Evaluating Enterprise Systems Implementation Methodologies in Action: Focusing Formalised and Situational Aspects

Daniela Mihailescu[1], Sven A. Carlsson[2] and Marius Mihailescu[1]
[1] Jönköping University, Sweden
[2]Lund University, Sweden
daniela.mihailescu@jibs.hj.se
sven.carlsson@ics.lu.se
marius.mihailescu@jibs.hj.se

Abstract: Enterprise Systems (ES) are often the largest and most important Information Systems (IS) an organisation employs. Most ES are rented or bought as COTS (Commercial Off The Shelf) software. The use of COTS leads to a distinction between the development of the ES software—done by ES software providers, like SAP and Microsoft—and the implementation of ES software in a specific organisation. Implementation of ES are often associated with problems like higher implementation cost and longer implementation process than anticipated. To improve ES implementation, ES providers increasingly support their ES software by, in part computer-based, implementation methodologies. The paper present an ES implementation evaluation framework called ES Implementation Methodology-in-Action. The framework integrates two complementary views: 1) a technology view, focusing on the formalised aspects as expressed in the ES implementation methodology (the content of the methodology), and 2) a structural view, focusing situational aspects as expressed by the implementers (the users of the implementation methodology) including implementers, implementation context, ES software and other individuals participating in the implementation project. Using document studies and interviews with implementers we show how the framework can be used to evaluate ES implementation methodologies. We evaluate one well-known ES implementation methodology: SAP's ASAP.

Keywords: Enterprise Systems Implementation Methodology, Evaluation Framework, Implementation Methodology in Action, Methodology Evaluation

1. Introduction

Enterprise systems (ES) are application software packages developed by ES software providers. ES are alternatives to custom-built software. An ES is implemented in an organisational context using a more or less formalised and adjusted implementation methodology. Most ES vendors have developed vendor specific implementation methodologies. The existing literature on ES implementation methodologies describes mainly the implementation methodology developed and recommended by one of the major ES vendors: SAP´s Accelerated SAP (ASAP) methodology. The existing lack of evaluations of ES implementation methodologies reduces practitioners' and researchers' possibilities to comprehend the characteristics, the significance, and the usefulness of ES methodologies. This paper addresses this shortcoming by: 1) developing an ES Implementation Methodology-in-Action framework to be used for evaluating ES implementation methodologies, and 2) by using one case, SAP's ASAP methodology, shows how the framework can be used to evaluate specific ES implementation methodologies. The remainder of the paper is organised as follows: In the next section (Section 2) we present our research approach. Our ES Implementation Methodology-in-Action framework is presented in Section 3. In section 4 we apply the framework on SAP's ASAP implementation methodology. This is followed by discussion, contribution, and further research.

2. Research approach

Using current ES and Information Systems Development literature we through an iterative process developed an ES Implementation Methodology-in-Action framework. The framework integrates two complementary views: 1) a technology view, focusing on the formalised aspects, and 2) a structural view, focusing situational and contextual aspects. The framework can be used to evaluate a specific ES implementation methodology or it can be used to compare different ES implementation methodologies. To illustrate the usefulness of the framework, we used the framework to evaluate a specific ES implementation methodology, namely SAP's ASAP implementation methodology. The primary data collection method for the evaluation study was semi-structured interviews with ten experienced ES implementers. The interviews elicited the respondents' views on and experiences of ASAP. The interviews were done in the fall of 2004 and each interview lasted between 30 minutes and two hours. Documentation was the second data source. Documents provided by some interviewees, SAP's web pages, a SAP conference (Managing SAP Projects 2004) and published articles and

Reference this paper as:
Mihailescu D, Carlsson S A and Mihailescu M (2007) "Evaluating Enterprise Systems Implementation Methodologies in Action: Focusing Formalised and Situational Aspects" *The Electronic Journal Information Systems Evaluation* Volume 10 Issue 1, pp 83 - 90, available online at www.ejise.com

books were used. Data for addressing the formalised aspects (discussed below) of the ASAP implementation methodology came mainly from documents; and for addressing the structural aspects interviews and documents were used.

