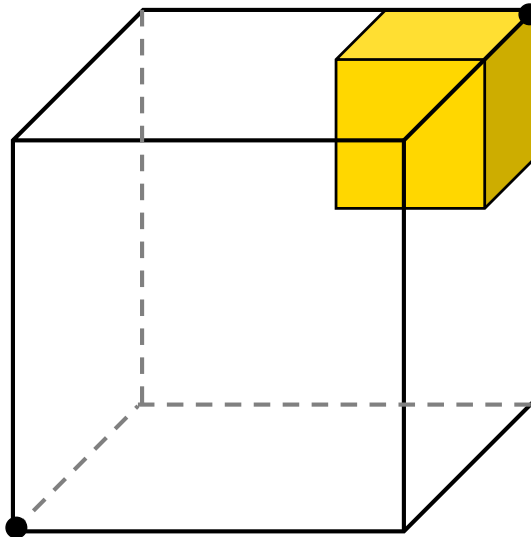


An IASS Subproject

Cost efficiency

How to improve the efficiency and the effectiveness of the service production process.



Industrializing After Sales Services, IASS, is a research and development project equally financed by participating companies and VINNOVA, performed by the Marketing Technology Centre, MTC, Linköping University School of Management, and the Swedish Industrial Design Foundation, SVID.

Participating companies are AGA/Linde Gas, BT Industries, TeliaSonera, ITT Flygt, Metso Minerals, Electrolux Laundry Systems, Volvo Bus Corporation, and Saab Technologies.

The aim of the project is to identify how to increase companies' ability to develop and produce after-sales services in an industrialized way.

This report summarizes the work within one of four IASS subprojects, with the intention of supporting companies' to improve the efficiency and the effectiveness of their service production. Examples from four companies are discussed and service productivity models and tools are introduced.

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1. New Challenges in Service Operations

- *Customer demand, competition from third-party service providers, technological possibilities, and the potential for increased sales and higher profitability drive many companies to develop more advanced service offerings.*
- *If well managed, after-sales services can enhance competitiveness, give higher margins, and improve customer retention.*

The increasing importance for manufacturing companies in the capital goods industries to engage in improving and developing their service operations is well documented. Despite the evidence of increasing interest among companies, it is not a new trend. Already in 1972, Levitt claimed that **“everybody is in service”** because all firms have a service component and he questioned why companies like General Motors and IBM were seen as manufacturing firms even though they were presumably more service-intense than manufacturing-intense. Since the physical good is only one part of the product, there are rarely any sales without services. Thus, Levitt argued, services production should get the same attention as manufacturing. Further, he stated that the more technologically advanced the good is, the more dependent the sales are on services.

A company that was early to recognize the importance of offering services is General Electric. In a recent interview¹, Jack Welch, the former CEO, emphasized the importance for manufacturing companies' businesses to have well-managed services and to focus on long-term customer relationships instead of solely transactions. Rather than concentrating on selling existing products to more customers, GE focused on developing new services, thereby **increasing its offerings for its existing customers**. In 1980, 85% of the group's profits derived from manufacturing, twenty years later three-quarters come from services². This change in business focus from a product-centric to a customer- and service-oriented strategy has major implications for manufacturing companies.

Siemens views industrial services as the main competitive advantage against the threat of having to compete through commoditized products and services with a cost leadership strategy. Furthermore, as the global enterprise moves from viewing itself as a good manufacturer to ultimately viewing itself as a service provider it has to **balance the need for standardized/automated service offerings with the need for customized ones**³.

Another company acknowledging the importance of services is Caterpillar. Its three service divisions Financial Services, Logistics, and Remanufacturing are fast growing higher-margin businesses and seen as **the key to the company's strategic shift** and critical for counterbalancing the cyclical product market and probable stagnating demand⁴.

