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Paper title:

Services in Project-based Firms - Four Types of Business Logic

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Services in Project-based Firms - Four Types of Business Logic

Abstract

This paper analyses drivers, barriers and business logic used to include services in the business model of a project-based firm. The empirical study includes six project supplier firms from different industries. Differences in the complexity of project delivery and variations in the project suppliers' degree of maturity in delivering services, serve as drivers and barriers for enlarging delivery scope or enhancing profitability with various types of services. The complexity of the project delivery and the firm's degree of maturity in delivering services, serve as two important determinants for distinctive business logic. This paper suggests a typology of four business logic in order for project supplier firms to include services in their business models. The four distinctive types of logic are product driven, innovation and technology driven, service driven, and business driven logic.

Keywords: project business, industrial services, project complexity, maturity

1. Introduction

Services as part of the offerings of project-based firms are increasing. However, differing views exist on the role of services in the business of a project supplier firm. The integration of services into the project-based firms as an extension and development of the business idea and business model has recently been discussed by several authors [1, 2, 3, 4, 5]. There are varying views on the importance of services and their roles in the business models of industrial firms where goods still dominate. For many firms, services are obviously considered an enhancement to the offering, based on a strong technology base, rather than a primary value creator [6]. However, a growing number of scholars argue that industrial firms are becoming progressively more service-driven [7, 8, 9]. Others emphasize the combination of services and goods which create new business models, where the focus is more on business topics and the overall functionality rather than the delivery of stand-alone equipment or services [10]. Changing this mindset and the values in the firm are seen as the main obstacle to including services. The organizing of projects with varying scope that are delivered to changing environments and support the use of the project's products during the operation and maintenance also need to be developed. Various organizational setups are proposed for the project-based firm by Whitley [11] depending on the singularity of their goals and outputs and the distinctiveness and stability of work roles and task organization.

Galbraith [12] presents various characteristics that describe the differences between product-centric and customer-centric firms. The focus of the product-centric firm's is on delivering goods, whereas the focus of customer-centric firms is on delivering customer solutions consisting of both goods and services. A further development of the customer-centric view is presented by Grönroos [7] and by Vargo and Lusch [13] and Lusch and Vargo [9] through the concept of service-dominant logic (S-D Logic).

Changes in industrial logic that are caused by the globalization of manufacturing, the liberalization of certain business segments such as energy and telecom, and the consolidation of several customer firms have also changed the possibilities and requirements of what can be offered. Many firms have made a total change in their business model (e.g. IBM, General Electric, Siemens, Hewlett Packard), including outsourcing of parts of their present or recent core offering and introducing new service concepts such as business consulting, system integration and advanced project management. Among the benefits of the new business models are continuous streams of revenues, higher profits, and new sustainable business models for differentiation. In these business models the focus is not necessarily on customer-centric or service-dominant thinking but rather that the focus can be characterized as business dominant or business-driven logic, where the primary interest is to innovate and develop business models for the customers.

Earlier work in the area of project business and inherent business with services has looked at the impact of services on the performance of project business. Artto, Wikström, Hellström and Kujala, [14] and Kujala J, Artto, Wikström and Kujala S, [15] have reported on various service concepts and distinctive types of impact that explain the different logic of how services affect business performance.

Partly drawing on this work, we strive to elaborate further on how services are included into the business models of a project firm. The underlying question that we address is why the firms that ostensibly appear to be similar differ in their business logic in respect of services. There is a need to analyze various business contexts to clarify the potential for including services into the business of a project-based firm. In essence, it seems that the literature on services can be divided into two streams: one stream takes the product-centric firm as a starting point and urges for a move towards services, and the other stream, dominated mostly by marketing literature, that emphasizes the processes and the mindset behind a service provision. Drawing on these two divisions we have chosen *complexity of the core project delivery* and the firm's *degree of maturity in delivering services* as the main independent variables for our research. The *complexity of the core project delivery* reflects the product-centric view, whereas the firm's *degree of maturity in delivering services* reflects the emphasis on service provision. We argue that these two variables considerably influence the potential for including services in the firm's business model. We address the following research question:

What are the drivers, barriers and business logic for including services in the business model of a project-based firm in various business environments with respect to core project complexity and the firm's degree of maturity in delivering services?