3. ES implementation methodology-in-action framework

The study of ISD methodologies is a core theme in the IS discipline (Jayaratna, 1994; Fitzgerald et al., 2002, Iivari et al., 2004). The ISD methodologies addressed and studied have not been ES implementation methodologies, which is the focus of this paper. In the ISD methodology evaluation literature there is a primary focus on the formalised aspect of methodologies (Truex et al., 2000), but a second focus emphasising the situational aspect and how methodologies are enacted and used in practice is emerging (Fitzgerald et al., 2002; Iivari and Maansaari, 1998; Mathiassen, 1998). Studies indicate that methodologies are applied by practitioners in a rather pragmatic way resulting in a unique instantiation of a methodology for each ISD process (Fitzgerald et al., 2002; Truex et al., 2000). Based on the ISD literature, we suggest that our framework should combine the two current views on methodologies: 1) technology, i.e. the formalised aspect, and 2) structure, i.e. the situational aspect. Each view highlights significant but different aspects of methodologies. The technology view focuses on the methodology per se and its formalised aspect, i.e. content and roles as prescribed by methodology designers. The structure view focuses situational aspects and considers how methodologies are used in practice (contextual use). The integration of these two views provides a high-level lens for conceptualising methodologies and for developing our ES Implementation Methodology-in-Action framework. The Method-In-Action (MiA) framework (Fitzgerald et al., 2002) underpins our framework (Table 1).

Table 1. Framework based on the method-in-action framework (Fitzgerald et al. 2002)

	Formalised aspect	Situational aspect
Conceptualisation of methodology	Methodology as a technology	Methodology as a structure
Components	Implementation Methodology content and its roles	Implementers Implementation context Enterprise Systems Software
Integrated Methodology conceptualisation	Implementation Methodology-in-Action	

The formalised aspect provides de-contextualised and practice-detached general knowledge about the implementation methodology. This aspect is represented by the content and roles prescribed by the methodology designers. The situational aspect and related components, i.e. implementers, implementation context and the enterprise systems software (ESS) emphasise specific features which vary in different degrees from one implementation project to another. For instance, the characteristics of the implementation context, i.e. uniqueness, complexity, and uncertainty, along with the characteristics of the ESS, i.e. purpose, complexity, and degree of novelty, are specific to each project. Implementers' competences, i.e. knowledge and skills necessary to manage the project and map business processes into the ES, as well as the ability to use the methodologies, are individually. Our ES Implementation Methodology-in-Action framework is depicted in Figure 1.

In the next section we use the framework to evaluate SAP's ASAP implementation methodology. SAP AG, the largest ERP provider, has developed and recommends the use of ASAP, which represents the de facto standard for implementing SAP solutions. The ASAP methodology was released in June 1997 and by year 2003 it was integrated in a tool named Solution Manager and in all SAP installations without charge.

