ability of actors.

- Examples of target domain factors (computer system): complexity of data, novelty of target domain technology, and complexity of computerised functions.

- Examples of project domain factors: size of project, number of sub-contractors, number of project actors, and complexity of development technology.

Four Cases

In this section we will present a resume of three cases representing three different development processes and one case carried out by the author within a joint project between a major Swedish research institute, a number of companies within the electronic business, and the Department of Computer Science at our university.

The work done in the joint project, AIS 5[1] – further described and analysed in Backlund and Strand (2002), may be described as action research in which the author took on the roles of systems analyst and part time project manager. The findings in this project needs to be contrasted to knowledge about other development processes. This was done in the three interviews, which form a convenient sample since they represent the processes of two IT consultancy companies and one in-house development process. The interviews and the findings from the AIS 5 project complement each other.

[1]"Implementering av BGA, CSP och Flip-Chip - AIS 5 is a joint project between the Swedish Industrial Research and Development Corporation (IVF), the department of Computer Science at the University of Skövde, and a number of companies within the electronic circuit industry: Parker Hannifin AB, Elektronikpartner AB, Digital Vision Sweden AB, Norrtelje Elektronik AB, Flextronics International Systems AB, and PartnerTech AB. The project is financed by NUTEK.

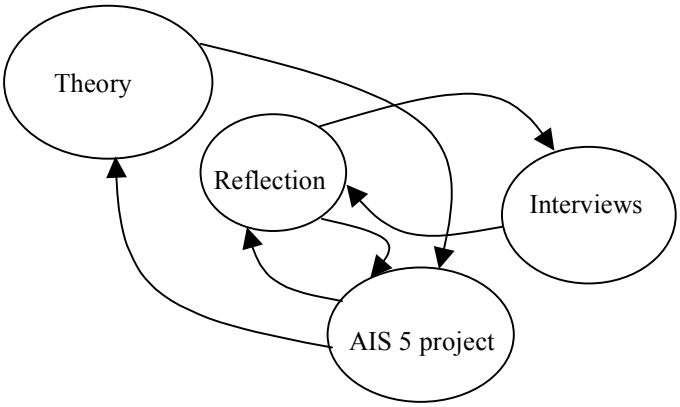

Figure 2. An Overview of the Theory-Action Cycle of Action Research in the AIS 5 Project, Complemented bythe Interviews (Adapted from Stowell et al. 1997)

The interviews were conducted as semi-structured interviews with the aim to gather qualitative data about the actual development processes at the different locations and what influential factors were considered important.

The use of action research in the field of information systems is discussed in Stowell et al. (1997). Action research provides a means of eliciting knowledge about the development process at the same time as domain knowledge is elicited within the project. The data presented was collected during project meetings, work sessions, and by using unstructured interviews. These means of collecting data may constitute a risk for bias. However, we have been aware of this risk and tried to balance them in ongoing discussions about the project and by performing interviews which complement the findings. An overview of the research process is presented in Figure 2. The interviews were recorded and transcribed in order to allow for content analysis.

Case 1: An International IT Consultancy Company

The process described in this section is used within a worldwide IT consultancy company. The forces and the adaptations were identified when interviewing a project manager with three years of experience in the firm. The interviewee has a background in process development, business development and in managing the implementation and adaptation of off-the-shelf systems. Currently the interviewee is working as a project manager. The interviewee is also responsible for a team of project managers. In Phase 0 the project is established, standards are decided upon, the technical environment is set, and the overall requirements are identified. The result of this phase is a set of requirements, which are to be coded. No coding is done in Phase 0.

Phase 1 and Phase 2 consist of a number of pilots. In Pilot 1 the overall requirements from Phase 0 are specified and the development work is started. The following Pilots implement functions. A pilot is normally estimated to last for 8 – 10 weeks. If the timeframe is broken unimplemented requirements are either postponed to another pilot or cancelled. The stipulated time is never changed. Figure 3 provides an overview of the process described.

