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# Replacing the Project Manager in Information System Projects: What Knowledge Should be Transferred?

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## Abstract

*Attempts to revitalise troubled information systems (IS) projects sometimes involve replacing the project manager. The replacement process may entail risks if the crucial knowledge that is critical for a project's success is not transferred to the successor. This exploratory study reveals the perceptions of twelve experienced project managers on what information should be transferred in case of replacement. The results suggest that knowledge on management issues, client organisation, decisions made, team members, and working atmosphere should be transferred whereas the transfer of unnecessary burden should be avoided. The findings are discussed and implications for practice and research are presented.*

*Keywords: Project Management, Knowledge Transfer, Replacement of the Project Manager, Information Systems Development*

## **Introduction**

Project is a typical work form in information systems development (ISD). IS projects are complex because a software project may involve software development, maintenance or an enhancement to software (Schwalbe 2004). In the hypercompetitive and chaotic (Kloppenborg and Petrick 1999; Yeo 2002) business environments, project managers face multitude of challenges (Boddy 2002; Maylor 2003) concerning, for example, risks (Wallace and Keil 2004) and quality issues as well as leadership (Smith 1999) issues.

A project manager is a key person in a project as she or he is to manage all critical project functions like planning, organizing, staffing, directing, and controlling (Thayer 1987). Reasons for failed projects are often traced back to managerial problems – not to technical problems. Knowledge is an essential resource in ISD projects. If managed effectively, knowledge can be used to decrease the time and costs involved in software projects, and to improve quality and customer satisfaction. Reich and Wee (2006) state: “A project manager’s primary task is to manage the knowledge bases of the team members and stakeholders so that they combine in the best possible way to successfully accomplish their assignment.” Projects in the IT field are faced with difficulties and organisational change. One of the most common ways in which organisational changes are brought about is through the replacement of key personnel. Replacing the project manager is common in software firms (Vartiainen and Pirhonen 2006; Aiyer et al. 2005, p. 37). When the manager to be replaced possesses critical knowledge, various knowledge gaps open up, and no one is fully aware of what has been lost. This often leads to instability in the project, and the question of knowledge transfer is thus raised. Although IS professionals agree that knowledge transfer is problematic in this context, little attention has been devoted to it in IS research. A study by Vartiainen and Pirhonen (2006) reports how attempts to rescue troubled IS projects include replacing the project manager, and that such a replacement affects almost everything in the project - the schedule, the cost, the team spirit, personal chemistry, and communication. However, there may be other reasons for the replacement, such as maternity leave, sick leave, or the replacement may be built in to the project process (when the project proceeds to the next phase).

Because knowledge transfer from the preceding manager to the successor is a complex task, one of the major challenges is to identify the valuable knowledge to be transferred. Failure to do so could lead to wasted activity and impaired project performance. Liikamaa (2006, p. 117) found that replacement of project manager and turnover in projects in production plants in various fields (e.g., energy field) prevents transfer of tacit knowledge.

The aim in our study was to determine what knowledge should be transferred when the project manager is replaced in an ongoing IS project. We therefore analysed the interviews of twelve experienced project managers concerning the knowledge that should be transferred from the outgoing manager to his or her successor. The study is descriptive in that we report categories of perceptions, and exploratory (Saunders et al. 2000, p. 97) in that the aim is, first, to identify the critical issues involved, and then to redefine the research question for the future research.

This paper is organised as follows. Section 2 reviews the literature related to tacit and explicit knowledge, and to transferring knowledge. The research design and data gathering are described in Section 3, and Section 4 reports the results of the analysis. Section 5 discusses the findings and presents implications for practice and research.

