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Impact of Services on Project Business

Abstract

Project supplier firms are solution providers. A solution may consist of a core project delivery with specific service contents, and/or of separate service deliveries. This paper analyzes the role of services in the business model of a project-based firm. The empirical study focuses on the business models of five project supplier firms, and on the relationship of the core project delivery and deliveries of different services to the business model. We identify six different ‘impact types’, each of which illustrates a different way in which services can affect the business of a project-based firm. The impact types are: customer entry, customer value, competitive advantage, delivery efficiency, service business, and innovation and learning. Our empirical study suggests a wealth of different service offerings and their complex relationships with the business model and revenue generation logic of a project supplier firm. We conclude with several distinctive findings that relate to how services are seen in the firms’ businesses, with these approaches obviously serving as enablers or barriers to good business performance. The paper suggests further research on specific areas related to the overall theme of project and service business.

Keywords: Project-based firm, business models, project business, services, service business, industrial services

1. Introduction

Achieving sustainable competitive advantage through superior product deliveries in highly competitive global markets is difficult. When technological innovations are combined with service components they are more likely to succeed [1].

Companies move into the service business by integrating service elements into their product deliveries [2,3]. The benefits include continuous streams of revenue, higher profits, and new opportunities to differentiate business [4,5]. These benefits are obvious, especially in cases when standardized products are contrasted with services in the form of after sales. However, in the case of project business [6], where the products often can be described as complex products and systems [7] the distinction between products, services and projects, and their role and interdependency in companies’ business models deserve a closer examination. One key issue is how to align service and project processes with the overall business processes in a project-based firm [8]. Systems integration— which occurs in the grey area between products and services [9] – has been increasingly identified as a key organizational element in project business [10]. Davies [11] further describes what he calls “integrated solutions” as one innovative, state of the art strategy where systems, products and services are combined into a set of vast and long-lasting deliverables from a supplier to its customer. Other scholars have used terms like “service-enhanced” [8] and “service-led” [12] to denote business cases where big projects are combined with services, especially during the use phase of the delivered products.

From a project business point of view, the challenge is how to integrate services into the project business of a project supplier firm that has several simultaneous projects under way at any given time [13,14,15,16]. In this paper we analyze the role of services in the business of a project-based firm which sells and delivers solutions to its customers by using projects (among other forms) for organizing its deliveries. The research question addressed in this paper is:

What is the impact of services on the performance of a project-based firm?

This paper adopts a project business view in order to develop an understanding of how services contribute to the project business of a project-based firm. This way, the paper provides clarification on the actual role of services in project business, and on how services complement the business of selling and delivering projects in a beneficial manner. The research question is addressed through a literature review and a case study with five companies that supply projects to their customers. The point of departure for our study is project business literature [17,13,18,6,19,20,21] and systems integration literature [22,23]. Despite this the theoretical and conceptual background found in our literature analysis focuses on services, especially those in the industrial sector, for building an understanding of the type of role services may have in the business of a project-based firm.

Finally, observations from five project supplier firms are used to describe and analyze which type of services different industrial system suppliers have integrated into their business models. This approach is based on the argument that the business of a project-based firm can be assessed through its business model [23] by using descriptions in more general literature on the concept and content of business models [24,25,26,27,28,29,30,31,32,33].

2. Theoretical and conceptual background

Service studies have sought to make a distinction between goods and services. Many attempts have been made to try and provide a definition of service [33,34,35,36]. Whereas products are generally characterized through ownership, services are seen as an “act” [35], “performance”, “process” or “deed” [35]. According to Vargo and Lusch [37] service is the application of specialized competences (skills and knowledge) through deeds, processes and performances for the benefit of another entity or the entity itself (self-service). Literature defining service also emphasizes that services cannot be produced separately from the customer and that delivery of the service must be understood as equivalent to the production of the service, even though service capacity can be kept on stand-by condition [38,39]. Project deliveries include both products and services that are used for unique solutions for the customer: for example, PMI’s project management standard defines a project as “a temporary endeavor undertaken to create a unique product, service, or result” [40]. While a project may include only the delivery of a service component, in this paper we claim that most large system solutions delivered through projects also include some kinds of core technological products. Therefore, we consider project-based firms to provide solutions that integrate a wide wealth of products, services and systems into their offerings to customers.