We define the core project in this article as the core delivery content of a project-based firm. However, it is important to recognize that the concepts "core content of delivery" or "core project" do not necessarily refer to the importance of these issues in terms of business volume or revenue. It may, for instance, be that delivering "core projects" provides the firm with a solid technological base and credibility in the market. However, by using its capabilities and the position thereby constructed, the firm has decided to put a great deal of emphasis on providing maintenance services for the installed base, which is in itself a strong and profitable business.

The outline of the paper is as follows: In the second section the two central theoretical frames of reference related to core project complexity and the firm's degree of maturity in delivering services are presented. Section three presents the empirical study comprising six firms that supply projects to

their customers. The six firms and their core projects are analyzed by using the two theoretical frameworks. Subsequently, in section four, the results from the two analyses are combined and the four types of business logic are conceptualized. The paper concludes with a summary and suggestions for further research.

2. Core project complexity and a firm's degree of maturity in delivering services

2.1 The impact of services on the business performance of a project-based firm

This paper continues the work conducted by Artto, Wikström, Hellström and Kujala [14]. They created a framework that addresses the lifetime of a solution, which includes a core project delivery and the related services. Their empirical results show a number of different service offerings that are implemented at various stages of the lifetime of the solution. These service offerings have furthermore been categorized in terms of six impact types [14, 15], which show the primary business interests for offering these services (Table 1). Furthermore, the authors provide additional findings from the case firms that relate to how services are viewed in the firm's business with the idea of such approaches obviously serving as drivers or barriers to a good business performance. The findings relate to the following areas: a. versatile role of consulting types of services; b. business emphasis on maintenance types of services; c. complex mechanisms of how services affect business performance; d. potential controversy between customer value creation and the profitable growth of the project supplier firm; e. the role of technology base and the fallacy of being a product firm; f. the role of an installed base and the different attitudes towards the company's own vs. competitors' installations, and; f. organizational constraints [14, 15].

Table 1

Six types of impacts of services on the business performance of a project-based firm

Impact type	Description of the impact
Customer entry	<i>Customer entry</i> refers to the desired effect of the service representing an entry point to a specific customer or other customers in the market segment, for additional services or projects in the future.
Customer value	<i>Customer value</i> refers to the effect of creating additional value to the customer with the service, which obviously has a favorable impact on the supplier firm's margins and profitability in the delivery of a single solution or in the overall business.
Competitive advantage	<i>Competitive advantage</i> refers to the increase in the competitiveness of the company's offerings with a specific customer or in the market segment by making the company's offering more attractive than competitors' offerings for the customer, or by making the company's offering more difficult to imitate: This leads to sustainable competitive advantage.
Delivery efficiency	<i>Delivery efficiency</i> refers to the service's impact on delivery activities making them more lean and cost-effective.
Service business	<i>Service business</i> refers to the fact that the delivered service itself is justified as part of a profitable business by creating for itself a steady and predictable revenue stream.
Innovation and learning	<i>Innovation and learning</i> refers to the service deliveries' impact on creating new knowledge, or creating of new solutions and capabilities, which improves either the specific project or service delivery at hand, or future deliveries and the overall business of the project-based firm.