A major study from 2004 of international manufacturing companies in the power equipment, rail vehicles, machine tools, paper machines, and metallurgy equipment industries and some of their European service customers pointed at continuous growth and profit opportunities across all industries. “The estimated annual growth rate of services (2000-2005) ranges from 5-10% in the machine tool and metallurgy equipment industries to 15% in the rail vehicles industry. **Service margins** could be as high as **15-20%** (in the power equipment and the metallurgy equipment industries), exceeding the average margins in the product business by a factor of 4 to 5”⁵. Nevertheless, the report states that these margins too are exposed to increasing pressure from low-cost service providers.

In times where the after-sales services are playing an increasingly important role and when service activities more and more are linked to new product sales in form of integrated solutions, it is important that after-sales services are produced cost efficiently and that any investments in the service production process is effective. Cost efficiency is important, as there is an increased commodization

¹ Affärsvärlden, 2005-11-16, Interview: Jack Welch

² Economist, 1999-09-18, pp. 23-26, The house that Jack built

³ Berner, R. (2005) Service Innovation and Management, presentation at the 5th Annual EURAM Conference, Munich

⁴ Business Week – European Edition, 2005-12-05, CAT sinks its claws into services

⁵ Monitor Group (2004, p. 15) Industrial Services Strategies: The quest for faster growth and higher margins

and cost pressure on services and not only on manufactured goods. There is competition on services from third-party competitors and these competitors are not necessarily small, local, and low-cost firms offering rather simple services, but also international service companies offering increasingly advanced services to customers. Thus, there is often a high potential for improvements in terms of cost efficiency.

In industrial companies, the main focus and resource allocation has traditionally been on the manufacturing-related activities, whereas **after-sales services have been conducted in a fragmented way**. This means that each local company often designs and operates their after-sales activities without interference or coordination from central units.

In opposite to manufacturing, improving both productivity and customer perceived quality is difficult in services. If a company intends to achieve increased service productivity through decisions concerning internal efficiency (e.g. cost reductions), these measures risk deteriorating customer perceived quality and leading to a vicious cycle of dissatisfied customers and financial problems (Normann 2000). This is not to say that improved profit orientation is not needed; internal efficiency should on the contrary be given priority, but the **improvements have to be based on service characteristics**. This implies that the interrelationships between the internal and external effects are taken into account; i.e. some processes and tasks can be automated and standardized, but not all.

This report is organized around three themes answering the following questions.

1. What models and frameworks have we found to be useful for understanding and improving service productivity and in particular the cost efficiency of the service production process?
2. What operations are the four case companies doing in after-sales services and what have they learned?
3. What are the generic conclusions we would like to present to support managers and companies that aim to improve the efficiency and the effectiveness of their service production processes?

2. Efficient Service Management

- *There is a clear trend towards increased proactivity and bundled offerings.*
- *A reorientation to customer centricity is considered of strategic importance.*
- *Relationships with key customers serve as valuable input to company's service processes.*
- *The knowledge about the installed base is considered a major advantage over many competitors in the service market.*
- *Companies should not only make more clever offerings but also make customers more intelligent.*

The four manufacturing companies studied are operating within different industries but all face increased competition from third-party companies for serving their customers' installed base. A major potential for industrial services has been identified and there is an increased focus on the installed base and on the connection between the product sale and the service market.

There is a clear trend towards increased proactivity and bundled offerings in the companies studied (see Figure 1). Developing the service offering could be a proactive maneuver or a reactive response in line with the companies' strategic reorientation from a product-centric manufacturing company to becoming more market-oriented and customer-centric. Neither of the companies would deliberately reduce their role to the role of a subcontractor and competitive service offerings with high value are therefore considered strategically critical in order not to erode profitability and a condition if expanding the business downstream.