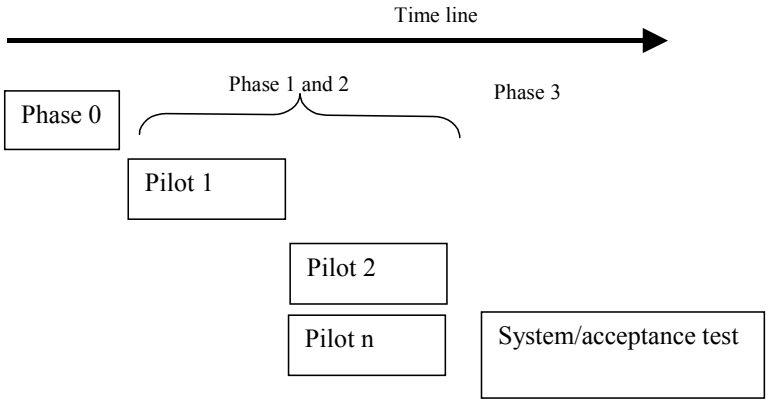

Figure 3. An Overview of the Development Process of a Major International IT Consultant

Case 2: The IT Department of a Large Manufacturing Company

The process described in this section is used within a large international manufacturing company. The forces and adaptations were identified in an interview with a person who works at the IT department as the responsible person for supplying developers with methodologies. The interviewee also works in different development projects. The ambition is to take on different roles in projects in order to get a good overview of the development process.

The interviewee made a distinction between model and method. The model is used to describe *what* is done and the method describes *how* something is done. When activities are added in order to describe the course of action the notion of process is used, i.e. a process constitutes of both model and method. There are four models: the project management model, the infrastructure model, the system administration model, and the early phases analysis model. Rational Unified Process (RUP) (e.g. Kruchten, 2000) is described as a model for application development. Figure 4 gives an overview of how the models are related to each other.

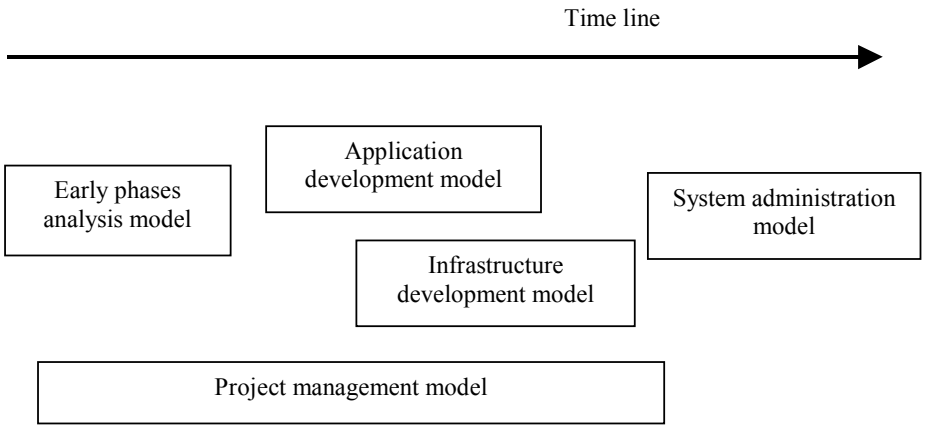

Figure 4. An Overview of the Development Process of the Large International Manufacturing Company

steps for system termination included in the system administration model.

The first step after an inquiry for a project is to conduct a pre-study. If the project is estimated to be larger than 400 hours it has to be mapped to the project management model, meaning that it is officially termed a 'project'. An important aspect of the project management model is the system of 'gates'. It is a system of checklists, which are used to decide on how to proceed. If the goal is to develop an application, RUP will be used as a model for doing this. The infrastructure development model is used to build the infrastructure and to roll out the application. After the roll-out there is a switch from the project management model to the system administration model. There are also

Case 3: A Swedish IT Consultancy Company

The process described in this section is used within a Swedish IT consultancy company. The company has its focus on Engineering consulting. There are also departments for IT support for construction systems (e.g. CAD), telematics, and technical information. The interviewee has a background in advertising and media and is responsible for the area of technical information. The interviewee also works as a project manager in multimedia projects.