## **Highlighting forms of knowledge**

Successful project management is based on both accumulated knowledge and the identification of crucial knowledge needed, and on the ability to utilise this knowledge. Process knowledge and experiences gained in previous projects comprise an important resource for project managers. In the absence of knowledge management, the managers are doomed to “re-inventing the wheel”, and possible to making the same mistakes made in previous projects. The completion of a project requires access to project-specific knowledge, which is useful for that project but is unlikely ever to be used again - such as knowledge on customers and suppliers (Leseure and Brookes 2004). Knowledge in this context includes knowledge of the project process (i.e. structure, methodology and status) and domain (i.e. industry, organisation, business processes, technology), and the necessary expertise, i.e. knowing where the expertise (such as programming skills) is located and who has it.

A number of academics and practitioners in the field of management have expressed an interest in the relationship between knowledge management and project management (Kamara et al. 2000; Gilbert and Holder 2000). A great deal of the know-how required in project management is tied to knowledge that is not written down in documents, but is rather realised through the expertise and understanding of the project manager. Next we discuss more specifically the definitions of the tacit and the explicit knowledge and the process of knowledge transfer.

### ***Tacit and explicit knowledge***

Knowledge is defined as justified personal belief that increases the entity's capacity for effective action (Huber 1991; Nonaka 1994). It is typically divided into tacit and explicit knowledge. Polanyi (1966) encapsulates the essence of tacit knowledge in the phrase, "We know more than we can tell", and provides further clarification of the concept in commonplace examples such as the ability to recognise faces, ride a bicycle or swim without even the slightest idea of how these things are done.

Tacit knowledge is derived from personal experience: it is subjective and difficult to formalise, acquire and transfer (Nonaka et al. 2000). Although tacit knowledge is informal, unstructured and mostly in the form of unconscious expertise contained in the heads of staff and stakeholders who have a relationship with the organisation, it can be converted into explicit knowledge (Nonaka and Takeuchi 1995). Tacit knowledge may be held by individuals in an employee's schemes, skills, habits and abstract knowledge (Lyles and Schwenk 1992; Starbuck 1992), or collectively in top-management schemes, organisational consensus on past collaborative experiences, firm routines, and firm and professional culture (Lyles and Schwenk 1992; Nonaka and Takeuchi 1995). It is often shared through highly interactive conversation, storytelling, and collaborative experience (Nonaka and Takeuchi 1995). Tacit knowledge is highly context- and history-dependent, and it is influenced by the individual situation.

Instead, explicit knowledge is codified and transferable in formal, systematic methods, such as in rules and procedures (Nonaka and Takeuchi 1995). Knowledge can be codified if it can be recorded or transmitted in the form of symbols (e.g., writing, drawings or speech), or embodied in a tangible form (e.g., machinery and tools). Explicit knowledge is more precisely and formally articulated than tacit knowledge. On the individual level it includes knowledge and skills that could be easily taught or written down, whereas collectively it resides in documentation, information systems, and rules (Brown and Duguid 1991, Starbuck 1992).

### ***The process of knowledge transfer***

An important process in knowledge management is that of knowledge transfer, which could be defined as the process through which one organisational unit is affected by the experience of another (Argote and Igram 2000). Gupta and Govindarajan (2000) conceptualised knowledge transfer (knowledge flows) in terms of five elements: (1) the value of the source unit's knowledge stock, (2) the motivational disposition of the source unit (i.e. the willingness to share knowledge), (3) the existence and richness of transmission channels, (4) the motivational disposition of the target unit (i.e. the willingness to acquire knowledge from the source), and (5) the absorptive capacity of the target unit, defined as the ability not only to acquire and assimilate but also to use knowledge. Frequency studies focus on the knowledge transfer channels (Alavi and Leidner 2001). Knowledge transfer channels can be informal or formal, personal or impersonal (Holtham and Courtney 1998). Davenport and Prusak (1998) highlight the difference between the more formalised transfer mechanisms such as documents and databases, and informal exchanges which are more casual events that usually take place face to face. Wathne et al. (1996) identified from the sociology and management literature four determining factors that influence knowledge transfer: openness (willingness to share knowledge and interact), channel of interaction (mail, telephone, face-to-face), trust, and prior experience (ability to internalize knowledge). According to Szulanski (2000), the basic elements potentially influence the transfer of knowledge: channel, message, context, recipients and source. Studies of knowledge management have identified different characteristics of the source, and one important factor that affects transferability is its perceived trustworthiness (Sarker et al. 2005, Szulanski et al. 2004; Wathne et al. 1996). However, "unless the implications of

experience can be transferred from those who experienced it to those who did not, the lessons of history are likely to be lost through turnover of personnel” (Levitt and March 1988, p. 328).

