INTRA-ORGANIZATIONAL NETWORK OF INDUSTRIAL SERVICE DEVELOPMENT

Competitive paper
Business to Business Service Networks

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ABSTRACT

Purpose of the paper and literature addressed - The acquisition of large machinery and equipment has decreased in the western industrial markets in the last decade while the competition has increased at the global level. This shift requires western organizations to change their modes of conducting business and development activities. To gain a competitive advantage, they have to innovate and implement new service strategies. Thus, the focus of businesses is shifting away from tangibles toward intangibles such as skills, capabilities, information, and knowledge because service innovation and development processes differ from traditional product innovation processes in being more fuzzy and unpredictable. The purpose of this paper is to scrutinize intra-organizational networks and their connection to external network actors in the context of industrial service development. The study focuses on industrial B2B services that support customers' business processes and play a strategic role to the customers. The literature addressed comes from the work of IMP Group, service-dominant logic (S-DL), service innovation and development as well as from the area of information management to draw a multifaceted picture of industrial service development.

Research method - The paper reports findings from a research project in Finland that aimed at enhancing customer understanding in industrial companies developing their services. The research design of the study encompassed nine Finnish case studies and an online survey targeted to the same industries as those of the case companies mainly in Finland, Sweden and Germany.

Research findings – Industrial service companies' service portfolios are wide. The results indicate that basic Installed Base services (IB) and maintenance services (see Oliva and Kallenberg's classification 2003) are the most common type of services in manufacturing companies. "Pure" industrial service companies that participated in the study offered IB services not bundled with a product as well as logistics services. In manufacturing companies, services' development is mainly post launch service and product development whilst real innovations are rare.

The changing role of marketing and sales as well as of other customer contact personnel in companies' internal networks and the importance of engaging marketing personnel's skills and capabilities in service development already at the beginning of the project were identified in the study. Furthermore, the results revealed the need for better customer information gathering practices and information utilization in the service development. Today, information and capabilities needed in innovation and development are scattered in digital systems and embedded in individuals from different functions.

Main contribution –

Findings suggest that much of the customer information and knowledge is tacit knowledge, which is hard to explicate in digital systems. To effectively handle the transfer of tacit knowledge, communication management is a vital part of customer knowledge creation. Customer information and the understanding of customers should be effectively transferred to service development not only by feeding information to digital systems but through personal networks.

Keywords - Industrial service, Industrial service development, intra-organizational network

INTRODUCTION

Knowlegde management and information sharing and their role in companies´ innovative and customer oriented behaviour have been in focus of many researchers in recent decades (e.g. Reychaw and Weisberg 2009; Stevens and Dimiatris 2005; Ancona and Caldwell 1992; Simon 1991; Maidique and Zirger 1990; von Hippel 1982; Katz and Tushman, 1981). In the context of innovations, Damanpour (1991) identified such important organizational determinants of innovation as functional differentiation, centralization, managerial attitude towards change, managerial tenure, technical knowledge resources, administrative intensity, and internal communication. In 1995 Nonaka and Takeuchi demonstrated the existence of links between the learning process and new product development. Their work anchored the development process in the creation of new knowledge. According to Stevens and Dimiatris (2005), recent work has revealed links between learning, communications flows and the new service development process. Management practices, cross-functional communication, organizational and decision-making patterns were found to influence the level of new service development project learning. This learning during the new service development process contributed positively to the competitiveness of the firm (Lievens and Monaert 2000; Blazevic and Lievens 2004). The development described above calls for deeper understanding of different networks needed to fulfill the requirements of new acting models of service oriented industrial companies.

The purpose of the paper at hand is to scrutinize industrial services and their development as well as the role of different intra-organizational actors in industrial service innovation and development processes. This is done by discussing earlier studies reported in the literature and by reporting findings of a research project focusing on industrial B2B services that support customers' business processes.

The further parts of the paper are constructed in the following way. The concept and types of industrial services are discussed in the next section. Then the transformation process of industrial offerings from products to services is scrutinized. After that, the changing roles of marketing and sales are discussed in the context of service innovations and development. After the literature review the research design and methodology of the empirical study are presented. Results of the study are then introduced and the findings discussed. Finally, concluding remarks are presented and future research paths are considered.

INDUSTRIAL SERVICES

The idea of service has received very little attention within the IMP, although IMP's work has considered services as one part of an offering and there have been some studies of business relationships involving the supply of services (Ford 2009). According to Ford, an IMP concept of service relates to specific problems and uncertainties of both counterparts rather than to general characteristics, offerings or problems of either or both of them. However, in this study the focus is on the suppliers' side of service(s) and service development.

The number of B2B service offerings is highly diverse. There exists, for example, facility services, financial services, logistics and transportation services, knowledge intensive services and professional services. Common to all are such service characteristics as intangibility, inseparability, perishability and heterogeneity. The complexity of the service is associated with

the specification of the content of the service. Furthermore, in contrast to goods, the interaction between the customer and the supplier is extended throughout the period during which the supplier provides services to the customer company and services are produced and consumed in interactive processes between the parties.

Business services and industrial services are not unanimously defined in the literature. In their study of the acquisition of business services across various industries from the organizational buyer's perspective, Jackson, Neidell and Lunsford (1995) found that organizational buyers perceive task differences for the purchase of services by an organization to run its operations and services bought for the production process.

There are many classifications of industrial products and services proposed in the literature but by 1997 "classification of industrial services has not received the same level of attention as has the categorization of consumer services" as Boyt and Harvey (1997, 294) put it. Mathieu (1999) made a distinction between the service which supports the supplier's product (SSP) and the service which supports the client's action in relation to the supplier's product (SSC). The aim of the SSP is to solve problems directly related to the supplier's product, for example, support that contributes to the availability of the supplier's product for the customer or to the maintenance of a machine. The aim of the SSC is to solve problems linked to the running of the customer's activity, for example training to improve customer skills in the use of the supplier's product. This distinction goes hand in hand with the classifications of services made by Lovelock (1983) and Fitzsimmons, Noh and Thies (1998).

Salle, Cova and Dontenville (2000) identified four types of service offers "surrounding" products of industrial products manufacturers. Two of them were already presented by Mathieu (1999), namely services which support the supplier's product (SSP) and services which support the client's actions in relation to the supplier's product (SSC), which Salle et al called SSC1. Two new types of services found were services which have no direct link with the supplier's product but which help customer activity and market position (SSC2) and services which support the customer's network (SSN). According to the writers, the latter (SSN) are used mainly by companies which sell complex systems and equipments (project marketing and system selling field).