The company has its own in-house method for IT projects. Since there is a focus on engineering, the method is described as a technical engineering method to be used in vastly different areas. The method has five phases: project handover, project start, implementation, hand over to customer, and project termination.

A project starts with the *project handover*. In this phase a project folder is started and the initial documents are created. During the *project start* phase the project manager goes through a number of checklists for setting up the project. This is a large phase in which the analysis work is done. A time and resource plan is set up, goal descriptions are made, a risk assessment is done, a requirements specification is created, and environmental aspects are considered. The *implementation phase* consists of ongoing development (which was not described in detail during the interview) and regular meetings with the customer. All work is to be documented by the performer. The implementation phase is tightly integrated with the *hand over to customer* phase, in which the result is to be physically handed over to the customer, may it be in the form of a folder or a web solution. A walkthrough of the project is carried out in order to ensure quality, and systems tests may be performed if necessary. The final phase, *project termination*, includes a number of administrative tasks and closing down of accounts. An overview of the phases is presented in Figure 5.

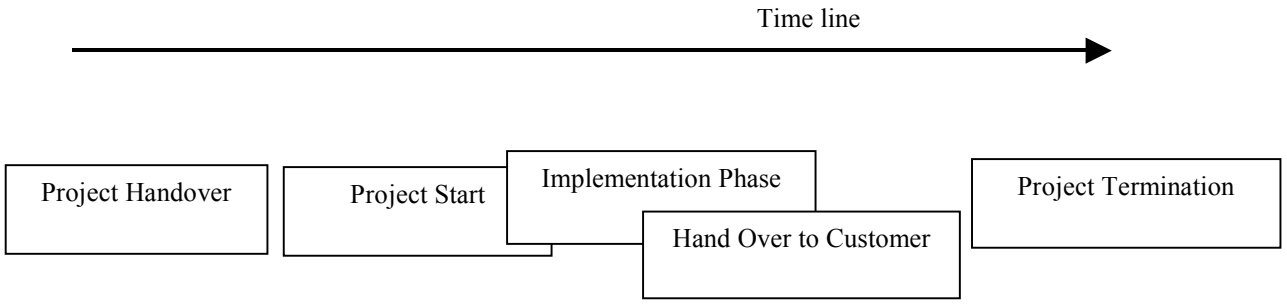

Figure 5. An Overview of the Phases of the Development Process of a Swedish it Consulting Firm

Case 4: An Inter Organisational Development Project

The process implements a web-based information system for a virtual organization consisting of members from various companies within the electronic components industry. The target domain is a virtual organization for developing and manufacturing of electronic components. The manufacturing process covers stages from initial product development to large volume manufacturing. Different companies typically carry out different stages in the process. The participants may compete in some situations and cooperate in other.

The initiation of the development process came from a major Swedish research institute (Figure 6 gives an overview of the whole process). The first step after initiating the project was to make a feasibility study, which resulted in a report with two versions. One version was intended for the actual company and included a more thorough SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis and the other version was a more general description, which was aimed for the entire virtual organisation. The research institute had, at an early stage, presented a process map, which was intended to form a basis for the knowledge managing system (the term used by the research institute) to be.

The aim of the prototype was to create a database into which suppliers' component data could be stored and linked to the manufacturers' knowledge about assembling them.