## **Research design**

In order to increase understanding about the phenomenon of replacing project managers in an ongoing project we started an exploratory study with several open-ended questions (see the first findings in Vartiainen and Pirhonen 2006). One of the interview themes relates to what knowledge should be transferred in the case of the replacement of the project manager in IS projects. Managers in software firms located in four towns in Finland were contacted. The firms in question represent the vendor side, i.e. they implement software projects to meet the needs of their clients, which is a typical function of any software firm. Project managers with considerable working experience in software projects, at least five to ten years were selected. In all we interviewed 12 project managers during the spring of 2006. Their age and gender profile was as follows (age/Male or Female): 41/M, 42/M, 42/F, 59/M, 46/F, 57/F, 33/M, 50/M, 38/M, 35/M, 43/M and 41/M.

The interview themes were sent to the interviewees in advance. The second author of this article interviewed the first five subjects and the first author the others. One of the interview questions was as follows: “*Describe what knowledge should be transferred to the successor project manager. What knowledge is critical?*” When the interviewees described their ideas, they were prompted to describe in more detail what they meant. The following prompting questions were used: “*Would you please describe in more detail what you said?*” and “*What else comes to mind?*” The interviews were recorded and transcribed. For the analysis of the transcripts interpretive content analysis were applied (Lacity and Janson 1994 148): this approach takes account of the contextual circumstances in which the subjects frame their answers and the circumstances that influence the researchers’ interpretations. We then formed categories based on our interpretations of the subjects’ perceptions. We found that the subjects described other aspects of knowledge transfer in addition to the content. We therefore determined two viewpoints based on the subjects’ perceptions: crucial knowledge to be transferred and other significant aspects for knowledge transfer. Both of these are described in the next section.

## **Findings**

This section explains the following viewpoints: Vital knowledge to be transferred (section 4.1), and Other significant aspects of knowledge transfer (section 4.2). Categories in both viewpoints are briefly described in each section.

### ***Vital knowledge to be transferred***

#### **Management issues**

The results achieved so far and management issues related to the project should all be transferred. Issues that were closely related to tasks, objectives, and results and their attainment, were among those mentioned. The following ones emerged: project organisation, resources, operational principles, ways of working in the project, processes, key persons, economic matters, timetables, project plans and other plans, risks, and meeting practices. Exemplary extracts follows:

PM8: *And then follow-up as facts, you know how much have we achieved as opposed to what we were supposed to achieve, and what goals have been reached, or however it is you’re measuring it.*

PM10: *A good description of the project in the master specs...Then a good specifications document that describes the project from all perspectives, like a commercial description, then like a user-perspective description and a technical description of the project...*

### **The client organisation, its objectives, and business**

The objectives of the client in the particular project, knowledge and experience regarding the cooperation with the client, staff competencies in the client organisation, and the client's experience of project work all emerged as significant. In addition, knowledge of the client's business, and the environment in which the outcome of the project would be used, was considered one of the major issues, as was informal knowledge on the client's decision-making process and the staff.