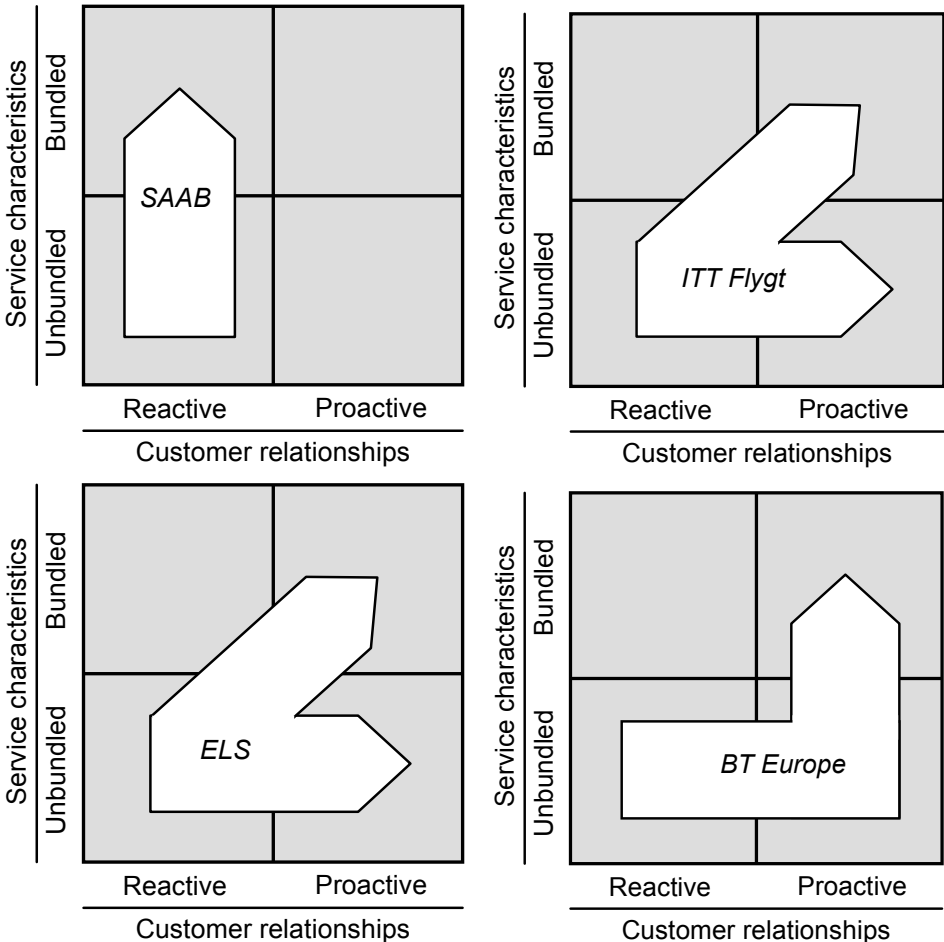


Figure 1. Development of service offering strategies: expanding the Service Strategy Scope (a more detailed explanation of the model can be found in Chapter 3).

If companies' services are in the reactive-unbundled quadrant in Figure 1, many services are seen as add-ons and something given away in order to land product sales. If the company has a relatively powerful position towards its customers, a more proactive approach is possible regarding unbundled services. All companies except Saab Aerosystems are in this position and BT Europe – who has developed offering in this direction over a long period – uses this position as a platform when developing bundled offerings. ELS and ITT Flygt do not have the same proactivity as BT Europe, but they too are increasing their focus on **proactively developing bundled offerings**. Hence, the service strategy scope in Figure 1 should not be seen as a move from one fixed position to another, but rather as an expansion of the current offering and strategy. In addition, different parts of the service strategy scope can be adequate for different customer needs/segments.

Operating in the proactive-bundled quadrant in Figure 1 implies that both the provider and its customer have powerful positions and this combination can be used to design offerings beneficial for both parties. It also means that several customers have similar needs so that the existing service portfolio can be used without too much customization. An example is when several of BT Europe's customers on different geographical markets have the same long-term rental contracts with the exception that truck wheels are excluded from some customer's contracts.