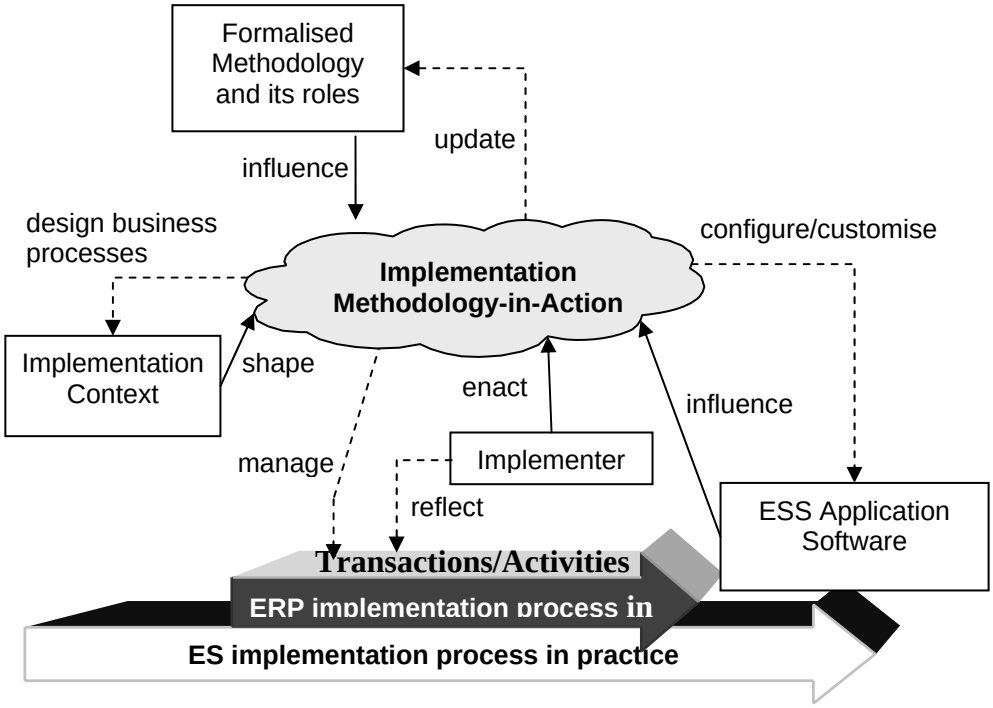

Figure 1. ES implementation methodology-in-action framework

4. ASAP-in-Action

The evaluation of the ASAP implementation methodology is structured according to the components included in the framework in terms of formalised and situational aspects followed by the integration of these two aspects, i.e. ASAP implementation methodology in action.

4.1 Formalised aspect of ASAP implementation methodology

ASAP implementation methodology is recommended to implementation partners and customers in order to facilitate and support a structured, efficient, and accelerated implementation of SAP solutions. ASAP specifies necessary project management activities and development tasks sequences, as well as methods, techniques, tools and services. The majority of implementation partners customise, i.e. add, adapt or supplement parts of the original methodology and develop their own methodology, so-called Powered ASAP. The implementation methodology can be customised to fit a specific project scope and a type of solution by choosing different roadmaps with related content, i.e. activities and templates, which might be dynamically adapted by using integrated implementation tools. These implementation tools are integrated with the application software and should lead to a rapid implementation and optimisation of the ES by providing guidelines and accelerators in order to manage the implementation process, configure/customise mySAP application software and produce related documentation (Ghosh, 1999). Since the content of the tools is dynamically adapted and integrated with the application software, the implementation tools are regarded as one of the key components of ASAP implementation methodology, which is based on the continuous business engineering approach. This underlying approach implies 1) an ESS implementation based on a Reference Model along with the use of integrated accelerators, 2) implementing organisation compliance with the standardised and competition-neutral process flows embedded in the enterprise systems software, and 3) the "optimisation" of the enterprise systems software. The content of ASAP implementation methodology is summarised in Table 2.

Table 2. The content of ASAP implementation methodology

Content	Description
Approach	Continuous Business Engineering – business process innovation through technology and IT practice and rapid implementation of flexible and market-based organisation structures in enterprises with related data processing support - goals: Standardise, structure and guide a rapid and efficient implementation of SAP solutions in organisations - assumptions: An enterprise should accept the embedded 'best practices' wherever possible; a

Content	Description
	common frame of reference, i.e. a business blueprint, is created by using a Reference Model which incorporates standardised and competition-neutral process flows and can be used as a starting point to solution and adjusted to a specific situation in this way preventing the modelling effort from starting from scratch and so profit from the experiences of other enterprises - process model: linear sequence of phases for entire implementation life cycle: Discovery, Evaluation, Implementation and Operations - conceptual model: process oriented
Methods	- ASAP Roadmaps including activities, deliverables, role descriptions, additional guides and accelerators as well as associated techniques and tools - Iterative Process Prototyping (IPP) with a focus on process design based on Reference Model and Prototyping
Techniques	- Event-controlled Process Chain (EPC) represents the basis for all process modelling activities and structures and assures consistent specification of process requirement, i.e. describes process flow of events, tasks and processes
Tools	- accelerators and comprehensive application platforms for structuring and supporting the construction and maintenance of the business blueprint and implementation phases - examples: SAP Solution Composer, ASAP Roadmaps, SAP Solution Manager
Services	- accessed through the operation sections or triggered dynamically depending on the configuration status of a solution

The formalised aspect of an implementation methodology is represented by its content along with its roles. The roles are summarised in Table 3.