2.2 A model of core project complexity and its relation with service offering potential

The bundling of service and project processes in relation to the overall business model of the firm has been characterized as demanding and increasing the complexity [6]. Alderman *et al.* [8] pinpoint the particular challenges with new kinds of large, service-led projects, and advocate sense-making as a management tool in coping with the increased complexity. Crespin-Mazet and Ghauri [16] state that customers are more prepared to request expert services from consultants, engineering firms and contractors when the project is extremely complex. Interestingly, they also refer to Guillou, Crespin-Mazet, and Salle [17] who state that the customer's perception of project complexity, not the supplier's, determine its contractual behavior. Similarly, Sioukas [18] found that customers are more likely to involve themselves with projects that they find novel or complex rather than with financially large projects.

Galbraith [12] notes that so called "solution providers", or suppliers of customized packages of products, services and software, must learn to package and deliver these solutions and must therefore add and integrate a customer-centric component into their traditionally product-based organizations.

He suggests that industry specificity (vertical or horizontal solution) of the core project, project scale and scope, the need for integration between the components, and the amount of revenue these solutions generate determines how deeply the customer-centric logic needs to be rooted in the firm's way of operating.

A considerable amount of recent research within the technology and innovation stream [e.g. 19, 6, 20, 3, 21, 22] work has identified firms supplying complex products and systems as a distinct analytical category. Hobday [19] characterizes complex products and systems as high cost and engineering-intensive. He uses the term complex to reflect a number of critical product dimensions, among others: the number of components, the breadth of knowledge and skills required and the degree of new knowledge involved in production (see also Figure 1). These complexity dimensions are partly similar to those discussed by Galbraith [12], which indicates that increased project complexity also requires more customer centricity. Quite naturally, complexity also gives rise to an increased need for coordination. Hobday and colleagues (see above) therefore stress the importance of systems integration capabilities for suppliers of such products. In particular, they argue that systems integration form a core capability for firms moving downstream towards customers through the provision of integrated solutions [3], at the same time as they are exploiting relationships with upstream component suppliers [22]. Hellström [23], in turn, argues that project-based firms could use modularity in creating business concepts that combine products and processes by relating to dependencies in complex product-process structures.

In order to determine the degree of complexity of the core projects in our case firms, we have chosen to use the schematic model presented by Hobday [19] for obtaining complexity profiles of the case firms' core projects (see Figure 1). This is achieved in this study by adopting Hobday's [19] product complexity dimensions for characterizing the complexity in core projects. The complexity model includes the following dimensions:

2.3 *A firm's degree of maturity in delivering services*

Different maturity patterns form as project-based firms modify their equipment-based business models towards more customer-centric approaches. Shah, Rust, Parasuraman, Staelin and Day [24] define possible roadblocks on the path towards customer-centricity. These are defined around the themes of organizational culture, structure, processes and financial metrics. They state that in a truly customer-centric organization every decision begins with the customer and anticipated opportunities of advantage. Employees should also view themselves as customer advocates and should be willing to share information across organizational units to enhance the most positive customer outcome possible. The firm's organizational structure processes and financial metrics should also enable and assist customer-centricity.

Nevertheless, some authors argue that mere organization as a means of delivering solutions to the customers is not enough. Tuli, Kohli, and Bharadwaj [25] found that whereas suppliers seem to view their solutions as integrated packages of goods and services delivered to their customers, "customers see the solutions as a set of relational processes between the supplier and the customer comprising of (1) customer requirements definition, (2) customization and integration of goods and/or services and (3) their deployment, and (4) post deployment customer support, all of which are aimed at meeting customers' business needs". Consequently, adopting the customer's view on solutions attests to true customer-centricity and enables the supplier to deliver more effective solutions at profitable prices. Introducing the customer's view on solutions can also enable the supplier to form more effective value propositions and service offerings in all the phases of the relational process on which the solution is founded.