For Saab Aerosystems the situation is rather different; the company is reactively moving towards bundled offerings and it has no powerful position relative its customers. Saab Aerosystems will however have to take into consideration very different customer needs and must therefore develop a capability to offer bundled offerings and to customize these in a way that knowledge and routines effectively can be recycled for future businesses. Whereas the possibility to pool spare parts between the Swedish and the South African customer is discussed, operational conditions and terms of payment will have to be adapted to each customer's prerequisites and strategic needs. Because **it is very seldom profitable to offer unique solutions not possible to replicate**, an efficient and effective service development and production process will be especially important for Saab Aerosystems.

Customer Knowledge and Relationships as Sources of Competitive Advantage

The existing service offering – both standard and optional services – is being examined and evaluated, aiming at improving service quality, efficiency, and delivery time. Examining existing services and possibly creating additional services is an important first step toward a more advanced service offering. Hence, **the company needs to identify which services to offer, and developed relationships with customers serve as valuable input** to the service development process. For example, after a thorough internal investigation has been made BT Europe engages customers suitable for the services intended. Discussions are held both about how the service is experienced and about possible future willingness to pay.

Further, knowledge about different actors' involvement and importance in different phases of the installed base lifecycle is vital (see Table 1). Depending on lifecycle phase, **relationships other than with the customers can be of paramount importance**. The three parties involved in the ITT Flygt case all have different interests and in the case of Saab Aerosystems, the interfaces between the company, FMV (the Swedish government agency for defense material administration and procurement), and the Swedish Air Force are sometimes still blurred.

Table.1. Primary actors during the lifecycle phases of the installed base.

	BT Europe	Electrolux Laundry Systems	ITT Flygt	Saab Aerosystems
Pre-contract phase	Customer (end-user)	Customer (end-user)	Consultant	FMV
Contract and delivery phase	Customer (end-user)	Customer (end-user)	Contractor	FMV
Operational phase	Customer (end-user)	Customer (end-user)	Customer (end-user)	FMV, Swedish Air Force (end-user)

By analogy with many product portfolios, discussions at some companies are about segmenting customers according to industry. Applying this on ITT Flygt would mean that today's rather similar bundled offerings would be developed with reference to the three customer segments; public utility, mining, and industry. However, this type of segmentation is not in line with the customer focus implied by services marketing and it is further argued that **customers should be segmented according to their similar service needs** instead. Although many companies in one industry segment will have comparable requirements, there will be customers for whom the offering will be either too extensive or too narrow. In the ITT Flygt case, a minor municipality can have a need more similar to the need of a mid-size industry customer than to the need of a complete metropolitan area.

Even if customers are segmented according to their similar service needs, it might not be enough; customers will always have some requirements not shared by the others in the segment because the providers' offerings tend to aim at fulfilling the average problem of the customer segment. Furthermore, there are customers not demanding an extensive offering and therefore preferring lower prices to an augmentation of services. The number of standard services offered to each segment should for that reason be the lowest necessary (Anderson and Narus 1995). The **flexibility aspect** and **customer focus** must therefore be one aspect kept in mind when further developing the offerings. Although not being as flexible as the service offering suggested by Anderson and Narus (1995), BT Europe offers several different long-term rental plans enabling further customization. This is in contrast to e.g. Saab Aerosystems that still has no extensive service offering. Thus, the number and content of Service Level Agreements (SLAs) and solutions vary a lot between the four case companies (see Table 2).

Table 2. Service level agreements and solutions offered.

