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Suppliers' Software Development Project Start-up Practices

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Suppliers’ Software Development Project Start-up Practices

Abstract

Purpose – The purpose of this paper is to present a life cycle phase of a software development project which is substantial for the success of the project. This paper visualizes the project start-up phase from suppliers’ perspective.

Design/methodology/approach – The method is a theory building from case studies. The data was collected from three software supplier firms by conducting process modelling separately in each firm.

Findings – The study resulted in a model of a supplier’s software project start-up which includes start-up practices and involved roles. The results indicate that project start-up is an integral and structured phase of project life cycle, which influences the execution of a software development project, especially from the supplier’s perspective in the project business context.

Research limitations/implications – The study focuses on the start-up phase of software development projects delivered to external customers. Therefore, developed project start-up model is applicable as such in software supplier firms.

Practical implications – The project start-up model presented in this paper indicate that project start-up is a complex and multi-dimensional activity in a supplier firm. This study suggests that if the project start-up phase is clearly defined, planned and followed in a supplier firm, it reduces confusion and miscommunication among the people involved in the project and helps to achieve the business goals of a project.

Originality/value This study emphasizes that it is necessary to make a distinction between the perspectives of the customer and the supplier when studying projects in the project business context. The findings contribute the new knowledge for managing outsourced software development projects.

Keywords Supplier, Software development project, Project start-up, Practices

Paper type Research paper

Introduction

The trend of procuring software development from outside sources is increasing (Crow, Muthuswamy 2014, Lee 2008). Hence, studies on outsourced software development have been published increasingly during the last decade (Mehta, Bharadwaj 2015). In outsourcing situations, there are at least two parties involved, a customer and a supplier¹, with different roles and responsibilities (Liu, Yuliani 2016).

Having two parties involved with different roles and responsibilities means that there are two parties with different perspectives. Existence of two different perspectives has been brought out for example in studies of Taylor (2005) and Liu and Yuliani (2016) on risks in outsourced IT projects. Taylor (2005) highlighted

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3 differences between project risks between the customer's and the supplier's side.
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5 Respectively, Liu and Yuliani (2016) found that the risks are different from the
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7 point of view of the customer and the supplier in outsourced IT projects. These
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9 studies emphasize the different perspectives of the customer and the supplier.
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11 Therefore, it is important to make difference between the customer's and the
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13 supplier's perspectives on outsourced software development projects.
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18 Although there are numerous studies on outsourcing and software
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20 development projects in general (Alsudairi, Dwivedi 2010, Hätönen, Eriksson
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22 2009, Aubert, Rivard et al. 2004), studies on outsourced software development
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24 projects from the supplier's perspective have been rare (Taylor 2007, Savolainen,
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26 Ahonen et al. 2012, Lee 2008, Levina, Ross 2003). Therefore, this paper
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28 concentrates on the supplier's perspective by considering the commercial
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30 relationship between two parties, a customer and a supplier.
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36 The commercial relationship between a customer and a supplier entails that
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38 a software development project is managed and conducted by a supplier firm and
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40 the end product of the project is delivered to an external customer (Kishore, Rao et
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42 al. 2003). For a supplier operating in the software industry, outsourcing means
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44 business, where it delivers projects to external customers. Thus, project deliveries
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46 are the one source of many supplier firms' revenues and the backbone of their
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48 business (Artto, Valtakoski et al. 2015, Kujala, Ahola et al. 2013, Andersen, Jessen
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50 2003). Hence, it is essential for the supplier firm to be able to market and sell
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52 projects to customers (Jalkala, Cova et al. 2010), because there is no project before
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54 a sales case has been successfully completed (Turkulainen, Kujala et al. 2013).
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A successful sales case means that the supplier firm gets an order from the customer (Cooper, Budd 2007). After the customer has placed an order, the supplier firm starts preparations for the project. These preparations should be fast, cost-effective and cover the required steps. These preparatory actions take place between the project's sales and execution phases. The interface between the supplier firm's sales operations and project operations has started to get increasing attention at both organizational and project levels (Cova, Salle 2005, Cooper, Budd 2007, Turkulainen, Kujala et al. 2013, Artto, Valtakoski et al. 2015).

Even though the importance of the interface between the supplier firm's project sales and project execution phases has been noticed, empirical studies on the topic are sparse (Savolainen 2011). However, it is noted that the supplier firm has a great responsibility that the software development project delivery fulfils both the customer's and the supplier's objectives (Lee 2008). Therefore, it is important for the supplier firm to be able to manage the project from the beginning to the delivery.

From the supplier's perspective, the software development project begins after a successful sales case with the project start-up phase. In brief, the project start-up phase has been identified earlier (Fangel 1991) and its importance for software development projects from the supplier's perspective has been highlighted (Savolainen, Ahonen et al. 2015). However, it is still unclear what happens in a software supplier firm after it receives an order from the customer. Especially vague are the first actions that the supplier firm performs after receiving an order from an external customer. To gain a better understanding of the project start-up phase from the supplier's perspective, we formulated the following research question:

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What happens in a software supplier firm during the project start-up phase?

Thus, to achieve our goal and to find the answer to our research question, we studied the software development project start-up phase in supplier firms.