The customer's view towards solutions embodies the service-dominant logic [13], which can be considered the ultimate goal of service- and customer centricity. Vargo and Lusch [13] see that service-dominant logic and the service-centered view are customer-centric and market driven. Being customer oriented is not enough, the logic here implies learning, collaborating and co-creating value

with the customer, and being adaptive to the customers' individual and dynamic needs. In addition, the service-centered view suggests that firms should cultivate relationships with their customers and that firms should develop customized, competitively compelling value propositions for their customers. Lusch, Vargo and O'Brien [26] also point out that service-dominant logic is philosophically grounded in a commitment to collaborative processes with customers, partners and employees. Furthermore, the authors argue that effectively competing through service has to do with the whole organization viewing itself and approaching the market using service-dominant logic.

In a similar vein, Deshpandé, Parley, and Webster [27] found that market cultures that place the customer's interests first were the most profitable. Neu and Brown [28] found that one of the most crucial success factors in forming business-to-business services in goods-dominant firms appear to be the orientation towards the markets and customers. They also indicate that firms should develop learning relationships with their customers when pursuing the strengthening of their service offerings. Sawhney *et al.* [10] also note that in taking a systematic approach to creating service-led growth, firms should begin by redefining their markets in terms of customer activities and customer outcomes instead of products and services.

Penttinen and Palmer [29] state that more complete offerings include bundling of products and services and that a more complete offering usually includes more service components and customer-specific solutions that also meet customers' needs better. They conclude that the supplier can change its business logic from being an equipment manufacturer to becoming an integrated solutions provider by either first moving towards a closer relationship with the customer or by first moving towards greater product bundling. Greater product bundling would in many cases lead to increased complexity. Oliva and Kallenberg [30] discuss a manufacturers' transition from product- to service-based offerings. Although the authors emphasize that the transition requires a change from a product-based to a relationship based business model their study is rooted to the manufacturing environment. The authors find that the suppliers of equipment have unique advantages when serving their installed base. The suppliers have more knowledge concerning the equipment joining the installed base as they are involved in selling them, they have more knowledge about their service requirements and they have

lower capital requirements for servicing the equipment than third party service providers as they possess many of the specialized technologies required to fabricate spare parts or upgrade systems. Naturally, these advantages increase simultaneously with the product complexity. The authors also note that these specialized technologies enable the supplier to move to provide relationship-based services, such as service contracts where pricing is based on higher equipment availability or to provide process-based services, such as services for continuous support and improvement of the equipment for the customers' needs.

Brady and Davies [20] present a different, complementary view on the evolution of firms increasing the scope of their projects. They recognize the importance of what they term "project capabilities" for firms delivering high value capital goods. They present a project-capability building model with three stages in the transition from exploratory to exploitative phases in project business: 1) learning from vanguard projects, 2) learning from project to project and 3) learning from project to organization. This model draws our attention from the project-service dichotomy towards an organizational perspective on the degree of maturity when delivering projects with increasingly larger scopes.

2.4 A model for analyzing a firm's degree of maturity in delivering services

Our research focuses on the project business and firms delivering projects. For this reason we find it relevant to take the perspective of how the firm's core project deliveries develop and vary as the amount of services increases. Therefore we are not interested in describing service integration and the degree of maturity of service content in a firm only from a service point of view. From the extant literature (in particular [12, and 13, 9]) we have identified three main phases in the degree of maturity when including services in a firm's business model. The phases are:

- 1. Goods dominant logic
- 2. Customer centric logic
- 3. Business dominant logic

We considered the framework for transition to customer centric logic, presented by Galbraith [12] to be a comprehensive tool for describing the first major step for a goods dominant firm in moving toward a more mature business model for including services into the offering. However, we further recognized that transition towards service-dominant logic, presented by Vargo and Lusch [13, 9], is another significant step for a firm in receiving a higher degree of maturity in including services to its offering. We also argue that firms should not compromise their own business interests in seeking to please their customers. We take, therefore, a rather overall business view of an even more ideal way to execute and operate the investment, thereby further developing and extending this third phase. We have chosen to call this third phase in our maturity frame "business dominant" emphasizing the overall business model not just the services. These arguments produced the three main phases of degree of maturity in delivering services. The characteristics of these three phases are shown in Table 2.