	BT Europe	Electrolux Laundry Systems	ITT Flygt	Saab Aerosystems
Variable (or variable and fixed) price contracts	Safety inspection	Country and business specific	Bronze contract: Basic preventive maintenance	Spare parts and apparatus
	Preventive maintenance		Silver contract: High-end preventive maintenance	
	Full service		Gold contract: Trouble-free operations	
Fixed price contracts	Short-term rental	Capacity / availability	Platinum contract: Total offer	Aircraft availability (not yet offered)
	Long-term rental (four different plans)	Rental (current pilot)		

Timing and rhythm are important aspects to take into consideration when making the service maneuver. **Correct timing can prevent a possible mismatch between the provider and customer** with regard to the offering; and the provider's ability to deliver the offering, the solution's technical maturity, and the customer's interest should have the same rhythm. Increasing the service content in the offering can mean competition from other service companies about the customer relationships and there is a risk that mismatch in timing will lead to competition with parts of the customer's business.

Having developed relationships and being proactive means that the provider is able to better synchronize timing and rhythm with the customer. Saab Aerosystems has traditionally had very close connections with FMV but the business has been regulated and there have not been any incentives for Saab Aerosystems to develop a proactive relationship. Even today, there is little advantage in being proactive towards the customer as the service market development is dependent on FMV's outsourcing of service activities. Although the situation might change with new products and new customers, Saab Aerosystems is very dependent on political decisions and other factors that are difficult for a provider to influence.

While Saab Aerosystems act reactively towards new services and contracts, ITT Flygt often runs the development of new service contracts. There is an ambition among many customers to focus more on lifecycle costs, but in reality many of them hesitate about signing more advanced contracts and especially publicly owned customers can be constrained by political aspects. Compared with these two companies, BT Europe's and ELS' customers have been more interested in new contract forms; thus

proactive behavior and the correct timing and rhythm have previously been more important for these companies.

Organizational Challenges When Bundling Offerings

Consideration has to be taken to the services not possible to price but necessary in order to exist and for selling products. Although it creates much value for the customer, services such as putting up gauge and analyze existing water flow through a pump station in order to optimize effectiveness are difficult for ITT Flygt to charge for. Customers are expecting these services for free and if the provider is about to charge for them, customers are likely to turn to competitors instead. If these services – often advanced and based on long-term knowledge and experience – are bundled with other services in an offering it can be very difficult to justify a premium price if the offering has free of charge services included. **What to offer and what role to play will partly depend on the trade-off between increased costs and the revenues gained from the added sales.**

The number of bundled offerings differs a lot between the case companies, something that is seen when comparing the companies’ market share of bundled offerings (see Table 3). Even if an offering is bundled, powerful customers are likely to demand the provider to give an account of the cost of each service component. This is on the contrary to the case companies, which want to bundle offerings externally while being able to unbundled them internally and map the costs of every component.

Table 3. The share of bundled and unbundled offerings (roughly estimated figures for 2005).

	BT Europe	Electrolux Laundry Systems	ITT Flygt	Saab Aerosystems
Unbundled offerings	< 50%	90%	95%	100%
Bundled offerings	> 50%	10%	5%	0%

Conversely, services have often been regarded as add-ons that can be given away in order to land a product deal even though it can reduce the profitability significantly. This mentality is still prevailing among personnel in many sales organizations of the companies studied; often linked to various incentives and reward systems. **There is a danger that customers take free services for granted**, thus reducing profitability. The companies’ are therefore facing an educational task to change this view among their personnel, which is in line with the internal transformation away from product centrality. During this transition towards increased customer and service focus, **there is internal resistance in all companies** based on the engineering tradition and pride in the products manufactured. Active top management support is therefore needed and the need for this strategic reorientation has also been expressed by managers within the organizations. In connection with this, performance indicators should be developed to assess the effectiveness and efficiency of the services.

Changing the performance indicators that the reward systems are based on are important control measures for altering behavior particularly negative when services are becoming increasingly important. ELS deliberately uses different performance indicators for different units as a control measure to guide them from different starting points towards the same direction.