Axelsson and Wynstra's (2002) typology of business services seen from the customer's perspective is an adaptation of a similar typology developed within the IMP Group, which has investigated interaction patterns related to the procurement of industrial goods. Researchers of this group were able to demonstrate that buying companies use different purchasing strategies and are confronted with different types of purchasing problems for different types of products (Håkansson 1982). Axelsson and Wynstra's typology contains four types of services. There are component services that are passed on to the end-customer unaltered and can add value to the buying company's offering. Subcontractors for a cleaning company are an example of component services. Semi-manufactured services are altered to some extent before being passed on to the final customer. An example is the in-flight catering service for an airline. Instrumental services are used as tools or instruments to produce the customer company's own offerings and impact the customer company's production processes. Instrumental services are, for example, trainings for the buying firm's employees. Finally, consumption services are used within the buying firm without becoming part of the offering to the final customer. An example might be cleaning and maintenance services for office buildings.

Oliva and Kallenberg (2003) report on a study of 11 capital equipment manufacturers developing service offerings for their products. They state that several labels such as industrial

services, service strategy in manufacturing, product-related services, product-services, or after-sales services are used in describing the service elements provided by manufacturing firms in the literature.

Common to all durable manufactured products, both capital equipment and consumer durable goods, is that they require services as they advance through their life-cycle (acquisition, installation, operation, upgrades, decommission etc.), and have associated a cost of ownership beyond the purchase price (spare parts, maintenance etc.). Oliva and Kallenberg (2003) introduce the concept of "product's installed base" (IB) and define it as the total number of products currently under use. They define IB services as "the range of product- or process related services required by an end-user over the useful life of a product in order to run it effectively in the context of its operating process" (p.163).

Oliva and Kallenberg (2003) identified both product-oriented and end-user's process-oriented services which they further divided into transaction-based and relationship-based services. They labeled product-oriented, transaction-based services *Basic installed base services.* These include such services as documentation, transport to client, installation/commissioning, product-oriented training, hot line/help desk, inspection/diagnosis, repairs/spare parts, product updates/upgrades, refurbishing and recycling/machine brokering. Product-oriented, relationship-based services are called *Maintenance services* and consist of preventive maintenance, condition monitoring, spare parts management and full maintenance contracts. End-user's process-oriented, transaction-based services were labeled by the writers as *Professional services*. They include process-oriented engineering, (tests, optimization, simulation), process-oriented R&D, spare parts management, process-oriented training, business-oriented training, process-oriented consulting and business-oriented consulting. The last category, i.e. the end-user's process-oriented, relationship services, *Operational services* include managing maintenance functions and managing operations.

Oliva and Kallenberg (2003) found in their study that services in relation to a products' IB are not restricted to services bundled with the product. IB services encompass all services required by the end-user to obtain a desired functionality, i.e. use the product in the context of its operating process. Therefore, service suppliers are not restricted to product manufacturers. Components manufacturers, system integrators, end-users' maintenance units and third parties (other manufacturers or independent service providers) also compete in the IB market.

A different conceptualization of services is introduced by Vargo and Lusch (2008). According to them, broadly speaking, there are two perspectives for the consideration of service(s). One views goods (tangible output embedded with value) as the primary focus of economic exchange and services as either a restricted type of (intangible) good (i.e., as units of output) or an add-on that enhances the value of a good. The writers (Vargo and Lusch 2004; Lusch and Vargo 2006) call this logic goods-dominant (G-D) logic. The second logic considers service (singular) – a process of doing something for another party – in its own right, without reference to goods and identifies service as the primary focus of exchange activity. Vargo and Lusch (2004, 2006) call this logic service-dominant (S-D) logic. In S-D logic, goods continue to play an important, service-delivery role, at least in a subset of economic exchange.

According to the writers, the most critical distinction between G-D logic and S-D logic is found in the conceptualization of service. In S-D logic, service is defined as the application of competences (knowledge and skills) for the benefit of another party. The use of the singular term service as opposed to the plural services, as traditionally employed in G-D logic represents a shift from thinking about value in terms of operand resources to operant resources that are

usually intangible, dynamic resources capable of creating value. Vargo and Lusch (2008) conclude that there are two logics for transitioning from goods to service(s). One based on G-D logic, in which services are a special type of good. The other is S-D logic, which considers service as a process, rather than a unit of output (good).

In his paper Ford (2009) compares S-D logic with the IMP approach. According to him, IMP takes a similar view in de-emphasizing the importance of the physical products that may emanate from either or both of the actors that are engaged with each other. At one level, this de-emphasis is because IMP uses the term "offering" rather than product (a term that is also used within S-D logic). For IMP, an offering is comprised of some combination of service, adaptation, advice, logistics and product (Ford et al 2006). IMP suggests that what happens cannot be adequately described in terms of the product, service, offering or "value" that may appear to be generated by one of them for the other. According to Ford, this is partially because the form of any business offering is likely to be determined and indeed "provided" by both actors together: Thus the development, production and transfer of an offering is at least a two-sided and two-way affair that takes place interactively between actors.

TRANFORMATION PROCESS OF INDUSTRIAL SERVICE OFFERINGS

Oliva and Kallenberg (2003) introduced an empirically founded process model for developing installed base (IB) service capabilities. In their study, the observed commonalities were not in the specific service provided, but in the nature of the service contracts and in their adoption sequence. Their analysis suggested that the transition occurs in stages. The stages are 1) consolidating product-related services, 2) entering the Installed base service market, 3a) expanding to relationship-based services or 3b) expanding to process-centered services and 4) taking over the end-user's operation.

During each stage, the firm focuses on a set of issues and addresses them through the development of new capabilities. In the report, the writers focus on the conditions triggering the move, goals and actions. They will be shortly introduced next.

Most manufacturing firms provide services to sell and support their products with. Those services have traditionally grown in different parts of the organization. They are fragmented and considered an unprofitable necessity to sell the product. Triggers for consolidation are customers' complaints and competition. The consolidation process is normally driven by a desire to sell more products and its goal is to improve the service performance, i.e. efficiency, quality and delivery time. Actions taken include moving services under one roof, monitoring effectiveness and efficiency of service delivery and adding services to support quality initiative. Accordingly, new internal networks emerge.