Table 2

A model for assessing the firm's degree of maturity in delivering services

PHASES	,
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Dimensions	Goods dominant	Customer centric	Business dominant
Goal	Best product	Best solution	Best process for benefit
Value creation route	Cutting-edge products	Customizing for best total solution	Customer co-creates value
Mental process	Possible uses for product	Best combination of products for customer	Combination of skills and resources for best value-in-use
Organizational concept	Product profit centres	Customer segments	Formation around natural work flows
Most important process	New product development	Customer relationship management	Three core processes, marketing is an integrator
Measures	New products, market share	Customer satisfaction, retention	Customer equity, satisfaction, life-time value
Culture	New product culture	Relationship management culture	Decisions begin with the customers and opportunities for profit
Most important customer	Most advanced customer	Most profitable, loyal customer	Co-creating, co-innovating customer
Priority-setting bases	Portfolio of products	Portfolio of customers	Portfolio of skills and resources
Main offering	Specific products	Personalized packages of services	Value propositions
Approach to personnel	Power to product development	Power to customer knowledge	Power to business developing
Sales bias	On the side of the seller	On the side of the buyer	Balanced

3. The research process

3.1 Data collection

For the empirical part of the underlying research program, six firms were chosen based on three criteria. First, the firms needed to qualify as industrial project and service suppliers. Second, we preferred to look at international and industry-leading firms. Finally, we turned to firms that could guarantee us sufficient access in order to obtain as rich data as possible. Table 3 provides a summary of some key characteristics of the case firms.

The main data has been gathered through semi-structured interviews of 17 executives altogether in the six case firms. The profile of the interviewees' affiliations reflects the fact that we sought to interview individuals both at top line positions and in business development positions in those firms. We have also used other data sources, such as the documents and presentations that were sent to us before and after the interviews, and, to a lesser degree, the firms' web sites. In some cases we were also able to make use of data that we have gathered in other research projects within the same case firms. We have then further developed, compared and aligned the information through a workshop with representatives from all the case firms.

The degree of complexity in the core project delivery and the degree of maturity of a firm to deliver services were seen as essential for understanding and identifying the potential to include services in the business model. This assumption was both tested and used by assessing every case firm's core project in terms of complexity and by assessing the degree of maturity of a firm to deliver services within the core project. The assessments were conducted by using the models of core project complexity and firm's maturity of delivering services (developed in Sections 2.2. and 2.4) as models for assessing the six firms. The complexity topics for each firm were then further combined with the various impact types for delivering services (the impact types were described in section 2.1 and in Table 1). In the discussion part in section 4 we elaborate on the combined findings in order to answer the research questions that are presented in the introduction of this paper.

Table 3

Characteristics of the six case firms and their core deliveries

Characteristic	Firm A	Firm B	Firm C	Firm D	Firm E	Firm F
Core content of delivery	Electric power and propulsion systems	Elevators	Ship machinery, propulsion and maneuvering systems	Telecom networks	Valves & flow control systems	Power generation engines, complete power plants
The project supplier's share of the main project	5-10 %	2-4 %	15-50 %	50-100 %	2-4 %	40-100%
Project buyers	Shipbuilding firms	Construction firms	Shipbuilding firms	Telecom operators	Plant/facility construction firms	Energy firms, utility owners
Investors/users	Ship owners	Real estate owners/operators	Ship owners	Telecom operators	Process plant owners	Energy firms, Utility owners
Core project	Propulsion and/or power equipment delivery	Complete installation and functional elevator	Ship engine and related power equipment delivery, propulsion system delivery, automation system delivery	Complete installation and functional telecom network system, network implementation (NI)	Valves, their actuators and related control system delivery	Complete installation and functional power plant
Core project's share of the total system life cycle cost	N/A	N/A	N/A	20-30 %	N/A	N/A
Firm's services	-Maintenance, spare parts -Service agreements, condition monitoring -Modernization, training -Extensive full service- contracts	Services for the life-cycle -Maintenance contracts, spare parts, comprehensive maintenance solutions Modernization from simple upgrades to full replacements -Preventive maintenance; internet-based monitoring and customer access	Services for the ship engine life-cycles -Installation of optimal machinery, propulsion and maneuvering solutions -Turn-key deliveries, project management, financial advice, 24/7 service support -Spare parts, field service, operations and maintenance services	-Network implementation services -Network care services -Consultation and system integration -Managed services	-Project frame services (design, implementation) -Transaction-based services (maintenance calls, spare parts) -Service projects (planned maintenance) -Service agreements (availability-based) -Development agreements (optimization, development, consultancy, training)	Services for the power plant life- cycle -Turn-key deliveries with project management, financial advice -24/7 service support -Spare parts, field service, operations and maintenance services etc.