There are examples of measuring after-sales services in detail is not being done enough; when examining the service organizations’ costs in detail, BT Europe was able to identify unprofitable activities previously hidden and improve them, thereby increasing the overall profitability. Being able to **asses the service costs** is of strategic importance when developing the service offering; if unbundled services are unprofitable, it will be problematic to develop profitable bundled offerings. One of the case companies makes losses on service hours in some countries, making it a constraint for further expanding offerings where service hours is a major component. Until the unbundled offering is profitable, no bundled offerings based on it will be profitable either. Hence, profitability per form of SLA is needed, and knowing the profitability per customer is vital if the company wants to act proactively.

Separate service market organizations have been built up centrally at both BT Europe and ITT Flygt, resulting in increased service market focus in the sales companies. **A separate organization to manage the service offerings is considered a critical success factor** for manufacturing companies delivering systems or solutions and ELS and Saab Aerosystems also have independent organizational

units working with the service market. Although service market organizations are established, roles and responsibilities are not clear at all companies and this was expressed by one manager as “it is like we are creating an organization without knowing what we are creating it for”.

Whereas Saab Aerosystems differs from the other companies by having a centralized structure and going from having one Gripen customer to several, the other three companies are multinational. A challenge for these companies is the requisition to form a global service infrastructure that can act in response to local needs. In order to gain economies of scale, **an effective service offering design through bundling requires standardized service components that are similar across markets.** Customer relationship management (CRM) systems can be managed centrally and information and communication technology (ICT) enables e.g. remote monitoring and optimization of equipment, further centralizing the traditionally relatively independent sales companies. Local needs and differences between different markets will however remain irrespective of this and it is therefore important not to centralize at the expense of service quality. Especially for ITT Flygt, third-party service providers have a powerful local connection making a local presence necessary. The main obstacle to increased centralization has however been disagreements and different interfaces between the companies and their sales companies.

Moving towards a solutions offering changes the pricing from variable to fixed price. Thus, the service organization becomes a fixed cost and maximizing capacity utilization becomes the most important revenue source. Saab Aerosystems' customers are believed to demand offerings with payment coupled to aircraft availability before long and the company is therefore reactively developing fixed price offerings. The other companies all have fixed price contracts and BT Europe in particular; continuously increasing the number of rental contracts. ELS has launched a rental pilot where customers pay per washing and ITT Flygt offer SLAs with fixed price per product and time period as well as contracts combining fixed and variable price. The more advanced the contract, the more risk is assumed by the provider and although the customer owns the equipment, e.g. vandalism is covered by ITT Flygt in fixed price contracts. For BT Europe, long-term relationships are almost prerequisites for rental contracts and focus on longer relationships and increased risks are changes linked to the transition from product focus to focus on the customer's value-creating processes.

All of the companies except Saab Aerosystems offer what can be considered as solutions today and for these contracts the products are no longer in focus. In its most radical form, solutions providers – being on the customer's side in the exchange – will use products from other manufacturers instead of the provider's own products if it makes more sense to the customer and the solution is better. However, this form of solutions offering is the most far-reaching form of customer centricity and it is neither necessary nor desirable for all providers. The companies investigated all have powerful engineering and product development traditions and such a move is considered out of the question for all. ELS is not even serving competitors' equipment, something both BT Europe and ITT Flygt are doing as they consider it important at their markets. The aim is however to eventually replace it with own equipment.

Developing and manufacturing the products that are being served and thereby **having knowledge about the installed base is a major advantage over many competitors in the service market** that the companies increasingly are trying to utilize. This can be seen as particularly challenging at ITT Flygt and Saab Aerosystems where the customers very often own their products and the products in use can have been developed several years before any fixed price contract is signed. On the other hand, when BT Europe and ELS are offering solutions they take ownership of the equipment as well which enables them to develop rental contracts. In spite of this, **there is only minor input from the companies' service organizations into the product development processes** and this can be an obstacle if planning to take a more comprehensive approach. One can therefore assume that the internal innovation processes have a major potential of improvement if different parts of the organization would cooperate better.

