Association for Information Systems
AIS Electronic Library (AISeL)

ECIS 2006 Proceedings

European Conference on Information Systems (ECIS)

2006

Utilizing systems development methods – a conceptual framework

Lasse Vogelsang
IT University of Copenhage

Finn Kensing
IT University of Copenhage

UTILIZING SYSTEMS DEVELOPMENT METHODS – A CONCEPTUAL FRAMEWORK

Lasse Vogelsang, IT University of Copenhagen, Denmark
Finn Kensing, IT University of Copenhagen, Denmark

Abstract

There are not many frameworks of method utilization or use in organization based on empirical studies nor is there a common understanding of these issues. This paper investigates how systems development methods are utilized in practice and proposes a framework to conceive method utilization. The explanatory value of the framework is illustrated by providing an analysis of a case study. The framework highlights several issues of method utilization based on a three years long field study. The framework has two dimensions. The first dimension covers three levels in organizations at which methods can be utilized. They are the organizational level, the project level, and the individual level. The second dimension covers three aspect of utilization of the method that can take place at each level. The three aspects are adoption, adaptation, and use. Thereby the framework provides nine perspectives on method utilization that allow us to understand and guide method utilization in a broader sense than we have found in the literature, which primarily deals with a subset of the nine perspectives. Furthermore, the paper introduces a distinction between method use and method utilization to emphasize a broad view on method utilization. Method utilization includes adoption, adaptation, and use at different levels in development organizations. Method use is strictly defined as the use of methods for systems development.

Keywords: method utilization, systems development methods, conceptual framework.

1 INTRODUCTION

This paper presents a framework that conceptualizes the work involved in bringing systems development methods to use. The framework is derived from a three years longitudinal field study that followed the introduction, use and extension of a method in a development organization. The framework covers the utilization of methods. We use the term *utilization* rather than *use* to emphasize that activities, besides the strict use of method for development, takes place when a method is taken up by an organization. We found that three aspects of method utilization take place: adoption, adaptation and use. These three aspects are one of two dimensions in the framework. The other dimension is the three levels, organizational, project and individual, in the development organization at which the utilization takes place.

The framework illustrates the scope that has to be dealt with in order to utilize a method. On top of the method utilization that takes place in systems development, the methods are also utilized for bringing the method into organizations. Thereby, the scope of method utilization becomes beyond the methods' primary focus on systems development. The effort that goes into utilizing a method in a development organization can take place at different levels in the organization and in order to adopt, adapt, and learn about the method. The framework provides a foundation that enables analyses of method utilization and for guiding the introduction of methods into IT organizations. The next section describes our research approach in the field study.

2 RESEARCH APPROACH

The framework presented in this paper is based on an interpretive longitudinal field study (Walsham 1993, Yin 1994). Our interpretation of the utilization of the systems development method is expressed in the framework presented in this paper. The main principle in process of constructing the framework was to iterate between the observations from the field study and the emergent framework as it is described in the fundamental principle in the hermeneutic circle (Klein and Myers 1999). Furthermore, the framework draws on the research literature related to method utilization. The framework was revised several times during the analysis to ensure that the framework (the whole) reflected the observations (the parts). The framework is one interpretation of the field study constructed to understand how methods are utilized in practice. We recognize that there are aspects of method utilization that the framework does not cover, for instance the methods political roles (Fitzgerald 1998), which we have not focused on these aspects. Our preconception (Klein and Myers 1999) of method utilization was that methods are primarily intended to be utilized for systems development although we recognize that some of our observations illustrate other purposes than systems development, for instance gaining recognition in an organization.

The longitudinal approach enabled us to get an in-depth understanding of method utilization, which has helped to broaden our view beyond what is traditionally called method use. The study was undertaken as a practice study (Mathiassen 2002) in order to explore and understand how methods are utilized in practice. We do recognize that the study is limited to a single organization and a single method and therefore is exploratory in nature and lack generalization. However, the study provides rich details on method utilized, which enables us to shed light on new aspects of method utilization. Furthermore, the study is the primary foundation for the conceptual framework.