In the next section, the background from the relevant literature is given. After that, the methodology of this study is described, and then the results are described in detail. Finally, the last sections concentrate on discussion, conclusions and future work.

Background

Software which is delivered to an external customer is usually developed in projects (Gottschalk, Karlsen 2005, Karlsen, Gottschalk 2006). As the focus of our study is on software development projects, we adopted the definition of a project from the standard for software development (ISO/IEC 2008a) which defines a project as an “endeavour with defined start and finish dates undertaken to create a product or service in accordance with specified resources and requirements”. Here, the project start date is when the supplier firm receives the order from the customer, and the finish date is when the customer pays for the delivered project to the supplier.

Because the most of the software development work is conducted in projects, suppliers are often project-based firms as they organize their business operations in projects (Mutka, Aaltonen 2013, Artto, Valtakoski et al. 2015). When a supplier firm conducts all or at least some parts of its business through projects, the firm conducts project business (Artto, Wikström 2005, Hobday 2000). Project business is defined in general as (Artto, Wikström 2005): “the part of business that relates directly or indirectly to projects, with a purpose to achieve objectives of a

firm or several firms”. From now on, we use the term ‘project business context’ to emphasise the supplier’s perspective.

For the project business research, there is a conceptual framework supporting scholars to position their research using four major research areas. These research areas are management of a project, management of a project-based firm, management of a project network, and management of a business network (Artto, Kujala 2008). Here, as the focus of this study is the management of outsourced projects in the project business context, we found a project business framework developed by Artto and Kujala (2008) helpful to posit our research one of the four research areas which they have defined. The most relevant research area for this study is management of a project. It is for finding answers to question how to manage a single project effectively and successfully (Artto, Kujala 2008). Although the topic has been studied extensively, it is still relevant in the case of outsourced software development projects, which have a reputation to fail. Thus, our study is about how to manage a single project in a project business context and we chose the perspective of a supplier firm.

Recently, Hobbs and Besner (Hobbs, Besner 2016) have highlighted that the project delivered to internal and external customers differ in how they are managed. In the project business context, the supplier firm starts preparations for the project after a successful completion of a sales case (Turkulainen, Kujala et al. 2013). In the case of software development projects, the project agreement is usually incomplete at the very beginning of a project because of complex nature of software delivery (Kujala, Nystén-Haarala et al. 2015). In practice, after the customer has placed an order, the project is transferred from sales operations to project operations within the supplier firm (Skaates, Tikkanen et al. 2002). Thus,

the transition from sales operations to project operations within the supplier firm means that each project passes through a specific phase. In this paper, this transition is called the project start-up phase, where we adopted the terminology from Fangel (1984, 1991).

Fangel (1991) defines the project start-up phase as “*a unified and systematic management process which quickly generates a platform for taking off and getting going effectively*”. Thus, the purpose of the project start-up phase is to create the conditions for the success of the project. The basis for understanding project start-up has been presented by the INTERNET Committee on Project Start-up that was founded at the end of 1984. This work can be found in the book ‘Handbook of Project Start-up: How to launch any phase effectively’ (Fangel 1990). It contains several abstracts, articles, and reports which were written for workshops, congresses, symposia and conferences on this theme during 1981-1988.

In addition, earlier research has described project start-up in general terms. Silvasti (1987) has studied project start-up phase in small delivery projects. Egginton (1996) has studied project start-up in large international projects. The results of a study made by Halman and Burger (2002) indicate that project start-up helps to gain a better understanding about a project. Different methods for project start-up are introduced, for example workshops, reports and ad hoc assistance (Turner 2009). More recently, a study focused on software development projects in the project business context suggested that by investing in the start-up phase of the project, the supplier firm is better placed to achieve the business objectives of the project (Savolainen, Ahonen et al. 2015). In addition to sparse research on the topic, project start-up is not described in detail in the standards.

Even though project management standards such as PMBOK (The Project Management Body of Knowledge) (PMI 2013), PRINCE2 (Office of Government Commerce 2009) and ISO21500 (Guidance on project management) (ISO 2012) identify the early phases of a project, they do not provide guidance for the project start-up phase for a supplier firm. Because of the general nature of these standards, they do not take different contexts into account. Therefore, standards lack, for example, the project business context where marketing and sales precedes every project. Thus, it is also somewhat surprising that the early phases of the project life cycle are not taken into account in software development related standards and frameworks, such as CMMI (Crisis, Konrad et al. 2009) and ISO/IEC/IEEE 16326 (ISO/IEC/IEEE 2009). The early phases of a project are discussed only in PMBOK (PMI 2013), PRINCE2 (Office of Government Commerce 2009) and ISO21500 (ISO 2012). PMBOK (PMI 2013) and ISO 21500 (ISO 2012) describe initiating activities with the term ‘Initiating process group’ and PRINCE2 (Office of Government Commerce 2009) defines the processes of ‘Starting up a project’ and ‘Initiating a project’.