3.2 The impact of core project complexity on the inclusion of services

The assessment of core project complexity was made using a scale of 0-100 (very low = $0 \dots$ very high = 100) for each dimension of the model of core project complexity (the complexity model and its dimensions were introduced in Section 2.2.). The results from the assessment are presented as complexity profiles for each case firm in Fig. 1





(dimensions are adopted from Hobday [19])

The core project's unit cost, or the financial scale of the project, has a strong impact on the potential to include services in the offering. With a large part of the overall investment the supplier can include a larger service content as the benefit from these services is not only limited to certain parts of the overall investment. The supplier can contribute with services related to its

technology platform that has a large impact on the commercial performance of the customer's overall investment. An essential driver or barrier is the adaptability and flexibility of the supplier's technology and organization in meeting differing needs. An increase in the extent of embedded software in the product also had a positive impact on the potential to integrate services into the offering. Examples of these services are systems integration in the early phase of the investment and also services relating to operation and maintenance. The number of suppliers involved in the core project delivery also allows for a larger portion of services in the total project scope. An increased degree of customization enables the inclusion of services such as systems integration and services relating to delivery efficiency. An interesting and important setting for providing services is a delivery where various skills and engineering knowledge are required. In this sample of suppliers, the intensity of authority involvement and the number of sub-suppliers involved were rather high causing more complexity, but this only creates a moderate potential for providing service concepts. A high degree of technology novelty enables the supplier to include certain types of services into the offering. In one of the cases high technology novelty also functioned as a barrier for including certain types of services as the uncertainty and risks would have been too high for the supplier.

3.3 The case firms' degree of maturity in delivering services

In this section we analyze the case firms' service maturity and its impact on increased service provision. Numerical assessments of the case firms were done by rating, for each firm, the maturity dimensions described in section 2.4 (Table 2) on a scale from 1 (low degree of maturity) to 5 (high degree of maturity). Low degree of maturity implies that the company's activities are dominated by delivering goods and high degree of maturity that the company's activities are dominated by focusing on business and investment benefits. Table 4 summarizes the results of this assessment.

The analysis showed that the six case firms differed in terms of their degree of maturity in delivering services. Most of the firms are still strongly focusing on products and their organizational structures, processes and culture are not to give a high priority to the customer or the business benefits. Following our earlier discussion, we argued that giving priority to further development of these maturity topics a firm will be able to include more services.

Table 4.	Results	of the	quantitative	analysis	on	the	firms'	degree	of	maturity	in	delivering
services ($1 = \log \theta$	degree (of maturity	. 5= high	deg	ree	of matu	rity)				

	Firm A	Firm B	Firm C	Firm D	Firm E	Firm F
Goal	3	3	3	5	4	4
Value creation route	3	2	3	4	3	4
Mental process	2	3	3	4	3	4
Organizational concept	1	3	3	3	3	4
Most important process	2	3	3	4	3	4
Measures	3	3	2	5	3	4
Culture	1	2	3	4	2	4
Most important customer	2	3	3	3	3	4
Priority-setting bases	2	2	2	3	2	3
Main offering	2	2	2	3	1	3
Approach to personnel	1	2	2	4	2	3
Sales bias	2	2	2	4	2	4
AVERAGE MATURITY	2,0	2,5	2,6	3,8	2,6	3,8