2.1 The role of services in business

Services are often seen as means to provide added value to the customer [41,42,43]. Customer value is an important element from a supplier firm’s point of view, because it closely relates to the business potential of the supplier firm in a given market. Services are also an effective way in which the supplier’s product can differentiate to better meet the varied needs of different customers. For example, Mathieu [44] refers to Donaldson [45] and to Mathe and Shapiro [46] who all state that the commercialization of services around a tangible product can raise revenues for a company. Superior service increases both first-time and repeat sales, and thus enhances market share [47]. Additionally, offering services is an effective way to maintain ongoing relationships [48]. Furthermore, Meier and Massberg [49] find that providing services will not only increase familiarity between the customer and the supplier but also gives the supplier the chance to recognize a change in the customer requirements and technological development potentials as early as possible, thus increasing the competitiveness of the supplier. Mathieu [44] recognizes three generic benefits for increasing service offerings: financial, strategic and marketing benefits. Financial benefits include increased revenues and more stable cash-flow. To exploit the benefits, the supplier needs to get its service cost structure under control and to apply a consistent pricing strategy. In strategic context, services can bring benefits by providing competitive advantage in terms of quality, added value and differentiation and help in building industry barriers to entry. Marketing benefits include increased customer satisfaction, improved new-product adoption and supplier credibility.

Services have different roles and functions in the business of delivering solutions or systems through projects. Services can be important when integrated into single system solution deliveries and their related

projects. However, separately delivered services can also have an impact on the overall business of the project-based firm.

Through our empirical analysis of the five case firms, and through a simultaneous analysis of the service literature, we have identified six different ways in which services may impact the business of a project-based firm. The six impact types are: customer entry, customer value, competitive advantage, delivery efficiency, service business, and innovation and learning.

The six impact types are explained in Table 1 through examples provided from service literature. However, we emphasize that the actual understanding of these impacts, their categorization, and how they appear in different phases of the project lifecycle view, was created simultaneously while analyzing the empirical data. This understanding is reflected in Table 3.

Table 1. Six impact types illustrating different types of impacts of services on business performance of a project-based firm

Impact type	Description of the impact	Examples of impacts from service literature
Customer entry	The service serves as an entry point to new customers, projects, or services.	Service as a way to maintain relationships [48,50]. Access to the customer during different phases of solution life time [51]. Indirect access to customers through other relevant actors [52]. Participation in a customer's investment planning process [53].
Customer value	The service creates additional value to the customer.	Use of services to support customer's business [53]. The combination of service elements with physical products to increase profitability [51]. A superior service increases both first-time sales and repeat sales [47]. Service leads to direct financial benefits and longer-term strategic benefits [44].
Competitive advantage	The service increases the competitiveness of the supplier's offerings among competitors.	Service as a chance to recognize a change in the customer requirements as early as possible, to increase the competitiveness of the supplier [49]. Services are difficult to imitate [54]. Competitive advantage through differentiation opportunities [51,55].
Delivery efficiency	The service helps to make delivery activities more lean and cost-effective.	Training and education increases the customer's understanding of system operations [53]. Fine-tuning of the exchange processes to increase efficiency [56]. Supplementary services to improve efficiency during the product life cycle [49].
Service business	The service itself is profitable and therefore also justified as an independent delivery.	Increase in revenues and profit [44,45,46]. Predictable revenue stream from an installed base of products [57,58].
Innovation and learning	The service creates new knowledge or capabilities, or helps in creating new or improved concepts or products.	A chance to recognize technological development potentials as early as possible [49]. Marketing benefits [44]. New profitable innovations between the parties [34].

2.2 *The relation between services and the core project delivery: before, during, and after*

From the point of view of a project supplier firm participating in projects for its business purposes, we adopt the project business definition of Artto and Wikström [6]: “Project business is the part of business that relates directly or indirectly to projects, with the purpose of achieving objectives of a firm or several firms.” Project supplier firms may engage in several sequential or parallel projects through different delivery scopes [50]: part deliveries, subproject deliveries, packaged complete subsystem deliveries, and turnkey deliveries of complete final products with their tested and assured functionalities for required performance.

Service offerings cover the entire life-cycle of the product (or solution) and they are often classified based on whether services are offered before, during, or after the sale [44]. In the field of industrial marketing, Frambach, Wels-Lips and Gündlach [51] refer to Samli, Jacobs and Wills [59] who have found that services are generally classified into three different categories representing subsequent stages of the industrial purchasing process:

- 1) Product services prior to the purchase decision (presale): Pre-sale product services are those which will aid the buyer in the purchase decision and will stimulate adoption of an industrial product, for example, demonstrating the product and offering a trial use of the product.
- 2) Product services that are directly relevant to the purchase decision (sale): Sale product services are those which help the customer to make use of the product, for example, installation and training.
- 3) Product services following the purchase decision (postsale): Post-sale product services are designed to keep the customer satisfied with the purchase, for example, handling issues that arise with the product and regular maintenance inspections.