Although project management and software development are comprehensively covered by different standards, the project start-up phase has been given very little attention in them. In addition, current literature has not outlined what a successful supplier firm does during the project start-up phase. However, previous studies have implied that at least some administrative effort should be invested in order to get a complex task, such as a software development project up and running (Barry, Mukhopadhyay et al. 2002). Thus, the importance of early phases of project lifecycle have noticed to be crucial for the success of a project (Kappelman, McKeeman et al. 2007). In addition, it is being noticed that the

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3 selection of a project management approach during the project start-up phase
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5 increases the probability of project success (Rolstadås, Tommelein et al. 2014).
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7 Moreover, there has been some interest on the project start-up activities of supplier
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9 firms in the project business context. Researcher have analysed failed software
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11 development projects and found that often the reason for failure can be traced to the
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13 start-up phase of the project (Ahonen, Savolainen 2010, Jørgensen 2014).
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18 In addition, researchers have highlighted that a software supplier firm
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20 encounters several challenges during the start-up phase of software development
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22 projects (Savolainen, Ahonen 2015). Those challenges include lost knowledge,
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24 communication problems, and resource management challenges, as has been
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26 discussed in recent studies (Turkulainen, Kujala et al. 2013, Savolainen, Ahonen
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28 2015). Challenges during the project start-up phase may endanger the supplier's
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30 business success at the organizational level as well as at the project level, and
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32 therefore, well-organized project start-up is necessary for a supplier firm.
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38 To conclude, the results of earlier studies suggest that the project start-up
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40 phase from the supplier's perspective requires more attention than it has been given.
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42 Therefore, we conducted this study to model the structure of the project start-up
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44 phase of a software development project delivered to an external customer. Even
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46 though the need for different project management practices in different projects in
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48 different contexts has been highlighted (Besner, Hobbs 2013), references to the
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50 activities or practices which supplier firms perform during the project start-up phase
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52 were not found. Thus, it can be concluded also that there is a need for the description
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54 of the actions performed to allow a supplier firm to start up projects quickly and
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56 cost-effectively. Consequently, our paper presents project start-up practices which
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58 offer one solution for this need.
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Methodology

As the project start-up phase within a supplier firm is still not well researched phenomenon and the aim of our study is to gain better understanding about it, we found it reasonable to study project start-up in natural settings together with the practitioners. Usually, firms do not want outsiders to become familiar with their business in depth. During our study, there was an ongoing research project where three software supplier firms were involved and they were willing to participate in the study. It offered the opportunity to us to study the project start-up phase in its natural settings and to see what practitioners do during this phase.

Building theories from cases

We chose a theory building from case studies as the research strategy. According to Benbasat et al. (1987), the case study approach allows researchers to study a phenomenon in its natural settings and offers a relatively full understanding about it. Rowley (2002) has stated that a case study research offers more detailed information about the studied phenomenon than a survey research. In addition, Myers (2013) has stated that the complexity of the context of real-life can be brought out with a research method where the researchers get to see the actions of practitioners in real-life situations.

Further, it is known that it is possible to build theories from case studies (Eisenhardt, 1989,Yin, 2013). By applying this research strategy, it is possible to build a theory which is novel, testable and empirically valid (Eisenhardt, 1989). This research strategy is suitable especially to research areas where existing theory is incomplete (Eisenhardt, 1989) as it is in the case of the project start-up phase

from the supplier's point of view. Thus, we found the theory building from case studies approach to be an applicable strategy for the needs of our study.

The central element of building theories from cases is a replication logic (Eisenhardt, 1989, Yin, 2013). Further, the use of multiple cases helps the researcher to build a more detailed theory than the use of a single case as the data source (Eisenhardt, 1991). Since three software supplier firms participated in our study, we got the opportunity to replicate the same study which resulted in three independent case descriptions. These case descriptions laid the foundation for the theory building process.

When conducting research in close collaboration with firms, it is important that data collection does not take more time than is needed and disturb the daily work of firms. Thus, we wanted to use a data collection method which allowed us to collect detailed information about project start-up phase efficiently. Therefore, we chose process modelling as a data collection method.

Data collection

The process modelling was the main data collection method and thus offered the primary data for our study. In addition to process modelling, firms offered us their quality manuals and other project related documentation for analysis. This additional information was the secondary data of our study.

In addition to practical reasons, there were different reasons why we selected a process modelling to be a data collection method in this study. Firstly, to be able to understand and to improve operations of any organization, it is important to have detailed models which describe different processes (Giaglis 2001). Secondly, process modelling offers detailed knowledge of different

processes of organizations (Bandara, Gable et al. 2005). Thirdly, process models and process guides are found to be useful in software firms to avoid problems in software project deliveries (Dingsøyr, Moe 2004). Fourthly, earlier experiences indicate that the process modelling is an effective method for modelling processes quickly and cost effectively (Dingsøyr, Moe 2004). In addition, it is important to define processes together with the people who will follow the defined process in their daily work (Dingsøyr, Moe 2004).

We replicated the study by applying the same process modelling technique with each case firms. We applied the process modelling technique LAPPI which started to evolve almost two decades ago 1999 (Raninen, Ahonen et al. 2013). The LAPPI technique has been developed through dozens of industrial cases, mainly in different IT organizations (Raninen, Ahonen et al. 2013). Nowadays, the LAPPI is in active use in different software supplier firms (Raninen, Ahonen et al. 2013). The applied LAPPI technique is documented in detail elsewhere (Raninen, Ahonen et al. 2013).

