Linköping University Post Print

Managing industrial service offerings: requirements on content and processes

Christian Kowalkowski, Per-Olof Brehmer and Daniel Kindström

N.B.: When citing this work, cite the original article.

Original Publication:

Christian Kowalkowski, Per-Olof Brehmer and Daniel Kindström, Managing industrial service offerings: requirements on content and processes, 2009, International Journal of Services Technology and Management, (11), 1, 42-63.

<http://dx.doi.org/10.1504/IJSTM.2009.022381>

Copyright: Inderscience Enterprises Ltd

<http://www.inderscience.com/>

Postprint available at: Linköping University Electronic Press

<http://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-12460>

Managing industrial service offerings: requirements on content and processes

Christian Kowalkowski*
Per-Olof Brehmer
Daniel Kindström

Department of Management and Engineering
Linköping University
581 83 Linköping, Sweden
Fax: +46-13-281101
E-mail: christian.kowalkowski@liu.se
E-mail: per-olof.brehmer@liu.se
E-mail: daniel.kindstrom@liu.se
*Corresponding author

Abstract: This paper develops a typology for industrial service offerings, inter-relating service scope (degree of bundling), service focus (level of customer integration), and service process interfaces. Different forms of industrial services and the impact of information and communication technology on the three service dimensions are discussed, and requirements are identified related to the expansion of services. It is suggested that bundled and process-orientated services hold a major potential for manufacturing companies and can facilitate the creation of competitive advantage and long-term relationships with customers. Increased knowledge of the customers' installed base and business processes enables better customisation of the service offerings. Even if more emphasis is put on standardising and formalising central and local processes, companies need to recognise local differences among subsidiaries.

Keywords: Industrial service offerings; manufacturing companies; service scope; service focus; service process interfaces; bundling.

Biographical notes: Christian Kowalkowski is a postdoctoral researcher at the division of Industrial Marketing at Linköping University, Sweden. His research focuses on industrial service development and strategies, and on challenges and possibilities connected to enhanced offerings in terms of organisational requirements, service processes, customer relationships, and new technology. Currently, he is involved in a three-year research project on service strategies in international manufacturing companies.

Per-Olof Brehmer is Associate Professor in Industrial Marketing and head of the Department of Management and Engineering, Linköping University. He received his PhD in Logistics Management from Linköping Institute of Technology. His research topics are value-creation strategies, industrial services, ICT effect on competitiveness, and especially strategies for innovations and service development in knowledge-intensive industries that shift their competitive power from products to services.

Daniel Kindström is a PhD and an Assistant Professor in Industrial Marketing at Linköping University. His current research focuses on the development of industrial offerings (combinations of products and services) and the value-creation potential of increased service content in traditionally product-focused companies. Other topics of interest concern e-business and the impact of ICT on companies' business models.

Introduction

A growing body of literature has explored the movement of capital equipment manufacturers towards providing services to support their industrial products and systems (e.g. Davies, 2004; Henkel et al., 2004; Howells, 2004; Kowalkowski, 2006; Penttinen and Palmer, 2007). Prior research has suggested that it is becoming increasingly difficult to maintain market leadership based on product sales due to the trend in many business markets gearing towards product commoditisation (Ulaga and Eggert, 2006) and competition from low-cost competitors (Lovelock, 1995). Traditionally, many engineering-based, product-orientated companies have regarded services as a ‘necessary evil’ in order to increase future sales of products and spare parts (Lele, 1997). Nevertheless, industrial services can be strategic tools in industrial markets; they facilitate achievement of competitive advantage, sustainable relationships with customers, and enable more complex, process-orientated offerings with higher margins than product sales (De Toni and Tonchia, 2004; Levitt, 1983; Mathieu, 2001; Oliva and Kallenberg, 2003). Industrial services represent a key source of growth for many companies (de Brentani, 1995), particularly as customers increasingly outsource maintenance and repair activities to their suppliers and also demand turnkey solutions (Frambach et al., 1997; Markeset and Kumar, 2003). Furthermore, Kumar and Kumar (2004) argue that there is a lack of literature describing different forms of services for industrial production systems and Morschett (2006) argues that there are few studies concerning how to organise for industrial services in foreign markets.

In this study, the concept of industrial service offerings is being viewed as a composite of three conceptually distinct factors: *service scope* (degree of bundling) (Stremersch et al., 2001), *service focus* (level of customer integration) (cf. Oliva and Kallenberg, 2003), and *service process interfaces* (front-office, back-office, and customer) (Larsson and Bowen, 1989). We believe that developing a clearer insight into these factors and the

interrelationships between them is of interest both from an academic and a managerial point of view.

Subsequently, the objective of this paper is to describe different forms of service offerings required for industrial production systems and to describe the requirements related to the expansion of industrial services. Of particular interest is to discuss the impact of information and communication technology (ICT) on the three service dimensions. The reason for this is that new technology is an important driver for new offerings (e.g. Agrawal and Berg, 2007) and ICT applications can be used to improve manufacturing companies' existing service processes and enable new, more advanced services (e.g. Kowalkowski, 2008).

In the next section, the research design and methodology is presented. Drawing from academic literature and from the exploratory insights from in-depth field studies of seven capital equipment manufacturers, a two-dimensional service continuum and the relationships between service scope, focus, and processes is then discussed. Subsequently, implications of ICT and internationalisation on service processes are analysed. The paper ends with conclusions drawn from the research.

Research design and methodology

The research approach was exploratory and was empirically based with its aim being to discover emerging patterns and practice (Meredith, 1989). Thus, a case study approach was chosen as the research strategy (Yin, 2003). Siggelkow (2007) believes that using case data in research enables the researcher to get closer to the theoretical constructs and provide a more persuasive argument about casual forces than broad empirical research can.

Case data comes from market-leading, capital equipment manufacturers that strive for an increased service offering and internationalisation of service activities, although they are in different stages of this development due to internal and external factors. Not all companies initially invited to participate in the research project were chosen for the entire study and the

choice of companies was, thus, a deliberate research design parameter to identify common patterns and ensure some degree of general applicability (Gummesson, 2000). Two selection criteria were used to select companies for the purpose of the study. First, the companies had to relate services to their products. Second, the companies had to consider service innovation/development as a focused issue. This meant that services were on the top managements' agendas in the companies studied and that all companies had teams dedicated to work with services. All companies offer industrial services both as part of combined product-service offerings and as stand-alone offerings. Thus, the choice of cases can be argued to have been made by theoretical sampling (Eisenhardt and Graebner, 2007) since they do offer an opportunity to illuminate requirements on service management in manufacturing companies.