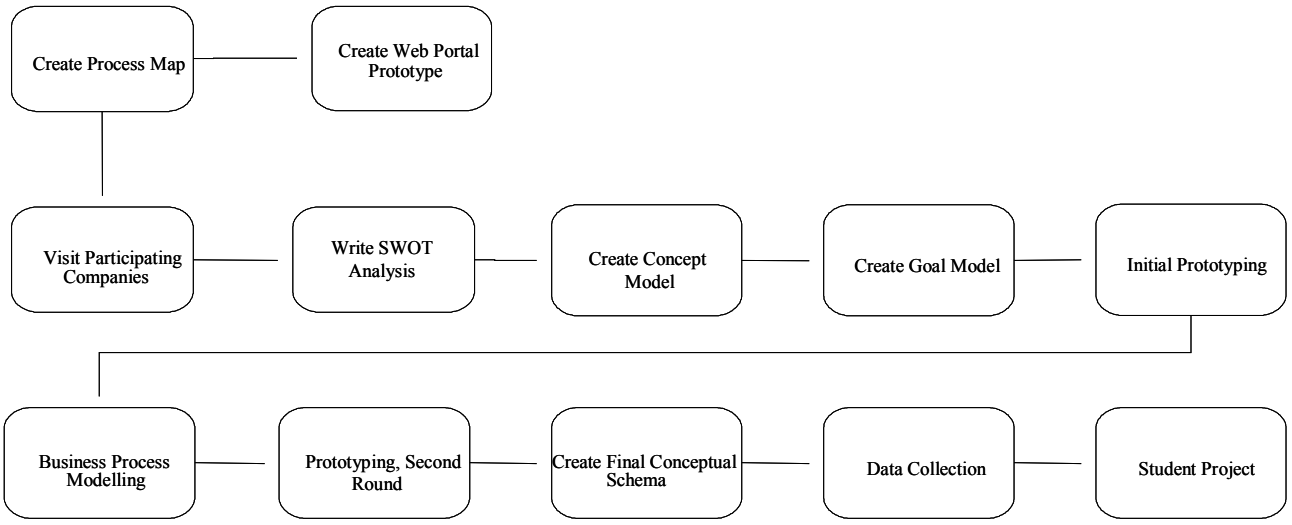

Figure 6. A Process Model of an Inter-Organisational Project

During the project there was a constant negotiation process concerning who should do what in the project. These negotiations were performed within the project as a whole or in the form of bi-lateral negotiations between project participants. Tasks were typically divided and then renegotiated, which lead to a number of delays. One such example was the collection of data from the industrial participants.

Situational Factors

In this section the method-in-action framework will be applied on the findings from the cases and the situational factors identified in the cases will be mapped to the method-in-action framework. Some initial conclusions concerning the situational factors will also be presented. An overview of the situational factors is found in Table 1. The first column indicates the factor as identified in the transcribed interviews and the following columns indicate the case(s) in which it was found.

A comparison to the classification of situational factors identified in Euromethod (1996) was made in order to map that classification to the method-in-action framework. The comparison showed that the target factors and domain factors corresponded to business/development context, developers, and information processing system in the method-in-action framework. Hence we have extended the possibility to classify factors concerning the formalised method and the role of the method. Furthermore, the method-in-action allows for the possibility to describe how different factors affect the method in action.

Table 1. Situational Factors Mapped to the Method-in-Action Framework

Business / Development Context	**Case 1**	**Case 2**	**Case 3**	**Case 4**
Lack of formulated requirements	x			x
Availability of key persons with domain knowledge	x	x		x
Project carried out within the own organisation			x	
Project carried out in customers organisation	x		x	
Project carried out in multi organisational context				x
Shareable data and knowledge				x
Methodological interest and knowledge of client organisation			x	
Resources of client organisation	x	x		
Current processes within the developing organisation		x		
Development tools		x		
Renegotiation of goals and tasks				x
Pressure to see tangible results				x
Preconceived notions of the system to be				x
Hidden agendas	x			x
Information Processing System				
Type of system to be developed		x		
Maintaining existing systems		x		
Further development of existing systems		x		
Knowledge of existing system		x		
Developers				
The number of developers.	x	x	x	
Availability and skill of developers.	x	x		
Accessibility of key persons	x	x		x
The role of the project manager	x	x	x	
People outside of the project who want to have a say	x			
Recruitment and termination of consultants	x			
Personal networks	x	x	x	x
Possibility to further develop competencies		x		
Analysts' domain knowledge		x		
Ability of domain experts to generalise their knowledge	x			
Formalised Method				
Trends on method market	x	x	x	
Roles of Method				
Involve people in the creation of new processes.		x	x	