Case firms

We collected the empirical evidence for this study from three software supplier firms. They all operate in a small European country and supply a wide variety of software development projects and related services to their customers. The firms are labeled here as Firm A, Firm B and Firm C.

Firm A is a part of a subsidiary of a large globally operating parent firm. The subsidiary has several business units around the country which all operate independently. Each business unit operates around their own specific business area which are part of the parent firm's business. Firm A is one of these business units.

The customers of Firm A are mainly medium-sized and large firms and public sector organizations. Its project deliveries are relatively large. The duration of projects varies from a few months to a few years. In addition, Firm A offers a wide variety of continuous and consultant services to its customers to complement its services.

Since Firm A delivers large projects, it is important for the firm to ensure the profitability of the projects. If a large project fails or its financial result is not profitable, it may have a relatively significant impact on the financial performance of the firm. Therefore, Firm A wants to put effort in the start-up phase of projects when it has better opportunities to affect the profitability of the projects than during the later phases of the project life cycle.

Firm B is a medium-sized software supplier with offices in several locations. Its customers are other firms and public sector organizations. Firm B offers software development and IT consulting services. The project deliveries of Firm B are small; the duration of projects varies from a few days to a few months. This means that they have very limited time for start-up projects after the customer has placed an order.

To maintain the profitability of its projects, Firm B must start projects fast and efficiently, avoiding extra work and costs. Therefore, to be able to operate effectively, Firm B wants its project start-up phase to be well planned and carried out by following to a certain routine.

Firm C is a very small firm with less than ten employees. They have one office where all employees work. The project deliveries of Firm C include both hardware and software. Most of the customers of Firm C operate in the construction

industry. The duration of the projects of Firm C varies greatly, depending on whether it is an existing or a completely new customer to the firm.

Since Firm C is very small and can deliver only a few projects annually, the profitability of each project is important for the continuity of the firm. Therefore, Firm C must ensure that its projects are profitable and it wants to invest in the formalization of the start-up phase of its projects.

Model building

This study resulted in a model of supplier’s software development project start-up phase. A model building followed a process which is presented in Figure 1.

Figure 1. A model building process

The basis of the model building was the firm specific descriptions of the project start-up phase. To begin with we conducted process modelling in all three firms (Firm A, Firm B and Firm C). We applied the same process modelling technique in each case. Process modellings resulted in descriptions of the case firms’ project start-up phases.

Firm-specific process descriptions included details of project start-up practices, the roles of the people who carry them out and information flows between roles during the project start-up phase in each firm. We validated each of the firm specific descriptions separately in the case firms.

Based on the validated firm specific descriptions, we built a model of project start-up by comparing the firm specific descriptions and then integrated their commonalities into the model. In the first step of model building, two researchers

(Researcher1 and Researcher2) worked independently and produced a draft of a model.

After this, during the second step, the same researchers (Researcher1 and Researcher2) compared their drafts of the model and formed it into a common vision with two other researchers (Researcher3 and Researcher4), which had not been involved in the model building previously.

In addition, we validated the model of project start-up separately in each case firm (Firm A, Firm B and Firm C). During validating workshops, each firm gave improvement suggestions on the model. After the validation was done in the case firms, we produced the final version of the model of project start-up which is described in detail in next section.

A model of a supplier's software project start-up

In the model, the project start-up phase begins in the supplier firm when the supplier has received an order from the customer or when the sales case of the project is near to its closure, and the supplier can be sure that they are going to win the deal. There are altogether 16 practices in the model of project start-up which is presented in Figure 2. There were initially less practices in the firm-specific process descriptions than in the project start-up model. This was because firms initially combined several project start-up practices, but in the validation phase, these practices were divided into smaller entities. Therefore, there is more amount of practices in the project start-up model than in firm-specific descriptions.

In general, in the literature discussing the activities related to project management the term practice is widely used (Loo 2002, Besner, Hobbs 2008, Besner, Hobbs 2013). For this study, we adopted the term practice from CMMI (Crisis, Konrad et al. 2009) where “generic *practice is the description of an activity that is considered*

important in achieving the associated generic goal”, because it describes the activities performed during the start-up phase of a software development project.

According to this definition of the term practice, the implementation of a single project start-up practice must be well defined, planned and organized. Further, each project start-up practice receives information either in verbal or documented form as input from a person who has a role in project start-up. The output of a project start-up practice can be, for example, a project-related document, such as a project plan. It can also be a decision relating to the project, such as information about who the project manager of the project will be.

The purpose of a single project start-up practice is to ensure that the issues associated with it are considered before the project begins so that possible challenges and risks can be better managed during the execution of the project. Further, the purpose of project start-up practices is to help the supplier firm to ensure the success of the software development project by setting up the project management environment for the project.

Start-up practices help the supplier firm to prepare for the forthcoming project during the project start-up phase and to manage and to develop its business. There is no strict execution order of project start-up practices in the model, except for two practices: Inform Production unit of Future Project and Organize Internal Kick-off Meeting. The former begins the project start-up phase and the latter closes it in the supplier firm. It is noteworthy that the emphasis of practices varies in each project.