The research process

We conducted the study using multiple qualitative data collection methods. In total, 55 respondents were interviewed between 2004 and 2007. Table 1 provides an overview of the research phases and activities, displays the number of companies involved, the main goals, and the research instruments for the various activities.

Insert Table 1 here

In the first phase, representatives from ten international manufacturing companies with a focus on industrial services as an innovative competitive edge were invited to participate in panel meetings about service management and business development issues. The group members were actively involved in the development, management, and marketing of industrial services. These sessions enabled us to gain a better understanding of the empirical context and all participants were also interviewed in order to get a deeper understanding of the

issues discussed during the panel sessions and to receive inputs to the design of the case study protocol.

In the second phase, an exploratory round of interviews was conducted with the seven companies that were chosen for the entire study (see Table 2). The interviewees were central service managers responsible for strategic development of services and management of the industrial service portfolio. In addition, interviews were conducted with representatives from eleven customers that had purchased different types of service offerings.

Insert Table 2 here

Since we wanted to validate the insights gained in the second phase before conducting the in-depth studies (Phase 3b), the panel group from Phase 1 was again consulted in Phase 3a. However, activities in Phase 3a and 3b were conducted in parallel and the reason for this design was that we wanted to have regular meetings with the company representatives in order to discuss preliminary findings and continuously receive feedback. This way, we could strengthen our argument that we were really looking into an issue with managerial as well as theoretical relevance. In Phase 3a, discussions with and between the different participants were generally very sincere and constructive since most of the managers were in similar positions within their organisations and none of the companies they represented were competitors. Hence, it is likely that the participants opened up and shared insights that would not have been available from the interviews conducted (cf. Matthyssens and Vandenbempt, 1998), which also is a way to validate the results.

In Phase 3b, most data was obtained through a number of semi-structured interviews lasting between twenty minutes and five hours, although most interviews lasted between one and two hours. Respondents were central service managers, local service managers and managing

directors, and central and local managers from other departments as well (i.e., sales, marketing, business development, products, and R&D). This type of convenience sampling (Miles and Huberman, 1994) saved time and effort in gaining relevant information access. Furthermore, we had considerable access as regards intranets and internal documents.

Data analysis

Initially, analyses of within-case data was done; this corresponds to Eisenhardt's (1989) and Yin's (2003) idea to first become familiar with each case as a separate entity in order to identify case specific patterns before making a cross-case comparison. Data was grouped into similar themes based on the research questions and theoretical framework, and regrouped following the systematic combining process (cf. Dubois and Gadde, 2002). A case study protocol was used to increase reliability. Interviews were taped and transcribed, notes were taken during all meetings, and all of this data is on file. The structuring of the data was in some phases done individually by each of the authors in order to increase the reliability of the study, a purpose also served by discussing the results at the panel meetings in Phase 3a. The respondents validated the cases in order to ensure accuracy and avoid misinterpretations, and pattern matching was repeatedly conducted during the analyses of each case in order to ensure internal validity (Yin, 2003). Also, as we followed a multiple case research design, we adopted a strategy of replication in multiple empirical settings in order to establish external validity.

Managing the service scope and service focus

As capital equipment manufacturers are becoming more aware of the strategic importance and the potential of industrial services, services are becoming a more central part of their value proposition and thus more extensive (Gebauer and Pütz, 2007; Penttinen and Palmer, 2007). The scope of the services can be extended through bundling of existing services and the focus can shift from a traditional product focus to a focus on the customer's business processes.

When enhancing the service offering it therefore becomes important to understand what implications these changes in scope and focus have for the organisation.

The service scope

The service scope, being seen as the firm's bundling strategy (cf. Stremersch et al., 2001), varies between companies and industries, and also between service offerings. Industrial services consisting of a specific activity, such as equipment repair, inspection, customer training, performance upgrade, or technical support, are seen as being unbundled if not offered together with products or services. Different types of industrial services can all hypothetically be offered either individually or as service bundles. Bundles can be simple combinations of some of the individual services or can also include facilitating goods; furthermore, a bundled service implies an increased service scope compared to an unbundled one. Being that bundled services are not just single transactions, they are generally associated with some form of legal arrangements and rather basic service level agreements (SLAs) or general framework agreements.

Stremersch et al. (2001) consider bundling an imperative aspect when offering a service that fully satisfies the customer's needs, additionally Gallouj and Weinstein (1997) discuss creating new service offerings through the bundling and/or unbundling of existing service elements. For instance, different tangible (e.g. ICT systems hardware) and intangible (e.g. modelling methods) technical characteristics and the service process output can be combined. New services through bundling imply a modular architecture (Sundbo, 2002) and an important assumption is that the offering can be broken down into well-defined elements (Gallouj and Weinstein, 1997). This is often easier to do with the tangible elements of the offering, e.g. an SLA with or without spare parts, whereas intangible elements such as the relationship value may be more difficult to formalise and monetise. A modular service structure along the lines of the Anderson and Narus (1995) notion of flexible service offerings

has the advantage of being both consistent and cost efficient if correctly designed and implemented.

THMG has been successful when it comes to offering bundled rental plans based on standardised components, albeit some differences between markets exist. Saab is elaborating with a modularised concept structure and ITT is offering bundled offerings based on a modular design, which bears similarities to Mattsson's (1973) view on systems selling, with the most extensive undertakings tailored to a specific customer site. Bundling can be facilitated by ICT, which changes some interfaces in service production and increases automation as well as central-local integration. Husqvarna is piloting a new service contract design and will use an ICT application to bundle new services, thereby increasing the value of the contract while at the same time deepening the relationship. Hence, it is possible to offer more complex services in a cost efficient manner. For example, plant automation, intelligent machines, and remote troubleshooting, monitoring, and control are critical components when Metso want to offer life-cycle services with focus on maximising customer operations. Volvo bundles several information-based services facilitated by ICT such as repair and maintenance services previously based on physical catalogues. Furthermore, regular bulletins are now dematerialised and are offered through a digital channel, which has increased efficiency and reduced costs across the supply chain.

One problem in many industries is that several services are regarded as add-ons that can be given away in order to land a product deal, even though it can reduce the profitability significantly (Anderson and Narus, 1995; Kalliokoski et al., 2004; Oliva and Kallenberg, 2003). This problem is both internal and external and can seriously undermine the attempt to create service bundles that include such services. The customer might expect to receive services like pre-sale process analysis, installation, or training for free and if the company does not provide these the customer may turn to a competitor instead. In industries with high

competition, low margins, and new actors from e.g. China and Korea entering the markets and competing on unit price, the situation is particularly precarious. Internally, the challenges for the case companies are generally related to the manufacturing and R&D-orientated corporate culture, lack of top management support, the sales organisation's focus on unit sales, and the salesmen's bonus schemes being linked to unit sales.