Entering the IB services market implies identifying a profit opportunity within the service arena and setting up the structures and processes to exploit it. Although the triggers for organizations to decide to go into this market differ (e.g. change in top management, successful competitor or customer satisfaction survey), the process followed by organizations in this stage is predictable. The goal of this stage is to tap the revenues in the IB service market. The actions needed are the definition and analysis of IB markets, the creation of a separate organization to the market and delivery of services and the creation of the infrastructure to respond to local service demands. Here, new external networks have to be identified and created.

The expansion of the service offering takes place once the core functionality of the service organization has been set, and it occurs through two distinct transformations. The first transition is to change the focus of customer interactions from transaction- to relationship-based.

Triggers for this are customers' requests and utilization of the existing service infrastructure. The increased utilization of the service infrastructure is the goal of this stage. The goal is targeted by assuming the operating risk, i.e. pricing in terms of availability and by achieving cost advantage through economies of scale, leaning curve and network effects.

The second transition changes the focus of the value proposition to the end-user from product efficacy – whether the product works – to the product's efficiency and effectiveness within the end-user's process. Triggered by customer request and utilization of product development skills and aiming at the increased utilization of PD skills and system integration capabilities, the companies take such actions as developing consulting capacity, creating new distribution network and expanding operations/processes to include other manufacturers' equipment into their service palette.

According to Oliva and Kallenberg (2003), advancing in the two dimensions yields the pure service organization that assumes operating risk and takes overall responsibility of the end-user's process. The move into the field of operational services, which includes taking charge of an end-user's maintenance or operating organization, is a largely uncharted territory for manufacturers in most industries. No organization in Oliva and Kallenberg's sample had yet moved into this space. The writers suggest that from a capability perspective, a firm should take this step only after its service organization has established itself firmly in the maintenance and professional services market.

INDUSTRIAL SERVICE INNOVATION AND DEVELOPMENT

A service provider is often required to customize services to meet individual customer needs and to respond positively to changing customer requirements. Changing customer needs, rapid technology development, and increased competition drives the service providers to continuously innovate and to focus on creatively using technology, knowledge and its networks to provide services that create value for a customer (van Riel and Lievens 2004; Kandampully 2002). In industrial services the customers are organizations that have different procurement strategies and complex demands (Fitzsimmons et al 1998; Jackson and Cooper 1988). The development or improvement of industrial services often needs high focus on interactions, relationship considerations and involvement of suppliers and specialists in the development and implementation process. Here, the role of all customer contact personnel has to be emphasized in a new way.

Innovation in general is a process that may result in new or improved physical products, extended products (Kuusisto and Meyer 2003), new or improved internal processes and organization, or improved networking, marketing and sales, etc. (Tidd and Hull 2005).

In the area of industrial services, some literature exists on the development of services when a manufacturer changes its role to become a service provider (Paloheimo, Miettinen and Brax 2004; Windahl, Andersson, Berggren and Nehler 2004; Bitran and Pedrosa 1998), development of performance-based service strategies (Kumar and Markeset 2007), on challenges faced in outsourcing industrial services (Nordin 2006) and on design and development of product support and maintenance concepts for industrial systems (Markeset and Kumar 2003).

Panesar and Markeset (2008) studied service innovation drivers, innovation process activities and industrial services innovation management and coordination in the Norwegian oil and gas (O&G) industry. The study indicates that the market needs are considered the most important innovation process drivers and feedback from the customers is the most important activity to encourage service innovations, whilst return on investments is the most important

decision-making factor in evaluating innovation feasibility. Furthermore, the study shows that service providers and receivers often collaborate in the innovation processes, and that many of the activities are performed simultaneously. This results in the collaborative parties needing to put resources on managing and coordinating the innovation process in a structured, effective and efficient way.

The innovation process involves idea generation, the successful development of that idea into a usable concept and finally the successful application of that concept (Cumming 1998; Ahmed 1998). Zeithaml, Bitner and Gremeler (2006) have identified actual steps to be followed in any type of services development. In their model, the development process is divided into front-end planning and implementation activities. The front-end planning activities include: idea generation, concept development and evaluation, and business analysis. The implementation activities include: service development and testing, market testing, commercialization, and post-introduction evaluation. However, the innovation process requires adaptations and must be objective, precise, fact driven and methodical. Therefore, each activity is followed by checkpoints, gates that specify requirements to be met before proceeding to the next activity.

In Panesar and Markeset's (2008) model, the process is divided into initiation, evaluation, development and implementation stages. In the initiation stage, the idea collection has been considered as one of the most important activities. Kelly and Storey (2000) indicate that the ideas for new services can arise inside or outside the company, as a result of formal or informal search procedures, involvement of the organization in creating the means of delivering the new service product, or involving the organization in creating the means of delivering the service product. However, all the ideas can not be developed into service concepts. Therefore, in the evaluation stage careful deliberations and strategic decisions with respect to creation and improvement of services would be required, keeping the business strategy in focus (Ahmed 1998). The development stage includes performing all activities that are required to actually design the service, resource allocation and monitoring progress of the development process. In the implementation or post introduction stage (Zeithaml et al. 2006; Kelly and Storey, 1999) the activities include gathering the information and making changes to the service content, delivery process and other organizational details. The focus is on the feedback from customers. Due to uncertainties of the innovation process, as well as time and resource constraints, the managers responsible for the innovation process face dilemmas that make it more challenging to effectively manage the innovation process at the initiation as well as at the implementation stage.

Stevens and Dimitriadis (2005) conducted a longitudinal case study of a bank and a retailer. Their findings led to a proposition of a model of new service development comprising a strong organizational learning process. The results of the study revealed an informal development process consisting of a sequence of issues to solve and decisions to make. The also identified multiple learning actions and strategies that enhance the process's effectiveness and efficiency.

In Stevens and Dimitriadis's study, actors participating in service development were general management, marketing department, information systems department, project teams, other departments and distribution network. Next, the changing role of one internal group of the actors, namely marketing and sales will be scrutinized more closely.