Similarly, Helander [53] groups services activities according to their delivery in relation to the core product delivery: pre-sales activities, implementation activities, and long-term activities.

A complex system solution is usually delivered to the customer as a project, which includes core product and related services to provide the required functionality for the solution. Services related to a project occur before the project delivery, during actual project delivery (e.g. as integrated into the project delivery), and/or after the project delivery. A project supplier firm has to carefully analyze, which services it wants to include in the delivery scope during the different time frames of the solution lifecycle. Figure 1 illustrates the formation of a supplier firm’s delivery scope before, during and after the core project delivery. The owner may use the project supplier firm or its competitors, or even a selected group of specialized project/service suppliers, for service deliveries during the total solution’s life time (before, during, and after). The owner may also conduct many service activities themselves (self-service), which may be due to the owner’s view that certain services related to the overall solution, for example operation of a production facility, are part of their own core competence that contributes to distinctive competitive advantage. Figure 1 also shows that these – often complex interrelationships between service deliveries and system/solution deliveries – contribute to the business performance of the project supplier firm. The impacts on business performance may be both direct and indirect, and short-term or long-term. The impact of such services (depicted in Figure 1) on the business performance of a project-based firm can be analyzed through the six impact types presented in Table 1.

Figure 1. The relation of services to single core project delivery: before, during, and after

3. The research process

For the empirical study we used three criteria to select five companies. First, the companies needed to qualify as industrial project and service suppliers. Second, we preferred to look at international and industry-leading companies. Third, it was important that companies that could guarantee us sufficient access so that we could acquire as much data as possible. Table 2 provides a summary of key characteristics of the selected case companies.

The main data was gathered through semi-structured interviews of 15 informants in the five case companies. The informants' affiliations included President, Senior Vice President, Vice President, Director, and Director of Business development. The profile of the interviewees' affiliations reflect the fact that we sought to interview individuals in both upper level positions and in business development positions.

In the semi-structured interviews, we asked about different prevalent project types and service types that the interviewees recognized in the company's business. Furthermore, we asked the interviewee to describe the company's business model. The business model was described so that the following issues were included, addressed and taken into account: offerings, value proposition to customers, value creation logic (customers' value), revenue generation logic, customer behaviour, competition, distinctive competencies and resources that contribute to competitive advantage, and use of external resources (suppliers). The interviewee was also asked to separately describe the typical business model used in the industry that the company belongs to. We also asked about the relationship of the project and service types to the business model, and the company strategy. Finally, we asked about which services the company provides before, during and after the project (see Figure 1), and why such services are provided.

The interviews were recorded and transcribed. The research process, which has been iterative in seeking an appropriate methodological approach and in filtering appropriate content and observations, has included several joint meetings and workshops among the authors of this paper. The six impact types illustrated in Table 1 were identified in an iterative process with concurrent analysis of the empirical data and the service literature.

Table 2. Characteristics of the five case companies, their core deliveries and core projects

Characteristic	A	B	C	D	E
Core content of delivery	Electric power and propulsion systems	Elevators	Ship machinery, propulsion and manoeuvring systems	Telecom networks	Valves & flow control systems
The share of the project delivery in buyer's main project/investment	5-10 %	2-4 %	15-50 %	50-100 %	2-4 %
Project buyers	Shipbuilding companies	Construction companies	Shipbuilding companies	Telecom operators	Plant/facility construction companies
Investors/users	Ship owners	Real estate owners/operators	Ship owners	Telecom operators	Process plant owners
Core project	Propulsion and/or power equipment delivery	Complete installed and functional elevator	Ship engine and related power equipment delivery, propulsion system delivery, automation system delivery	Complete installed and functional telecom network system, network implementation (NI)	Valves, their actuators and related control system delivery
The share of core project's cost of total system life cycle cost	N/A	N/A	N/A	20-30 %	N/A