Figure 2. Model of a supplier’s software project start-up

Most of the project start-up practices are carried out only in the supplier firm. Some of the practices require cooperation with the customer and third parties, such as subcontractors. There are six different roles involved in the project start-up practices. Four of them are internal (Sales Manager, Business Manager, Project Manager, Project Team) and two of the roles are external (Customer, 3rd Party). These roles are listed and connected to project start-up practices in Table 1.

Table 1. Project start-up practices and participating roles.

Since project start-up phase is an interface between sales operations and project operations, practices in the model are mainly related to business and project management. Only a small part of the work during the start-up phase is related to the software development. Business related practices direct the supplier's business by helping to ensure the achievement of the business objectives of the project. Project management related practices establish the conditions for the successful management and execution of the project. Software development related practice ensures that there is required technical environment available for the project in the supplier's side and in the customer's side.

To achieve the business objectives, the cooperation between the project sales team and the project team within the supplier firm is very important (Turkulainen, Kujala et al. 2013). Thus, Inform Production Unit of Future Project practice is needed as it begins the project start-up phase and builds a bridge between the supplier's sales operations and project operations. When the project is transferred from the sales

operation to project operations, it is important that the project manager is appointed as soon as possible.

The project manager is one of the most important members of the project team in the supplier firm. Thus, Appoint Project Manager practice requires attention during the project start-up phase. The project manager does not only manage the project, but he or she also manages the customer relationship and the business around the project. Therefore, the selection of a project manager is an important decision for the supplier firm (Mainela, Ulkuniemi 2013). The supplier would benefit from the fact that the project manager has been appointed already during the sales of the project. Then, the project manager would be familiar with the project and the customer from the very beginning (Savolainen, Ahonen 2015).

During the project start-up, seamless cooperation between the supplier's sales team and the project team is required, so that the supplier can create the conditions for successful project delivery. The Transfer Project to Production practice helps to transfer the project and all project related information from the sales team to the project team within the supplier firm. After that, the project team has responsibility for the project, and the role of the sales team will be primarily consultative.

The cooperation between sales operations and project operations is essential to ensure that the solution, which is sold to the customer, is doable within the limits of the agreement (Ahonen, Savolainen 2010). Therefore, it is necessary to ensure that the supplier and the customer have achieved a consistent view of the content of the project agreement before project execution begins. Thus, the Prepare Project Agreement practice is necessary, when the project is delivered to an external customer.

During sales, the project is only a piece of paper (Mainela, Ulkuniemi 2013).

After the sales case is successfully closed, the project becomes visible in the supplier firm when the information about the customer's order is saved in the supplier's information system. The Save Order Information in System this practice is needed to update the information about the customer in the system. The information about the customer supports customer relationship management and helps the supplier improve products, services and processes (Khodakarami, Chan 2014).

During the project start-up phase, the supplier firm needs to assign and engage the project team in the forthcoming project. If there is lack of requisite skills in the project team, the project manager should plan how they are acquired on time (Kappelman, McKeeman et al. 2007). It should be noted that usually the supplier is under pressure to allocate resources for multiple simultaneous projects (Browning, Yassine 2010). Clearly defined responsibilities of a project team help to meet cost and time targets of the project (Papke-Shields, Beise et al. 2010). The Allocate Resources for Project practice is needed to ensure that the requisite human resources are available at the right time during the execution phase of the project. In addition, if there are third parties involved to the project, the Manage 3rd Parties practice is taking place at the project start-up. This practice helps to plan and manage the cooperation which may be carried out with third parties during the forthcoming project.

In the project business context, the supplier must be able to manage the discontinuity of customer relationships (Mainela, Ulkuniemi 2013). The continuity of customer relationships requires that customers are satisfied with delivered projects (Narayanan, Balasubramanian et al. 2011). According to Bose (2002) customer relationship management involves tasks the purpose of which is to acquire, analyze and use knowledge about the customer to build and to maintain long-term customer

relationships. Therefore, Manage Customer Relationship practice takes place during the project start-up phase.

In addition to the long-term customer relationships, the supplier strives for profitable business. The Ensure Project Profitability practice helps to ensure the profitability of the project. Usually the outcome of the project can be implemented in various ways. However, the supplier firm must offer to the customer the option that produces the best possible result from the supplier's business perspective. This requires clarifying the needs of the customer during the project start-up phase.

Personal interaction between the project manager of the supplier and the representatives of the customer during the early phase of a project is not important only for the forthcoming project, it is important for the management of the customer relationship (Mainela, Ulkuniemi 2013). Meeting with the customer during project start-up helps the supplier to build trust in the customer relationship, which will help to increase the commitment of the customer to the project and eventually it may lead to higher customer satisfaction (Smyth, Gustafsson et al. 2010). The Meet Customer practice helps to organize a meeting where the supplier can refine the unclear matters related to the project with the customer.

The Define Technical Environment practice is the only practice which is directly related to software development work. This practice ensures that the requisite technical environment is available during the execution phase of the project. The supplier firm must separately define the technical environment for development and testing and for the customer. If the technical environment of the forthcoming project is not defined with sufficient care during the project start-up phase, it may lead to project failure (Ahonen, Savolainen 2010).