ROLE OF MARKETING AND SALES IN SERVICE INNOVATION AND DEVELOPMENT

Kampas (2003) has described how the source of customer value shifts from product innovation to business innovation and how the centre of power shifts from suppliers to customers during the "path of technological development". The commoditization of products begins, once a dominant design has been widely accepted. Product functionality and standards are clear, and e.g. product styling, packaging and branding become important marketing tools in addition to price, ease of use, safety and reliability. Moore (2004) shows that in the "main street-mature" stage of the product life cycle customers take the category for granted, while in the "main street-decline" stage the category has become "ossified" and customers are actively looking for relief. To hinder the commoditization the suppliers have to find new ways of creating value for customers. At the moment, service dominated logic and innovations to pursue it seem to be a means to give relief to customers.

In the manufacturing firms and service firms with goods dominated logic the transition from the product-oriented mindset to the service-oriented one is challenging. It may be difficult for an organization built to design and deliver complex equipment to get excited about the possibility of repairing it. Furthermore, the economics of the service business are different from the economics of the product market, making it difficult for the sales organization to focus on small service offerings. In addition, in manufacturing firms services are often thought of as add-ons, and initial services (installation, commissioning, etc.) may be frequently "given away" during the negotiations to sell the product.

At the core of this cultural transformation, then, the manufacturing firm must learn to value services and how to sell, deliver and bill them. As most services are tailored, at least to some extent, to the needs and wants of the customer, it becomes crucial for the supplier company to understand the customers' value creation and to get appropriate and timely information from and about the customers. Accordingly, the role of sales and other customer contact personnel is expected to change from the one of persuading the customers to buy and delivering the offering to an information intermediary between the supplier and the customer. In their article, Sheth and Sharma (2008) suggest that marketing is undergoing a paradigmatic shift that involves a change in focus from the exchange of goods, which are usually manufactured output, to providing a service, which is fundamental to economic exchange (Vargo & Lusch 2004). Findings of the study suggest that the traditional product-focused sales organization will evolve in two directions. First, enhanced use of technology will reduce some traditional sales functions and even face-to-face contact. Second, customers who are important to marketers will experience improvements in the level of customer contact. This will lead to growth in customer-focused sales organizations and an increase in global account management teams.

Changes in sales organizations will also lead to changes in the selection, training, and recruitment of salespeople as well as changes in their roles. According to Sheth and Sharma (2008) the role of a salesperson in the emerging era will be more than that of a general manager. Salespersons will be responsible for marshalling internal and external resources to satisfy customer needs and wants. The writers also state that some of the fundamental premises that Vargo and Lusch (2006) suggest are relevant to the personal selling and sales management context. Those premises are:

The application of specialized skills and knowledge is the fundamental unit of exchange.

Goods are distribution mechanisms for service provision.

Knowledge is the fundamental source of competitive advantage.

The customer is always a co-creator of value.

A service-centered view is customer oriented and relational.

Salespeople's knowledge of customers and solutions will become a source of competitive advantage. In addition, a service dominant logic requires a better understanding of customers. This should lead to a rise in sales force that has a better understanding of customer needs. Two such sales force types are customer-focused sales force (for small and medium-sized customers/businesses) and global account teams (for large customers). The rise of customer-focused sales force will inevitably lead to a decrease in product-focused sales force. (Sheth and Sharma 2008)

The final shift in the organization of personal selling and sales management will be in the area of internal marketing. Internal marketing is critical for global account managers (Millman 1996). It involves promoting ideas and initiatives, and changing organization's focus towards issues such as customer-centric marketing.

In industrial solution and project business service development processes that, to a growing extent, are organizational learning processes the role of marketing and sales becomes more decisive. Also the roles of other customer contact persons as customer information sources and intermediaries are expected to change when companies turn into customer focusing service providers.

RESEARCH DESIGN AND METHODOLOGY

The study reported in the paper was conducted between June 2008 and February 2010. The research project was carried out by VTT Technical Research Centre of Finland and Turku School of Economics (TSE) and financed by Tekes – the Finnish Funding Agency for Technology and Innovation.

The first phase of the empirical study applied a case study approach, a research strategy, which can involve either single or multiple cases to arrive at conclusions about a certain phenomena, or to recognize complex interrelations and ambiguities of social life (Eisenhardt 1989, p. 534; Gummesson 2001, pp. 34-35). We employed the IMP approach to study the cases. The IMP (Industrial/International Marketing and Purchasing) Group introduced the Interaction Approach to industrial markets (Håkansson 1982). The focus of the approach is on a two-party relationship but the approach can also be applied to a multi-party relationship. According to researchers outside the IMP, Vargo and Lusch (2008), in a collaborative model of value creation one party does not produce value while the other consumes (or destroys) value. They reciprocally co-create value, with each party bringing their own unique resource accessibility and integratability into that process. Vargo and Lusch refer especially to the work of the IMP group as being in head of creating understanding in business marketing (e.g., Håkansson and Prenkert 2004). According to them, particularly noteworthy in this regard is the actor, resource, activity (ARA) model (e.g., Håkansson and Snehota, 1995), which is relatively effortlessly isomorphic with the resource integrator/resource/service model of service-dominant (S-D) logic.

Research using the IMP approach has traditionally concentrated on the interaction processes between the buyer and the seller at the company level. However, in our study we focused on the interaction between different actors within the company developing new services.

In the second phase of the study we conducted a survey. Target companies were mainly from Scandinavia and Central Europe. They represented the same industries as the nine Finnish case companies. By this choice we wanted to gain more generalizability, understanding and benchmarking information of the vaguely explored industrial service development area. Thus,

the evidence (data) of the study is both qualitative (interviews) and quantitative (survey) aiming to build a picture about the phenomenon in multiple cases.

Case companies

The nine industrial companies of the research project committed to it by paying a certain amount of money and dedicating their time to the researchers as well as sharing their experiences with other participating companies' representatives. The case companies participating in our study can be classified in two categories. Six of them can be considered as manufacturers. The other category of our case companies includes service providers. Information of the case companies is depicted in Table 1.