4. Impact mechanisms of services on business performance

Table 3 (Table 3 is in three separate parts: part 1, before the project; part 2, during the project; and part 3, after the project) summarizes the observations from the empirical study concerning the impact that services have on business performance. In the table, our observations of such impacts are categorized into the six impact types described above. Observations concerning all case companies A, B, C, D, and E are combined into this summary table, and observations concerning specific companies are not shown separately, partly to ensure anonymity. In Table 3, the impact of services on project business is categorized by the timing of the service implementation in the solution life time (before, during, or after the project, see Figure 1) and by the impact type (for six distinct impact types, see Table 1). However, it is important to note that although the observations of services and their impacts in Table 3 are arranged to occur before, during, or after the project, the term ‘project’ refers to what we called a “core project” above (see Table 2 for case companies’ core projects). Furthermore, likewise, references to ‘project’ in Table 3 refer to a “core project” but such a core project may also be delivered by the project supplier’s competitor firm. This way, a competitor may have built the customer’s installed base with a core project, and the supplier firm can offer and deliver its post-project services to provide maintenance or operations support services for the competitor-installed base. Thus, the reference to the timing of the service delivery (before, during, or after) in relation to the ‘project’ in Table 3 does not refer to a specific individual project but rather to any project (of the many) that “were” (or “are being”, or “will be”) completed by the project supplier or its competitor firm in the competitive marketplace. Table 3 not only explains the various logics in the empirical data of how the services influence the business performance of the firm, but the table also shows how different service types are categorized into six impact types and how they appear in different phases of the project lifecycle. The categorization in Table 3 into different impact types was created simultaneously while analyzing the empirical data, and, accordingly, the understanding of what the six impact types are, was created simultaneously in the actual empirical analysis.

Table 3. Observations of impacts of services on project business (Part 1 of the table: ‘before the project’)

Time frame	Impact type	Service’s impact on project business	Observed service offering
Before the project	1) customer entry	Consulting is a growth engine that leads to bigger and bigger projects or service deliveries. For this reason, consulting is often delivered free-of-charge (consultative selling). Conceptual design and feasibility studies help the customer to design the solution and the supplier firm to simultaneously develop its project offering to match customer’s needs. Joint development and innovation activities support on-going discussion, mutual target definition, and furthermore enhances trust. Configuration tools and methods for creating specifications can help the customer to plan, visualise and consider many alternatives at an early stage, and to match the supplier firm’s offering to these alternatives.	Consulting, consultative selling, conceptual design and feasibility studies, joint development and innovation activities, configuration tools and methods for creating specifications
	2) customer value	Engineering design and systems integration is used for novel ideas and to support the customer’s investment by creating technology advances.	Engineering design, systems integration
	3) competitive advantage	Consulting , conceptual design , and systems integration services are used to participate in the customer’s request for bid preparation directly or indirectly, and to simultaneously ensure a fit between customer’s request and the supplier firm’s offering.	Consulting, conceptual design, systems integration
	4) delivery efficiency	Supported – even web-based and free-of-charge – project/product configurators set for customer’s use ensure such project scope definitions that enable smooth and efficient delivery. Customer’s training in projects and their potential product choices are used for same purpose.	Project/product configurator, training
	5) service business	Maintenance contract often leads to other kinds of service and project deliveries; for example, a long term maintenance or operations support relationship with the customer provides a good opportunity for the supplier to bid for or deliver another ‘core project’ (modernization, extension, or even a new green field system/solution).	Maintenance, operations support
	6) innovation and learning	Exercising consulting , conceptual design , and systems integration services helps the supplier to understand the customer’s business better, and to fit the solution being currently offered to suit the customer’s business. Furthermore, in the case of lacking capabilities or resources to implement customer’s, consulting types of services helps to observe the need and to acquire appropriate partners for delivering a solution, and to develop the capabilities of the supplier firm accordingly.	Consulting, conceptual design, systems integration

Table 3. Observations of impacts of services on project business (Part 2 of the table: ‘during the project’)

