

Project Learning and Project Competencies in Project-based Firms; Swedish Consultancy firms as Case Study*

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This study explores, describes and analyzes the various characteristics of interproject learning mechanisms and project competencies found in a sample of consulting firms in Sweden. The study focuses on the perceived importance of different interproject learning mechanisms and their perceived impact in developing project competencies in consulting firms. The study interrogates the 'perceptions' of 'key' informed project management practitioners, who have experience of managing projects. Their perceptions about project activities in their respective firms helped capture a 'managerial' view, as well as, provide 'expert' opinion. The study finds that the most highly ranked and valued interproject learning mechanisms involved some degree of face-to-face interactions. Learning mechanisms that enables the capture, storage and transfer of explicit knowledge, though important, were not ranked highly in importance as person-to-person communication. The difference might be due to the efficient way the latter mechanisms have in transferring socially embedded and context-dependant tacit knowledge, which comprise a large part of knowledge applied in execution and management of projects. As a result of the research findings, a number of recommendations are outlined.

Keywords: Interproject learning mechanisms, Project competencies, Project-based firms, Knowledge transfer, Consultancy sector

Field of Research: Management

1. Introduction

Project-based firms (PBFs) face several challenges in transferring learning and knowledge accumulated during the execution of one project to another (often) very different project(s) or the parent organization (Boh, 2007; Prencipe and Tell, 2001). Transferring of lessons learned across current and future projects is seen to be key in developing dynamic competitive capabilities, which are needed to survive in today's globally competitive market place (Newell and Edelman, 2008). A growing number of researchers are now emphasizing the critical importance of learning and knowledge accumulation in building-up project competencies (i.e., Anbari *et al.* 2008; Kotnour and Vergopia, 2005; Soderlund, 2005). These researchers point to the crucial role 'project knowledge' accumulated across a consecutive series of projects can play in enhancing the market performance of firms. They place continuous learning and knowledge accumulation at the very center of firm-level competitiveness. Project-based firms (PBFs) may well be advised to develop various learning mechanisms that can enhance

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the accumulation of relevant project knowledge (Brady and Davies, 2004; Soderlund *et al.*, 2008; Williams, 2003).

Despite growing emphasis on the need for continuous learning and knowledge accumulation, very few studies have examined the relative effectiveness of various learning mechanisms in strengthening different types of project competencies, across different firm-types and subsectors (Kotnour and Vergopia, 2005). It might well be that different learning mechanisms (or their combinations) are good at collecting different types of knowledge needed to develop different types of project competencies. This raises the possibility that certain learning mechanisms might not be appropriate channels to use in developing some types of project competencies in particular sectoral contexts. For example, Kasi *et al.*, (2008) has observed that adopting post-project audits in certain cases might reinforce organizational learning dysfunctions rather than improve current practices. It is, therefore, not clear whether different types of project-learning mechanisms are effective in developing various types of project competencies in different sectors. Focusing on individual economic sectors might also help clarify certain sector-specific issues associated with developing project competencies in project-based firms. To fill this gap, this research paper aim at exploring and examining interproject learning mechanisms and project competencies in the consultancy sector in Sweden.

The structure of this research paper is as follows. The research objective of the study is covered following this introductory section. The research questions are covered in Section 3. The theoretical framework underpinning the study is covered in Section 4. Section 5 outlines the main research methodology used for the study. Section 6 and 7 covers the Data analysis and discussions of results, respectively. The conclusions of the study are given in Section 8.

2. Research Objectives

The prime research objective is to explore, describe and analyze the perceived nature of interproject learning mechanisms and project competencies of project-based firms (consultancy firms) in Sweden. The prime research objective has been broken down into two sub-objectives.

The two research sub-objectives are:

- (i) To identify the different types of interproject learning mechanisms used by project-based firms to transfer 'lessons learned' on one project to other project(s) or parent organization.
- (ii) To determine – from project management practitioners' perceptions – the types of project competencies that are developed as a result of investment in interproject learning in consultancy firms.

The proposed study focuses on project-based firms operating in the consultancy service sector. A couple of previous studies have been done on consultancy firms. When organizational knowledge is studied on consultancy firms, it is mainly covered from the

'Knowledge Management' or organizational learning perspective. However, most consultancy firms can also be seen as project-based firms. They render unique customized services to different customers. Most of their services are provided within a particular time frame. Most studies done on project-based firms have been done in engineering, technology, constructions and R&D sectors. A lot of consultancy firms are a unique type of project-based firms, in that their main output is not normally a product but a service. Consultancy firms are also involved in knowledge production. They are considered to be archetype of 'knowledge-intensive' firms (Donnelly, 2008; Werr and Stjernberg, 2003). It is, therefore, fruitful to focus our study on the consultancy sector. As recommended by Prencipe and Tell (2001), further research is required to examine the effectiveness of different interproject learning mechanisms in different contextual environments.

3. Research Questions

To achieve the above research objectives, one main research question was developed. The main research question is:

What is the perceived nature of interproject learning mechanisms and their impact on strengthening different types of project competencies in consulting firms in Sweden?

The main research question is further decomposed into two specific sub-research questions. The two sub-questions are:

- (i) What are the different types of interproject learning mechanisms used by consultancy firms to transfer lessons learned on one project to other project(s) or the parent organization? And what are their perceived ranking in importance?
- (ii) Which types of project competencies are perceived – by project management practitioners - as well developed due to investment in interproject learning in consultancy firms?

4. Theoretical Framework

4.1 Project Learning

The concept of project learning is derived mainly from the literature on organizational learning (Kotnour, 2000). The underpinning theoretical perspective is that organizational competencies (in our case, project competencies) are built-up through various learning processes (Söderlund, 2005). In the context of project work, project-learning must not be seen as an automatic by-product of the project (Ayas, 1997). In other words, "learning has to be managed together with the project and must be integrated into project management as standard practice" (Ayas, 1996, as quoted in, Schindler and Eppler, 2003: 225). A typical project must, therefore, have two outputs; (i) the actual end-product/service delivered by the project, and (ii) a post-project assessment of what has been 'learned' during the project (Cooper *et al.*, 2002). For this to happen, however, there must be deliberate efforts to invest resources (money, time, effort, processes, etc) in structuring a project environment that promote systematic retention of knowledge and

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insights gathered during a project (Schindler and Eppler, 2003; Cooper *et al.*, 2002). Otherwise, there is a real danger that transferable project insights gained may be lost once the project is completed, the project team gets disbanded, and individual project team members move in different directions (Brady and Davies, 2004). To avoid such knowledge loss, there is need for firms to have a more structured approach that incorporates systematic 'reflective practices' on project experiences (Soderlund *et al.*, 2008).