Table 1 Case companies of the study

Company	Business Area	Sales or turnover 2009	Employees
A	a global provider of marine cargo flow and offshore solutions	EUR 2.6 billion	9500
B	a factory automation supplier and a partner for the plastic industries	EUR 100 million	360
C	sells, manufactures, installs, services and modernizes elevators and escalators and services automatic building doors worldwide	EUR 4.7 billion	34000
D	one of the leading wholesale and service companies in the industrial process technology in Finland	EUR 21 million	64
E	environmental management and property and plant support services	EUR 582 million	8700
F	specializes in pulp, paper and power generation industry processes, machinery, equipment and aftermarket services	EUR 1408 million	12221
G	provides innovative and environmentally sound solutions in minerals and metals processing as well as related process industries worldwide	EUR 877.7 million	3128
H	a full service port operator offering transport, logistics and related services	EUR 64,5 million (2008)	620
I	a designer, manufacturer and consultant of electronic solutions	EUR 6 million (2006)	60

Survey companies

The target group of the survey was formed with the help of participating case companies and through an Internet search. The survey was conducted both in Finnish and in English. The respondents' organizations represented the same industries (except one) as the case companies. The individual respondents came from sales, service development, maintenance, service production, customer management and from business unit and general management. The number and industries of the survey companies are depicted in Table 2.

Table 2 Survey companies of the study

Respondents of the survey		
representing the industry of the case company	**Number of answers in Finnish**	**in English**
A		
B	14	
C	9	1
D		1
E	20	
F	3	2
G	1	3
H	7	
I	1	3
	55	**10**

In their answers, the respondents of the survey were considering the whole company in 43 (FI) and 27 (EN) percents of the answers and the business unit they represented in 57 (FI) and 73 percents of the answers. Therefore, the numbers may vary to a considerable amount.

The given turnovers or sales of the survey companies varied from EUR 1, 2 million to EUR 370 million. The number of employees varied between four and 14000.

Data collecting

The data for the study was collected in the first phase by at least two researchers visiting together all nine companies in autumn 2008 and conducting preliminary discussions with the company representatives appointed as responsible for the research project. The discussions lasted approximately two ours and were tape recorded and transcribed. Based on the discussions and the literature review conducted in July-October 2008, we created a semi-structured interview guide with the themes of the services offered, customers and customer contacts, customer information and its utilization as well as service innovation and development. It was tested with three representatives of other industrial service companies than the case companies.

We conducted 31 interviews (1 group interview, 30 individual interviews) from October 2008 to January 2009. All the interviews took place on the case companies' premises and they lasted from two to two and a half hours. All interviews were tape recorded and transcribed. Our interviewees included, for example, a general manager of service business, product manager, sales-technician, maintenance manager, business manager, global account manager, sales manager, general manager of global product management, vice president, sales, service

development engineer, product development manager, sales director, commercial director and a product director.

After the preliminary analysis of the interview material, a questionnaire based on theme interviews was made and tested in Finnish by sending the link to the Webropol questionnaire to few representatives of industrial service companies, again different from the case companies. The survey was conducted both in Finnish and in English. The questionnaire was translated into English and back to Finnish again to ensure the correspondences between the languages. Questions dealt with background information, service portfolio, creating customer understanding and acquisition and sharing of customer information in addition to questions about service innovation and development.

Links to the survey were emailed to 560 potential respondents in June – August 2009. After two reminders we received altogether 65 answers, ten of which were in English. The respondents' organizations represented all the case industries but one.

Data Analysis

After transcribing the interview data which produced nearly 700 A4 pages text, the material was first analyzed by ARA (actors, resources, activities) model. Further analyses were made by themes. We conducted both within case and cross case analyses.

For the study at hand, interview materials from companies B, C, D and F were analyzed by previously defined themes using ARA (actors, resources, activities) framework of the IMP group and by the themes of service innovation and development and customer information management. The whole survey data of was analyzed with SPSS 15 software. The analysis produced mainly descriptive data.

EMPIRICAL FINDINGS OF THE INDUSTRIAL SERVICE INNOVATION AND DEVELOPMENT

Respondents' images of the companies

All the case companies saw themselves as service companies that thrive to solve customers' problems. Of the respondents of the survey, 54 percent considered their company as a service company, 43 percent as a manufacturing company that also offers services and 3 percent as a manufacturing company that does not offer services. From the Finnish respondents 75 percent told that there had been a shift towards a service-dominant way of thinking in the last few years. In the English answers, only 44 percent of the respondents said that there had been a shift in thinking.

As to the types of services offered, the analysis of the survey data resulted in the following figures. Of the services that the respondents' organizations develop, 11 %[1] are standardized services, the same applying to all customers. Almost 28 % of the services are modularized, i.e. service solutions are created by combining different ready-made modules whilst 57 % are fully tailored for the customer. The latter are development projects and individual service solutions.

[1] The figure depicts the percentage of the answers to the option in a question.

Service innovation in the case companies seemed to follow the traditional linear innovation models with different phases and gates. To scrutinize the process more, we asked in our survey
- who were responsible for developing the overall services business operatively,
- whose responsibility was to develop new service concepts operatively,
- whose responsibility was to operatively further developing the existing services,
- who participated in the service idea generation,
- who selected service ideas to further development,
- who participated in the service development process and
- how does the commercialization of services take place

Actors responsible for different service development are presented in Table 3.

The responsibility of the overall services business operative development mainly belongs to the top management. In addition top management, development manager or development team, responsibility may be in a relevant department or in some small department, in an aftermarket organization, or a country manager may be responsible for the service business development.

In the case of new service concept development, responsibility also often lies in the hands of the top management, development manager or cross-professional team of developers. Others responsible for new service concept development are managers of maintenance business, country managers, regional units and relevant managers of business units in development projects, in addition to service manager and own development organization.

Table 3 Responsibilities in industrial service development

responsible for responsibility of	**service business development**	**new service concept development**	**post launch service development**
top management	71 %	48 %	
development manager	10 %	18 %	
development team	8 %	8 %	26 %
full-time service developer			16 %
full-time product developer			8 %
other	11 %	26 %	50 %
	100 %	100 %	100 %
			n = 65

Most of the service development seems, according to our survey respondents, to be that of further development of already existing services. There, responsible for development are cross-professional development teams, full-time service developers and full-time product developers. However, other instances were responsible for post-launch service development in half of the cases. They were key account managers, personnel responsible for customer relationships, maintenance managers, managers of business or profit units etc. All in all, about 20 different quarters were mentioned under the title “other.”

Cross-professional development teams in companies consisted of full-time product (10 %) and service (20 %) developers, marketing (34 %) and sales (45 %) personnel, mechanics and service personnel (23 %) and customer representatives (15 %). Product and service suppliers participated in teams according to 6 % of the answers. Other representatives were involved in 17 %. They are, for example, managers of business units, quality managers, appointed persons from production and project managers. In some cases, teams are formed due to the task.