ICT-based Improvements in Service Productivity

In all the case companies studied, there is a trend towards more SLAs and fixed price contracts. In line with the increasing industrialization of services, this tendency require companies to standardize their input to the service process to a much higher extent than before, and ICT (Information and Communication Technology) applications can be a means to standardize operant resources and processes. Not only do the case companies have more SLAs than before, the numbers of international

contracts are also increasing; thereby further emphasizing standardization in quality. In spite of international contracts and increasingly global/central ICT-based systems, a strong local customer service management will always be needed.

Beside cost reduction through increased efficiency and effectiveness, ICT has enabled the companies to enhance existing services and create new ones that increase customer value and sometimes are unique for the company. Although ICT applications can enable companies to standardize and bundle their services (and in that way making it possible to have a mixed bundling strategy), variety is not an end in itself. **Variety is not necessarily customization, it can become very costly, and that it might confuse customers.** While the variety of offerings will probably go down as the companies (except Saab Aerosystems) are centralizing more service activities than before, all companies strive to increase their SLAs and other bundled offerings. One must therefore have in mind not to increase the number of offerings only because it is technically possible of doing so.

E-learning: An Example from Electrolux

In connection with the laundry systems becoming increasingly complex, ELS has recognized a need of knowing not only what product knowledge the service partner has, but also the knowledge profile of each individual technician. A wrong measure by a non-trained service technician in one country might not affect that specific business deal, but can lead to ELS missing business opportunities in other countries and possibly not becoming a proffered supplier to the customer. Therefore, **an online certification program has been launched to assure homogenous quality of industrial services** and that external service personnel too have the skills needed. It was developed by a local IT company and the investment costs were for that reason considered as moderate. The payoff time can consequently be considered almost non-existing, but there is however a minor running cost of managing the certification system and productivity losses in terms of technicians having to take the time doing the e-learning tests.

The e-learning certification program is free-of-charge and the aim is to comprise 1,000 service providers. It is also a way for ELS to better find out who the service partners actually are. Husqvarna, an Electrolux business unit that offers outdoor power products, has implemented a similar certification program successfully. So far, it is too early to evaluate the success at ELS, but the reception among service partners has been positive.

None of ELS' competitors have a similar certification system, which is one of the reasons why ELS developed the system. The system cannot only ensure that the service partner has the right competence, but also that the customer/user has the knowledge needed. Further, online information, technical bulletins, and the spare parts catalogue can be linked to it, and it can serve as a training package no matter if it is e-learning or not. It can be used on the customers' operational personnel in the laundries so that they not only receive information verbally but also through the system, so that ELS can make sure that they know how to handle the equipment correctly. The customers pay for the training that is either bought separately or bundled in a service package.

ELS' online certification program is an example of how ICT can be used to achieve a guaranteed minimum level of expertise of individual service technicians worldwide as more or less all service partners nowadays have Internet access. This can be beneficial for ELS as they are planning to take over external service partners but the certification initiative is mainly a way to try to ensure that the outcome will be of a certain homogeneous quality. Hence, a certification program for service personnel can primarily be seen as a means to improve external efficiency through increased customer perceived quality. Mapping the knowledge and skills the personnel possess can however also generate reduced costs and better capacity utilization, but these effects can be considered secondary.

Other Examples

Another initiative made by ELS is the creation of an installed base database, which can provide the company with information about machinery type, application, installation date, customer site, actions taken, etc. Better utilisation of the installed base database has also been proposed internally at Flygt but so far met resistance. Improved mapping of the installed base gives the companies better customer insight and better estimation of market potential, although the prerequisites for different industries can vary a lot. While ELS' and ITT Flygt's products rather seldom are relocated and sold

further, BT Europe's products often change user and the many small business having one or a few BT-made warehouse trucks are almost impossible to map.