The identification of project risks during the project start-up phase increases the awareness of risks among the stakeholders of the project and contributes to the success of the project (De Bakker, Boonstra et al. 2010). Thus, if the supplier is prepared for the potential risks and their occurrence at the very beginning of the project, the project has a better chance of being completed in accordance with the plan (Papke-Shields, Beise et al. 2010). Therefore, Analyze Project Risks practice is necessary during the project start-up phase.

When project is delivered to an external customer, the supplier must report the progress of the project to the customer. Thus, the supplier must agree separately on its internal reporting practices and on reporting to the customer. If the supplier organizes regular project status meetings, the achievement of the project objectives is more likely (Papke-Shields, Beise et al. 2010). In addition, effective communication with the customer helps to increase the customer's understanding of the progress of the project and leads to higher customer satisfaction (Papke-Shields, Beise et al. 2010). Therefore, the Plan Project Monitoring practice takes place during the project start-up phase.

Although the project scope is defined in the project agreement, it may have changed during or after the sales phase of the project. Therefore, the scope of the project must be redefined during the start-up phase in cooperation with the customer and the supplier. The project will be more likely to be completed on time and on budget if the changes of the scope of the project are planned and implemented in accordance with formal practices (Papke-Shields, Beise et al. 2010). Thus, the Redefine Project Scope practice is necessary during the project start-up.

The customer-supplier context is the reason to re-write the project plan during the project start-up phase. It is a usual situation that after the sales case is closed, the

representatives both in the customer's and the supplier's organizations may change. Therefore, it is necessary to re-create the shared vision of the project with the customer and the supplier. Thus, the Prepare Project Plan practice ensures that the project plan is updated.

The Organize Internal Kick-off Meeting practice completes the project start-up phase, after which the project execution phase can begin.

Discussion

Previous research has revealed that the project start-up phase is essential to the success of the project. Thus, a disciplined project start-up is a prerequisite for successful project management. Further, successful project management is a prerequisite for the success of the project. Therefore, supplier firms should invest in the project start-up phase and follow formal practices.

Even though project start-up related issues can be found in standards, such as PMBOK (PMI 2013), PRINCE2 (Office of Government Commerce 2009) and ISO 21500 (ISO 2012), earlier research has left the structure and the practices performed during project start-up very vague. Thus, project start-up related issues have not been assembled together in such a manner as a supplier firm faces them after completing a successful sales case, before the actual project starts.

Earlier studies have revealed that project success can be endangered if the start-up is not properly performed (Ahonen, Savolainen 2010, Rolstadås, Tommelein et al. 2014). In addition, the boundaries for the supplier's software development project start-up phase have been defined, and action points in the project start-up process have been identified (Savolainen, Ahonen et al. 2015).

Based on our findings reported in this paper, it can be said that there is a structured project start-up phase between project sales and execution phases within the supplier firm. Our study indicates that, during the project start-up phase, the supplier firm implements several start-up practices before the project starts, and they are repeated for every project which is delivered to an external customer.

It should, however, be noted that although our study reveals practices that are essential for the project start-up phase, the Project Manager and Project Team do not perform all of them. Certain practices are performed by other internal roles and the external Customer is involved with some of the supplier's software development project start-up practices, such as Prepare Project Agreement, Allocate Resources for Project, Meet Customer, Define Technical Environment, Plan Project Monitoring, Redefine Project Scope and Prepare Project Plan. Therefore, successful project start-up requires cooperation at the organizational level as well as at the project level with different units within the supplier firm and with the customer.

As several roles are involved during the supplier's project start-up, this raises the question of costs and how they are covered. The question of costs allocation was discussed also in Fulford (2013) and Savolainen et al. (2015). Thus, we assume that the effort used for project start-up practices may not be logged as costs for the project. In other words, these costs are likely to be considered a part of the general overhead, although they are clearly related to individual projects, and will influence the profitability of the project.

The project start-up practices presented in this paper suggest that project start-up is a more complex and multi-dimensional activity in supplier firms than one would expect. However, if project start-up practices are clearly defined and followed, it reduces confusion and miscommunication among the people involved in the project. This further

reduces challenges during project implementation and helps software suppliers to achieve the business goals of a project.

Given the importance of project start-up being an interface between sales operations and project operations, it is unclear why project start-up has been a neglected subject in related standards and previous research. One of the reasons might be that research has not distinguished between suppliers' and customers' perspectives on projects. Our study is one step among others in making the supplier's project start-up phase visible.

Conclusions and future work

The aim of this study was to answer the question of what happens in a software supplier firm during the project start-up phase. To find the answer to the research question, we modelled the software development project start-up phase in three supplier firms and built a model of project start-up.

Our study contributes the knowledge of project management by building a theory of project start-up from three case studies. The project start-up model offers a missing piece to the theory of project management in the project business context. The process modelling technique we applied in this study is documented in detail and can be replicated in other supplier firms by following a similar process. Our study is a good starting point for project start-up research, and our results can be compared with both smaller and larger software supplier firms later to gain a better understanding of what happens before a software project starts. In addition, the findings of our study confirm what previous studies have shown and answer the research question.

In previous studies, project start-up has been identified and defined, but its structure and practices have not been established from the supplier's perspective in the

project business context. Thus, our study deepened our understanding about the software development project start-up phase, especially from the supplier firms' point of view.