The study took place over a 3 years period and followed 4 projects in an IT department. The main focus in the study was on the utilization of a method in the projects. We had the opportunity to follow how a method (Rational Unified Process) was introduced in the IT department, the initial use of the method, a more mature use of the method, and some of the activities involved in adopting and adapting the method. The following describes the 4 projects we followed, how and why the methods were utilized, and how data was collected in each of the projects.

The first project, the *Method Project*, was initiated to find and introduce a new method in the IT department. The main arguments for introducing a new method were the use of new technology (object oriented), new ways of developing IT (web development), and that the existing method was an old waterfall method and not a modern and iterative method. Our focus in the project was on 1) how the method was utilized in the process of bringing the method into use in the IT department and 2) the main purposes for adopting a method. The data was collected through interviews of the project participants, observation of all project meetings, and by analysing key documents.

The second project, the *Try-out Project*, was a development project where parts of the new method were tried out in a real development context. The main purpose of the project was to develop a web site. Therefore, the method utilization was secondary to the primary focus in the project on developing the web site. Our focus in the project was on 1) how the method was perceived in the project and 2) how the method was actually utilized in the project. We interviewed key project participants at the outset of the project and after the project finished. We had the option to observe a few project meeting, but not the daily work routines because the company lacked office space at the time. We also collected documents from the different phases in the project especially those related to the method use. Together the Method Project and the Try-out Project lead to the adoption of a new method (Rational Unified Process (Kruchten 2000)) in the IT department.

The third project, the *Use Project*, was a development project of a web application used to collect patient data among doctors. The project took place 1 1/2 years after the new method was adopted in the IT department. During the 1 1/2 years people in the IT department had attended courses and started using the method on a regular basis in development projects. Furthermore, a significant amount of work went into adapting the method to the IT department context. Our focus was on how the method was utilized in relation to the development project. We observed meetings and office work where the method was utilized. Furthermore, we interviewed the project participants about the method and analysed documents from the project and the method.

The fourth project, the *Extension Project*, was initiated to synthesize work practices into a technique used to mock-up user interfaces. The introduced method did not have a technique for that, so the idea was to create a technique for mocking up user interfaces and add it to the method. The project consisted of 3 people who worked with the task of creating mock-ups of user interfaces and one of the authors of this paper. The author's role was to cooperate with the other three project participants on creating the technique. In other words, the author's role was collaborative participation (Baskerville and Wood-Harper 1998). The main purpose of having a researcher being part of the project was to communicate some of the problems with mock-up user interfaces that we observed in the Use Project. The construction of the standard technique was primarily done by the project participants from the IT department.

3 A FRAMEWORK FOR METHOD UTILIZATION

The purpose of this chapter is to present a framework for analyzing the utilization of systems development methods in practice. The reason for creating the framework presented in this paper is to provide a structure that can be used for researchers and practitioners to analyze and guide method utilization.

The framework consists of two dimensions: levels of utilization and aspect of method utilization. These two dimensions are described in detail in the first two parts of this section. The first part describes the levels of utilization. The framework consists of three utilization levels and at each level the other dimension, the aspects of method utilization, can be found. The levels of utilization are used to categorize things such as activities, aspects of use, and deliveries that are part of systems development and related to method utilization, into different levels in the development organization. The levels provide categories that help us understand and guide certain aspects of method utilization.

The framework does not cover the method industry where the development and dissemination of standard "off-the-shelf" methods to the software industry takes place. The development and dissemination of methods is usually undertaken by companies such as Rational (IBM) and Microsoft or by academia. The methods are disseminated as text books, web sites, software and through teaching and courses held by the private organizations or in an academic context. It is from the method industry that development organizations obtain standard methods. The method industry is not included in the framework because we do not have data on it. We recognize that it could be a level to add to the framework, because it has a significant influence on how and why methods are used in practice. We think it is reasonable to assume that the three aspects of utilization (adoption, adaptation and use) takes place in the method industry, which future research might show.