The supplier with the lowest degree of maturity had the strongest focus on product development and deliveries, and was also organized from a product point of view. The supplier with highest average degree of maturity, in turn, had actually emerged into a new business, the telecom market, and did not have a strong history with a goods dominant business model. The business model was strongly focused on business benefits rather than goods or specific customer requirements. The supplier active in the power industry also had a business model focusing on business benefits. This supplier also worked in an industry segment where liberalization of global energy market had brought major changes to the business logic and created potential for the supplier to deliver a larger scope consisting of both products and services. Certain core projects were initialized so that the supplier developed the actual investment by investigating suitable building sites and possibilities for grid connections and initial negotiations with end-users before they identified suitable customers, who would then own the power station. They are also involved in operations and maintenance as well as upgrading and extension activities, often based on their own initiatives. The other suppliers work in relatively stable industries and are more focused on goods and customer specifications in the core projects. A stable business segment can be a barrier for extending the scope and integration of services.

All firms emphasize customer relationship management and they all measure customer satisfaction. In all of the firms the cultural maturity was lagging behind; most of the firms still had a technology driven, product development focused organization even if processes and metrics for a more customer- and business-dominant logic were already in place. Only two of the firm's emphasized co-production and co-value creation with customers, but also in these firms the internal priorities of the importance of goods and services were still unclear.

Operations and maintenance strategies varied strongly. The limited approach is spare parts sales and predefined maintenance services. The most advanced suppliers offer a large variety of services from optimization of processes to total care where the supplier has an overall responsibility to guarantee the operational availability, including maintenance of the investment. Contractual responsibility defines a certain availability percentage for the investment. All of the suppliers are considering this and three of them already have maintenance monitoring systems in place, which are remotely operated.

4. Synthesis and discussion

We positioned the case firms in a two dimensional landscape according to their averages in the ratings of complexity and degree of maturity (Fig. 3). By analyzing the potential to include services, the interviews and the positioning of the case firms, we identified four types of business

logic for a project-based firm: product driven, innovation and technology driven, service driven and business driven.



Fig. 2. A typology of four types of business logic in project-based firms, and the positions of the case firms in the typology

4.1 Product driven business logic

For the firms characterized by a *product driven* business logic, the most important drivers for including services relate to technological novelty and the degree of customization of the final system. The degree of embedded software also had a positive impact on including services into the offering. To increase the degree of maturity in delivering services the firms need to change from product focus to customer focus in the offering and the organizational setup should change to customer segments. One of the firms benefited significantly from legislation requirements that

20(26)

were a driver for extensive service offering. In addition, the optimization of operations was a typical driver for offering refurbishing and maintenance services. The importance of the technology base was emphasized and the strong technology orientation in the organization was a barrier for including services. Barriers were identified for the suppliers acting in rather stable markets where the role and responsibilities had been established and new business models were often met with suspicion. For the suppliers acting in the marine industry the challenge was to manage two strong customer relationships for their core project deliveries; the ship owners that are especially active during early phases of the investment and during operation, and the shipyard that is active during the delivery phase. The increased base of knowledge references enabled the firms to introduce new services. Moreover, by increasing the technology base with automation systems had a strong positive effect for one of the suppliers to become involved in discussions regarding the overall investment, even if the original technology base represented a rather small part of the overall investment. In this segment on-line and remote diagnostics were not yet used extensively but it was seen as having an important part to play in order to have more frequent contact with the customer and thereby impact on the management and optimization of the asset/installation.