Table 3. ASAP's roles

1.	To have a transparent approach which helps to integrate, harmonies, coordinate, structure, control, guide and follow up components that make an implementation successful, i.e. a rapid delivery of the system and working as a team to reduce implementation time, costs and risks
2.	To describe all activities in an implementation and make sure that nothing is left out by offering project plans well in advance for execution and ensuring the quality of the work by being an integrated part of the quality assurance system
3.	To include the entire technical area to support technical project management and address things like interfaces, data conversion and authorisation earlier than in most traditional implementations
4.	To achieve better results by using accelerators and best practices which cover both hard facts, i.e. what to do, as well as soft facts, i.e. who, when and how to do things
5.	To help implementers to understand the context, facilitate their communication with customers and the work with an organisation in change and handle unexpected changes in a project
6.	To win credibility and trustworthiness and reduce resistance
7.	To meet requirements in order to be certified by vendors and be accepted by customers
8.	To promote knowledge management, e.g. to gather knowledge on how to organise and run implementation projects and document the knowledge

It should be noted that there is an underlying rational view in ASAP´s roles, but some of the roles draw attention to understanding, knowledge, and communication, which are related to the enactment of a methodology in an actual project. They highlight the situational aspects of ASAP, which are presented next.

4.2 Situational aspect of ASAP implementation methodology

The components, which reveal the situational aspects of a methodology, are: the implementers, implementation context, and Enterprise Systems Software (in this case SAP's MySAP).

4.2.1 Implementers

Implementers' business competences—including organisational, strategic, business process and project management competences—were emphasised by the interviewees as critical. The stressing of business competences and personal competences echoes the result in Zwieg et al.'s (2006) and Gartner's (2006) recent studies on changes in IT competencies. A summary of competences perceived as critical by implementers are presented in Table 4.

Table 4. Perceived personal competences by implementers

	Personal Competences
1.	Commitment, motivation, inquisitiveness in order to ask relevant questions, collect information and understand the context
2.	Creativity, experience and professional knowledge, i.e. business and technical, necessary to find the

	Personal Competences
	right solution
3.	Open attitude, professionalism and ability to communicate the solution in order to gain trust
4.	Ability to communicate, collaborate and negotiate with project stakeholders and manage conflicts

The competences stressed by the interviewees are related to understanding of the context, suggesting workable solutions, gaining trust, and ability to work in project teams. The interviewees argued that general business competences will remain significant in the future and even increase in importance. Furthermore, personal and technical knowledge and skills are also important. The interviewees stressed that the implementers must be able to transform their general knowledge and skills into contextual practice and actions. The implementers play a central role in how an implementation methodology is used. The interviewees also stressed implementers capability to develop good relationships to other project stakeholders (a situational component) is critical for implementation projects.

4.2.2 Implementation context

Implementation context has different meanings and degrees of influence. The influence can be direct or indirect. A direct influence on implementers' decisions and work with a methodology is from the context, which is characterised by uniqueness, complexity, and uncertainty. These characteristics are reflected on two levels: project and organisation. The characteristics of a project, i.e. the scope and goal of a project along with the implementation approach, are considered significant to elucidate expectations and perceptions of project participants, both implementers and customers, related to 1) the degree of organisational change and 2) the extent to which the application software needs to be configured/customised. The characteristics of an organisation, summarised in Table 5, are complementary to project characteristics. Thus, the project and organisation characteristics are on the one hand considered to help implementers to understand and recognise the characteristics of the context and on the other hand to influence the roadmap, resources and time necessary to accomplish the tasks during the implementation process.

Table 5: Characteristics of an organisation

	Characteristics of an organisation
1.	Culture and structure
2.	Business values and specific strategic aspects
3.	Degree of standardised processes and use of standardised components
4.	Customer's understanding of own organisation
5.	IT infrastructure

Two other contexts influence the use of a methodology, but in an indirect way:

- An implementer's context represents the context where the methodology is adopted and may be adapted. This context has a direct influence on the implementers and an indirect on their use of methodologies.
- An implantation methodology designer's context has a direct influence on the contents of the methodology and thus an indirect influence on the use of methodology, since in an ES context the implementation methodology is integrated in tools which are integrated with the ESS.