The central-local relationship

In addition to the scope of the content, the geographical scope of the services is becoming an important aspect to take into consideration due to the internationalisation of industrial services (Morschett, 2006). Just as for products, where centralised procurement is a common method for many larger customers (van Weele, 2004), some major customers of Metso and TMHG are requiring service agreements that are not site-specific but covering all operations on a particular national market or even across several national markets. Accordingly, increased geographical scope has an effect on the service processes, thus, we arrive at another form of bundling which is more complex, as the service scope covers several markets.

Many industry incumbents expanded internationally in times when the coordination limitations to the growth and size of companies discussed by Penrose (1955) were still valid. This expansion either took place through independent dealers (some which have later been acquired by the manufacturer) or subsidiaries, or a combination of both. Morschett (2006) found that with increasing experience in a foreign market and when regarding services as a fundamental component of corporate strategy, manufacturers are more likely to implement fully-owned service operations. This study supports Morschett's findings and with independent dealers it generally becomes more difficult to deploy a successful service strategy (Oliva and Kallenberg, 2003). Although operating through dealers gives the manufacturer increased flexibility, the manufacturer can become more vulnerable and dependent on strong local dealers (e.g. ELS, Husqvarna, ITT, and Volvo on some markets). A

major disadvantage is the fact that it is the dealer that has the operational relationship (or the interface) with the customer.

If instead fully-owned subsidiaries had the local relationship throughout the product lifecycle, it would provide better knowledge about customer processes and needs, which in turn would enable the provider to be more proactive. It would also have the advantage of being able to sell equipment and spare parts through service technicians, a strategy ELS, ITT, and TMHG have successfully deployed. Often, dealers do not have access to the manufacturer's business system, are less knowledgeable regarding the products, and are less loyal to the manufacturer. Companies operating through authorised and unauthorised service partners face the same problem. On markets where manufacturers operate through both a fully-owned service organisation and service partners, a significantly lower share of the service partners' sales can be attributed to SLAs and other bundled offerings compared to the subsidiaries' service sales. Thus, independent dealers and service partners can be a constraint for the deployment of more advanced offerings. Husqvarna operates, with the exception of a few markets, solely with independent dealers and must design its offerings to provide incentives both to the dealers and the customers. Furthermore, the company has to create a profit sharing scheme that enables dealers to sell the service contracts instead of having the customers purchase reactive repair and maintenance.

The case companies' subsidiaries have traditionally had a high degree of independence, which has resulted in local service development and business systems fully or partially incompatible with the central system and other local systems. Some of the case companies are therefore not able to present trustworthy figures as the reporting varies from one subsidiary to another. However, not only central managers but also local managers and directors at e.g. ITT and THMG believe that increased central-local integration is positive as long as the business system facilitates the local organisation and enables it to allocate resources more efficiently

and effectively to its core operations. This presumes that central management takes into account the needs of the operative personnel in order to gain acceptance for new systems and processes. Volvo for example have employed a dual strategy with both independent dealers and subsidiaries, but are now procuring strategically important dealerships in order to develop them; local dealers often lack the financial resources to substantially increase operations and subsequently, increase service sales and improve customer relationships.

The endeavour to gain increased central control is clear in the cases and ICT is the key that has enabled these centralisation strategies (cf. Kowalkowski and Brehmer, 2008). In order to achieve standardisation of service processes and compatibility between information systems and between subsidiaries, more resources are allocated to ICT development centrally. In addition, few subsidiaries have the time, financial resources, and expertise required to invest in new, large-scale ICT projects. For example, THMG's highly successful mobile solution where service technicians are using personal digital assistants (PDAs) was developed by the central organisation (although in close cooperation with leading subsidiaries and external ICT partners) The mobile business solution is possible to implement at the subsidiary level using the central organisation's business system and it has provided a platform for more efficient service processes and new offerings that the subsidiaries are able to offer.

Nevertheless, there can be a danger with too much focus on centralisation, because centralised decision making may result in reduced market information gathering and responsiveness (Jaworski and Kohli, 1993). Service concepts and processes centrally initiated often aim at a 'European average market', which makes subsidiaries that are either more advanced (these subsidiaries fear that they will lose business if they change, what they perceive as, their successful service operations) or less advanced (these subsidiaries may not have the resources to offer what is centrally recommended) disinclined to align with central strategies. Hence,

companies must manage to balance increased integration and central control with entrepreneurial spirit and local business.

Leong and Tan (1993) consider a transnational structure as the preferred organisational option for companies competing in a global environment. In transnational organisations local market differences and the importance of flexibility among subsidiaries are recognised, and at the same time subsidiaries are able to synergise from increased internal efficiency and better central resource allocation. Of the companies studied, the most successful ones regarding their internationalisation of services are those having a transnational structure. One example of service development in a transnational structure is SLAs being effectively developed and deployed at a leading TMHG subsidiary and then implemented on other markets with a centrally-initiated project serving as a catalyst.

The service focus

Traditional industrial services such as repair, maintenance and other after-sales services focus on product efficacy. When companies expand their service offering not only are these product-orientated services offered but also services which focus on the product's efficiency and effectiveness within the customer's processes (Oliva and Kallenberg, 2003). Process-orientated services require competences other than traditional after-sales support as knowledge about not only the installed base and how to service it is needed, but also how it affects the customer's industrial production process and how this process can be improved. The emphasis is shifting from after-sales services to offerings where the distinction between equipment and the services associated with them becomes blurred. Thus, the physical product no longer is the centre of the value proposition. It can be regarded as a shift in focus from a producer to a customer perspective and a shift from the means to the utilisation (Gummesson, 1995).

ELS wants to be a knowledge partner to some of its customers, not only selling and installing machines but also conducting laundry analysis and optimising customers' processes. Husqvarna has introduced a number of service and support contracts in order to reach its customers' business and create lock-in effects by improving that business by e.g. reducing down time and offering availability. Similarly, Volvo offers an availability concept where the idea is to offer customers bus availability instead of the physical bus product.