Time frame	Impact type	Service’s impact on project business	Observed service offering
During the project	1) customer entry	The core project delivery itself often serves as a major point of entry into the customer’s business. By delivery process planning and by continuously adapting delivery logic, the supplier can influence when such entries are made. However, when the major delivery project is being executed, possibilities of building additional add-on service deliveries that would be delivered during the project on the top of the actual project delivery are rare. This occurs since the customer’s interest is often to concentrate on the execution of the major investment and not to buy anything additional, e.g. optimization or related services, until the major delivery project is completed.	Delivery process planning
	2) customer value	With some companies, core projects are only sold with training included; this guarantees the customer’s appropriate use of the systems, and customer’s value accordingly. Project management and systems integration are often seen as essential aspects of the core project delivery that add value to the customer. Engineering and design are typically included in many project deliveries in order to design the delivery to match customer’s needs.	Training, project management, systems integration, engineering and design
	3) competitive advantage	In many companies, the core project is itself a service that serves as a means to sell related equipment. In this respect, the core project guarantees flexibility in product structure, which is seen as important competitive factor.	Core project and inherent service offering
	4) delivery efficiency	Experience in demanding supply chains and supply chain management , including handling of custom, permit, and classification society issues, guarantees a smooth delivery, capabilities to handle uncertainty and improve the delivery logic continuously. Procurement , global network of available resources and commissioning and handing over services are important.	Supply chain management, procurement, commissioning and handing over
	5) service business	Core project is a means of building an installed base, which even may include proprietary components or software that guarantee a supplier’s maintenance/update activities after the project. The installed base is then a platform for other kinds of services, like maintenance. Therefore, a core project is an entry point so that the customer for will be interested in future services. Build-Operate-Transfer (BOT) represents a service package with supplier’s substantial responsibility of customer’s operations.	Core project and inherent service offering, Build-Operate-Transfer (BOT)
	6) innovation and learning	In the actual project execution phase, customer’s interest is often to concentrate on the success of major investments and not to buy anything additional, e.g. optimization or related services, until the major delivery project is completed. However, despite the explicit low innovation mode, the project itself can be considered an adopting and internally learning entity: engineering and design and systems integration are included in many project deliveries to design and optimize the actual project outcome. Project management and delivery process planning , on the other hand, are used for efficient project execution.	Engineering and design, systems integration, project management, delivery process planning

Table 3. Observations of impacts of services on project business (Part 3 of the table: ‘after the project’)

Time frame	Impact type	Service's impact on project business	Observed service offering
After the project	1) customer entry	Consulting, optimization of the system, and even simple field maintenance services often lead to larger delivery scopes. Training in an early operations phase can support the extension of collaboration.	Consulting, optimization, maintenance, training
	2) customer value	A maintenance or operations support relationship with the customer often includes technical systems integration and optimization services that help to sell larger projects, such as upgrades, modernizations or extensions . Maintenance is provided with simple service availability guarantees or spare parts inventory management schemes. Fixed-price operations support with system operability and system uptime/downtime (availability/reliability) guarantees are also provided. In such cases the supplier carries at least a degree of the customer's production loss risk. The supplier can reduce its risk by independently optimizing the operations by adding preventive maintenance activities and/or by using equipment and systems of higher quality assuring availability and reliability. Outsourcing services represent supplier firm's long-term investment (with financing) and the supplier's substantial responsibility of a customer's operations. Asset sharing with the customer in new investment projects and their operation is conducted with revenue sharing types of contracts; this means supplier's definitive investments and financing . Arranged bank loans represent some minor financing arrangements with small customers. Localized operations support/service centres and open web-based and real-time information sharing concerning the status of customer's system are used to enhance customer's value. In some cases, local self-governed service centers with close and even sometimes personalized and intimate customer contacting are considered to be major value increasing vehicles.	Systems integration, optimization, upgrades, modernizations, extensions, maintenance, operations support, outsourcing, asset sharing, financing, localized operations support/service centres, open web-based and real-time information sharing
	3) competitive advantage	Outsourcing and asset sharing require considerable investments and responsibilities on the part of the supplier firm, which means that the supplier shifts its business towards specializing in customer's operations (this may even require that the supplier acquires assets that traditionally belong on the customer's side); this is not always desirable to the supplier, but the supplier's primary motivation for such services often is based on maintaining the competitive advantage and on sustaining long-term customer relationships. This way, outsourcing may even cannibalize ongoing more profitable maintenance/operations support with the customer, but despite this, suppliers are willing to take larger responsibilities with even lower margins due to the interest of creating a closer and more stable customer relationship due to the highly competitive situation in the market.	Outsourcing, asset sharing
	4) delivery efficiency	Centralized (but to some extent localized) operations service centres are used to achieve favourable economies of scale effects while providing maintenance and operations support services to several customers. Centralization of maintenance and operations support, and advanced information systems are used for monitoring, analyzing, and distant care activities. Centralization helps to achieve economies of scale effects, and information technology helps to avoid using excessive manhours. The shaping of customer base by acquiring installed base with high local density also enables the combination of field maintenance with several sets of field equipment in the travel of a single technician.	Centralized operations service centres, maintenance, operations support
	5) service business	Consulting is a profitable business itself; technical consulting often relates to systems optimization and systems integration , which often leads to larger deliveries. Training itself may also be a profitable business. Maintenance, operations support, outsourcing, and asset sharing are profitable service businesses as well..	Consulting, systems optimization, systems integration, training, maintenance, operations support, outsourcing, asset sharing
	6) innovation and learning	Maintenance and operations support services often include diagnostics for customers' systems , as well as monitoring and analyzing of customers' operations. This is often complemented by consulting and optimization of the system. This helps not only in suggesting instant improvements in a specific system, but also allows supplier to learn from the customers' businesses and operations. This kind of feedback enhances supplier's learning and supplier's capability for even more value-adding offerings and deliveries of more intelligent solutions for future sales.	Maintenance, operations support, diagnostics for customers' systems, consulting, optimization

5. Service types and their business impacts

In this section we discuss the findings of our analysis in all six impact types and across the whole life time view (before, during, and after). This way, the section provides observations from case companies that relate to approaches of how services are included in the firms' businesses, and accordingly, obviously how such approaches serve as enablers or barriers to favourable business performance.