Business/Development Context: The business context is described in terms of a lack of formulated requirements. One of the cases shows that there is a constant negotiation on requirements and goals. There are typically restrictions on the availability of key persons with domain knowledge, mainly due to the resources that the participants are to spend. However, efficient and effective cooperation with domain experts is crucial. One of the interviewees described a situation where domain experts outside the project constituted a threat to the project. This was described as a problem with which the customer had to deal. The interviews also showed other situations in which it is important to bring problems to the surface (e.g. documenting disputes on requirements). The cases constitute three types of contexts, all containing different problems to be dealt with. ISE projects may be carried out within the organisation itself, in a customers' organisation, or as virtual organisation projects involving various companies and organisations. In the latter case we found that there is a need to deal with potential hidden agendas pertaining to the participating organisations. Companies that compete in some situations and cooperate in other may also constitute a virtual organisation, which leads to situations in which it is not clear whether data and knowledge was sharable or not. Furthermore, there is a risk to the project if the main reason for participating is to establish business contacts. This may lead to difficulties in formulating common goals and preserving the virtual organisation.

Information Processing System: The interviewees also stressed the importance of networks for technical competencies in relation to different types of systems. The responses also indicate that the participation in user communities and expos is considered important. One of the responses indicates problems in applying the same method in different types of projects, since the method tends to become too general in order to fit all situations. There are different needs when developing e.g. a business system compared to a manufacturing robot lane.

Developers: The concept of developers includes the actual developers as well as the clients and users. It is important to have access to people with domain knowledge. However, it is not always the case that the domain experts have the ability to generalise beyond their own situation and see the organisational use of the developed system. There are issues such as hidden agendas, which may have an effect on how people act. There is also a need to balance the contributions and benefits on behalf of all participants, especially when working in inter-organisational projects.

The availability and skill of the developers play an important role. There is a need to deal with recruiting and phasing out developers within a project. Furthermore, there is a need to be aware of broader issues, concerning the organisation as a whole, when staffing a project, e.g. how to involve less experienced developers and provide interesting challenges for skilled developers. All interviewees stressed the importance of personal networks for knowledge sharing. These networks are perceived as more important than formalised solutions for knowledge sharing such as best practices databases.

Formalised Method: One important factor concerning the formalised methods used is the trends on the method market. The interviewees frequently referred to RUP as some sort of industry standard. One of the interviewees actually described the in-house method of the company as being similar to RUP.

Roles of Method: Two of the interviewees claimed the importance of having developers involved in the creation of new processes. The utilisation of a method does not only mean adhering to it, but also further developing it and improving it. A number of the responses stress the importance of developers participating in the process of method improvement, be it in the large or in making small local adaptations and standards.

Method-in-Action: There is an ongoing negotiation of goals and tasks during the development process, which has to be dealt with. Some of the responses indicate that this is done to some extent and that it is very important to make changes explicit and to document them.

There may be differences in the interest taken in methodological issues on behalf of the customer. One of the interviewees described a span from no interest at all, in which case the in-house methodology is applied, to explicit demands on using a certain methodology. This issue was not perceived as a major problem. Sometimes there are demands to see tangible results of the development process. This fact may push for more prototyping as early as possible in the process. One major reason for this pressure was a need to motivate resources spent on the project within the own company. This pressure was combined with preconceived notions of the system to be. However, the ideas clashed and there was a situation of conflicting goals.

Methodological Considerations and Adaptations

In this section we present the methodological factors identified in the interviews. We will also draw some initial conclusions concerning methodological issues from the material presented. An overview of the methodological considerations and adaptations is found in Table 2.