Project learning is a multifaceted concept, involving a number of activities at different levels of an organization. Project learning takes place at the level of an individual employee, project team, across project teams, a single organization and/or a group of firms working on a particular project. Lampel *et al.* (2008) identifies four levels of project-related learning and knowledge activities; interorganisational, intraorganizational, interproject, and intraproject learning. Interorganizational project learning refers to knowledge that is transferred across several project-based firms working on a single project. On very large projects (e.g., the development of the Airbus A380), one is likely to see a number of companies working together to complete a particular project. As these firms interact with each other, project knowledge is shared across firms. Intraorganizational project learning refers to a situation where various departments, functions or divisions of a firm are called upon to support and contribute their expertise to the delivery of a particular project. Interproject and intraproject learning refers to knowledge creation and flow that takes place across projects and within each project team, respectively. It is also possible that the nature and depth of learning that takes place at all the four different levels given above is qualitatively different (Boh, 2007).

The focus of all learning and associated knowledge accumulation activities is, of course, to strengthen project competencies required to be competitive in the long term. Interproject learning, therefore, focused on the accumulation of relevant knowledge, skills and experiences needed by firms to efficiently and effectively execute current and future streams of projects (Newell and Edelman, 2008; Lee, 2008). With the risk of oversimplification, interproject learning can be presented diagrammatically as shown in Figure 1 below. In Figure 1, interproject learning is facilitated by a deliberate incorporation of post-project reviews into the project management methodology underpinning project execution. The new experiential knowledge acquired from the execution of Project A & Project B is captured in status, stage gate, and post-project review reports. This accumulated knowledge is then deposited into the Organizational Knowledge-base Repository or databases. This approach to knowledge accumulation needs to also take account of the tacit and contextual knowledge which might not be captured in official post-project reviews (Kasvi *et al.*, 2003). For example, it might be that a particular solution implemented when countering a particular difficulty during the project execution may have been chosen due to the unique contextual environment. It is, therefore, important to point out the contextual environment under which particular decisions were made. Knowledge of 'why' particular solutions were selected in past projects can help future project teams to know whether some past solutions are relevant to their current challenges. The emphasis must, therefore, be put on capturing both tacit and non-tacit knowledge, experiences and expertise generated during the execution of a project (Boh, 2007). Institutionalization of individualized knowledge sharing

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teams struggle to develop new solutions to encountered problems, they develop new knowledge of what works and does not work, and why? Such knowledge, if captured can help in building the project knowledge base of the organization. But for this to happen, deliberate processes, procedures and routines need to be in place, to support continuous learning and knowledge development at all three levels of the company (i.e., individual-, project-, and organizational-level). However, a more holistic understanding of project competence-building requires that one understand the complexities associated with the generation, capturing, storage and re-use of knowledge within a project environment (Brady and Davies, 2004; Kasi *et al.*, 2008).

According to Soderlund (2005: 456), project competencies should have at least the following four characteristics:

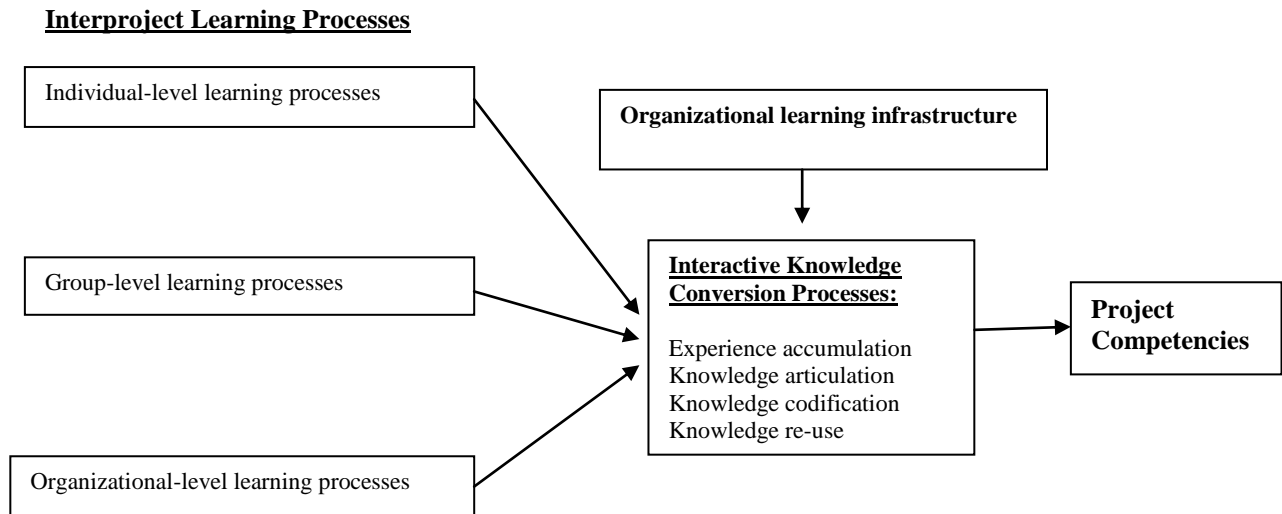
- (i). Should be capable of application across different project types.
- (ii). Related to having a holistic approach to projects (i.e., capacity to generate good project ideas, as well as, good project execution).
- (iii). Must underpin strategic competitive project operations, that are continually adaptive to technological and market dynamics.
- (iv). Must be built upon clear 'key' building blocks or activities.

In a market environment that is relentlessly changing, project-based firms need to be continuously reconfiguring their bundles of project competencies, while at the same time getting rid of those which are no longer relevant (Lindkvist, 2008). In order to achieve this, Landaeta (2008) argues that firms need to continuously develop and upgrade three types of knowledge; technical project knowledge, problem-solving knowledge, and continuous improvement knowledge. The later is critical, as it enables the "continuous improvements of project tasks" (ibid: 34). In the long run, it is such continuous improvement and learning activities that determine the competitive advantage of project-based firms. As quoted in Suikki *et al.* (2006: 724); "In the long run, the only sustainable source of competitive advantage is your organization's ability to learn faster than its competitors".

Pulling the various strands of the literature covered above, we now outline the various strands that are of focus in this study. These are summarized in the research model shown in Figure 2 below. In short, we are interested in exploring the perceived nature and linkages between interproject learning mechanisms and Project competencies, with the organizational learning infrastructure playing a mediating role. We have to acknowledge that the 'visual presentation' masks a complex process with various feedback loops.