5.1 *Observed service types*

Based on Table 3 we can conclude that there is a wealth of different service offerings that are implemented in various phases of the solution life time. The observed service types are: consulting, consultative selling, conceptual design and feasibility studies, joint development and innovation activities, configuration tools and methods for creating specifications, engineering design, systems integration, project/product configuration, delivery process planning, training, project management, supply chain management, procurement, commissioning and handing over, Build-Operate-Transfer (BOT), maintenance, operations support, diagnostics for customers' systems, optimization, upgrades, modernizations, extensions, localized operations support/service centres, centralized operations service centres, open web-based and real-time information sharing, outsourcing, asset sharing, and financing. Of these, outsourcing, BOT, and asset sharing represent supplier's serious investments for taking responsibility for running customer's operations. The categorization of these services in terms of the six impact types in Table 3 shows the primary business interests that explain why these services are offered.

5.2 *Versatile role of consulting types of services in solution providing*

With the term 'consulting types of services' we refer rather widely to consulting, technical services, conceptual design and feasibility studies, optimization, and systems integration. The generic solution-orientation and growth engine role of consulting types of services can be recognized from our analyses: consulting types of services played an important role in all six impact types, and we also recognized their frequent occurrence through all three phases of the solution life time (before, during, and after the core project). Our empirical study indicated that consulting types of services are highly value-adding, and margins are often high. Also the innovation and learning impact from consulting is obvious: most of the consulting services were integrated with existing offerings and thereby consulting influenced the activity system of the company to enhance its deliveries. Increasing design and engineering services was mentioned as a means to understand larger wholes and thereby to offer much wider delivery scopes than is available from a homegrown technology basis.

However, these consulting services were mostly seen as part of marketing and sales activities providing the opportunity for a continuous dialogue and early entry into the customer's investment process. Consulting activities were also often used to enhance the relationship and create a trust base for larger and more profitable activities. Therefore, many consulting types of services are delivered to the customer free of charge (as 'consultative selling'). Observations about free-of-charge services for specific purposes such as relationship building have also been reported by Mathieu [44] and Helander [53].

5.3 *Emphasis on maintenance types of services*

With the term maintenance types of services, we refer not only to maintenance, but also to operations support, outsourcing and other types of services that relate to operating or developing the existing installed base. According to our observations these types of services were extensive both in number and volume. It is even the case with some companies that the core project deliveries no longer play an important role in terms of volume or profitability. Instead, the role of core projects and core product technology may be to indirectly support the firm's technological advancement that enables a even more worthwhile business that relates to the installed base and maintenance types of services.

Existing literature on industrial services recognizes that after-sales services are often one of the main profit generators for the supplier. The ongoing business relationships are often guaranteed in the form of after-sales [48,51,60]. However, Johansson and Olhager [61] ask how deep of an involvement in the management of customer's operations a supplier can take. This question is justified, as the supplier may have previously preferred to establish traditional maintenance contracts but is now increasingly involved in the customer's operations through long-term outsourcing responsibilities [62]. Gallouj and Weinstein [34] see an extensive and balanced co-production at operational level as an advantage. This close involvement can enhance the development of new profitable innovations between the parties. Meier and Massberg [49] point out various advantages in service contracting type of operations. As the production systems are not owned by the customer, such advantages include – in addition to economic advantages – a possibility to establish technological innovations or a chance to re-use components in new configurations in production systems. Furthermore, the possibility of installing supplementary equipment to improve efficiency during the after-delivery life time is an advantage [49].

5.4 The complexity of mechanisms of how services affect business performance

Our empirical study suggests that there is a complex interrelatedness between services and projects, and various complex mechanisms of how services affect business performance. As described above, the complex impacts on business performance are direct and indirect, in both the short-term and the long-term. The complexity is considerably increased by potential controversial or even cannibalistic-type relationships that the services may have. For example, when consulting with the customer, the customer must often be helped when choosing the best possible solution and this may sometimes require that the consultant's suggestions do not rely on their firm's but rather a competitor's equipment deliveries. Also, an outsourcing contract may even cannibalize an ongoing more profitable maintenance/operations support contract with the customer, but despite this, the supplier is often willing to take larger outsourcing responsibilities with even lower margins, due to the interest of creating a closer and ongoing more stable customer relationship in the highly competitive market situation. In our case companies, the organizational arrangements of having different services in different units may enable independence between certain service offerings, but on the other hand effective integration is needed to weave the firm's offering into a complete solution for the customer.