Very extensive undertakings, such as Volvo's availability concept, are commonly referred to as integrated solutions (Davies, 2004; Windahl et al., 2004) or functional products (Markeset and Kumar, 2003). Instead of offering a preventive maintenance agreement for sewage pumps and mixers, ITT can take on customised agreements when it works proactively to reduce life-cycle cost (LCC) by taking measures such as replacing existing pumps with better dimensioned and more energy efficient equipment. Revenue models for such unbundled and bundled offerings are often fundamentally different from product-orientated ones, Saab's aircraft availability offering being an example. Also, Metso have a number of very extensive offerings in place where it employs profit- and gain-sharing schemes, sometimes involving the taking over of complete mines (including personnel). In a payback rental plan where TMHG took over a customer's fleet of 600 trucks, TMHG agreed to an annual fleet reduction which implies that the company focuses on increasing the utilisation rate and availability, and thus fewer trucks and spare parts will be sold.

New technologies, and thereby potential service opportunities, are increasingly bundled with the products. For Saab and Metso this is not a novel idea due to the offering's technical complexity, but to the five high-volume manufacturers this is becoming increasingly important to take into account as the falling price of ICT makes it affordable to build more technology into the equipment. TMHG can extract detailed performance and service data from the warehouse trucks, ELS' machines with new ports enable remote services, and a

black box in the pump station can provide ITT with data and enable machine-to-machine communication. Volvo, for example, is increasing the ICT content in the buses in order to capture operational information and devise offerings based on this information, such as more accurate preventive maintenance and service contracts. Finally Husqvarna is prototyping using radio-frequency identification (RFID) tags to gather operating information from the equipment. New process data becomes available and new process-orientated services are thereby possible, something which may require new internal competences. Besides, the ability to ensure ICT reliability will become even more critical as it becomes a more integrated part of the offering.

A framework for service offerings

A classification of industrial service offerings is presented in the service offering framework of Figure 1. These patterns emanated from literature and crystallised during data collection and analysis. The two-dimensional framework is composed of service characteristics representing the focus of the offering, either the installed base or the customer's production process, and the scope of the offering, ranging from unbundled services to bundled offerings. Evidently, the more extensive the service offering scope and the more focus on the customer's production process instead of solely on the installed base, the more important it becomes with relationship longevity. In addition, the revenue model depends on the type of offering, which means that pricing differs between offerings in different cells.

Insert Figure 1 here

The customer relationship has a central role for influencing and enabling offerings and it is likewise affected by new service processes and technologies. The type of customer relationship has a decisive role in service production, with long-term orientation improving

productivity (Grönroos and Ojasalo, 2004; Gummesson, 1987), and long-term relationships being both beneficial and a prerequisite for future sales as well as for extensive service offerings. Extensive bundled offerings with fixed or dynamic pricing requires that both parties have relational intent and that the offering is mutually beneficial. In addition, long-term relationships enable the companies to be proactive with a customer-centric approach, i.e. not only being proactive with an internal product focus in mind. This is important in order for new offerings to reflect expressed and latent customer needs, and reduce the risk of developing offerings only because it is technically possible. Examples of the case companies' service offerings are presented in Table 3. These offerings are categorised according to the typology in Figure 1. Although most of the services are performed by the case companies, services are also undertaken by external service providers. TMHG's driver training is carried through by franchisees and service partners provide most of ELS', Husqvarna's, and ITT's after-sales services on many markets.

Insert Table 3 here

Unbundled product-orientated services

The majority of unbundled product-orientated services (see cell one in Figure 1) are of such character that the customer does not take an active role in these services; technical support, particularly customer training, are the exceptions. The non-recurrent nature of the offering suggests arm's length relationships as there is generally little incentive to invest in the relationship. If there is a potential to increase the offering and for recurrent exchanges, relational intent is preferable.

Unbundled process-orientated services

Despite being unbundled, process-orientated services (cell two in Figure 1) generally require previous exchanges, i.e. the customer has purchased product-orientated services previously. If

the relationship is profitable, relationship longevity is preferred. This is because recurrent exchanges will increase the knowledge of the installed base and the customer's processes, which is likely to result in increased value potential for both customer and provider.

Bundled product-orientated services

Services in cell three (Figure 1) differ from the ones in cell one as they constitute of several subsets of the latter. This generally implies a modular internal service structure with standardised processes and interfaces. As the exchange generally is recurrent over a set period of time, long-term relationships should be the normative goal, although variable pricing is not necessarily promoting increased interdependence between the two parties from the provider's point of view. The longevity of the relationship and agreement (in opposition to services in cell one and two) enables investments in new technology that is not expected to be remunerative until some time in the future.

Bundled process-orientated services

Bundled service offerings with a process focus as illustrated in cell four (Figure 1), are more extensive than the variable-price agreements of cell three. These offerings have fixed or dynamic prices and are generally a result of a successful relationship involving less advanced agreements, i.e. cell three. Since the offering is bundled, it most likely contains both product- and process-orientated services, and it can vary considerably in scope. The agreement may comprise of only one customer entity (e.g. one bus) or cover all national entities (e.g. all bus depots). In addition, it can be a standardised rental plan, a customised partnership agreement, and ultimately a joint venture. Some form of partnership agreement is often required for extensive, process-orientated offerings (cf. Kalliokoski et al., 2004). In order to offer such services, the ability to coordinate and integrate inputs from software firms, equipment suppliers, engineering consultants, and other external actors becomes more critical. The need for such competence depends on both market and industry as does the premises for analogous

offerings; despite similar scope and focus the risk parameters can differ radically between for example aircraft availability for an air force and bus uptime for a bus operator.

Service process interfaces

Whereas the service scope (unbundled and bundled offerings) and service focus (product and process orientation) form a two-dimensional framework, the service process interfaces form the infrastructure of the service offering. Depending on service scope and focus the process interfaces will differ, and likewise the process interfaces can constrain or enable new services with a different scope and/or focus than existing ones. However, it is not enough to focus on the internal service organisation as the customer is also a source of product inputs (Hill, 1977). Because value is co-produced, customers themselves participate, to various degrees, in the service production process and thereby influence their own satisfaction and perceived quality (Ramírez, 1999). Furthermore, the interactions between provider and customer are an important source for service development and innovation (Gallouj and Weinstein, 1997). Different service scope and focus require different service processes and the intra-firm and inter-firm interdependence patterns between organisational entities thus differ.

How the service production is divided internally between front-office and back-office, with various degrees of coupling, is a key issue when discussing service process interfaces. Larsson and Bowen (1989) discuss a framework of service process interfaces with two contingencies;

- 1) degree of customer disposition to participate
- 2) diversity of customers' demand

These two composite a typology with four different service interdependence patterns (see Figure 2). Based on Thompson's (1967) classification, Larsson and Bowen (1989) align the interdependencies in order of complexity; pooled, sequential, and reciprocal. The main locus

of interdependencies in each cell is the most complex area of coordination in the respective service production process.