Our study was conducted in close cooperation with the practitioners working in the software supplier firms. The study was conducted as a multiple case study, and the data collection method was process modelling implemented in the software supplier firms. Finally, we followed the theory building process to develop the model of project start-up phase. The results of our study indicate that project start-up is a structured phase of a project's life cycle and includes several practices.

We used the project business framework (Artto, Kujala 2008) to posit our study in a particular research area. We found the research area on management of a project relevant for this study. The findings contribute the new knowledge for this research area which has gained wide interest among researchers and practitioners for decades. Our study emphasizes that it is necessary to make a distinction between the perspectives of the customer and the supplier when studying projects in the project business context. This point has also been highlighted recently in a study focusing on the customer's and supplier's risks in outsourced IT projects (Liu, Yuliani 2016). So far, the study of Liu and Yuliani (2016) is one of the best, where the different perspectives of the customer and the supplier have been separated from each other. As this study focused on supplier's perspective, it is important to continue to study this topic also from the customer's point of view.

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[¹] Other terms meaning ‘supplier’ include vendor, contractor, and seller, and other terms meaning ‘customer’ include client, buyer, and acquirer (ISO/IEC 2008a, ISO/IEC 2008b, ISO/IEC 2009, PMI 2013).

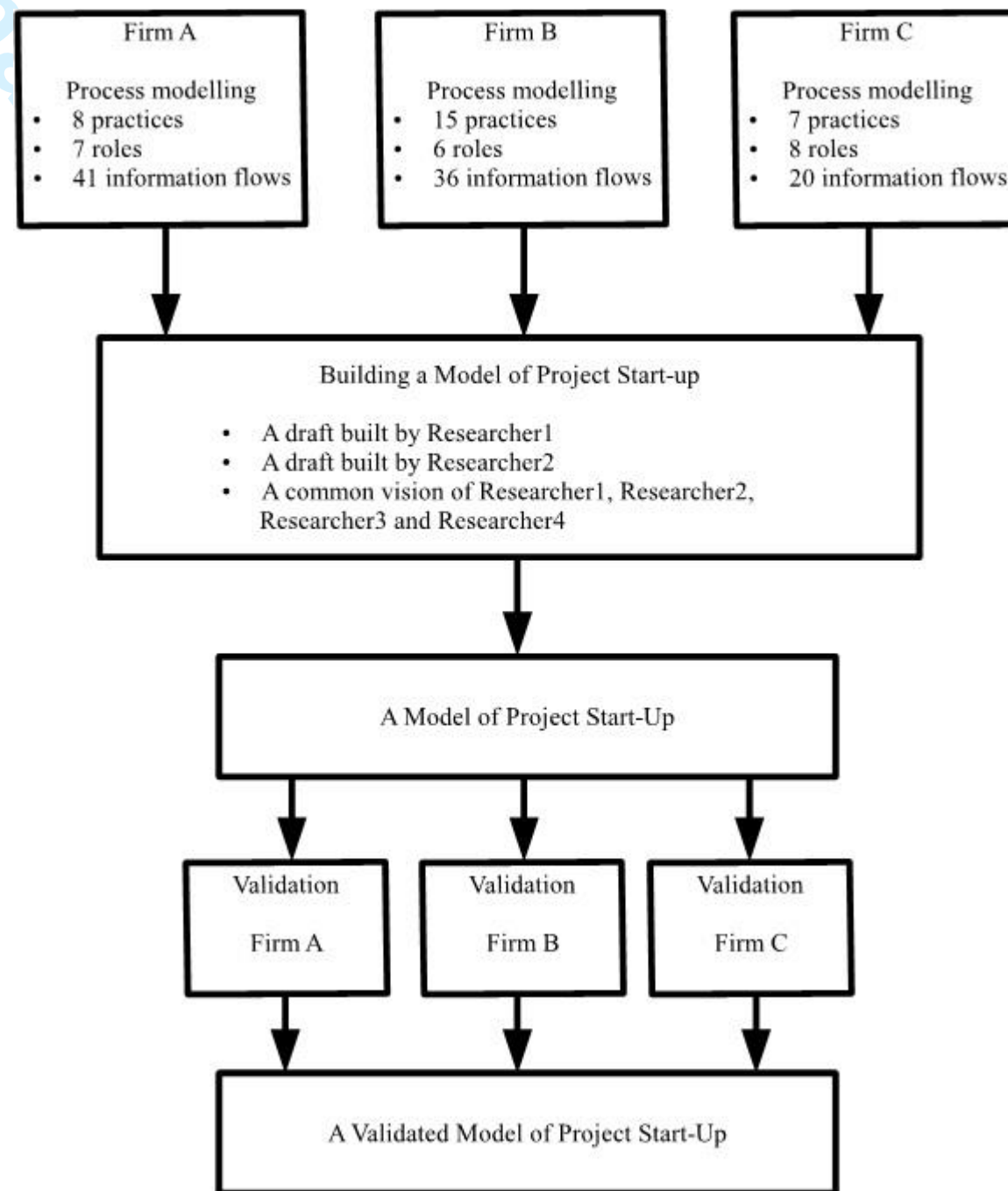
Figure 1. A model building process

Figure 2. Model of a supplier's software project start-up

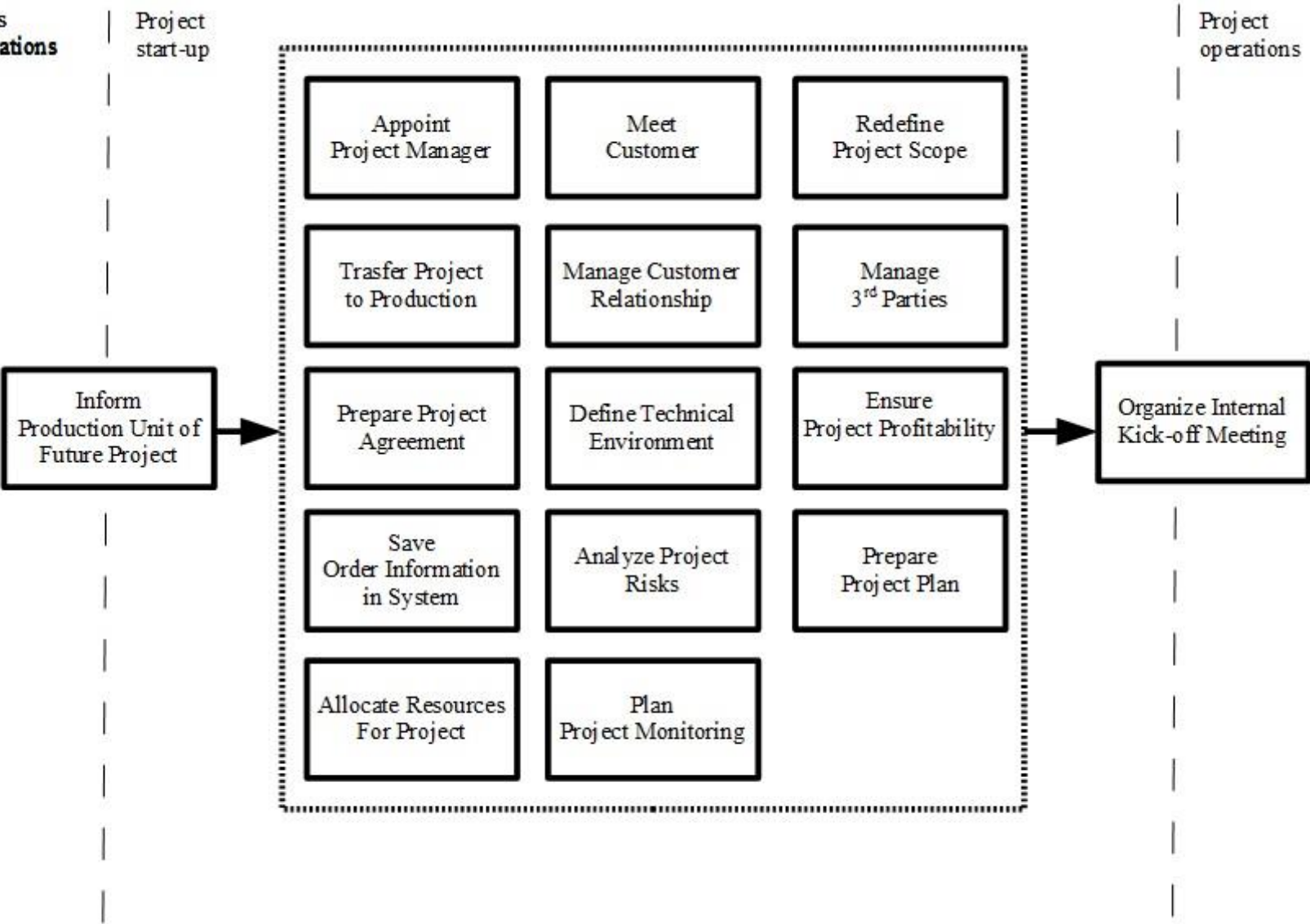


Table 1. Project start-up practices and participating roles.

Practice	Internal's role(s)	External role(s)
Inform Production Unit of Future Project	Sales Manager Business Manager	
Appoint Project Manager	Business Manager Project Manager	
Transfer Project to Production	Sales Manager Business Manager Project Manager	
Prepare Project Agreement	Sales Manager Business Manager Project Manager	Customer
Save Order Information in System	Project Manager	
Allocate Resources for Project	Sales Manager Business Manager Project Manager Project Team	Customer
Manage Customer Relationship	Sales Manager Business Manager Project Manager	
Ensure Project Profitability	Sales Manager Business Manager Project Manager	
Meet Customer	Project Manager Project Team	Customer
Define Technical Environment	Project Manager Project Team	Customer
Analyze Project Risks	Business Manager Project Manager	
Plan Project Monitoring	Sales Manager Business Manager Project Manager	Customer
Redefine Project Scope	Sales Manager Business Manager Project Manager	Customer
Manage 3 rd Parties	Business Manager Project Manager	3 rd Party
Prepare Project Plan	Business Manager Project Manager	Customer
Organize Internal Kick-off Meeting	Project Manager Project Team	