As shown in Figure 2, the process of developing project competencies involve generation, capturing and sharing of new project knowledge at three levels of learning processes. These processes interact with four deliberate 'secondary' processes at the project and organizational level (i.e., experience accumulation, knowledge articulation, knowledge codification, and knowledge re-use). On top of these activities, investment in developing and continuously upgrading project competencies is conditioned by existing and effectiveness of 'organizational learning-supporting' infrastructure.

Figure 2: Relationship between Interproject learning and Project Competencies



Source: Yan & Mainga (2009,p30)

5. Research Methodology

The aim of this exploratory study was to capture the major facets of interproject learning mechanisms and project competences among consulting firms in Sweden. The findings from our study could form a base for anyone in future who would want to conduct a large scale survey, whose objective would be more explanatory in nature. The research approach had seven steps: literature review, development of research objectives and research questions, definition of the target sample, administering of the questionnaire, data collection, data analysis and discussion of results, and writing up of recommendations/conclusions.

Sweden was selected as the country of study because that is the country where the two lead authors were studying for the MSc degree. The unit of analysis in this study are the 'processes' of transferring new knowledge generated within projects (i.e., during the execution of a project) to other projects or the parent organization. The sampling frame was created by searching the web for consulting firms in Sweden, especially those firms with their own website. The rationale was that consulting firms which have their own websites on internet would more likely have 'formal' project management processes. Moreover, it was a much easier way to create a sampling frame, taking account of the language barriers. Firms were drawn from management consulting, financial/auditing/accounting consulting, and technical/engineering consulting subsectors.

The 'sampling element' is any project management practitioners in consulting firms (i.e., project coordinator, project manager/assistant project manager, program manager, project director, etc.). Our study captures 'expert' perceptions of project management

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practitioners from consulting firms, who have practical experience of running and managing projects. Watson and Hewett's (2006) study on MNCs consulting firms also uses perceptions of respondents, instead of objective indicators to capture the transfer of knowledge within organizations.

The questions in the questionnaire were developed partly from the literature review, as well as, adopted (& adapted) from past questionnaires used by other researchers. A number of questions were adopted (& some times adapted) from sample questionnaires used by other researchers (i.e., Kotnour, 1999, 2000; Lampel, 2001; Landaeta, 2008; Newell and Edelman, 2008). Other questions were, however, developed from the literature review. The questionnaire was largely a close-ended questionnaire, with four subsections; General questions, Interproject learning mechanisms, Project competencies, and Learning Infrastructure and Postmortem Reviews. The questionnaire was kept to a maximum length of three pages, to enhance the response rate. The length of a questionnaire is normally negatively related to the response rate. We expected the closed nature of most questions in the questionnaire would contribute to enhancing reliability of the study. We therefore expect only minor variation in answers given to individual questions, if the same questionnaire was administered to the same respondents at a different time period.

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a mailed pre-notice (Kaplowitz *et al.*, 2004). Consequently, in our study, prior to emailing the questionnaires, the companies were contacted by either telephone or email, informing them of the forthcoming questionnaire.

Of the 48 questionnaires administered to consulting firms, only 9 were returned, representing a return rate of almost 19%. While a higher return rate is desirable, our exploratory study is not focusing too much on getting a representative sample. The main focus is to seek out 'expert' opinion from respondents, and try to find out whether there are any patterns that can be detected, which can then be carried forward in future research. A number of follow-up efforts were made, using telephone calls and emails. Due to the fact that one returned questionnaire had a lot of subsections that were not completely filled-in, the analysis focuses on only the remaining eight (8) usable questionnaires. If there was no time limitations, the two lead researchers would probably have got a bigger return rate, if there was longer time to wait for more returned questions.

As an exploratory study, we adopt largely a qualitative approach in analyzing the data. In addition, our exploratory study was focused on soliciting perceptions of project management practitioners (as expert opinion holders). In part, because of the small sample, but also because we are analyzing perceptions, the qualitative data analysis approach is seen as the most appropriate.

Of the 8 respondents, 3 were currently project managers, 2 were project coordinators, and 2 were at the director level in their respective firms. 1 respondent did not name his/her position in the company. The respondents had practical experience of working on projects that ranged from 5 to 25 years. With the exception of 1 respondent, others did not seem to want to identify the name of their companies and opted to identify the sector in which their company was located. Of the 8 respondents, 3 were from management consulting firms, 1 from financial/accounting consulting firm, 3 identifying themselves as involved in technical/engineering consulting subsector. One respondent did not identify either his/her company name or sector.

6. Data Analysis

The data analysis is arranged following the order of the two sub-questions covered in this study. We, therefore, discuss the answers to each research sub-question in sequence. The analysis starts with examining the ranking of interproject learning mechanisms used by consulting firms to transfer 'lessons learned' accumulated on a particular project to other projects or the rest of the parent organization.

6.1 Mechanisms of Transferring 'Lessons Learned' to Other Projects

While there is a long list of various mechanisms used to transfer 'lessons learned' in the literature, only those assumed to be more commonly applied in consultancy firms are included in the study. There was an option for respondents to state any other interproject learning mechanism(s) that may not have been listed in the question. The results are shown in Table 1. The results are derived from responses to Q4 in the

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questionnaire. While it is important to be cautious in making wide generalization from a small sample, the result shows a few (weak) patterns among the answers provided by the 8 respondents.

In general, the highly ranked interproject learning mechanisms are those that involve face-to-face transfer of project knowledge across projects. The two most important and critical ones are; (i) the transfer of experienced project personnel to new projects, and (ii) the person-to-person informal discussions with work colleagues involved in other projects. The result suggests that project knowledge in consulting firms involves some degree of tacit knowledge. Such knowledge is more likely to be conveyed by personal interactions, practice-induced conversations, and through observations of experienced co-workers (Landaeta, 2008; Newell *et al.*, 2006; Zedtwitz, 2002). In addition, the culture in consultancy firms require employees to work together to solve particular problems. Often various consultants would be working on various projects at the same time. The ability for experienced consultants to have their ‘feet’ in more than one project at a time can help in diffusing best practices across several projects. In addition, the nature of consulting projects often requires putting together a project team whose members have complementary skills. The interdependence required to deliver a particular project within limited time period puts an imperative for enhanced face-to-face interactions (Koch, 2004; Marks and Lockyer, 2004).