New service development processes' actors are depicted in Table 4. New service ideas come from and marketing, full-time product and service developers, mechanics and service personnel and customer representatives Selection of service ideas to further development is done by management, by full-time service developers or by cross-professional teams. In the actual development process sales and marketing personnel, full-time product and service developers and maintenance personnel work together with customer representatives and product and service suppliers. In the commercialization phase new services are first "sold" to own employees in the third of the survey companies. In half of the companies sales personnel is trained to sell the service while in some companies the service is launch like a physical product (16 %). The service was piloted together with the customer in 66 percent.

Table 4 New service development in the survey's companies

	idea generation	idea selection	development process	commercialization
top management		81 %		
sales	72 %		75 %	100 %
marketing	54 %		54 %	100 %
mechanics and service personnel	39 %			
service developers	28 %	8 %	32 %	
product developers	20 %		23 %	
development team		8 %		
maintenance			32 %	
customers	40 %		37 %	66 %
suppliers			6 %	
own personnel as customers				34 %

In the light of the above numbers, the strategic decisions concerning the service business are mainly in the hands of the top management while the decisions about service concepts are more decentralized in the organizations. The direct involvement of customers in the innovation processes seem to be moderate. However, services (or solutions) are quite often piloted with customers.

When asking about the differences in developing new and existing services, the answers varied a lot. In some cases, the respondents saw hardly any difference while in some cases the development processes were seen as totally different. Such differences were identified as

- the starting point – new perspective or need that can't be fulfilled by existing services
- often initiated by the top management or discussions with the customer
- the involvement of top management and other non-operative personnel

- developing new services needs more resources and actors in different roles
- more basic and background information is needed
- more interaction between the supplier and the customer is needed
- the need for profitability calculations and activity plans
- more control and follow-up
- the need for piloting customers
- the need for new customers for the service
- the need for the new style of selling the service

Only 12 % of the respondents told that service development activities were standardized in their company. Standardization takes such forms as ISO 9001 and other quality standards, process descriptions, process portfolios, and process standards and modules.

Changing role of marketing and sales in service development

To illustrate the changing role of marketing and sales in service development, a short case description is presented next.

Case company F specializes in pulp, paper and power generation industry processes, machinery, equipment and aftermarket services. The company and the whole corporation defines itself a service corporation. The company's offering extends over the entire life cycle of the process, covering new lines, rebuilds and various services. The service portfolio is wide ranging from traditional product-related services to IB services.

According to the interviewees the role of sales in the front-end of a service innovation process traditionally is that of presenting ideas for new services. Often those ideas are customers' suggestions about services that competitors already have. The input for the post-launch service development by the sales force usually is negative customer feedback and reclamations in addition to desired new features of some product. Salespeople very seldom introduce radical ideas for innovative services.

Corporation F wants to become a solution provider. The launching of a new strategy and the change of the corporation triggered the development of new concepts. Based on the strategy, the company has developed a new global IB service concept which was launched in December 2008. To start the development of the concept, people responsible for it first investigated the reasons for the failures of four earlier solutions concepts. This time the realization of the project is different from earlier projects. Internally, the rules and norms of sharing the revenues from the service are now agreed upon before launching the concept. Externally, more emphasis is put on customers' thoughts and needs when trying to form solution concepts and philosophy for selling the customer solution. Solutions are looked for more through customer orientation than through products which was the case earlier. More emphasis is also put on the sales process, sales materials and sales speech to get customers interested in the new service concept. Marketing has been participating in the solution development process from the very beginning. It has created the name of the service as well as all the sales material.

Concerning the sales, earlier solutions were sold by a single salesman. Due to the multiple technologies involved in the solution, it was impossible for the salesman to handle all of them. Today, the sales process is different. The goal of the first stage of the selling process is to get the salesman to choose a potential customer. Thereafter, his goal is to raise the potential customer's interest with the sales material. In the next stage, a group of experts will contact the

potential customer to define specifications with them. Then the sales people will enter the picture once more to negotiate price, bonuses, sanctions, delivery times etc.

The first stage of the process, the choice of the right potential customer is critical because the selling process is expensive, about 20 000 euros. Therefore, internal marketing and training has been taken place in the company. At the time of the interview (beginning of November 2008) the training of internal and external sales personnel was about to be accomplished. In addition to that, a dialogue with a former customer is conducted to develop new, customer-oriented style for sales. Sales material and information is also available in the Internet.

According to the interviewees, the launching of the new concept is a challenge for the business organization of the company. Even though the concept is considered feasible, there is some doubt about the skills and capabilities of launching it.

EMPIRICAL FINDINGS OF CUSTOMER INFORMATION MANAGEMENT

According to Teece (2000), with a customer-oriented approach an enterprise can gain a thorough understanding of their customers and be more able to fulfill their demands. Therefore, it is important for a business to build up an extensive customer knowledge database, as well as to develop the necessary mechanisms for acquisition, control, and publication of the information it contains. Our study revealed that customer knowledge and information is not as well organized as it should be to serve as an effective assistance in creating customer orientation and effective service development and production. As Rowley (2002) argued, customer knowledge is an essential intangible asset for any company, because it enables them to create value for customers and themselves. Garcia-Murillo and Annabi (2002) pointed out that workers should seize every opportunity for interaction with customers so that they can enrich their customer knowledge database.

In the interviews and discussions in the case companies we asked the respondents about information they collected and transferred both in the company and outside. In our survey we asked about the types of information collected and delivered. Furthermore, we wanted to know from whom the respondents got information and to whom they gave information. We were also interested in the means by which information is transferred as well as factors improving and building barriers to communication. The answers will be presented next.

Types of information

Customer information consists of inbound information, i.e. information that is acquired by the supplying company from external sources. Internal (intra-organizational) information consists of external information that is transferred by company personnel within the organization and of internal information stored in different systems and databases. Outbound information consists of marketing and sales material, offerings and organizational information delivered to customers by the company representatives. Customer information may be technical information about the condition of customer's machines and equipment, production lines etc. Functional (operational) information is concerned with issues like customer's perceptions about the supplier's ability and willingness to serve the customers. Organizational information includes strategic information about customer organization's structure, policies, future plans etc. Market information is here seen as general knowledge of customers' industries and markets where they operate in. Market information may include political, economic and cultural as well as environmental and social factors.