4.2 Innovation and technology driven business logic

The *innovation and technology driven* business logic is in certain ways similar to the productdriven type of business logic. Obviously the complexity of the core project content provides an even greater opportunity for service-enhanced project deliveries for the case firm in this category. For example, the intensity of regulatory involvement was a strong driver for including services in the early phase of the deliveries as the complexity of product technology required input from the supplier itself. Topics related to technology, such as choice of system architecture, extent of embedded software and customization of final system, were the strongest drivers. One reason was that the firm's product was strongly coupled with the central parts of the overall product under construction and heavily influenced the operational performance.

However, the maturity analysis also indicated that there should be focus on developing the organization and company culture to give more priority to customer's needs and involvement and encourage a stronger focus on customer knowledge and development of overall project rather than just technology. Radical technology innovation was an enabler to always include services such as integration of system and training of end-users in the project delivery. Technology is also in a key role for one of the suppliers, as its advanced technology gives credibility to the supplier's capabilities. The strong technology base enables the supplier to provide services for solving the customers' problems.

4.3 Business driven business logic

The two firms characterized by business-*driven* business logic in the study were focused on business benefits, also many times exceeding the customer's needs by being involved early, sometimes developing the solution and by focusing on industrial logic. The knowledge base and its variety was a strong driver for including services, as well as the amount of stakeholders involved. One common characteristic for these two firms in this category was that their delivery scope forms a large part of their customers' overall investment. Obviously this rewarded them with certain credibility and certain capabilities to participate in the early phases of the investment. This in combination with their dominant positions on the supply market also further provided them with certain bargaining power to pursue true win-win contracts that may finally dictate the evolution of the industrial logic in the respective industries.

From a maturity point of view, the organizational concept should be more organized around natural work flows, and the co-creation activities should be even more emphasized. Environmental issues relating to sustainability can be a strong driver for these types of firms. Environmental requirements enabled one of the customers to provide a larger scope where a significant part of the scope was services. Radical changes in a business environment, such as liberalization of energy market and the introduction of a totally new business logic in telecom market is a strong driver for two of the suppliers to be involved early and to provide service concepts that aim to improve the business potential for the customer.

4.4 Service driven business logic

The obvious representative of this business logic is a firm without a base in manufacturing, such as a management consultancy or an engineering firm. One could furthermore assume that the size, the network and the specificity or variety in the knowledge base form drivers for such a firm to enhance its scope of deliveries and at the same time to gradually move towards the quadrant of business-driven firms. Our sample does not include any firm with service driven business logic.

5. Conclusion

We analyzed the impact of complexity of core project content and the firm's degree of maturity in delivering services on what services can be included into the offering and the business model. From the analysis we can conclude that there are important differences in core project complexity and degree of maturity in delivering services among our six case firms. These differences exposed a variety of specific drivers and business logic that can enable the firm to include services into its business models.

The most relevant core project complexity drivers are: unit cost/ financial scale of project, variety of distinct knowledge bases, extent of embedded software in the product, degree of technological novelty, variety of skill and engineering outputs and degree of customization of final system. The most relevant drivers based on the maturity analysis in this sample of firms were transforming organizational concepts, company culture, approach to personnel, priority setting basis, main offering and sales bias.

The main theoretical contribution of this paper lies in recognizing and conceptualizing project complexity and firm degree of maturity in including services as factors that enhance service provision. On the practical side, the paper contributes a typology that identifies four kinds of business logic among project-based firms: product driven, innovation and technology driven, service driven, and business driven. These types expose various priorities in how and what services could be included.

6. Further research

Further research is needed to confirm and further develop the results of this analysis by elaborating on the four different types of business logic. We suggest these types of business logic are analyzed and explained through the research on business models. More specifically, we suggest that future research should address the following themes and questions:

- Distinctive business models in project-based firms: 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?
- Emergence and evolution of different business models: What are the various maturity paths of project-based firms that explain the emergence of new business models and the related inclusion of services into the firms' business models?

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