Insert Figure 2 here

Pooled service design

Services with a pooled service design can be relatively standardised and economies of scale is utilised due to quantitative rather than qualitative diversities in demand. This allows for allocating most of the production to back-office operations which are relatively decoupled from most front-office activities and independent of the customer. Examples of pooled services design are: ITT's automatic software upgrades and remote monitoring and control of pump stations or Metso's mining processes.

Sequential standardised service design

Sequential standardised service design implies that the customer takes an active part in the value-creation process. Surveillance, online ordering of spare parts, relatively trivial repair and maintenance work, and other standardised services enable extensive decoupling between front-office and back-office for service production. For these services, the provider offers customers the technical infrastructure (e.g. an extranet solution) and other resources (e.g. service manuals) required for them to serve themselves. The case of customers monitoring the mining process themselves rather than outsourcing the surveillance to Metso is an example of this.

Sequential customised service design

For sequential customised service design, coupling between front-office and back-office is required for these services because front-office personnel often have to receive the customer's specification initially. Hence, the customer's unique requirements precede the actual service

production. Repair and maintenance are generally associated with this service design. Service production is mainly an internal matter between front-office and back-office, although ICT has enabled front-office personnel to substitute some previous back-office activities and some processes for coordination of service support are automated and/or eliminated. For example, mobile business systems enable service technicians to increase their role in administrative activities, which have previously been performed by back-office.

Reciprocal service design

A reciprocal service design represents complex and unique problems. The main variable cost for these services is often the front-office personnel and the focus of these services is the customer's business process rather than the installed base as such (Oliva and Kallenberg, 2003). Fleet management, customer training, LCC analysis, and other problem-solving and business-development services are examples of services produced with reciprocal design.

Synthesising the service factors

The perceived value of a service offering differs between customers depending on their production processes and depending on the influencers in the buying centre (Webster and Wind, 1972) as well as the interface to the provider. A purchasing manager's buying criteria and order winners are likely to differ from those of an engineer or operator, and such aspects also have to be taken into consideration when developing the service offerings. Apart from this, the customer (being a co-producer of value) influences the service production process and output, particularly for reciprocal services. Thus, when discussing the service offering the customer's role also has to be taken into consideration (see Figure 3).

Insert Figure 3 here

The bi-directional arrows in Figure 3 indicate the interdependencies between the elements of the service offering. For example, reduced customer disposition to participate in the service production process can lead to a decision to outsource service activities previously conducted in-house to the provider, thereby increasing the demand for more extensive, performance-based agreements (such as Saab's aircraft availability offering being developed as a response to customer demand). This increase in the diversity of demand would imply changes in the service scope (e.g. an increased bundle of services) and service focus (e.g. increased process orientation) in order to match demand (cf. Larsson and Bowen, 1989). Furthermore, a more extensive form of service offering also means that the service process interfaces become more complex, both between internal organisational entities and towards the customer.

Developing and managing industrial services is not only a question of *what* services manufacturing companies should offer, it is also a question of determining *how* they should be delivered to gain the expected value. Capital equipment manufacturers should, to a greater extent than today, map, formalise, and standardise their service production processes (Kowalkowski and Brehmer, 2008). This implies increasing integration between headquarters and subsidiaries and having more consistent local service processes, which leads to more competitive service value propositions. At the same time, the companies must have the ability to respond to local customer needs, making it necessary to manage both reactive and proactive service development and deployment. Continuous input from customers through the local service organisation is vital, indicating that business development cannot take place solely on a central level.

It is a strategic decision whether the services should mainly build on personal interactions or through non-human interfaces, i.e. ICT-based services. Independent of strategy, emphasis should be put on standardising and formalising internal processes while customising the offerings through knowledge of the customer's installed base and production process. The

result will be a focus not only on the outcome of the services but rather on the process of developing the organisational and supportive mechanisms. However, the focus should not be solely on standardising the service processes (Das and Canel, 2006). Standardisation must have the service quality aspect in mind (Grönroos, 2000), ensuring that customers perceive there to be value in the process improvements. Thus, when refining the service processes by utilising ICT, consideration has to be taken to diversity of demand and customer disposition to participate (Larsson and Bowen, 1989) as well as to the “humanistic” side of services (Das and Canel, 2006) and customisation/standardisation aspects (cf. Anderson et al., 1997).

By relating the service focus to the service scope we developed a typology that enabled us to categorise service offering via a variety of mechanisms such as offering, pricing and relationship. Hence, different operational processes and interfaces become critical depending on where in the service offering framework the service offering is positioned, i.e. depending on the content of the service offering and the customer relationship (see Figure 4). Services in cell one and two generally require the ability to manage one particular process interface, as the services are unbundled. Because the bundled offerings in cell three to four contain several services, they involve the ability to manage several different service processes and interfaces.

Insert Figure 4 here

In all of the companies studied, the market trend is moving towards more bundled service offerings. In bundled offerings, several patterns of service production process interfaces are important and in a fixed-price SLA or rental plan, all portfolios of interface patterns become important to some extent. Thus, companies have to manage several interfaces and understand the dynamics of the service process interfaces. Besides, as the activities in the customers’ production processes generally are interconnected (and therefore inter-related), more

extensive offerings often imply that the provider needs to optimise not only each activity but rather overall performance. In the mining industry, for example, the activities (feeding, crushing, screening, grinding, etc.) have traditionally been analysed and optimised independently whereas a bundled life-cycle service requires performance optimisation of the services in the context of the whole operation.

Being market leaders, the companies have to manage all interfaces and work simultaneously with both reducing internal costs and introducing new services to proactively and reactively meet changing customer demand. Most of the case companies' SLAs are site-specific and for companies with more extensive service offerings, such as Metso and TMHG, rental plans and SLAs are either site-specific or national. Due to outsourcing of industrial services, sequential standardised service design is the least common interface for these extensive services.

Traditionally, close contact between front- and back-office personnel is required for services in cell one as well as many services in the other cells. Thus, having the front-office and back-office as the main locus of interdependence is essential not only for product-orientated services but also for some services with a direct process focus, for example operations, which implies that the customer does not participate in the service production. However, front-office centred processes enabled by the utilisation of ICT are particularly suitable for rather trivial services like the ones in cell one, as is the case with bundled services containing such service elements. Integrated ICT systems and the utilisation of bundled-in technologies also enable many service processes to be conducted mainly by back-office. As it may require investments in new technology and in customer relations, for example integration with the customer's system, these processes are likely to require recurrent exchange and bundled, product- or process-orientated services.