Exemplary extracts follow:

*PM3: Mostly to do with who the people are, what are their positions, what are their backgrounds, what are their roles in this project. Plus then the kind of informal information; who decides on things and who you can get information from, how you must deal with, and not deal with some person. That's the ideal situation, if you could get all this from the previous project manager.*

*PM9: ... So it's not just the project requirements, but more deeply what the client is trying to achieve with the software you are doing and how extensively it'll be distributed, so you can take testing seriously enough. If the software is to be distributed to millions of cell phones you'll want to test it a little better than if you're doing a not-so-important server or system where you can make corrections if necessary.*

### **Decisions and the rationale behind them**

Project managers make a series of decisions during each project. However, neither the decisions made nor the rationale behind them is necessarily written into the project plan or into any other project document. Awareness of the issues agreed with the client is valuable knowledge for the project manager. The following extract exemplifies these issues:

*PM12: Well of course the project plan first, where you can see what you've agreed with the client and planned things, but there's probably a lot of the kind of silent knowledge, grey area, that contains everything unofficial, so the problem is transferring that feeling of how this project is going according to that supplier and according to that customer. If you could transfer that knowledge, although I don't know if there's a way of doing that, but one way is probably this kind of contact information or how the customer has been contacted and what information has been exchanged, that's the information you should be able to exchange. So these client systems, where you save these conversations and what you've agreed over the phone. Everything goes there in the project management, so the methods and tools are in that sense OK for you to save.*

### **Team members**

The project managers felt that knowledge about the team members should be transferred: their background, skills, workload, motivation, and how they had kept up with their work. Examples follow:

*PM2: What's the resource situation, their workload? In other words, how much work do the people have?*

*PM3: Yeah, so it's the same thing there as well. Background, know-how, what kind of persons they are what kind of tasks they have in the project and how they've handled them. Then there's also this informal information. You have to be a little more careful with that.*

## **Atmosphere and feelings**

According to the project managers, knowledge of the working atmosphere and of feelings concerning the project, on the side of both the supplier and client, is valuable. Group dynamics and relations between team members should also be taken into consideration: there may be disagreement and conflict – not just within the supplier's team but also inside the client organisation - of which the successor project manager should be aware. Knowledge about problems and successes should be transferred. Exemplary extracts follow:

*PM12... but certainly there's plenty of that kind of tacit knowledge, grey areas, wherein all the informal [knowledge] lies. The problem is how to transfer the feelings of both the supplier and the client about the project progress, if this kind of knowledge could be transferred. ...what the group dynamics are like... the preceding manager should be able to transfer information about how the team members co-operate with each other or if there is something [inside the group] that deserves attention.*

*PM6: There are such, how should I say, such circles or such [projects] involving many clients or different organisations of the client. They may quarrel with one another... And before you know it there's this kind of discord...*

## **Other significant aspects of knowledge transfer**

### **Accuracy in documentation**

Given the possibility of deficiencies in project documents the new manager may consider it important to question the plausibility of the documentation given. The next extract describes how project managers do not always update the project plans.

*PM9: It is useful to know how accurate the documentation is, if the project plan is up-to-date and if things are really going as she or he [project manager] says. I'm supposed to have read the project plan in advance, but I don't necessarily trust it... My experience tells me that project managers are not very active in updating the project plan...*

### **Avoiding the transfer of unnecessary burden**

The need to avoid transferring unnecessary burden was mentioned. The project may have involved failures and conflicts that have been resolved, in which case there is no need to transfer such knowledge because of the negative connotations. As one project manager stated:

*PM5: There might be some troublesome matters that don't need to be dwelt on. They've been taken care of and there's no use informing the successor project manager and lumbering him with what has happened earlier.*

### **In-depth discussions**

In-depth discussions between the parties were considered important when a new manager begins the job. He or she should discuss project-related and other issues with the preceding manager and with the team members in order to get to know the personalities in the team. An example follows:

PM2: *The personal experiences of the outgoing project manager should somehow be conveyed, a kind of review of the project to the successor that specifically covers the problems and so on. On an even deeper level, it could be a one-to-one discussion so that you don't need other people. You'll go into more detail about the problems.*

## Discussion

The findings of this study show that a whole range of project-related critical knowledge should be transferred when a project manager is replaced. This involves challenges in terms of identifying valuable explicit and tacit knowledge, and in determining how to transfer both types of knowledge from the preceding manager to the successor. There are also other factors affecting the transfer process, including the accuracy and trustworthiness of the knowledge and the different means of supporting the transfer, such as with in-depth discussions. Furthermore, it is suggested that there may be knowledge the transfer of which would be unnecessary for the successor (unnecessary burden).