3.1 Levels of method utilization

The framework deals with utilization at three levels in development organizations, which are: The individual level, the project level, and the organizational level. The levels are inspired by the levels found in Fitzgerald, Russo, and O'Kane (2003) and Fitzgerald, Russo, and Stolterman (2002) (see section 5 for more details). An activity, product, or aspects of method utilization belongs to a level of utilization if its current way of existence depends on the level. If a project is stopped (for whatever reason) then some activities and products become pointless to continue (e.g. project meeting and project plans). Project meetings and project plans are categorized into the project level of utilization, because their existence is dependent on that level of utilization. However, other products and activities might survive the termination of the project at other levels of utilization, for instance standards for coding, tasks, approaches, etc.

3.1.1 Utilization at the organizational level

The organizational level of utilization is where we find activities and products that are intended to affect an entire development organization or development department. At this level, adoption and adaptation of a method are intended to have an organization or department wide effect. It is at the organizational level that we find the process or method department and the organization's methods.

A reason for dealing with methods at the organizational level is reuse of knowledge, transfer of specific knowledge among projects, and to have a standard approach for systems development. By working with methods at the organizational level, the organization can achieve a common language among project participants, a division of work, standard procedures, etc., which can be reused in the different projects without starting from scratch each time. Another reason is transfer of knowledge through codification of knowledge for reuse in other or future projects. A third reason is to enforce standards on the systems development projects to meet certain industrial standards, such as ISO 9000.

The activities at the organizational level are for instance to bring a method into the organization, adapt the method to the organizational context, and maintain the method. The products we find at the organizational level are a standard or a customized method used in the organization. It is also at the organizational level that 'tools' for managing development organizational wide such as ISO 9000 and CMM are enforced on the organization. Basically, the organizational level deals with method related issues that are for the entire organization.

3.1.2 Utilization at the project level

The second level of utilization is the project level. It is at this level we find the development projects, where the systems development takes place. It is at this level that some of the central method fragments are intended to be utilized. For instance, process models such as the waterfall model and the spiral model which are intended to guide the development process, diagrams techniques, such as Use

Cases, flow diagrams, and E/R diagrams, which are intended to support the work on describing and developing the system under development.

Most information systems are so complex to develop, technically and socially, that it takes several people to develop the system. The most common way of organizing systems development is to establish a project. Projects are characterized by taking place within a specific timeframe and having a specific purpose. Development projects can involve project participants with different qualifications and roles in the development projects. Methods often provide descriptions of qualifications and roles and guidelines for organizing them in the development projects. Organizing systems development into projects is one way of dealing with the complexity in systems development. The inclusion of the project level of utilization emphasizes that methods can have significant influence on the development projects and therefore is an important aspect of their utilization.

The activities at the project level is for instance the management and organization of the development process for the development of specific system, the coordination of activities carried out by the project participants, project meetings, etc. The products produced at the project level are, besides the information system, artefacts related to the development process, for instance, Use Cases, flow diagrams, E/R diagrams, project plans, etc. Some of the products become part of the information system and others are means to develop the information system and become obsolete when the development ends.

3.1.3 Utilization at the individual level

The third level of utilization is the individual level of utilization. The individual level of utilization is where a project participant utilizes the method or its parts in order to develop systems. The individual level of utilization covers the part of method utilization that are not reflected directly in the development organization or the development projects. An example is when a project participant decides to use a method or a method fragment without disseminating the use to a development project or the development organization. The individual level of utilization also covers that methods are not necessarily used by project participants as intended in the development project, the development organization or by the method. For instance, a project participant may have to change part of a method to fit the specific context in which he or she works in order to make the method fit their work. Furthermore, project participants can face problems that the method does not cover. In that case, the project participants might have to deviate from the method and find their own way of doing the job.

Some of the method utilization performed by individuals is required by either the project or the organization. This type is not considered to be method utilization at the individual level because it originates from another level of utilization. Instead, method utilization at the individual level covers that a developer adopt a method fragment to ease and conduct work. For instance, developers program, create and use Use Cases, E/R diagrams etc. to do their work. These activities and products often also play a part at the project level. The individual level also deals with the non-use of methods, i.e. that developers sometimes don't use methods as intended from the other three levels.