Table 1: Mechanisms of transferring ‘lessons learned’

No	Means of transferring ‘lessons learned’ on one project to other projects	Average score of raw ranking*	Ranking of average score
i	Project documents (i.e., project manuals, status reports, process maps, surveys, etc)	3.71	3
ii	De-briefing meetings	4.29	4
iii	Person-to-person informal discussion with work colleagues involved in other projects	2.25	2
iv	Cross-staffing of experienced project team member(s) to a new project	1.13	1
v	Use of ‘Lessons learned’ database	5.57	6
vi	On-going project review meetings (i.e., milestone/stage-gate reviews, review workshops, project team meetings, etc)	6.17	7
vii	Recruitment of external expertise to be part of project team	8.67	9
viii	Ad-hoc meetings	10.67	11
ix	Post-project reviews (i.e., Case writing, use of external auditors, project history files, etc)	7.57	8
x	Informal organizational routines (i.e., project team/managers’ camp outings, central meeting place, storytelling sessions, etc)	5.75	5
xi	Groupware/intranet & Forum (i.e., micro articles by email, request for information, etc)	9.29	10
xii	Others, please specify:	(2)**	
<p>* = Sum of total rankings in a particular cell/Number of respondents who ranked the item ** = Only one respondent ranked this item as the 2nd highest. For practical purposes, we ignore this row.</p> <p>Source: Survey data</p>			

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The third and fourth important transfer mechanisms are; (i) Project documents and (ii) De-briefing meetings. These two transfer mechanisms tend to be critical at the start and (often) end phase of each consulting project, respectively (Schindler and Eppler, 2003). Any project during its life cycle tends to generate a lot of different documents (i.e., feasibility studies, business case, technical reports, user manuals, status reports, review documents, test reports, etc.) that can be used in future projects (Kasi *et al.*, 2008). At the planning phase, project documents (of both past projects and the current project) are used to compile estimates of project parameters (i.e., types of activities required to complete particular tasks, duration estimates, activity costs, etc). Past historical data of similar activities done in the past can act as a guide when estimating future project activities' time and cost estimates. Debriefing workshops can be held at any time during the project life cycle, even though most of them tend to be held when the project is completed. The study by Schindler and Eppler (2003) find that most debriefing sessions at the end of the project tend to have very limited focus on documenting what was learned during the project, but more on reallocation of project team members back to their former functional departments, transfer of responsibilities, hand-overs, etc. For debriefing sessions to contribute to learning, they need to be focused on what can be improved on past performance, rather than on assigning blame or on what went wrong. These two mechanisms seem to be good opportunity to bring-in past lessons to bear on new projects, as well as, improve the organization's ability to manage projects successfully. Either way, these two knowledge transfer mechanisms tend to be incorporated in a number of (formal) project management methodologies. To what extent they incorporate lessons from past projects may be hard to judge. What is known from the responses given by respondents is that they play second fiddle to two face-to-face project knowledge transfer mechanisms discussed earlier.

What was surprising from the responses shown in Table 1, was the relatively low ranking of knowledge transfer mechanisms that can be used to transfer 'explicit' project knowledge across projects. The three mechanisms of interest here are; (i) use of 'lessons learned' database, (ii) Post-project reviews, and (iii) Groupware/intranet & forums. The use of 'lessons learned' database is, on average, ranked 6th in importance. The ranking in importance of both 'post-project reviews' and 'Groupware/intranet & forums' tends to tilt toward the bottom of the list. The importance of 'lessons learned' databases as a means to transfer knowledge across projects seem to be ranked, in general, higher than the use of post-project reviews or Groupware/intranet. The result might suggest that the respondents seem to perceive 'lessons learned' drawn from databases to have a more direct impact on new projects, in a way that the other two latter options are not. It is also possible that post-project reviews when undertaken are not perceived as knowledge transfer mechanisms, than the need to meet minimum project documentation requirements (Schindler and Eppler, 2003). The relatively very low ranking of 'Groupware/intranet & forum' as a means to transfer project knowledge across projects might have to do with the weakness of such transfer channels. Generally, ICT based systems are good at transferring large quantities of information faster and cheaper across various access points. However, moving information across multiple access points is not necessarily the same as transferring new knowledge.

The relatively low ranking of 'on-going project review meetings' seem to be based on the core utility of such meetings. It is probably true to say, such meetings are used as

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'tools' geared towards the control of on-going project activities, rather than as a mechanism to transfer knowledge across projects.

Having analyzed the relative importance of the various mechanisms used by consulting firms to transfer knowledge across projects, we now turn to how interproject learning is associated with building project competences. In other words, which project competencies are build-up through interproject learning processes.

6.2 Perceived association between Interproject Learning and Project Competencies

It is important to be upfront and acknowledge that our analysis here does have limitations. The analysis does not identify individual interproject learning mechanisms and link them to particular type of project competencies. Despite this limitation, the 8 responses do provide insight on the relative effectiveness of interproject learning efforts among sampled consulting firms in developing certain project competencies. It might be that certain interproject learning mechanisms support the development of certain project competencies, while not being good at strengthening other types of project competencies. A much more refined analysis (& questionnaire) is required to identify which (& why) certain specific learning mechanisms do support the development of some project competencies, while not supporting the build-up of others.

The survey results of the perceived impact of interproject learning on project competencies are shown in Table 2. The results are derived from Q7 in the questionnaire. The respondents were asked the extent to which they agreed or disagreed with each statement given in Table 2. They had to rank their answers on a scale of 1 to 5 (5 = strongly agree, 4=agree, 3=neither agree or disagree, 2=disagree, 1=strongly disagree). The number of respondents who ticked each box is shown in respective cells in the table. For example, of the 8 respondents, only a single respondent disagreed (ranked 2 on the scale) with the statement suggesting that interproject learning enhanced the ability of his/her company to assess complex and fluid project situations. 5 respondents were neutral to whether interproject learning enhanced the ability of their consulting companies (or project teams) to assess complex and fluid project situations. Two (2) respondents, however, agreed that interproject learning enhanced the capacity of their project teams/companies to assess complex and fluid situations. While it is not possible to generalize from these answers, it is possible to say that – at least from the companies represented in the survey results – most respondents weren't fully convinced that interproject learning taking place in their respective firms enhanced their ability to assess complex and fluid situations. There may be a number of explanations to such an outcome. It maybe that interproject learning processes have either; (i) not yet been fully implemented in most of the respective consulting companies, (ii) have not been properly implemented, and/or (iii) that elements of interproject learning processes implemented have little effect in enhancing this particular project competence (i.e., enhancing the ability to assess complex and fluid situations).