Although ICT applications and systems enable automated processes and many customers have fewer dispositions to participate than before; many process-orientated services (as well as

customer training) require customer participation. Services such as technical consulting and support in cell two, and bundled, process-orientated services in cell four, call for the provider to manage the interface between customer and front-office to ensure that the customer acquires the skills and knowledge needed.

The internationalisation of industrial services

What distinguishes international services from local or national ones are not only differences in national regulations, fiscal legislation, and country-specific factors for pricing. International services imply that the local service organisations operating in each country must coordinate their activities not only with the central service organisation but also partly with the other local organisational entities at the markets covered by the agreement¹. However, the manufacturer must decide where to invest time and effort; and decide whether it is better to approach the customer locally through the existing market channels and relationships or to try and sign a central agreement; the latter being more complex and likely to take more time. For example, services such as gain sharing agreements require strong support among top management and the complex coordination processes means that, many times, local sales of less extensive agreements are more effective. Apart from this, the customer must also have a rationale for signing an agreement for a major international undertaking instead of having several customised, country or site specific agreements. With central agreements, both national and international ones, there is a risk that the customer locally chooses not to follow the agreement. Thus, in order to manage the agreement successfully, the customer must also have a certain level of central-local integration and central control of the agreement.

A transnational service development and deployment, i.e. both central and local as well as the interplay between the two, becomes particularly important for extensive offerings. Automation of processes is possible for all services to some extent and the more extensive the scope, the higher the synergy potential seems to be. Many support activities are particularly

suitable for being centralised instead of being performed at each subsidiary independent of one another (Kowalkowski and Brehmer, 2008). In international service agreements the process interfaces become more complex than for local or national ones as coordination is required between several entities (also between back-office entities through business systems in every country for which the agreement is signed, as well as between central and local organisations). Increased coordination between these organisational entities in a transnational organisation gives new opportunities for international offerings, and may be necessary in order to respond to the demand from major customers regarding international agreements. Although the numbers are growing, so far relatively few customers demand international agreements (Figure 5 illustrates the most characteristic ones).

Insert Figure 5 here

Among the international agreements signed, most services are unbundled, product-orientated ones, such as general framework agreements regarding spare parts, which are signed centrally. However, Metso's consultation services to global key account customers are an example of a process-orientated service. THMG is the only case company to have signed a major international, bundled contracts. Depending on the extent of the SLA, these services are either product or process orientated (however, they are not as complex as e.g. availability agreements). An increasing number of TMHG's customers sign preferred supplier agreements that include long-term rental and fleet management reports. Generally, international bundled, process-orientated services seem to be extremely complicated to manage and coordinate. For example, most process-orientated services require developed local customer relationships and extensive site-specific knowledge.

Conclusions

To conclude, the lack of resources traditionally allocated to the service organisations compared to manufacturing units suggest that there is major improvement potential and that financial gains are possible to achieve if more attention is given to industrial services. By introducing a framework for service offerings consisting of Service focus and Service scope this paper develops a typology that fills a gap in existing literature (see e.g. Kumar and Kumar, 2004) by describing different forms of industrial service offerings. Furthermore, by inter-relating this typology with the Service process interface dimension, the differences in interfaces needed depending on the characteristics and range of the service offerings is discussed. The internationalisation aspect of industrial services has not been emphasised in previous service typologies (e.g. Mathieu, 2001; Oliva and Kallenberg, 2003; Penttinen and Palmer, 2007), which is something that further adds to the contribution of the research presented here. In addition, by addressing the growing impact of ICT, this paper should hold significant contemporary interest for both practitioners and academics.

It is illusive to deal with different industrial services in the same way (Mathieu, 2001) and this study illustrates that different services demand different competences, ICT systems, processes, and organisational structures. Managers can for example use the proposed typology to classify their service offering portfolio and formulate service development and deployment strategies on both local and global levels. By seeing services as adaptive to different situations (e.g. that they relate to a large degree to the customers' situation and needs), the organisation of the services be can made more effective and, thus, drive the companies' market leadership further, beyond the approaching product commoditisation.

Although focus has been on the companies' European operations, given the nature of the empirical evidence and the analysis made, we believe that the findings are valid also for the North American, Australian, and other industrialised markets where the companies are represented. Only focussing on the companies' service offerings and not on the industrial

products is a deliberate limitation made in this paper, although product–service integration aspects are a critical managerial issue as well that should be further examined in future research. For industrial offerings (extensive services in particular) the customer-provider relationship as such is often more important than the actual characteristics of the bundle of specific products and services (Tuli et al., 2007). How to manage the dynamics of the customer-provider relationship and the dynamics between the central and local organisations and between products and services are all strategic issues that deserve further attention.

References

- Agrawal, G.K. and Berg, D. (2007) 'Technology in the service development process: a missing dimension', *International Journal of Services Technology and Management*, Vol. 8, No. 2-3, pp.107-122.
- Anderson, E.W., Fornell, C. and Rust, R.T. (1997) 'Customer satisfaction, productivity and profitability: differences between goods and services', *Marketing Science*, Vol. 16, No. 2, pp.129-145.
- Anderson, J.C. and Narus, J.A. (1995) 'Capturing the value of supplementary services', *Harvard Business Review*, Vol. 73, No. 1, pp.75-83.
- Das, S. R. and Canel, C. (2006), 'Designing service processes: a design factor based process model', *International Journal of Services Technology and Management*, Vol. 7, No. 1, pp. 85-107.
- Davies, A.C. (2004) 'Moving base into high-value integrated solutions: a value stream approach', *Industrial and Corporate Change*, Vol. 13, No. 5, pp.727-756.
- de Brentani, U. (1995) 'New industrial service development: scenarios for success and failure', *Journal of Business Research*, Vol. 32, No. 2, pp.93-103.
- De Toni, A. and Tonchia, S. (2004) 'Measuring and managing after-sales service: Aprilia's experience', *International Journal of Services Technology and Management*, Vol. 5, No. 4, pp.385-393.
- Dubois, A. and Gadde, L-E. (2002) 'Systematic combining: an abductive approach to case research', *Journal of Business Research*, Vol. 55, No. 7, pp.553-560.
- Eisenhardt, K.M. (1989) 'Building theory from case study research', *Academy of Management Review*, Vol. 14, No. 4, pp.532-550.
- Eisenhardt, K.M. and Graebner, M.E. (2007), 'Theory building from cases: opportunities and challenges,' *Academy of Management Journal*, Vol. 50, No. 1, pp.25-32.