Business/Development Context: We found that there are demands for the adoption of certain methods, be it an in-house method of a customer or a commercial method such as RUP. This corresponds to the notion of over-riding policies as described by Fitzgerald (2001). One of the interviewees described the method of the firm as 'RUP-like'. However, the demands of the customers are important and it is easier to describe a well-known commercial method to them. In fact, one of the interviewees described RUP as an emerging de facto standard for system development. However, the interviewee described situations in which RUP needs to be tailored and complemented by the company's in-house models. These issues are important to consider when implementing new processes.

Information Processing System: Different types of systems call for different development processes. The interviewees described local adaptations as well as project specific adaptations of the development process. One of the interviewees would like to see different configurations of the methodology for different types of projects, e.g. one configuration for maintenance and one configuration for developing small business systems.

Table 2. Methodological Factors Mapped to the Method-in-action Framework

Business / Development Context	**Case 1**	**Case 2**	**Case 3**	**Case 4**
Methodological de facto standards	x	x	x	
Change vs. no change of time plan	x		x	
Number of Pilots and workshops	x			
Dealing with changing requirements	x			x
Take increments into operation	x			
Demands for certain method	x		x	
Information Processing System				
Method configurations for different types of systems		x		
Developers	**Case 1**	**Case 2**	**Case 3**	**Case 4**
Spread and share knowledge within the organisation	x	x	x	
Acquire knowledge		x		
Possibility to have influence on the process		x	x	
Willingness to adhere to methodology		x		
Formalised Method				
A Scandinavian version of the method	x			
Cooperation with method vendors		x		
Cooperation with universities		x		
Need for different configurations		x		
Method toolbox		x		x
Roles of Method				
Select and adapt method components		x		
Planning and identification of potential problems.			x	
Feed back knowledge by e.g. best practices	x	x	x	
Make knowledge explicit			x	
Ensure quality	x		x	
Coordination of large projects	x	x		
Reuse knowledge within the organisation	x	x		

Developers: Two of the interviewees stressed the importance of having the developers involved in developing the work processes. There is a need to recognise that people are different and you cannot expect to successfully impose methodologies on people against their own will.

The method may be considered as a means to manage knowledge about the development process. One of the interviewees described the importance of formalised processes in order to satisfy the interest of the organisation to have a certain amount of control over its development process. Another important issue may be the need to institutionalise knowledge in order not to become dependent on individuals.

Ideally, the formalised method should serve as a means to spread and share knowledge within the organisation. The interviewees described a willingness to contribute to the knowledge base in terms of best practices and experience reports. However, the responses indicate that personal networks and personal communication is a more important way of knowledge transfer.

Formalised Method: The development method may be perceived as a means for managing knowledge about the development process. The method is described in terms of best practices, model types, and checklists. All interviewees described that their organisation used one or more formalised methods. The utilisation of a method typically means selecting parts of it in a toolbox manner. There are processes for sharing best practices and experiences, which are typically based on the project managers' reports from finished projects. However, it is unclear to which extent these documents are used afterwards. Some of the responses indicate that personal networks are important in managing this type of knowledge as well.

The interviewees also described 'method development' in terms of local adaptations of formalised methodologies as a means of improving the development process. The cooperation with method vendors and universities are some other means of achieving this.

Roles of Method: The method is primarily described as useful in large projects in which there is a need for coordination of resources. The utilisation of a formalised method is described as less important in small projects. However, one of the interviewees stressed the organisational use for formalised methods in the sense that documentation and processes may become less dependent on individual co-workers. The formalised method is also perceived as an integrated part of the quality assurance system. It is important to follow it since most projects are subject to quality revisions.

Method-in-Action: Even though the same method is used in various projects it is always uniquely enacted. The actual process is shaped by the factors described above. One of the interviewees described how strategies may vary between projects with regard to dealing with changing requirements and decisions on how to take increments into operation during project run time. The method is the same but it is used / enacted in different ways. We found two different ways of dealing with changing time plans. One interviewee described the change of time plan as one of the most common adjustments made within a project, whereas another interviewee described the time plan (for a pilot) as unchangeable.