Most of the knowledge needed for managing the costs and schedules is explicit and is stored in databases and documents (Davenport and Prusak 1998). However, it may well not enable the new project manager to familiarise herself or himself with the project history because even documented knowledge may require in-depth introduction with the help of face-to-face discussions. The successor manager should assess the trustworthiness of the acquired knowledge because the documentation may not be up-to-date (cf. Sarker et al. 2005; Szulanski et al. 2004; Wathne et al. 1996). Indeed, the findings show that there is plenty of valuable and necessary knowledge in project management that is not written down in the documents but that could be transferred in-depth discussions. This encompasses knowledge of cooperation between the team members as well between the project manager and the client, the personalities of the team members and the client representatives, and the rationale behind the decisions and the undocumented changes in plans and specifications.

The coordination of expertise in the team, as recognised by Faraj and Sproull (2000), emerged in the results of our study in how knowledge about team members, such as their backgrounds and skills, and about their work motivation and how they had kept up with it, was to be transferred. This is not unproblematic because the departing manager may be prejudiced against some team members and this may hinder future cooperation. The successful continuation of the project requires the successor to acquire knowledge from his or her predecessor, but also from the team members. In-depth introductory discussions were considered a means of transferring knowledge. However, in reality willingness to share knowledge varies: Foos et al. (2006) state that “project managers are not interested in the long-term ramifications of tacit knowledge transfer”, although this could be vital knowledge in terms of the project success. Willingness to share knowledge also depends on the context of the replacement: if the project manager is replaced due to incompetence she or he is probably not eager to share her or his knowledge of the project with the successor, for example.

### ***Implications for project management and research***

*The documentation of critical knowledge.* One of the major tasks of the project manager is the management of project knowledge including formal documentation such as plans, reports, etc. The systematic documentation of mistakes and potential pitfalls helps to reduce the risks and to develop competencies (Schindler and Eppler 2003). The gathering of experiences and lessons learned does not usually take place systematically during the course of the project, but is rather left until the end. This could be a problem if the project manager is replaced the meantime because the experiences and lessons learned so far are not documented or available. Resources covering the documentation of experience throughout the project should be allocated in the project plan.

*Maintaining a collaborative climate even if the project manager is replaced.* A collaborative climate, which is recognised as a major factor influencing the effectiveness of knowledge work (Sveiby et al. 2002), should be maintained even if the project manager is replaced. Significant factors affecting to the knowledge transfer, openness, the degree to which the parties work



closely together on a common task, and trustful relations (Wathne et al. 1996), should be maintained and developed. If the replacement is made in order to rescue a troubled project, and trust in the project manager has been lost, maintaining a collaborative climate may be a major challenge. The means of doing so, even in crisis situations, should be developed.

*The need for research on the replacement of the project manager.* More in-depth research is needed in this phenomenon. Based on the results we hypothesize that in different projects (whether the difference relate to type of project, size of project, stakeholders involved, duration etc.) the criticality and effects of replacing project manager are different and the criticality of the knowledge transfer in such a situation also differs. The reason for the replacement of project manager and its effects to the process of knowledge transfer should be investigated. Future research should also consider the perceptions of senior managers, and how previous and following managers experienced the replacement.