Frambach, R.T., Wels-Lips, I. and Gündlach, A. (1997) 'Proactive product service strategies: an application in the european health market', *Industrial Marketing Management*, Vol. 26, No. 4, pp.341-352.

Gallouj, F. and Weinstein, O. (1997) 'Innovation in services', *Research Policy*, Vol. 26, No. 4/5, pp.537-556.

Gebauer, H. and Pütz, F. (2007) 'The impact of service offerings on service-related performance outcomes', *International Journal of Services Technology and Management*, Vol. 8, No. 2-3, pp.123-138.

Grönroos, C. (2000), *Service management and marketing: a customer relationship management approach*, Chichester, UK: John Wiley & Sons Ltd.

Grönroos, C. and Ojasalo, K. (2004) 'Service productivity: towards a conceptualization of the transformation of inputs into economic results in services', *Journal of Business Research*, Vol. 57, pp.414-423.

Gummesson, E. (1987) 'The new marketing - developing long-term interactive relationships', *Long Range Planning*, Vol. 20, No. 4, pp.10-20.

Gummesson, E. (1995) Relationship marketing; its role in the service economy. *Understanding service management*. Eds: Glynn, W.J. and Barnes, J.G. Dublin, Ireland, Oak Tree Press, pp.224-268.

Gummesson, E. (2000) *Qualitative methods in management research*, Thousand Oaks, CA: Sage Publications.

Henkel, C. B., Bendig, O.B., Caspari, T. and Hasagic, N. (2004) *Industrial services strategies: the quest for faster growth and higher margins*, Monitor Group.

Hill, T.P. (1977) 'On goods and services', *Review of Income and Wealth*, Vol. 23, No. 4, pp.315-338.

Howells, J. (2004) 'Innovation, consumption and services: encapsulation and the combinatorial role of services', *Service Industries Journal*, Vol. 24, No. 1, pp.19-36.

Jaworski, B.J. and Kohli, A.K. (1993) 'Market orientation: antecedents and consequences', *Journal of Marketing*, July, Vol. 57, pp.53-70.

Kalliokoski, P., Andersson, G., Salminen, V. and Hemilä, J. (2004) *BestServ Feasibility Study Final Report*. Kerava: Technology Industries of Finland.

Kowalkowski, C. (2006), *Enhancing the industrial service offering – new requirements on content and processes*, Licentiate thesis, Linköping University, Sweden.

Kowalkowski, C. (2008) 'Service productivity gains through information and communication technology applications: a service marketing approach', *International Journal of Knowledge Management Studies*, Vol. 2, No. 1, pp. 4-22.

- Kowalkowski, C. and Brehmer, P.O. (2008), 'Technology as a driver for changing customer-provider interfaces: evidence from industrial service production', *Management Research News*, Vol. 31, No. 11, pp. 746-757.
- Kumar, R. and Kumar, U. (2004) 'A conceptual framework for the development of a service delivery strategy for industrial systems and products', *Journal of Business and Industrial Marketing*, Vol. 19, No. 5, pp.310-319.
- Larsson, R. and Bowen, D.E. (1989) 'Organization and customer: managing design and coordination of services', *Academy of Management Review* 14, No. 2, pp.213-233.
- Lele, M. M. (1997), 'After-sales service - necessary evil or strategic opportunity?' *Managing Service Quality*, Vol. 7, No. 3, pp. 141-45.
- Leong, S.M. and Tan, C.T. (1993) 'Managing across borders: an empirical test of the Bartlett and Ghoshal (1989) organizational typology', *Journal of International Business Studies*, Vol. 24, No. 3, pp.449-464.
- Levitt, T. (1983) 'After the sale is over', *Harvard Business Review*, Vol. 61, No. 5, pp.87-93.
- Lovelock, C. (1995) 'Competing on service: technology and teamwork in supplementary services', *Planning Review*, July/Aug, pp. 32-47.
- Markeset, T. and Kumar, U. (2003) 'Design and development of product support and maintenance concepts for industrial systems." *Journal of Quality in Maintenance Engineering*, Vol. 9, No. 4, pp.376-392.
- Mathieu, V. (2001) 'Service strategies within the manufacturing sector: benefits, costs and partnership', *International Journal of Service Industry Management*, Vol. 12, No. 5, pp.451-475.
- Matthyssens, P. and Vandenbempt, K. (1998) 'Creating competitive advantage in industrial services', *Journal of Business and Industrial Marketing*, Vol. 13, No. 4/5, pp.339-355.
- Mattsson, L-G. (1973) 'Systems selling as a strategy on industrial markets', *Industrial Marketing Management*, Vol. 3, pp.107-120.
- Meredith, J. (1989) 'Building operations management theory through case and field research', *Journal of Operations Management*, Vol. 16, pp.441-454.
- Miles, M.B. and Huberman, A.M. (1994), *Qualitative data analysis*. London, UK: Sage Publications.
- Morschett, D. (2006) 'Firm-specific influences on the internalization of after-sales service activities in foreign markets', *Journal of Services Marketing*, Vol. 20, No. 5, pp.309-323.
- Oliva, R. and Kallenberg, R. (2003) 'Managing the transition from products to services', *International Journal of Service Industry Management*, Vol. 14, No. 2, pp.160-172.

- Penrose, E. (1955) 'Limits to the growth and size of firms', *The American Economic Review*, Vol. 45, No. 2, pp.531-543.
- Penttinen, E. and Palmer, J. (2007), 'Improving firm positioning through enhanced offerings and buyer-seller relationships', *Industrial Marketing Management*, Vol. 36, No. 5, pp. 552-64.
- Ramírez, R. (1999) 'Value co-production: intellectual origins and implications for practice and research', *Strategic Management Journal*, Vol. 20, No. 1, pp.49-65.
- Siggelkow, N. (2007) 'Persuasion with case studies', *Academy of Management Journal*, Vol. 50, No. 1, pp.20-24.
- Stremersch, S., Wuyts, S. and Frambach, R.T. (2001) 'The purchasing of full-service contracts: an exploratory study within the industrial maintenance market', *Industrial Marketing Management*, Vol. 30, No. 1, pp.1-12.
- Sundbo, J. (2002) 'The service economy: standardisation or customisation?', *Service Industries Journal*, Vol. 22, No. 4, pp.93-116.
- Thompson, J.D. (1967) *Organizations in action*, New York: McGraw-Hill.
- Tuli, K.R., Ajay K. Kohli, and Sundar G.B. (2007), 'Rethinking customer solutions: from product bundles to relational processes', *Journal of Marketing*, Vol. 71, July, pp.1-17.
- Ulag, W. and Eggert, A. (2006) 'Value-based differentiation in business relationships: gaining and sustaining key supplier status', *Journal of Marketing*, Vol. 70, No. 1, pp.119-136.
- van Weele, A. (2004) *Purchasing and supply chain management*, London, UK: Thomson Learning.
- Webster, F.E., and Wind, Y. (1972) *Organizational buying behavior*, Englewood Cliffs, New Jersey: Prentice-Hall, Inc.
- Windahl, C., Andersson, P., Berggren, C. and Nehler, C. (2004) 'Manufacturing firms and integrated solutions: characteristics and implications', *European Journal of Innovation Management*, Vol. 7, No. 3, pp.218-228.
- Yin, R.K. (2003) *Case study research: design and methods*, Thousand Oaks, CA: Sage Publications.