Examining the whole of Table 2 seems to give out a few patterns. All the 8 respondents seem to agree that interproject learning has enhanced the capacity to make better

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estimates of 'hard-core' project variables that are part and parcel of any 'traditional' project management methodology. 3 respondents and 5 respondents agree or strongly agree that interproject learning has enhanced abilities of their project teams to make better estimates of project costs and schedules. This is not necessarily surprising. Insights gained on the 'right' size of resources needed to accomplish certain 'work packages' can help in making better estimates of resource requirements in similar work packages in future projects. This is a result of benefits derived from 'economies of repetition' (Davies and Brady, 2000). What is surprising, however, is the fact that most respondents don't see interproject learning as contributing to enhancing the capacity of respective consulting firms' project teams to make better estimates of project risks. 7 of the 8 respondents are either neutral or disagree to the suggestion that interproject learning had enhanced the ability to make 'better estimates of project risk'. At one level, the responses from the respondents make sense. The ability to make better estimates of project risks may require more skills and knowledge than what can be accumulated through practical experience gained on working on successive projects. On the other hand, the ability to make better estimates of a lot of project parameters (i.e., ability to make better estimates of resource requirements for particular work packages) – gained through practical experience - ought to enhance the capacity to reduce overall project risks.

Table 2: Perceived impact of interproject learning on Project competencies

No	Interproject learning has enhanced the following Project Competencies:	1 Strongly disagree	2	3 Neutral	4	5 Strongly agree
i	Ability to assess complex and fluid situations		1	5*	2	
ii	Better estimates of project costs				3	5
iii	Better estimates of schedules				3	5
iv	Better estimates of project risks		1	6	1	
v	Ability to adapt project structure to new work processes		2	5	1	
vi	Improved cost efficiencies		2	6		
vii	Abilities to meet project objectives (i.e., cost, schedule and performance requirements)		3	4		1
viii	At project start, project teams have a better understanding of what could go wrong		5	2	1	
ix	When starting a new project, project teams have a better understanding of the right work methods to follow to ensure project success			2	6	
x	Ability to adjust team dynamics to unforeseen contingencies		1	1	4	2
xi	Transferring of new knowledge quickly to other projects	2	3	2	1	
xii	Ability to satisfy our customer(s)		2	3	2	1

* = Number of respondents who ticked each cell

Source: Survey Data

When we examine the middle section of Table 2, we can see that most respondents are either neutral or disagree with the assumption that interproject learning had a positive

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impact in enhancing the development of what can be referred to as 2nd order or 'dynamic' project competencies. Most respondents either are neutral or disagree that interproject learning has enhanced the ability of their firms/project teams to adapt project structures to new work processes, improve cost efficiencies, ability when starting a new project to have a better understanding of what could go wrong, or had enhanced their abilities to meet project objectives (i.e., cost, schedule and performance objectives). Enhancing some of these project competencies is, however, key to strengthening the dynamic capabilities of firms needed to deal with evolving project targets or deal with uncertain project environments (Newell and Edelman, 2008).

An examination of the last three rows in Table 2 suggests a mixed picture. On one hand, 6 of the 8 respondents seem to agree or strongly agree that interproject learning has enhanced the ability to adjust team dynamics to unforeseen contingencies. On the other hand, 5 out of 8 respondents were either neutral or disagreed with the statement that interproject learning has enhanced the abilities of respective firms to satisfy their customers. This later result may, however, not be very surprising when one examines the answers given to the eleventh item in Table 2. Seven (7) out of 8 respondents were either neutral or disagreed that interproject learning activities in their respective firms had strengthened their ability to quickly transfer new project knowledge created to other projects. This result suggests deficiencies associated with the 'maturity' and effectiveness of learning processes put in place to support interproject learning.

7. Discussion of Results

This section discusses the results from the Data Analysis section, in the light of the literature on project-based firms. In areas where our findings are similar to past research results, we highlight those researchers' findings. Where they are differences, we outline some of the possible reasons why our results might differ? The discussion follows the same sequence given in the previous section. We start by discussing the data analysis results to the first research sub-question, before moving to answers to the second research sub-question.

7.1 The Relative Importance of Different Interproject Learning Mechanisms

A study by Prencipe and Tell (2001) list an extensive (though not necessarily exhaustive) list of interproject learning mechanisms at different levels of the organization (i.e., individual-, group/project- and organizational-levels). Building on that list and other past research, the authors of this research were able to aggregate and reduce the number of items into a manageable list. The responses on the returned questionnaires suggest that most respondents rank highly (in importance) those interproject learning mechanisms that involve face-to-face transmission of new project knowledge across project teams or to the rest of the parent organization. New project knowledge (i.e., new innovative solution to a first-time encountered problem) is often dynamic, evolving, and situation specific to a particular project setting or group (Bresnen *et al.*, 2003). It's development might involve a combination or re-combination of new and existing knowledge bases, as well as, trial and error experimentation. In such situations, the new knowledge would have a high degree of tacitness (or stickiness). In such

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cases, a more effective and efficient transfer mode of knowledge transfer would require person-to-person interactions. Among the surveyed consulting firms, assigning experienced consultants to new projects is ranked as the most important way of transferring new project knowledge across projects. This is followed by the 'person-to-person informal discussions with work colleagues involved in other projects'.

Moving experienced organizational members to new projects is seen as a very effective tool to transfer knowledge across the organization (Argote and Ingram, 2000). Experienced team members are able to adapt the tacit and explicit knowledge they have to new situations (in a way that knowledge carried in explicit format alone can not). The transfer of knowledge through assigning experienced personal to new projects also allows flexibility in delivery of new knowledge. There is opportunity for discussions, clarifications, and sharing of interpretation of 'meaning' with other project team members (Boh, 2007; Prencipe and Tell, 2001). This process of building organizational-wide project competencies through the moving around of experienced project team members has been termed 'Experience accumulation' (Zollo and Winter, 2002). Newell and Edelman (2008) argues for a more strategic approach to assigning experienced project team members to new projects, as a means to enhance effective and efficient problem-solving:

“Strategically utilizing accumulated experience, so that people are assigned to projects where their previous experience is going to be applicable, would mean that there may be more efficient team learning on a project, because the individuals involved have been assigned based on the fact that they have learnt how to solve the problems that are likely to be faced” (Newell and Edelman, 2008: 570).

From the limited results we have, it seems that knowledge capture, transfer and sharing through 'experience accumulation' is highly regarded in almost all the respective consulting firms in our survey. Our result is similar to other research findings. A couple of past researches argue for the need to institutionalize the process of transferring experience staff to new projects, as a means to enhance knowledge transfer (Argote and Ingram, 2000; Newell *et al.*, 2006; Zedtwitz, 2002).