5.5 Customer value vs. project supplier firm's profitable growth

Much of the extant service literature suggests that a supplier should aim to generate ever-increased customer value. However, the potential deficiencies in this have been recognized by some researchers [52,56]. The emphasis on customer value creation as the single major objective tends to neglect the supplier firm's aim of running a wealthy and profitable business on a sustainable basis. Indeed, our empirical study adopted a supplier firm's business perspective, and, accordingly, we analyzed the mechanisms of how the supplier's creation of customer value may support or hinder the supplier firm's business performance. These observations also relate to the selling and pricing of services: for example, although there is a sound rationale observed when providing the customer with free-of-charge consulting services, many of the case companies struggle with the problem of how to price the services to a reasonable level by simultaneously avoiding offering of too much cheap or free-of-charge value adding services for customers. This problem relates to the productization of services and to the marketing and selling of services that often are strongly constrained by industry standards and industry-specific operating practices.

5.6 Role of product technology basis: the fallacy of being a product company

All case companies have a history in equipment manufacturing. Therefore, each firm has a significant know-how and technological capability concerning technical systems, and each firm has a strong product base. Most of the case companies consider themselves to be in a project business. However, a large share of their current business comes from services. Successful services are based on the resources and capabilities of a firm [34]. The strong technological competence and product brand has obviously provided the case firms with opportunities to move into services. Spare part sales, engineered system supplies, and more extensive operation and maintenance agreements are enabled in particular by the experience that the companies gather from their installed base. The more knowledgeable the companies are of the operational

needs of their customers, the better equipped they are to consult their customers in their business planning. Although this may not always be as straightforward a process as is described here, it reflects the fact that what originally was the core business of the companies, now only plays a partial role in their project business.

These observations are not to say that the product business would have become less important. However, the product technology focus may still be a burden for many companies when developing their business models and organizational settings. This may, for instance, imply that some firms may concentrate on advancing the sales of their equipment and on technical solutions instead of selling solutions independently. Neu and Brown [63] point out that existing technological capabilities and resources can help a company to form new strategies, for example for services, but the same capabilities may be a cause for inherent rigidities (discussed in [64]) that inhibit it from doing so. In this context, a rigid mindset to focus on increasing product sales could restrain the company from moving to service a competitor's installed base.

Koskela [65], Rothschild [66], and Parasuraman and Grewal [67] argue that services can be used to differentiate the product, as services are much more difficult for competitors to imitate. The cost of supplying high quality services is likely to continue rising. Therefore, services must utilize technical developments [65], which may occur through the use of the technical product system base for enhancing service deliveries, e.g. in the form of preventive maintenance or automatic continuous monitoring of a customer's equipment [49].

5.7 *Role of installed base: attitudes towards own vs. competitors' installations*

Our empirical observations concerning the installed base relate to the observations of the 'customer entry' impact type, and to observations about product technology basis discussed above. Our analysis showed that there are several entry points to the customer. In many companies, the core project and many services were seen as partial vehicles for indirectly selling more own equipment. This seemed to be a built-in perspective to a firm's business, which sometimes may make the viewpoints to customers' businesses and to potential entry points too narrow.

An interesting observation is that some of the companies seemed to not be interested in maintaining or operating competitors' installed equipment, but rather concentrated on delivering their own equipment to the market, and on providing maintenance type of services only to their own installations/equipment. This behavior is justified with the higher risk of guaranteeing the availability/reliability of a competitor's installation, due to the potentially higher repair costs, or due to proprietary rights that the competitor may have with the installation. However, there are two major reasons for also servicing also a competitor's installation. First, such services may, under certain circumstances, be profitable to business as such (the service business impact type, or potential economics-of-scale effects may imply the delivery efficiency impact type). Second, such service relationships might serve as entry points to the customer and consequently an opportunity to generate more business, either through more service sales or through new core project deliveries (the customer entry impact type).