3.2 Aspects of method utilization

The framework consists of three aspects of method utilization in practice. We use the term aspect to focus on a specific perspective or view on method utilization. The aspects enable us to focus on a certain part of method utilization. The aspects of method utilization are: adoption, adaptation, and use. Method adoption is the decision to use a method in a certain context. Method adaptation is the deliberate or non-deliberate change of a method. Method use is the enactment of a method. The following three sections go into details on each of the three aspects.

3.2.1 Method adoption

An adoption of a method is the decision to bring a specific method or a specific method fragment into use in a specific context. The context can be an organization, a project, or an individual. The adoption of a method can include examination of methods and experimentation undertaken at one of the three levels. The examination and experimentation with a method leads to either adoption or rejection of the method. This intention can be different at the three levels of utilisation and across organizations, projects and individuals. More concrete, the claimed value of utilizing methods can be different at each level. For instance, the intend behind adopting a method at the organizational level (e.g. getting a certification) might not be the same as the intention is behind adopting the methods in the project (e.g. communication among project participants). The same applies to projects and individuals.

The organizational level carries an intention through the method utilization organizational wide. For instance by enforcing standards to meet certain certification such as ISO9000, to bring conformity among the projects, and to communicate to customers that development is done in a certain way in the organization. The project level of utilization carries an intention through the method utilization in projects. For instance by bringing method fragments such as diagramming techniques and process models into use in the projects for a specific purpose. Finally, the individual level of utilization carries the intention that an individual has. Individuals enact their intention through their preferences and working styles. The result of the different views on a method at the three levels can be that a method or some of its fragments might only be adopted at some levels in the organization. This is e.g. the case if an organization adopt a method but the method is not adopted by the individuals or vice versa.

3.2.2 Method adaptation

Method adaptation is the change of a method so it becomes suitable for a specific context. The adaptation can be undertaken to suit an organization, a project, or individuals. Furthermore, the adaptation can be undertaken by an organization, a project or individuals. Adaptation can take place at the organizational level to suit needs at the project level and adaptation can take place at the project level to suit needs at the individual level. Adaptation can also take place within each of the three levels, e.g. the method is adapted at the organizational level to suit needs at the organizational level.

This section introduces the notion of adaptation style. An adaptation style conceives in which way a method or a method fragment is adapted to a specific context. The purpose of introducing the adaptation styles is to provide a vocabulary for describing ways in which adaptation takes place. Furthermore, the adaptation styles are provided to help us understand the adaptations and, perhaps in the future, help us understand what adaptation styles that can lead to successful adaptations. An adaptation style is defined by: 1) whether the adaptation is planned or unplanned and 2) the type of adaptation i.e. does the adaptation exclude, change, extend, or take the method as it is.

Method adaptation can be deliberate, i.e. planned, or something that ‘just happens’, i.e. unplanned. Planned adaptation can take place for instance if changes to the method is prescribed by the method (e.g. consider whether or not to use a technique or a documents). Unplanned adaptation can take place when a situation is not covered by a method or when the method does not sufficiently fit the situation and is unintentionally adapted to fit the situation. In these cases the project participants have to adjust or ignore the method to be able to do their work.

The adaptation styles consist of four types of adaptation of the methods; excluding, changing, extending, and literal adaptation. The excluding type of adaptation means that the method or a fragment of the method is ignored and not used, which might be either planned or unplanned. The changing type of adaptation happens when a part of or the method is changed to fit a specific situation, but the method is still intended to be used. The original method fragment or method in this case do not fit the context and has to be changed to be used in the context. The change of the method can be planned, for instance by deliberately adapting the method to a specific organization or project. The

change of the method can also take place in an unplanned fashion when methods are changed to suit a situation without any prior planning. The extending type of adaptation covers the cases where activities or product, needed in a development project, are not covered by the method and thus has to be added. This may take place either in an ad hoc fashion or be based on experiences from former and similar situations. Finally, the literal type of adaptation, is when the method is adopted "as-is", i.e. without changing the method. This can happen if it is assumed that the method works out of the box. Table 1 describes the eight adaptation styles.