Types of customer information identified in our case study are divided in three categories. These are information concerned with operation, business processes and strategy. They are depicted in Table 5.

Table 5 Classification of customer information

Information concerned with

OPERATIONS	BUSINESS PROCESSES	STRATEGY
Functionality of products and services (reference Information)	Reference information	Reference information
Sales figures (volumes)	Customers´ preferable communication channels	Benchmarking information
Visit reports	Financial measures	Cultural information about customers and markets
Reclamations	Mutual scorecards with customers	Customers' mental models
Customer feedback (designs, machine deliveries, Installation etc.)	Customers' wishes for new characteristics in maschines and equipment	Customer knowledge (often tacit)
Technical status of Customers´ machines and equipment	Problems and risks perceived by customers	Cost analyses and models (e.g. total cost of ownership)
Customers' bying and contact histories	Customers´situations in different markets	Customers' future maintenance strategies, plans and investments
Spare parts situation	Industry information	Market situations
Customer contact information	Customers´ ideas and feedback concerned with service concepts and products and services under testing	Lead users' insights about service changes and partnerships
Customer satisfaction	Energy consumption and environmental friendliness of maschines and equipment	Annual supplier evaluations
	Customers' wishes for proactive Maintenance and service development	Practises and cultural differences In supplier-customer relationships
	Successes and failures in customer service	
	Customers´ production processes	
	Customers´ best practises	
	Maschines´and equipment's need for modernisation	

Other types of information transferred internally were technical information, competitor information, information about product as well as the suppliers of products and services. Also information concerned with service and product ideas and their development is transferred in the companies.

Information networks

Sources of customer information at the organizational level were customers, suppliers, different business units and subsidiaries of own organization like sales and marketing units, project business, product business, service business, import and spare parts supplying organizations in addition to different country organizations, regional units and competence centers. Furthermore, customer information is acquired from competitors, resellers, consulting companies and media. At the individual level, information is gathered and distributed by sales personnel, mechanics, maintenance staff and managers, service employees, customer service personnel, technology managers and experts working with customers, key account managers, service and product developers, regional and country managers as well as general management.

Tools for information transfer

The respondents used multiple means to acquire and transfer customer information. Different reports and measures, formal audits, surveys and systematic analysis of customer databases and project databases produce information about customers´ behavior while maintenance reports and equipment audits, reclamations, remote control and diagnostic tools mediate technical information about machines, equipment and service. Information is, however, mainly acquired and exchanged in multiple face-to-face situations. Examples of these are visits to customers and customers' visits to supplier premises, periodic customer meetings, seminars and workshops, lead user discussion groups, focus groups, different formal team and departmental meetings within own organization as well as informal discussions among colleagues both inside and outside own organization. Furthermore, information is exchanged in technical and commercial negotiations as well as in reference visits where a supplier and a customer together visit another customer. Still, information is gathered as feedback from testing and piloting new products and services. Some of the case companies have customer programs and idea competitions. One company maintains a discussion forum on the Internet wherein customers are invited to participate.

IT systems play a vital part in information gathering, storing and dissemination in the case companies. CRM (Customer relationship management) systems, maintenance information and management systems, engineering information systems, project management and invention announcement systems as well as ERP (Enterprise resource planning) systems were mentioned by the respondents. Customer databases, digital reports of maintenance and repair visits, sales tools, technical information bases on the intranet, as well as team tools are used in some companies. Furthermore, customer knowledge base was mentioned too. Telephone and email were also emphasized in many answers. Respondents also mentioned other than digital IT systems as systems for customer information transfer inside their own organization. These are, for example, monthly project meetings, monthly departmental meetings, team meetings and periodic briefings.

Non-documented, verbal information that is communicated in face-to-face situations and by telephone plays a crucial role in everyday communication. About 73 % of the survey respondents say that their main connection with their own company's personnel who are relevant to their work is face-to-face contact and 19 % use primarily e-mail when contacting others.

Personal networks are important in development projects. From the survey respondents about 65 % search information about previous development projects primarily through personal networks to find answers or to find the right person and 6 % search information primarily

through grapevine. To find the right information, IT systems are primarily used by 30 % of the respondents.

Communication enablers and barriers

We also studied which factors improve internal communication and which might be the barriers. According to our study, factors that improve communication are the following:

- small size of an organization which makes information and opinion exchange fast and flexible
- ERP, CRM and quality systems, reporting tools
- integrating customer's IT systems to those of supplier's
- customer focus and clearly defined customer responsibilities
- wideness of customer interface (number of contact persons per customer)
- sales education
- internal marketing
- systematic utilization of staff's experience and tacit knowledge
- learning from best practices and successful projects
- open atmosphere
- structured service development process, i.e. specification of development conditions (technology, customer's maintenance capability, age if equipment)

Respondents also mentioned barriers or challenges that reduce the possibilities to effective communication. Those were:

- customer knowledge is often tacit knowledge or in personal documents
- geographical distance
- hurry
- bad communication system
- unclear role of sales between own and customer organization
- lack of mutual insight and understanding of service business and its possibilities
- different practices, visions and wishes of divisions
- ad hoc problem solving and service development
- no representative of product development in board of directors

Interestingly, multiple organizational changes and reorganizing were also mentioned to blur information flows because of changing actors and codes of conduct. It always slows down the efficiency and effectiveness that might have been gained by routinizing and institutionalizing. Thus, the ever changing network amebas have their pitfalls even though it has been said that innovations best take place in new, challenging situations.

Making tacit knowledge visible often requires changes in personnel's mental models. Attitudes and poor interest of some staff members as well as closed minds that will not accept new innovations were mentioned as challenges of communication. Ignorance about the value of information and specific demand on information sharing at all levels: "who needs the received information?" A very minor issue for someone can be of very great relevance for somebody else.

IT systems in the case companies are not fully utilized to store and deliver information. One of the respondents put it: "you need a good character to use the system at all times." There seems to be a lack of systematic recording of customer information into systems. Also the vast amount of information is seen a challenge. How to find proper and essential information? As

some of the respondents suggested, companies need a search engine like the one in Google to better get to information. One challenge still is that different IT systems do not communicate with each other and thus information is scattered in multiple databases. In addition to challenges of IT systems, there is also a need for systematic face-to-face communication patterns between and among organizational teams.