### ***Evaluation of the study***

The subjects in this study were asked to produce descriptions of what project knowledge should be transferred to the successor project manager and what knowledge was critical. According to Fielding (1993), the problems with interviewing, however, include interviewee attempts at rationalisation, and the fact that the interviewees may fear being exposed. As the theme investigated may have been emotionally difficult for the interviewees we therefore refrained from asking them if they had experience of being removed from a project. As far as reliability is concerned, we recognise the fact that two researchers with different backgrounds and of different personality types conducted the interviews, and this may have caused response bias. On the one hand, both of us have a broad view of the issues because we have been teaching project management in cooperation with companies for several years. This strengthens the validity of our results. In terms of numbers, twelve interviewees represent a small population, and, therefore, more data is needed to produce a richer variety of perceptions. For the same reason we cannot generalize the results to all projects. In addition, as the research is in the exploratory phase, the more detailed research objective is needed. Finally, one of the strengths of the study is that by using subjects who were experienced project managers we were able to bring out the major viewpoints on the issue in question.

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### **References**

- Aiyer, J., Rajkumar, T., and Havelka, D. "A Staged Framework for the Recovery and Rehabilitation of Troubled IS Development Projects," *Project Management Journal* (36:4), 2005, pp. 32-43.
- Alavi, M., and Leidner, D. "Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues," *MIS Quarterly* (25:1), 2001, pp. 107-136.
- Argote, L., and Ingram, P. "Knowledge Transfer: A Basis for Competitive Advantage in Firms," *Organizational Behavior and Human Decision Processes* (82:1), 2000, pp. 150-169.
- Boddy, D. *Managing Projects: Building and Leading the Team*. Harlow, Essex: Prentice Hall, 2002.
- Brown, J.S., and Duguid, P. "Organizational Learning and Communities-in-Practise: Toward a Unified View of Working, Learning, and Innovation," *Organization Science* (2:1) 1991, pp. 40-57.
- Davenport, T., and Prusak, L. *Working knowledge: how organizations manage what they know*. Boston (Mass.): Harvard Business School Press, 1998.
- Faraj, S., and Sproull, L. "Coordinating Expertise in Software Development Teams," *Management Science*, (46:12), 2000, pp. 1554-1568.