Adaptation Styles	Excluding	Changing	Extending	Literal
Planned adaptation	Excluding a method fragment from the method.	Planned change of a method fragment.	Deliberately borrow method fragments from other methods.	To use the method as it is.
Unplanned adaptation	The method or method fragment never comes into use.	A new method emerges from the original method, because the method did not suit the situation.	Unplanned adoption of method fragments from other methods.	The provided methods are used as-is.

Table 1: Method adaptation styles

3.2.3 Method use

Method use is when a method is brought into use to accomplish a task in systems development. The task the method is used for can take place at each of the three levels of utilization. Therefore the task the method is used for can be quite different in nature. This is the most common use of methods. However, methods are also sometimes utilized in the process of adopting and adapting the method at the three levels. The method can be used to provide information about its potential use in systems development. Thereby the method is used for assessing the method's potential, which can lead to either adoption or rejection of the method. Some method (e.g. Rational Unified process (Kruchten, 2000)) and approaches (e.g. Method Engineering (Brinkkemper 1996; Welke and Kumar 1991)) includes ways to adapt the methods themselves. By using these approaches the methods are in use in order to adapt the methods. The methods provide a meta-method fragment that supports processes for adapting methods and bringing them into use. The main point in both assessments of methods (adoption) and meta-method fragments for adaptation is that the method can play an important part and is brought into use to enable actors to do certain tasks, which are not in a strict sense systems development. These tasks are related to systems development and important to make a method valuable in systems development. The tasks are in some sense meta-tasks performed to bring the methods to use for systems development in the IT development organizations. Our understanding of "method use" thus is broader than the common "method use" term that almost entirely is focused on methods used for systems development. Therefore we have chosen to use the term method utilization to emphasize this 'broader' view on methods.

4 EXAMPLES FROM THE LONGITUDIONAL FIELD STUDY

This section provides examples from the longitudinal field study that illustrate the explanatory value of the framework.

4.1 Organizational level of method use

We observed two examples of method *adoptions* at the organizational level of utilization in the field study: In the Method Project where a new method was brought into the organization and in the Extension Project where the method was extended by synthesizing a current work practice. The main intention of method adoption were in both cases to standardize parts of the development process and deliveries to make the projects in the organization more conform and reduce ad hoc activities. The targeted areas where perceived as too ad hoc, which lead to problems with taking over other peoples work (dealt with in the Extension Project) and developing an understanding of where the project was heading (dealt with in the Method Project). The Method Project was initiated to make a more conform development process and was an attempt to reduce the amount of ad hoc activities and development. The main mean to this was to introduce a new method in the organization. The Extension Project had a similar goal although it was targeted towards very specific activities and delivery. Furthermore, the means to make activities and products conform in this case was to synthesize their current work practice into a new method fragment instead of adopting a new method fragment from a standard method.

The main *adaptation* at the organizational level took place in the Method Project. It was quite quickly acknowledged by the project participants that the standard method would not fit the organization. The reasons for this were that there were certain differences in use of terms and standard to be met in the organization because it was making software for the medical industry. Furthermore, the project participants realized that several work practices had to be changed and some people in the organization would resist some of these changes. These problems were to some extend solved by adapting the method. The need for adaptation was perceived so excessive that a permanent group of people were established to adapt and maintain the method. Two years after the adoption of the method at the organizational level only half of the method was actually brought into use in the projects at the project level. This was due to an extensive work with adapting the method and changing work practices.

The main goal in the Extension Project was to synthesize a part of their current work practice into a method fragment and add it to the method adopted in the Method Project. The project participants in the Extension Project did not bring a method fragment that could support the work practice. Therefore no *adaptation* of an existing method happened in the Extension Project. However, a number of possibilities for adaptation of the created method fragment were given to the ones that were going to use it. These possibilities for adaptation were primarily introduced in areas where the development projects in the organization was perceived as being too diverse to synthesize or because a standard was too difficult to explicate or the available tools could not support the work.

The method was in use as guidelines in the Method Project and in the Extension Projects. Main techniques from the method were tried out in the Method Project. Furthermore, Use Cases and iterations were tried out in the Try-out Project to test the method in practice. The initiation of these activities where inspired by guidelines from the method on adopting the method in an organization. The method was used to support the process of adopting and adapting the method to the organization. The project participants in the Extension Project also used guidelines from the method to synthesize a new method fragment. The method prescribed a set of characteristic and requirements for the created method fragment. An example of a guideline is that every process must result in a product. Requirements like this guided the construction of the method fragment throughout the Extension Project. In general, the method was used at the organizational level as an infrastructure for creating and bringing the method into the organization.