4.2.3 Enterprise systems software

The purpose of mySAP application software is to make use of technological advances and support the business requirements of an adaptable business. It automates and supports the business process but most importantly it enables changes, e.g. business process change, in an organisation based on best practices. SAP's first generation of ERP application software was intended to offer a centralised infrastructure to ensure both internal and external functionality within the boundary of an organisation, based on client/server architecture. The development of SAP's second generation of ERP application software is intended to offer a web-enabled infrastructure to support collaborative processes. This latest business solution offered by SAP comprises three parts 1) an integrated application platform, SAP NetWeaver; which includes implementation tools, 2) a well defined and tuned business core functionality existent in enterprise systems software, mySAP ERP; and 3) additional enterprise systems extensions to support collaborative processes, mySAP Solutions. The integrated characteristics of these applications are intended to ensure the transition towards process innovation technology based on Web services and Enterprise Service Architecture (ESA). The Enterprise Systems Software as presented in this section is associated with a high degree of technical and social complexity and a possible high degree of novelty. These features motivate and influence the implementation methodology enactment.

4.3 ASAP implementation methodology in action

According to the interviewees, in order to take full advantage of the underlying approach, the

adherence to integrated implementation tools which automatically adapt the content of existent roadmaps to the characteristics of a project and type of solution is recommended. In this way the actual implementation process takes place in compliance with the sequence of phases provided in the Roadmaps and the adaptation of the implementation methodology is restrained. However, implementers have the possibility to influence the content of activities and individualise the templates related to each phase. Through formal or informal transactions with other project stakeholders they understand the context by using the Reference Model embedded in the ESS as baselines. The implementers *reflect on* formal activities or those which occur spontaneously in their work and *enact* the *ASAP implementation methodology-in-action*. The enactment implies that implementers apply their competences and adapt the use of ASAP implementation methodology in a particular project and by using it take appropriate action:

- Learn and improve their competence;
- Manage the implementation process over time, e.g. phases, formal and unexpected activities, methods and techniques with defined milestones and deliveries;
- Identify, design and model a business blueprint based on the Reference Model embedded in mySAP with regard to regulations and characteristics of the implementation context;
- Configure and/or customise mySAP, e.g. parameter settings and/or addition of extra features to the software by writing program code as well as modules and/or system integration;
- Update the formalised methodology over time in terms of phases, activities, templates, methods, techniques and tools as well based on their own experiences and/or regulations from their organisation;
- Communicate, collaborate, and negotiate with project stakeholders, e.g. managers, users and other implementers involved in a project.

In the our ES implementation methodology framework the use of implementation methodology was considered to be influenced explicitly or implicitly by a formalised implementation methodology, the implementation context and the enterprise systems software and enacted by implementers. The interviews suggest that the implementers' actions and project stakeholders' actions influence the use of an implementation methodology. As discussed previously the characteristics of a project, i.e. scope and goal of a project along with the implementation approach, are considered to influence the roadmap, resources and time necessary to accomplish the tasks during the ESS implementation process. Figure 2 summarises ASAP in Action.