For the second important interproject learning mechanisms – learning new knowledge through dialogue with other work colleagues – a study by Bresnen *et al.* (2003: 165) found that knowledge acquisition and transfer in project settings rely heavily on “social patterns, practices and processes in ways which emphasis the value and importance of adopting a community-based approach”. A study by Marks and Lockyer (2004) of design project teams in five software firms in Scotland found a very strong reliance on other project team members and project work as a means to acquire new knowledge and skills. “Team members were cited as being the most important resource for the acquisition of knowledge” (ibid: 239). Over time, team members broadened their knowledge by working and moving across different projects, while learning from more experienced colleagues and acquiring a diverse portfolio of project experiences. Project design teams tend to be more multi-disciplinary, requiring diversity of knowledge bases. The skills interdependence required to jointly analyze and solve complex design

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problems often meant that knowledge flow and learning were often done informally among project team members (*ibid*).

Our finding tends to support the results of Koch (2004). Koch's study on knowledge production processes in a Danish Consulting Engineering firm found that;

“The single project gives rise to negotiations on necessary knowledge, potential reuse of knowledge and how to create knowledge. problem-solving most frequently occurs through directly conferring with colleagues who have solved a similar problems before. This again is predominantly done on the basis of direct interpersonal interaction” (*ibid*: 294).

The limited studies of learning in consulting firms in India (Lam, 2005) and the US (Boh, 2007) found a preference for person-to-person mode of communication. Similarly, a study by Werr and Stjernberg (2003: 893) on two global management consulting organizations (Accenture and Ernst & Young Management Consulting) reports that the “consultants in our study repeatedly referred to their own and their colleagues' experience as the most important source of knowledge in designing and carrying out consulting projects”. The importance of face-to-face interaction as a ‘rich’ form of knowledge transfer suggest that significant amount of project knowledge in consultancy firms in our survey remains uncoded or uncodifiable. Such knowledge is ingrained in individual experienced/expert consultants embedded within project teams and within their associated knowledge networks. In a study done by Bresnen *et al.*, (2003: 161), a quote is given of one response from the Technical Director, who said: “In these days of electronic wizardly and technology, my opinion is that you can't beat a face-to-face, eyeball-to-eyeball meeting”.

Though face-to-face interaction-based interproject learning mechanisms are highly ranked, it is important to note that they suffer from what has been called the “problem of scalability” (Boh, 2007: 32). In other words, the knowledge ‘expert/possessor’ can only be at limited places at any one time. In addition, the following has to take place before new knowledge is transferred: (i) the knowledge recipient must realize the need of new knowledge, and be willing to put efforts in seeking to fill the missing knowledge gap; (ii) the knowledge recipient must know who in the organization possesses the missing knowledge gap; and (iii) the knowledge holder/possessor must be willing to share his/her knowledge (Watson and Hewett, 2006). All the three factors can act as barriers to knowledge sharing within an organization. For example, the ‘knowledge recipient’ might not want to admit he lacks certain knowledge, as it represents admission of ignorance (Lam, 2005). Or if he wants to search for new knowledge, he might not know who has the appropriate knowledge in the organization. Even with the existence of expert directory in the organization's database, it might take some effort to get the right person. And more importantly, the ‘knowledge holder’ might not be willing to share the information or knowledge being sought, if knowledge sharing means a loss of competitive advantage. A study by Lam (2005) on knowledge management in one Indian consulting firm found that the intensive competitive culture among the various company consultants resulted in ‘knowledge hoarding’. To overcome such disincentives, organizations might want to introduce incentives that are directly related to knowledge sharing. For example, project managers and project team members could be

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periodically appraised, in part, on how much effort they exerted disseminating new knowledge across their organization.

Most interproject learning mechanisms that are perceived as supporting the creation, capture and dissemination of 'explicit' project knowledge seem to be ranked as of moderate to low importance. Codified learning mechanisms are often not seen as providing a "rich medium for communication" (Boh, 2007: 30). For example, the use of 'lessons learned' databases was ranked 6th in importance, post-project reviews ranked 8th in importance, and 'Groupware/intranet & Forum' was ranked 10th in position. The low ranking of the latter group of learning mechanisms was rather surprising, taking into account the widespread use of information and communication technology (ICT) in today's consulting firms. One probable reason might be that most respondents saw Groupware/intranet & forums more as channels to distribute information, but not necessarily a medium for communicating knowledge.

The low ranking of the use of 'lessons learned' databases and post-project reviews as a means to enhance interproject learning might be due to a number of factors. Firstly, most studies that have been done on both mechanisms find a generally low (consistent) application of these two interproject learning mechanisms in other sectors - other than consulting sector (i.e., Kasvi *et al.*, 2003; Koners and Goffin, 2007; Schindler and Eppler, 2003). A study of one of the two engineering project-based firms covered by Prencipe and Tell (2001: 1384) shows that even if project reviews were done throughout all the projects, "they were aimed 95% at reviewing costs and schedules, and only 5% at lessons learnt". Studying post-project reviews in R&D projects, Zedtwitz (2002) analyses 63 responses from a group of senior R&D managers and R&D directors. The results show that only 8 out of the 63 respondents (13%) thought results from post-project reviews were used to improve the effectiveness and efficiency of project management processes.

The mechanics of how to conduct 'good' post-project reviews have been covered elsewhere in the literature (i.e., Anbari *et al.*, 2008; Kotnour and Vergopia, 2005; Lee, 2008), and will not be covered here. What can be mentioned here, is the importance of institutionalizing the structures, processes, procedures, routines and incentives that systematically support the capture, store and dissemination of new project knowledge and experiences for future re-use (Ayas and Zeniuk, 2001; Schindler and Eppler, 2003). For example, Watson and Hewett (2006) argues that two factors need to be considered when trying to promote project knowledge transfer using 'lessons learned' stored in knowledge repositories like databases. Firstly, useful knowledge to future project teams must be stored. This includes what learning and knowledge is stored, how it is stored, and where. Secondly, the actual demand to use new knowledge stored in databases by future project teams. This includes perceptions of what relevant knowledge is stored in databases, easy of access, and incentives project teams have to invest in consulting project documents on past projects.

Having discussed the broad characteristics of interproject learning used by firms, we now turn to the perceived impact on the development of Project competencies.