4.2 Project level of method utilization

The *adoption* observed in the field study at the project level took place in the Try-out Project and the Use project. As mentioned above, two key method fragments, Use Cases and iterations, were adopted

in the Try-out Project in order to try out vital parts of the method in practice. There were no attempts to *adapt* the Use Cases and iterations to the project. There was no formal adaptation of the method fragments in the Try-out Project and therefore name conventions and techniques were taken "as-is". It is important to notice that Use Cases were never used in the entire project, only by a few programmers. Furthermore, iterations never played a significant role in the Try-out Project due to delays and lack of motivation for having the iterations.

The *adoption* in the In-Use project was more or less given because the method was adopted in the organization to such an extend that the method was expected to be used in development projects. The *adaptation* in the project was about which method fragment that should be used. The adaptation of the method was done in a formal way, by having the project manager, the lead developer and a process engineer to select which fragments to include and which to exclude. Some method fragments were excluded because the activities described were not taking place (e.g. assessment of server capacity on local servers because the application was placed on other servers) and other activities were included in the project although they were not formally a part of the method (e.g. information architecture). The role of the method in the Use Project was primarily to guide the development process and to provide guidelines for deliveries in the project. The prescriptions of activities and products in the method were perceived as guidelines that had to be followed unless there were reasons for doing something else. The actual use of the method was very complex because the method influenced many aspects of the development. We did observe that most of the terminology and some of the techniques from the method was in use in the entire project. The project used iterations although they were in reality more like status meetings than a point in time were the deliveries were tested to a standard as the method prescribed. The project manager was aware of this and it was perceived as a practical way to use iterations.

4.3 Individual level of method utilization

In the field study we observed several *adoptions* of method fragments at the individual level. We also observed a change in the way the adopted method was perceived in the organization. In the beginning, where the organizational adoption still hadn't taken place at the organizational level (i.e. in the Method Project and Try-out Projects), the method did not play an important role neither in the in the projects nor for the individuals. As the method was adapted at the organizational level to fit the organization and as people got more experience with the method, it also became more important for the individuals in their daily work. The method became part of the daily work practice and means to get the job done for each individual. In the Try-out Project, the method fragments adopted at the project level were rejected by a major part of the project participants because they did not understand the purpose and what to do with the method fragments. This was radically changed in the Use Project. The project participants understood the purpose and relevance of the method and enough about the method fragments to perceive them as beneficial. Therefore the project participants adopted the method and relevant method fragments. Besides a better understanding of the method and its fragments, the project participants also got a better understanding of how to adapt the method. As described above, the project participants understood the method as relevant guidelines and were able to adapt the method to their situation, for instance by skipping a certain activity or by changing a technique or product.

5 RELATED WORK

The framework proposed in this paper illustrates various ways in which a method can be utilized in an IT development organization. By interpreting the field study in terms of the framework we have shown how the framework can be used to analyse situations in which methods are utilized for different purposes. The following two sections relate the framework to research on methods in practice. The first section relates the framework to two of the few other frameworks on method use that are based on

empirical research. The second section interprets some examples of empirical studies of method utilization in terms of our framework.

5.1 Method frameworks

Andersen et. al. (1990) provides one of the earlier frameworks on method use. The framework was created as part of the MARS research project and is based on empirical work. Andersen et. al. makes a distinction between abstract and concrete concepts for describing systems development. For abstract descriptions of systems development they suggest functions (e.g. analysis, design, planning, etc) for describing intension behind actual processes or actions. Likewise they introduce terms like methods, tools, and techniques to talk about how actual processes and actions ought to be carried out. They suggest processes as the main concept for describing what actually happens at the concrete level. In the vocabulary of the framework presented in this paper, Andersen et al deal with method use at all three levels of method utilization, however they only briefly discuss adoption at the three levels and adaptation are not dealt with at any of the levels.