Note

1 The situation with a subsidiary in every country is simplified because subsidiaries may include several countries and because some markets are served through service partners, thereby involving additional challenges.

Figures

Figure 1. The service offering framework.

Figure 2. Service production process interfaces (Larsson and Bowen 1989, p. 221).

Figure 3. The extended service offering, including customer requirements and participation.

Figure 4. The interrelationship between service space and service process interfaces.

Service Focus			
Process	Reciprocal Service Design Sequential Customised Service Design 2	Reciprocal Service Design Sequential Customised Service Design Pooled Service Design 4	
Product	Sequential Customised Service Design 1	Sequential Customised Service Design Pooled Service Design 3	
	Unbundled	Bundled, site or country specific	Service Scope

Figure 5. Examples of international service offerings.

Service Focus	Process	Metso: A global specialist group is offering process-technology consultation to international customers.	TMHG: International key customer agreements which include e.g. rental trucks and fleet management report packages. Local differences exist, e.g. due to national safety regulations. Customers are able to compare performance between sites worldwide.
	Product	Volvo: Common European spare parts pricing for international coach operators. Different cost structure in different countries implies that Volvo centrally takes an increased risk in central agreements in order to get the business (some local responsibility is transferred).	TMHG: An international service agreement signed centrally in connection to the global product agreement with the retailer IKEA. IKEA does not necessarily have to buy service locally from THMG, but THMG has to be able to offer service to the extent and price centrally agreed upon.
		Unbundled international	Bundled international
		Service Scope	

Tables

Table 1. An overview of the empirical research activities

Research phase	Research activity	Companies involved	Goals	Research instruments
Phase 1	Panel sessions	10 providers	To get acquainted with the sector and industrial services, and select cases	3 panel sessions with 12-20 people and follow-up interviews with the participants.
Phase 2	Exploratory interviews	7 providers and 11 industrial customers	To obtain insight in industrial service processes, linkages between products and services, service scope, service focus and forces affecting industrial services	18 interviews (majority tape recorded and transcribed)
Phase 3a	Panel sessions	10 providers	To discuss results of phase 2	5 panel sessions with 14-16 people
Phase 3b	Case studies	7 providers	To obtain in-depth insight of service interfaces, service scope and service focus	49 interviews with managing directors, central service managers, local service managers, and other managers and staff (tape recorded and transcribed)

Table 2. The case companies

Company	Business	Main products	Main service offering
Electrolux Laundry Systems (ELS)	Professional laundry	Washer extractors, dryers, finishing equipment	Single services, service level agreements (SLAs) [not all markets], laundry analysis
Husqvarna	Garden and forestry equipment	Garden tractors, lawn mowers, chainsaws	Service and support contracts
ITT Water & Wastewater	Fluid handling	Drainage pumps, sewage pumps and mixers, propeller pumps	Single services, SLAs
Metso Minerals	Mining equipment	Mining equipment, consumables	Maintenance, SLAs, performance guarantees
Saab Aerosystems	Aviation and defence	Airborne systems and subsystems	Single services, systems engineering, apparatus SLAs
Toyota Material Handling Group (TMHG)	Material handling	Warehouse trucks, counterbalanced trucks, manual trucks	Single services, SLAs, rental plans
Volvo Buses	Bus manufacturer	City buses and coaches	Spare parts, single services, maintenance availability

Table 3. The industrial service offerings.

Company	Cell 1: Unbundled product-orientated services	Cell 2: Unbundled process-orientated services	Cell 3: Bundled product-orientated services	Cell 4: Bundled process-orientated services
Electrolux Laundry Systems (ELS)	Spare parts, repair, reconditioning, preventive and corrective maintenance, technical support, customer training	Performance upgrade, technical consulting, performance audit, technical support	Country- and business-specific SLAs (usually three levels)	Capacity/availability (few customers)
Husqvarna	Spare parts, repair, maintenance, customer training	No offerings	Service and support contracts (including spare parts, maintenance and repair) (few customers)	Extensive service and support contracts specifying an uptime guarantee (pilot customers)
ITT Water & Wastewater	Spare parts, repair (variable and fixed price), reconditioning, preventive and corrective maintenance, technical support, customer training	Performance upgrade, performance audit, systems engineering, technical support, supervision service	Basic preventive maintenance SLA, high-end preventive maintenance SLA, trouble-free operations SLA	Total offer SLA (sometimes including operation) (few customers)
Metso Minerals	Spare parts, repair, refurbishment and rebuilds, preventive and corrective maintenance, spot service, technical supervision, customer training	Retrofit upgrade, condition monitoring, technical consulting, performance audit, application and process optimisation	Maintenance agreement, spares and wear contract, technical support contract	Life-cycle services, reliability-centred maintenance, capacity-related agreement, gain-sharing
Saab Aerosystems	Spare parts, repair, reconditioning, safety inspection, preventive and corrective maintenance, technical support, extensive customer training	Performance upgrade, technical consulting, performance audit (safety critical), systems engineering, material support, extensive customer training	Spare parts and apparatus agreements	Aircraft availability (not yet sold)
Toyota Material Handling Group (TMHG)	Spare parts, repair, reconditioning, safety inspection, preventive and corrective maintenance, technical support, driver training	Performance upgrade, business consulting, performance audit, technical support, fleet management	Safety inspection SLA, preventive maintenance SLA	Full service SLA, short-term rental, long-term rental (four different plans)
Volvo Buses	Spare parts, repair, remanufacturing, safety inspection, preventive and corrective maintenance, fuel management (driver training), assistance	Operational services	Preventive maintenance contract, preventive maintenance and repairs (of the driveline or vehicle) contract	Vehicle and transportation management, extended coverage contract