- Fielding, N. "Qualitative Interviewing," in *Researching Social Life*, N. Gilbert (ed.), London: SAGE Publications, 1993, pp. 135-153.
- Foos, T., Schum, G., and Rothenberg, S. "Tacit Knowledge Transfer and the Knowledge Disconnect," *Journal of Knowledge Management*, (10:1), 2006, pp. 6-18.
- Gilbert, M., and Holder, N. "An approach to project knowledge management". Proceeding of the BPRC Knowledge Management: Concepts and Controversies Conference, held at the University of Warwick, 193, 2000.
- Gupta, A., and Govindarajan, V. "Knowledge Flow within Multinational Corporations," *Strategic Management Journal* (21:4), 2000, pp. 473-496.
- Holtham, C., and Courtney, N. "The Executive Learning Ladder: A Knowledge Creation Process Grounded in the Strategic Information Systems Domain," In *Proceedings of the Fourth Americas Conference on Information Systems*. Hoadley, E., and Benbasat, I. (eds.), Baltimore, MD, 1998, pp. 594-597.
- Huber, G. *Organizational Learning: The Contributing Processes and the Literatures*. *Organization Science* (2:1), 1991, pp. 88-115.
- Kamara, J., Leseure, M., Carillo, P., and Anumba, C., "A framework for cross-sectoral learning", Proceeding of the BPRC Knowledge Management: Concepts and Controversies Conference, held at the University of Warwick 2000, pp. 177.
- Kloppenborg, T., and Petrick, J. "Leadership in Project Life Cycle and Team Character Development," *Project Management Journal* (30:2), 1999, pp. 8-14.
- Lacity, M.C., and Janson, M.A. "Understanding Qualitative Data: A Framework of Text Analysis Methods," *Journal of Management Information Systems* (11:2), 1994, pp. 137-155.
- Leseure, M., and Brookes, N. "Knowledge management benchmarks for project management," *Journal of Knowledge Management*, (8:1), 2004, pp. 103-116.
- Levitt, B., and March, J. "Organizational Learning," *Annual Review of Sociology* (14), 1988, pp. 319-340.
- Liikamaa, K. *Piilevä tieto ja projektipäällikön kompetenssit (Tacit Knowledge and Project Manager's Competencies)*, Tampere University of Technology. Publication 628. Diss. (In Finnish), 2006.
- Lyles, M., and Schwenk, C. "Top Management, Strategy and Organizational Knowledge Structure," *Journal of Management Studies* (29:2), 1992, pp. 155-174.
- Maylor, H. *Project Management*. Harlow, Essex: Prentice Hall, 2003.
- Nonaka, I. "A Dynamic Theory of Organizational Knowledge Creation," *Organization Science* (5:1), 1994, pp. 14-37.
- Nonaka, I., and Takeuchi, H. *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation?* Oxford University Press, Oxford, 1995.
- Nonaka, I., Totama, R., and Nagata, A. "A Firm as a Knowledge-Creating Entity: A New Perspective of the Theory of the Firm," *Industrial and Corporate Change* (9:4), 2000, pp. 1-20.
- Polanyi, M. *Personal Knowledge*. Chicago, IL. University of Chicago Press, 1962.
- Reich, B., and Wee, S. "Searching for Knowledge in the PMBOK® Guide," *Project Management Journal* (37:2), 2006, pp. 11-26.
- Sarker, S., Nicholson, D.B., and Joshi, K.D. "Knowledge Transfer in Virtual Systems Development Teams: an Exploratory Study of Four Key Enablers," *IEEE Transactions on Professional Communication* (48:2), 2005, pp. 201-218.
- Saunders, M., Lewis, P., and Thornhill, A. *Research Methods for Business Students*. Harlow, England: Prentice Hall, 2000.
- Schindler, M., and Eppler, M. "Harvesting Project Knowledge: a Review of Project Learning Methods and Success Factors," *International Journal of Project Management* (21:3), 2003, pp. 219-228.
- Smith, G.R. "Project Leadership: Why Project Management Alone Doesn't Work," *Hospital Material Management Quarterly* (21), 1999, pp. 88-92.
- Starbuck, W. "Learning by Knowledge-Intensive Firms," *The Journal of Management Studies*, (29:6), 1992, pp. 713-740.
- Schwalbe, K. *Information Technology Project Management*. Boston: Thomson Learning Inc., 2004.
- Sveiby, K-E., and Simons, R. "Collaborative Climate and Effectiveness of Knowledge Work," *Journal of Knowledge Management* (6:5), 2002, pp. 420-433.
- Szulanski, G. "The Process of Knowledge Transfer: A Diachronic Analysis of Stickiness," *Organizational Behavior and Human Decision Processes* (82:1), 2000, pp. 9-27.
- Szulanski, G., Cappetta, R., and Jensen, R. "When and How Trustworthiness Matters: Knowledge Transfer and the Moderating Effect of Causal Ambiguity," *Organizational Science* (15:5), 2004, pp. 600-613.
- Thayer, R.H. "Software Engineering Project Management, a Top-Down View," *IEEE*, 1987, pp. 15-53.
- Wallace, L., and Keil, M. "Software Project Risks and Their Effect on Outcomes," *Communications of the ACM* (47:4), 2004, pp. 67-73.
- Wathne, K., Roos, J., and von Krogh, G. "Towards a Theory of Knowledge Transfer in a Cooperative Context," in *Managing Knowledge. Perspectives on cooperation and competition*, von Krogh, G., and Roos, J. (eds.) London: SAGE Publications, 1996.

- Vartiainen, T., and Pirhonen, M. "How is Project Success Affected by Replacing Project Manager?" Fifteenth International Conference on Information Systems Development (ISD'2006), Budapest, Hungary, 2006.
- Yeo, K.T. "Critical failure factors in information systems projects," *International Journal of Project Management* (20:3), 2002, pp. 241-246.