Knecht et al. [68], Potts [69], and Oliva and Kallenberg [57] argue that substantial revenue can be generated from an installed base of products with a long life cycle. Similarly, Johansson and Olhager [62] found that the characteristics of the product to be serviced determine the service opportunities for the service provider. However, if there are strong third party providers in the market, such opportunities decrease. Helander [53] argued that an aggressive system supplier could provide care services for the customer who uses a competitor's equipment, to establish an entry point to customer's business.

5.8 *Organizational constraints*

Concerning organizational constraints, most of the interviewed companies are still organized in divisions or functions that each concentrate on a narrow part of the system life-cycle (see the solution life time view in Figure 1), often with different priorities related their own part of the life-cycle. This is often a potential barrier to taking full benefit of the services provided. We also observed that services related to different phases of the solution life time may be overly segmented through organizational arrangements. Such organizational arrangements do not always lead to an ideal method of increasing a customers' value, nor to supplier's profitability and wealth.

Existing research recognizes the challenges in managing the service and equipment sales markets, which often have their origins in organizational constraints [57]. Trade-offs must be made between the increased service quality that would increase the product's life-cycle by making the goods more durable, and service volume that would simultaneously diminish due to the decreasing need for maintenance services and replacement sales. Oliva and Kallenberg [57] also recognize the typical organizational difficulties in managing a geographically distributed installed base.

6. Conclusion and further research

In our study we have identified six different 'impact types' that characterize different impacts of how services may affect the business of a project-based firm. The six impact types are:

- customer entry: the service serves as an entry point to new customers, projects, or services
- customer value: the service creates additional value to the customer
- competitive advantage: the service increases the competitiveness of the supplier's offerings among competitors
- delivery efficiency: the service helps to make delivery activities more lean and cost-effective
- service business: the service itself is profitable and therefore also justified as an independent delivery
- innovation and learning: the service creates new knowledge or capabilities, or helps in creating new or improved concepts or products.

We used the framework of the six impact types and the solution life time view (before, during, and after the core project) in our empirical data gathering and in structuring of our observations and findings.

Our empirical study provided a wealth of different service offerings and their complex interrelatedness with the business model and revenue generation logic of a project supplier firm. The findings relate to approaches in the case companies to include services in the firms' businesses, with the impact of such approaches serving as enablers or barriers for good business performance. Such findings are related to the following areas:

- Versatile role of consulting types of services in solution providing.
- Emphasis on maintenance types of services.
- The complexity of mechanisms of how services affect business performance.
- Customer value vs. project supplier firm's profitable growth.
- Role of product technology basis: the fallacy of being a product company.
- Role of installed base: attitudes towards own vs. competitors' installations.
- Organizational constraints.

We suggest further research on context-specific business models used by project and service supplier firms, and on their contingency factors. More specifically, we suggest that future research should address the following questions:

- What are new emerging business models for project-based firms with their embedded project and service offerings?
- What are the relevant service types and concepts, and what are their business implications, as integrated to customers' businesses, when it comes to the lifecycle of the investment product, and to the supplier firm's overall business?
- What are the characteristics of different forms of project business, and what are the relevant contingency factors in the business environment that have an impact on a) the choice of different business models, and b) the performance of different business models?
- How do customers' own business models, strategies, and approaches to their own and their suppliers' businesses influence possibilities to perform service deliveries? How does the

nature of customer relationships and customers' attitudes (due to e.g. industry specific practices) affect possibilities for service deliveries?

- More specifically, concerning the measurement of performance of project delivery business, the relevant questions are: How will the firm create value (value proposition)? For whom will the firm create value (potential market segments)? What are the implications of customers' own business models and the nature of customer relationships? What is the firm's source of competitive advantage? How will the firm position itself in the marketplace (position within the value network)? How will the firm make money (revenue and cost structure and profit potential)?
- What are the impacts of different dimensions in the core project complexity on the possibility of integrating services in a project supplier firm's offerings?
- What are the implications of risk in various business logics of a project supplier firm to take significant long-term responsibilities of its customers' business operations by moving downstream with outsourcing, asset sharing, and other related business arrangements?
- Concerning maintenance and operations services, what inter-organizational activities are appropriate and what kind of responsibility sharing schemes exist between a) the owner's own maintenance function, b) the project supplier's maintenance function, and c) a third party (i.e. a specialized maintenance company) performing maintenance for the project supplier or owner?
- What are the relevant issues – including risk issues – related to the business logic of a project supplier firm when the firm considers taking significant service responsibility on installed base with competitors' installments?
- What is the role of services in influencing or managing the discontinuity between any two delivery projects (typical for project business), and managing related discontinuity of customer relationships and supplier relationships?
- What are the various maturity paths of project supplier firms that explain the inclusion of services into the firm's business model?

7. References

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