7.2 Types of Project Competencies Developed

Due to a small response rate, the survey results suggest limited patterns that should be interpreted with caution. The results suggest that respondents thought most of the interproject learning which was taking place in their respective consulting firms was geared towards strengthening the capacities to improve what can loosely be called 'traditional' project parameters. In other words, interproject learning strengthened project teams' capacities to: (i) make better estimates of project costs, (ii) make better estimates of schedule, (iii) have a better understanding of the right 'methods' to follow to ensure project success, and (iv) adjust team dynamics to unforeseen contingencies. Our results seem to be in line with findings from Newell *et al.* (2006). Newell *et al.* (2006) makes distinctions between two types of learning and knowledge; product knowledge and process knowledge. They define product knowledge as learning and knowledge that is associated with the goals or objectives of the project (i.e., deliverable or output). Process knowledge was defined as "knowledge about processes that the team had deployed to achieve these goals and why they seemed to have worked well or badly" (ibid: 175). In their study of 13 projects in 6 firms, they find that most learning was related to 'product knowledge' rather than to 'process knowledge'. In this study, the four above types of competencies ranked to have been more developed due to investment in project learning, are those that are related to the immediate deliverable or project output. More importantly, most of the well developed project competencies cited above may be 'by-products' associated with the practice of assigning more experienced project consultants to new projects.

Project competencies that can be characterized as underpinned by 'process knowledge' were less developed. These include cases where interproject learning had little effect in developing; (i) the abilities of project teams to have a better understanding of what could go wrong at project-start (needed to develop advance-contingence plans), (ii) ability to transfer new knowledge quickly to other projects (or learning to learn), (iii) ability to improve cost efficiencies (which is different to ability to make better cost estimates), and (iv) ability to make better estimates of project risks. It is possible that these deficiencies may explain why only one respondent strongly agreed that interproject learning enhanced the ability of project teams to meet project objectives (i.e., cost, schedule and performance requirements), and only three respondents agreed or strongly agreed that interproject learning had strengthened the abilities of their respective companies to satisfy their customers.

8. Conclusions

This research study was done in the context of growing debate on the need to extend our understanding of how knowledge is managed in project-based firms. There are specific problems related to project work that makes the management of knowledge in project work environment especially challenging. Observed discontinuity in resources-flow (i.e., project team members, input materials, work-flow, etc) presents daunting challenges in continuously accumulating new knowledge and upgrading project competencies (Bresnen *et al.*, 2003). Apart from wanting to expand our knowledge of interproject learning mechanisms and project competencies in the consultancy sector,

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this research was inspired by the study conducted by Prencipe and Tell (2001), who argue for more research on interproject learning in different contextual environments (or sectors). We conclude this paper by examining the similarities and differences between the literature review and our empirical findings.

The comparisons between the literature review and empirical findings is analyzed by following the research sub-questions we sort to answer in this study;

- (i) *What are the different types of interproject learning mechanisms used by consultancy firms to transfer lessons learned on one project to other project(s) or the parent organization? And what are their perceived ranking in importance?***

The general thrust of past research findings conducted in other sectors (notably from manufacturing, engineering and construction sectors) were supported by our findings from the 8 respondents drawn from consulting firms in Sweden. Most respondents ranked highly the importance of those interproject learning mechanisms that involved face-to-face interaction and knowledge sharing (i.e., transferring experienced staff to new projects, and informal individual-to-individual discussions, conversations and dialogues). These types of interproject learning mechanisms tend to be 'rich' medium for the transmission of tacit or near tacit knowledge. There are also advantages of flexibility and adaptability of knowledge to new contexts (i.e., knowledge recipients can ask for instant clarification on something they don't understand).

The result do not, however, negates the importance of mechanisms that support the transmission and diffusion of explicit knowledge (i.e, through ICT-supported medium), or the need to have deliberate processes that can convert tacit knowledge to explicit knowledge for easy transfer. The main argument is that both types of knowledge are important for successful execution of projects in the consultancy sector. In the current digital era where early literature in the field of organizational knowledge management, tended to over emphasis the power of computer technology in transferring knowledge, our finding is an overdue correction. Electronic and computer-based technologies can only facilitate the fast transfer of large quantities of codified or codifiable knowledge. It is poorly positioned to transmit uncodifiable tacit knowledge (Boh, 2007).

- (ii) *Which types of project competencies are perceived – by project management practitioners - as well developed due to investment in interproject learning in consultancy firms?***

In broad terms, most respondents tend to think that interproject learning processes taking place in their respective firms is geared towards building project competencies that are associated with 'product knowledge' rather than 'process knowledge'. In other words, interproject learning in the respective firms has greater emphasis on short-term abilities (i.e., capacities to make better estimates of project costs, schedules, and chose right project methodology) to meet a particular project output or deliverables. Interproject learning happening in respective firms is not always geared towards continuous 'process improvements' – better estimate of project risks, faster transfer of new 'sticky' project knowledge to other parts of the organization, and better advance-

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understanding (at the start of the project) of what could go wrong with a project. Efforts on upgrading 'process knowledge' through interproject learning is at least not as much as that put to meeting short term project objectives. Yet, the latter competencies are important in developing dynamic project competencies and long-term competitiveness. While our findings are similar to Newell *et al.* (2006), most past research on learning in projects haven't caught-up with the distinction between 'product knowledge' versus 'process knowledge'.

Any exploratory study would inevitably have limitations. For this study, three main research limitations can be highlighted: (i) Due to the fact that we could not get access to one or two consultancy firms to enable us to do some in-person interviews, we could not do any meaningful triangulation of feedback from respondents. Future follow-up studies might want to allocate enough time and resources to ensure proper triangulation is done; (ii) The research study focused only on 'perceptions' of key informed 'project management practitioners' with some managerial responsibilities. It might be helpful in future studies to capture the perceptions of other project team members (i.e., ordinary team workers) who may not have managerial responsibilities; (iii) in addition, future research could focus on generating more refined 'objective' measures to capture the extent of the relationship between different interproject learning mechanisms and project competencies. Our study captured 'perceptions' rather than what can be called 'hard' indicators. All the above mentioned limitations of the study provide opportunities for future research direction.

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Appendix – Survey Questionnaire

INTER-PROJECT LEARNING QUESTIONNAIRE

Instructions:

1. The Questionnaire focuses on ‘inter-project learning’ (the process of transferring ‘lessons learned’ from one project to other concurrent or future projects).
2. Please kindly answer all or as many questions as possible.
3. Please download the questionnaire onto your computer’s c-drive or ‘My Document’ folder, fill it in, save it, and then re-attach it to any of the two return email addresses given below:

Postal Address: Ms Lina Yan, Historiegrand 08 C 0233, Umea University, Umea 90734, Sweden

E-mail address: liya0001@student.umu.se or wima0002@student.umu.se

Section A: General Questions

- Q1. How many years have you been working on projects? _____ years
- Q2. What is the typical role you play in projects? (i.e., Project coordinator, Project Manager, etc)

- Q3. What is the name of your company or sector? (optional) _____

Section B: Inter-project Learning Mechanisms

- Q4. Which mechanisms listed below does your company use to transfer ‘lessons learned’ on one project to other projects or parent organization? (please rank the most applicable in order of importance, i.e., 1, 2, 3, 4, etc.).