Information networks in service development

Service developers get customer information from inside their company. Main sources of information are sales personnel, other customer service personnel, assemblers and other mechanics, and service employees. Furthermore, all who participate in projects may also transfer information to service development. Technical information, information about the future plans, ideas and service needs of customers as well as information about the successfulness of cooperation in service production reach the service development personnel. They also get information about products and services, competitors and about the suppliers of services and products. Developers also deliver this information together with ideas about product development further in the company. Information receivers vary depending on the nature of the information. Respondents mentioned such targets as all departments, project groups, higher management, product development and mechanical and automation engineering. Furthermore, marketing is involved in service concept development already from the very beginning in one of the case companies, as presented earlier.

Post launch service development network

As a result of the case study, a framework for understanding one kind of service development process is introduced here. Product-oriented, relationship-based maintenance services (Oliva and Kallenberg 2003) consist of preventive maintenance, condition monitoring, spare parts management and full maintenance contracts. Most of the after sales maintenance service development offered by manufacturing companies is about developing both products and services. Maintenance service is often about improving the physical product. The development process is usually triggered by customer feedback. Feedback to service maintenance development usually comes from sales and maintenance personnel i.e. mechanics and assemblers etc. In the maintenance function or maintenance department of the company, the need and possibilities for the development is first evaluated. Because most services offered by manufacturing companies focus on physical possessions, developing maintenance services include both developing products and developing services. Therefore, maintenance developers have to interact with the production departments frequently. As an outcome of the maintenance development process, a renewed product/service is then delivered to customers and information concerning the outcome is also transferred to customer contact personnel in different positions. The process of post launch service development is depicted in Figure 1.

Due to the relationship-based nature of maintenance services, interaction between and among actors is ongoing and individual development processes are parts of the holistic relationship process. The outcome of one maintenance development process may either be applicable to only one customer or many customers as is the case when some product, for example, part of a machine is improved.

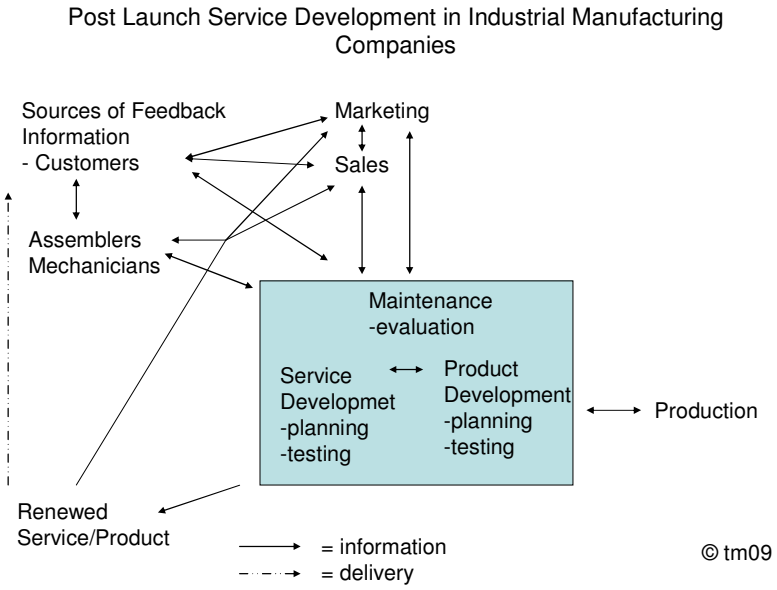

Figure 1 Post launch service development process in industrial manufacturing companies

DISCUSSION AND CONCLUSIONS

The transformation from product-oriented, technology-driven companies to customer-oriented, business-driven service providers is a must for western industrial companies. Adoption of the new mentality and the adaptation of the activities to the service-dominant logic are still in their infancy in many companies. The issue is not easy. This was nicely put by one of the potential respondents to our survey. He sent us an email telling that he will not answer our questions because the research area is too dedicated.

In the light of this study, the adoption of service-dominant logic does not mean the rejection of product-dominant logic. Even though companies were in the market to serve customers – as their mission today often is compared to old mission statements where companies told that they were in the market to produce something – relationships have to have some scope and also services have to be "productized" to be exchanged. I would argue that even a service contract is a kind of product defined and negotiated by two or more parties. Doing business requires some measurement of financial value for the objects exchanged.

The heterogeneity of industrial services is vast. The variety of industrial services yields for multiple ways of service innovation and development. Thus, traditional ways of thinking and conducting development processes and involving actors is not suitable for changing circumstances. Looking at service development as an organizational learning process and utilizing the skills and capabilities of multiple internal and external actors seem to be a more suitable approach to the issue.

The importance of information and communication is crucial in service development. Present state of customer information management varies considerably between companies. Due to the easiness of producing and storing digital information, its amount is huge and finding the relevant information is difficult and time consuming. Therefore, face-to-face information and personal networks are preferred in many cases. Furthermore, much of the customer information

and knowledge is tacit knowledge, which is hard to explicate in digital systems. To effectively utilize the transfer of tacit knowledge, communication management is a vital part of customer knowledge creation. When a company is collecting customers' personal information, trading data, preferences, and so on, this information should be systematically organized into communicative customer knowledge as stated by Campbell (2003). Here we need both digital and face-to-face organizational communication systems.

The transformation of case companies to customer-oriented service firms seems to have many practical challenges. Customers may not be willing to outsource the maintenance of their machinery or product lines. The new service concepts offered increase customers' dependence on suppliers. Here one can also see the same problems as in principal-agent relationships. Because of the volatility of economic conditions globally, companies have to play survival game in bad times. Difficult issues in outsourcing so called value services (supplier's services' value to the customer) are pricing, risk and profit sharing. These issues need more scholarly research.

One interesting area worth future research is the different values of customers in, for example, Asia and Western countries. For instance, in pulp and paper industry, Asian customers are not interested in buying maintenance and modernization services. There are instead willing to buy new better machines for their plants. As to results of this study, we have to bear in mind that the figures are only indicative and they apply in a given context. To increase generality, research in different contexts is needed.

Due to industrial services' growing emphasis on the economy not only in companies but on the national level in western countries, more research and understanding is needed in the area. In spite of the fact that the importance of customer understanding and knowledge in product and service development processes has long been recognized, its potential has not been widely researched. This is one area for future research. Additionally, further research on the role and practices of customer information and its utilization in different industrial service companies and service development processes is needed.

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