The method, to its largest extent, provides support for explicit knowledge[2]. However the development process is not only shaped by the method, there are other factors, which have an impact on the process as well as on the application of the method. The project manager has to deal with these factors based on his/her experience, i.e. the application of a method and the ability to deal with the factors is a question of tacit knowledge. In order to provide better process support there is a need to make this tacit knowledge explicit. One interviewee made a clear distinction between what is to be done and how it is to be done. When the activities that describe the course of action are added, we end up with the actual development process. This view means that the utilisation of a method is always a matter of selecting and adapting parts of it in a particular situation of use.

Some of the responses indicate that organisations keep parts of their current processes and adapt parts of new commercial methods. These adaptations are typically made where the commercial methods are considered weak in some aspect. One of the interviewees described how the in-house processes for early analysis and infrastructure development complements RUP, since RUP has been considered weak in these aspects. The solution to this problem was to keep the existing processes for these phases. In this sense there is a specific company standard for rolling out applications.

Planning and identifying potential problems is described as crucial and the method should support these activities. One of the interviewees considered experience as an important factor in foreseeing problems and bringing them to the surface, i.e. a better knowledge in applying the method. One of the interviewees identified experience as an ability to see potential pitfalls. This ability may be hard to make explicit within a method since it is a question of the personal potential to apply the method.

Concluding Remarks

There has been some work done in identifying and listing situational factors. In this paper the method-in-action framework has been used to classify some situational factors with respect their impact on different aspects of IS development. However there is a need for more work on *how* these factors can be *identified* and *measured*. Euromethod (1996) propose scales for: complexity {simple, moderate, complex} and uncertainty {certain, moderate, uncertain}. A future project will be undertaken in order to more thoroughly describe different processes for developing information systems. Doing this is necessary in order to acquire a better understanding of how situational factors influence IS projects. The findings in this paper are based on how project managers describe their work. These descriptions may not always be the same as the actions taken. This is a weakness in our approach, which has to be dealt with in future work. The limited number of interviews makes generalisation of the results risky. However, we claim that the interviews performed complement and validate the findings in the AIS 5 project. Furthermore, the findings in this study need to be contrasted to the descriptions of the usage of patterns in ISE (Backlund, 2001) since one aim of using patterns is to describe solutions to common problems in a context.

[2]Explicit knowledge can be articulated in natural and formal language, which makes it 'easy' to transmit between people via e.g. documents and other types of records. Tacit knowledge has to do with personal knowledge that is embedded in person experience and is therefore not so easy to formalise and record.

The situational factors identified in this project correspond to the characteristics of the method-in-action framework as presented by Fitzgerald (2001). However, we would like to point out that some of the factors, which were described as very important by the interviewees. These major characteristics are:

- Different method configurations for different types of projects are perceived as important. There may be method configurations for different types of systems; for maintaining systems; and for further developing existing systems.
- IS development methods are perceived as a means to feed back best practices. However, the usage of these best practices is another matter. Personal communication and personal networks seem to be very important.
- Method usage is to a large extent a matter of selecting and adapting method components to existing processes.
- There are problems associated with multi organisational development projects, which have to be dealt with. Some issues of interest are: the resource level of the different organisations; the relations between the participating organisations; cultural differences between organisations; and situations in which some data and knowledge may not be considered as sharable.

The concept of situational factors as presented in e.g. Euromethod (1996) is used to describe the target domain and the project domain. This paper shows how the method-in-action framework can be used to add an ISD methodological aspect to the notion of situational factors as described in Euromethod (1996). By doing this we include the possibility to identify *situational factors concerning the formalised method, the roles of the method, and the method-in-action*. This is a useful extension since the method chosen and its application has an impact on the project. The items in the above list indicate this need.

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