No	Mechanisms of transferring ‘lessons learned’ on one project to other projects	Select and rank those applicable
i	Project documents (i.e., project manuals, status reports, process maps, surveys, etc)	
ii	De-briefing meetings	
iii	Person-to-person informal discussion with work colleagues involved in other projects	
iv	Cross-staffing of experienced project team member(s) to a new project	
v	Use of ‘Lessons learned’ database	
vi	On-going project review meetings (i.e., milestone/stage-gate reviews, review workshops, project team meetings, etc)	
vii	Recruitment of external expertise to be part of project team	
viii	Ad-hoc meetings	
ix	Post-project reviews (i.e., Case writing, use of external auditors, project history files, etc)	
x	Informal organizational routines (i.e., project team/managers’ camp outings, central meeting place, storytelling sessions, etc)	
xi	Groupware/intranet & Forum (i.e., micro articles by email, request for information, etc)	
xii	Others, please specify:	

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Q5. How often do you do Post-Project Reviews (PPR) in your company? (please put an 'X' in the appropriate box selected)

No	Item	Mark box
i	We do post-project reviews on all projects	
ii	We do post-project reviews only on major projects	
iii	We do post-project reviews only on projects that had major problems	
iv	There is no fixed criteria used to select projects that are subjected to post-project reviews	
v	We don't do any post-project reviews	

Q6. Which activities shown in the table below describe more accurately the project planning and execution stages in your company? (please say whether you agree or disagree with statements given below, using the following scale: 5 = strongly agree, 4=agree, 3=neutral, 2=disagree, 1=strongly disagree). Please put an 'X' in the appropriate box selected.

No	Project Planning & Execution Stages	1 Strongly disagree	2	3 Neutral	4	5 Strongly agree
i	During planning stage, the review of past project plans is done					
ii	During planning stage, the review of past 'lessons learned' is done					
iii	During project execution, data about the actual set of steps used to complete the project is collected					
iv	A project is usually seen as a learning opportunity					
v	Project teams readily share new 'lessons learned' from project success					
vi	Project teams readily admit and share new 'lessons learned' from project failure					
vii	During project execution, documentation of the set of problems encountered during the project is done					
viii	Some times, project teams encounter the same problem over and over again					
ix	During the planning stage, the company explicitly include time to do post-project/mortem reviews into the project plan					
x	During the planning stage, we explicitly schedule time to do milestone reviews.					

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Section C: Project Competencies

Q7. Which project competencies shown below have been enhanced as a result of transferring ‘lessons learned’ across projects? (please say whether you agree or disagree with statements given below, using the following scale: 5 = strongly agree, 4=agree, 3=neither agree or disagree, 2=disagree, 1=strongly disagree). Please put an ‘X’ in the appropriate box selected.

No	Inter-project learning has enhanced the following Project Competencies:	1 Strongly disagree	2	3	4	5 Strongly agree
i	Ability to assess complex and fluid situations					
ii	Better estimates of project costs					
iii	Better estimates of schedules					
iv	Better estimates of project risks					
v	Ability to adapt project structure to new work processes					
vi	Improved cost efficiencies					
vii	Abilities to meet project objectives (i.e., cost, schedule and performance requirements)					
viii	At project start, project teams have a better understanding of what could go wrong					
ix	When starting a new project, project teams have a better understanding of the right work methods to follow to ensure project success					
x	Ability to adjust team dynamics to unforeseen contingencies					
xi	Transferring of new knowledge quickly to other projects					
xii	Ability to satisfy our customer(s)					

Section D: Learning Infrastructure & Post-mortem Reviews

Q8. Please rank the extent to which the various systems, procedures and routines have been implemented in your company? (please say whether none or full implementation exist, using the following scale: 5=strong implementation, 4=good, 3=neither good or bad, 2= inadequate implementation, 1= none exists). Please put an ‘X’ in the appropriate box selected

No	Learning systems, procedures and routines in the company	1 None exists	2	3	4	5 Strong implementation
i	Explicitly build time in project schedules for critical ‘reflections’ on project outcome (not just at the end of project)					
ii	Has a Project Management Office					
iii	We have a ‘no blame culture’ (i.e., tolerant of mistakes)					
iv	Project culture open to experimentation and new insights					
v	Explicit reward incentives tied to project learning do exist					
vi	Multi-disciplinary self-managing project teams					
vii	Removal of organizational/functional boundaries					
viii	Have deliberate processes to capture, document, store and distribute project experience					
ix	Recording of important project events					
x	Groupware/intranet system & discussion forums					
xi	Readily accessible ‘Lessons Learned’ database					
xii	Paper-based reports that describe learning from each project are readily circulated through out the company					
xiii	We do post-mortems for all projects undertaken in the company					

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Q9. Which factors do you think hinders the transfer of knowledge across projects in your company? (please say whether you agree or disagree with statements given below, using the following scale: 5 = strongly agree, 4=agree, 3=neither agree or disagree, 2=disagree, 1=strongly disagree).

No	Difficulties of sharing new knowledge across projects	Select and rank those applicable
i	Project team members don't see any benefits in getting involved in post-project reviews	
ii	It is not mandatory to use 'lessons learned' of past projects when starting a new project	
iii	Difficulties in coordinating debriefings – persons already engaged in other new projects	
iv	Experience 'reflection' & recording not integrated into project management processes	
v	High time pressure towards the project's end (i.e., completion pressure, new tasks awaiting)	
vi	Fear of negative sanctions (in case of disclosing mistakes)	
vii	Having only project reviews at the end of the project	
viii	Don't have an organizational learning culture	
ix	Lack of incentives explicitly tied to project learning	
x	Too focused on short-term project deliverables (i.e., meeting immediate milestone)	
xi	Others, please specify:	

After filling-in the questionnaire, please email back the questionnaire (as an attachment) to either of the two email addresses: liya0001@student.umu.se or wima0002@student.umu.se .

We would like to express - in advance - how very grateful we are for your understanding help in filling-in the questionnaire. All information provided will be treated with strictest confidence, for academic purposes only, and no identity of any respondent will be revealed in the MSc dissertation.

Yours sincerely,

Lina Yan & Wise Mainga.