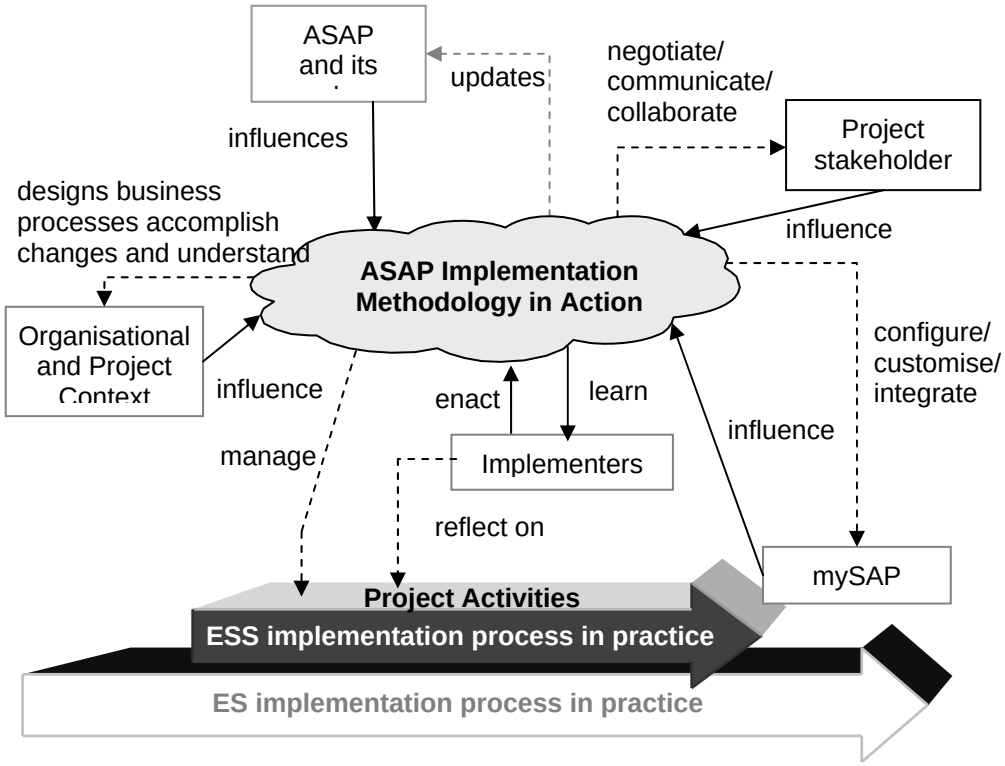

Figure 2. ASAP implementation methodology in action

The framework integrates both formalised and situational aspects and highlights the components which influence (continuous arrows in Figure 1) the use of the implementation methodology, and implementers' actions (dashed arrows in the figure) which occur through the use of implementation methodology in the ESS implementation process. The components which influence the use of the methodology are implementers, organisational and project context, formalised methodology, project stakeholders and the enterprise systems software.

5. Discussions and conclusions

In this paper, a framework which draws on current views on methodology-in-action has been developed and used to evaluate one implementation methodology (ASAP). We argue that an implementation methodology is characterised by both formalised and situational aspects. These two aspects emphasise different features.

Although ASAP in many cases is requested by customers the opposite case exists as well, e.g. the organisation where the application software is implemented uses its own or other methodologies than ASAP. However, according to all interviewees, the different ES implementation methodologies on the market seem to be similar to ASAP. The main differences between them are considered to be 1) the number of accelerators, which is significant in order to identify when and what to do, 2) the integrated tools and prototyping, which support and have an significant importance during the ESS implementation process and 3) some fixed principles specific to the ESS, in this case SAP's software, that need to be taken into consideration. The integration of formalised and situational aspects is considered to highlight the characteristics of an implementation methodology and is regarded as necessary in order to increase our understanding of this concept and reduce possible misunderstandings and confusing research results.

The incorporation of implementation methodology into tools integrated with the application software has the effect of structuring and standardising the implementation process by enforcing a particular set of phases, activities and necessary documentation upon implementers (Truex and Avison, 2003). In this way, the implementer is guided through the configuration process of the enterprise systems software. This may explain interviewees' perception that the configuration is less arduous than the design of solution, i.e. the process identification and modelling.

ASAP implementation methodology, like other formalised methodologies, provides support for explicit knowledge. Accelerators and implementation tools may be regarded as knowledge repositories for organisations and implementers who reuse and update templates with knowledge from earlier projects. However, the use of a methodology and the ability to deal with unexpected events is more a question of tacit knowledge which is primarily related to implementers' personal competence in terms of creativity, motivation and inquisitiveness, which cannot be easily planned and learned. For implementers a methodology represents a tool, which shows how to reach the solution, but they have to put this instrument into action and help the organisation to understand the complexity of the environment and the solution, to change behaviour and mature through a transparent process during the implementation.