Fitzgerald et. al. (2002) provides a framework on method use in which they distinguish between the formal method and the method-in-action. They draw on Argyris and Schön's (1974) distinction between espoused theory and theory in use. The formal method in their framework corresponds to the espoused theory and the method-in-action to the theory in use. The formal method is the method as it is described in books and manuals. The method-in-action is the enacted method, i.e. how the method is actually used in practice, which might not be the same as the method prescribes. According to Fitzgerald et. al. a method has a role (political or rational (Fitzgerald 1998) that shapes the formal method and influences the method-in-action. Fitzgerald et al (2003) report from a case study of method tailoring where the method's role was rational. They investigated method tailoring at an industrial-, organizational-, and project level. The company adopted method fragments from the method industry (industrial level), tailored them to different organizational divisions (organizational level), and tailored the divisional methods to each development project (project level).

The main difference is that our framework emphasises the activities involved in utilizing a method. It is process centric. The framework by Fiztgerald et. al. (2002) is focused on where the method comes from, where it is changed and used. Their framework is method centric. This is reflected in the way in which the levels are used. Further, our framework has Fiztgerald et al's industrial and organizational activities at the organizational level, because the adoption of method takes place in the organizations. Fitzgerald et al perceives the method fragments as coming from the industry and therefore put them at the industrial level. We could have included an industrial level, but have left it out because we haven't investigated, in this study, how adoption, adaptation and use take place in the method industry. Instead we did observe adoption, adaptation, and use by individuals and that is the reason for introducing the individual level. The two frameworks have different focuses, but are not contra dictionary. They are complementary in the sense that they provide two different approaches to understand methods in practice. The framework by Fitzgerald et. al. provides an understanding of the enactment of methods and our framework provides an understanding of the complex activities involved in adopting and adapting methods in development organizations.

5.2 Methods in practice

Several studies have been conducted on method use in practice although we still have a lot to learn about method used in practice (Wynecoop and Russo 1993). There is a long tradition for investigating method utilization based on quantitative studies. The findings from these studies are often on the adoption rate of methods (e.g. Fitzgerald 1998b) and factors influencing use (e.g. Premkumar and Potter 1995). These studies provide snap shots of method use, but do not an understanding on how and why a method is utilized in a specific context (Wynecoop and Russo 1995). We are interested in how

and why or why not methods work in practice. Therefore the research we examine to compare our framework is qualitative in nature.

Bansler and Bødker (1993) set out to explore how structured analysis is used in practice. They investigate the reasons for adopting structured analysis and how it is applied in three organizations. They go into details on which parts of structured analysis that are adopted at the organization, project and individual level. They have a few details on the adoption at the organizational level and most details at the individual level. They do not investigate adaptation of structured analysis, besides that they find that the method was used among other techniques. Adapting the method as such is not an issue they bring up in their paper. They go in to details on how the method is applied by developers to show that structured analysis is not applied as described by the method. The main point in the paper is that there is a gap between the method and its use. They suggest investigating practice to understand systems development which should enable us to create methods that are more suited for actual systems development.

In terms of our framework, Bansler and Bødker (ibid.) are interested in adoption at all three levels with an emphasis on the individual level. They are not investigating adaptation of the method at any level and investigate the use of the method primarily at the individual level. Assuming that adaptation is not described by Bansler and Bødker (ibid.) because it did not take place, our framework would have guided the focus in the organization towards adaptation of the method to make it more suitable for the organization, the project and individuals. This is in line with the suggestion of adapting methods to suit systems development practice given by Bansler and Bødker (ibid). They suggest changing the standard methods so they suit the development practice. Our framework points at the possibility to adapt the method within the organization.

Stolerman (1992) investigates how designers think about methods. He is interested in understanding how methods can support systems development and convinces developers to use them. He interviewed 20 developers about the utilization of methods by asking about why methods were adopted and how they could be used in systems development. Stolterman's study is about the individual level of method utilization and with a focus method adoption and improving the chance of method adoption by creating methods that suits systems development better.