6. Contributions and further research

The framework developed in this study has a number of implications for research and practice. Building on current views on method in action integrated with insights from Information Systems Development and Enterprise Systems research, a framework for evaluating ES implementation methodologies has been proposed. The practical contributions aim to broaden and deepen implementers and users understanding of implementation methodologies by offering an integrated view of the characteristics of such methodologies. The underlying approach of the implementation methodology implies a rapid enterprise systems software implementation based on a Reference Model along with the use of integrated accelerators and implementation tools. These features along with the integration between implementation tools and the enterprise systems software may stimulate the utilisation of implementation tools in order to facilitate and improve the implementation process. In consequence, the implementers may change their way of working in order to improve the outcome (implementation success) of their efforts. However, the use of the implementation tools cannot ensure an automatic improvement of the implementation process, which is influenced by the characteristics of several components, implementers and other project stakeholders, the implementation context and the enterprise systems software.

For the users at the implementation organisation, understanding the features of an implementation methodology may help them in defining expectations and deciding to adopt, adapt, or

Reference this paper as:
Mihailescu D, Carlsson S A and Mihailescu M (2007) "Evaluating Enterprise Systems Implementation Methodologies in Action: Focusing Formalised and Situational Aspects" *The Electronic Journal Information Systems Evaluation* Volume 10 Issue 1, pp 83 - 90, available online at www.ejise.com

reject the use of the implementation methodology depending on the nature of the implementation situation. Thus, they have to be aware of both formalised and situational aspects of the implementation methodology since the value of the implementation methodology per se does not automatically lead to a successful implementation process. User empowerment and the question of adopting or not adopting the integrated implementation tools is a topical issue which implementing organisations need to pay attention to. At the same time, each organisation has to consider the alternative of acquiring or outsourcing indispensable competence during as well as after the implementation. In order to be able to optimise and innovate the business processes through an effective use of implementation tools is important. In consequence, a better understanding of the implementation methodology concept is relevant not only for the implementers but also for the users at the implementation organisations.

The framework suggested in this study appears to be useful for evaluating a particular type of implementation methodologies in terms of its characteristics and its use. Furthermore, since the implementation methodology is relevant not only for the implementers but for the users at the implementing organisations as well, it would be especially interesting to study the implementation methodology from the users´ perspective. In this sense, implementers' role as coaches and the way the knowledge can be transferred to the users in an effective way could be further studied. This perspective is particularly important since many organisations have implemented enterprise systems software and are in the optimisation phase which request competence to handle the business processes in an innovative way to sustain the growth and competitiveness of the organisations. In this study we used the framework to evaluate ASAP. Further studies can use the framework to study other ES implementation methodologies in action. It can also be used in comparative studies, where different ES implementation methodologies are studied and compared.

References

Fitzgerald, B., Russo, L., N. and Stolterman, E. (2002) *Information Systems Development: Methods in Action*, McGraw-Hill, London.

Gartner (2006) "How to Lead and Manage the IT-Literate Workforce", Research report, ID Number G00138404.

Ghosh, J. (1999) *SAP Consulting and Project Management*, McGraw-Hill, London.

Iivari, J. and Maansaari, J. (1998) "The usage of systems development methods: are we stuck to old practices?", Information and Software Technology, Vol. 40, No. 9, pp 501-510.

Juhani Iivari, J., Hirschheim, R. and Klein, H.K. (2004) "Towards a distinctive body of knowledge for Information Systems experts: coding ISD process knowledge in two IS journals", Information Systems Journal, 14, 313-342.

Jayaratna, N. (1994) *Understanding and Evaluating Methodologies NIMSAD A Systemic Framework*, McGraw-Hill, London.

Mathiassen, L. (1998) *Reflective Systems Development*, Dr. Techn. Thesis, Aalborg University. http://www.cs.auc.dk/~larsm/rsd.html.

SAP AG . (2005) "SAP Solution Manager", [online] http://www.sap.com/

Truex, D. and Avison, D. (2003) "Method engineering: reflections on the past and ways forward", Proceedings of the 9th Americas Conference on Information Systems, August 4-5, Tampa, Florida.

Truex, D., Baskerville, R. A. and Travis, J. (2000) "Amethodical systems development: the deferred meaning of systems development methods", Accounting, Management and Information Technologies, Vol. 10, No. 1, pp 53-79.

Zwieg, P. et al. (2006) "The Information Technology workforce: trends and implications 2005-2008", Society for Information Management IT Workforce White Paper.