6 CONCLUSION

The paper introduces a framework that opens up "method use" as it is usually treated in the literature and by practitioners. The framework consists of the three aspects of method utilization (adaptation, adoption, and use) and three levels of method utilization (organizational, project, and individual). The three aspects can be found at each of the three levels. Together the aspects and levels provide nine perspectives on method utilization. The nine perspectives can be used to analyse and guide method utilization. The perspectives from the framework can guide an analysis of method utilization by providing a terminology to base the analysis upon. The perspectives can also guide method utilization by providing an understanding of the activities it take in a development organization to utilize a method. However, we do recognize the guidance is at an abstract level and does not provide very specific guidelines for actual actions to be taking. Its purpose is to provide areas to take into consideration when utilizing methods.

The framework is based on a longitudinal field study and illustrates the diversity of method utilization in practice. Our field study showed that methods had an important role in other contexts than systems development. The paper introduces a distinction between method use and method utilization to emphasise that methods are brought in as a resource for other purposes than systems development. Furthermore, the paper discusses to what extend the literature related to method utilization captures the diversity in method utilization. The paper shows that other field studies on method utilization only capture a few of the nine perspectives that our framework provides.

7 REFERENCES

Argyris, C., and Schön, D. (1974). Theory in Practice: Increasing Professional Effectiveness. Jossey-Bass, USA.

Andersen N. E., F. Kensing, M. Lassen, J. Lundin, L. Mathiassen A. Munk-Madsen and P. Sørgaard (1990). Professional Systems Development-Experiences, Ideas, and Action. Prentice-Hall.

Bansler, J. P. and K. Bødker (1993). A Reappraisal of Structured Analysis: Design in an Organization Context. ACM Transactions on Information Systems, vol. 11, pp. 165-193.

Baskerville R. L. and T. Wood-Harper (1998). Diversity in information systems action research methods. European Journal of Information Systems, vol. 7, 90-107.

Brinkkemper S. (1996). Method engineering: engineering of information systems development methods and tools. Information and Software Technology (38), 275-280.

Fitzgerald, B. (1998a). A tale of two roles: the use of systems development methodologies in practice. in N. Jayaratna, B. Fitzgerald, A. T. Wood-Harper and J. Larrasquet (eds.) Educating Methodology Practitioners and Researchers. UK: Springer-Verlag, 89-96.

Fitzgerald, B. (1998b). An empirical investigation into the adoption of systems development methodologies. Information and Management (34), 317-328.

Fitzgerald, B., Russo, N., and O'Kane, T. (2003). Software development method tailoring at Motorola. Communications of the ACM 46 (4), April, 64-70.

Fitzgerald, B., Russo, N.L., and Stolterman, E (2002). Information systems development: methods in action. McGraw-Hill, London.

Klein, H.K. and Myers, M.D. (1999). A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems. MIS Quarterly 23 (1), 67-93.

Kruchten, P. (2000). The Rational Unified Process An Introduction. Second Edition. Addison-Wesley, Reading.

Mathiassen, L. (2002). Collaborative practice research. Information Technology & People (15). 321-342.

Premkumar, G., and Potter, M. (1995). Adoption of computer aided software engineering (CASE) technology: an innovation adoption perspective. ACM SIGMIS Database 26 (2-3). May/Aug, 105-124.

Stolterman, E. (1992). How system designers think about design and methods: some reflections based on an interview study. Scandinavian Journal of Information Systems 4, 137-150.

Walsham, G. (1993). Interpretive case studies in IS research: nature and method. European Journal of Information Systems 4, 74-81.

Welke R. and K. Kumar (1991). Method Engineering: A Proposal for Situation-Specific Methodology Construction. in Systems Analysis and Design: A Research Agenda, Cotterman and Senn, Eds. New York: Wiley.

Wynekoop, J.L., and Russo, N.L. (1993). Systems development methodologies: unanswered questions and the research practice gab. the 14th International Conference on Information Systems. ACM, New York, 181-190.

Wynekoop J. and Russo N.L. (1995), Systems Development Methodologies: Unanswered Questions. Journal of Information Technology 10, 65-73.

Yin R. K. (1994). Case Study Research: Design and Methods. 2nd ed. Newbury Park: Sage Publications.