Besides internal resistance, ITT Flygt is facing a problem with mapping as half of the sales go via a third party (contractor) before reaching the customer and therefore are more difficult to trace. **Installed base knowledge** is captured from interactions with the customer and **can be used to improve customer perceived quality by providing services that are more accurate**. It can help reducing the number of unnecessary travels by service personnel to a customer site that can occur due to wrong equipment or personnel being sent because of incorrect information about the customer's machinery. As a result, not only external efficiency but also better cost efficiency and capacity utilization can be obtained.

The growing number of SLAs makes advance planning possible and profitability can thereby be achieved through better capacity utilization. As in the case of ITT Flygt, SLAs enable companies to plan repairs and improve the workshop occupation ratio. **A more flexible service organization means that capacity can be better balanced in accordance with customer demand**, making e.g. SLAs and installed base information particularly useful as the flexibility can enable larger productivity gains. A possible attempt is made by ITT Flygt to reduce the stationary parts and instead introduce a number of mobile service units/workshops at one of their European markets. These mobile workshops can handle 80% of all product repairs and these can be made at the customer's site, thereby reducing lead times and fixed costs. Combined with an increased amount of SLAs, route-planning programs can enhance these workshops' capacity utilization even further.

As e.g. BT Europe offers emergency breakdown response, there has to be readiness round the clock. By utilizing the personnel and equipment better, capacity efficiency can increase and total costs are believed to decrease. Further, a flexible service organization has the potential to reduce response and repair time and thus improve revenues and external efficiency. Many competitors are small, local companies and a faster response time could possibly reduce one of their competitive advantages.

When it comes to cost reduction, internal efficiency should be prioritized and back-office activities in particular as they are invisible to customers. Many administrative activities are non-value-added and should therefore be eliminated. EASY, the PDA solution implemented at BT Europe is an example of such a measure that resulted in reduced invoicing time and improved internal efficiency through reduced administrative costs. While cost efficiency was the primary objective, a number of other synergies also occurred. EASY has been marketed as a time efficient tool and it has made customers view BT Europe as high-tech also in services. Customers have also valued to receive the work reports electronically; it is something none of BT Europe's competitors is able to offer currently. By receiving future work orders in advance, the service technicians can be better utilized than before.

Similar to EASY, ELS' online system for laundry equipment (CMIS) makes the service organization more technically advanced in the eyes of the customer and substitutes personnel for dematerialized information. However, the internal cost reduction is mainly related to front-end personnel. Furthermore, it is more linked to revenue generation and customer perceived quality than EASY is, due to its impact in the service process output. In addition, it is present also when the customer is producing the service in isolation from the service provider.

Similarities and Differences between Solutions

When improving service productivity, one of three profitability-generating strategies (cost efficiency, revenue efficiency, and capacity utilization) – or a combination of them – can be used if the service productivity model is applied (see Chapter 3). The interrelations between the three elements imply that although a new technical solution can change one of the elements the most, the other two are also affected by the change. Although ICT applications mainly improve internal efficiency, the elements improved vary depending on how ICT is made use of. Even though parts of the service process can be handled as dematerialized information, it is not a completely new way of making business; service marketing logic is still valid. An example of that ICT can have different impact on service productivity is the case companies' solutions that were analyzed (see Table 4).

Table 4. Impact on service productivity elements by ICT-based solutions.

	Cost efficiency	Revenue efficiency	Capacity utilisation
PDA invoicing solution	Primary	Secondary	Secondary
Remote monitoring and optimisation	Primary	Secondary	Secondary
Installed base database	Secondary	Primary	Secondary
Certification programme	Secondary	Primary	
Mobile workshops	Primary	Secondary	Primary

With more data available, it would be possible to describe the service productivity changes affecting profitability in monetary terms. A thorough description of the service productivity elements and a connection to capital investment appraisal is found in Chapter 3. Long-term relationships are valued by the case companies and their opinion is in line with the services marketing view that relationship continuity contributes positively to all three service-productivity elements.

3. Service Productivity

- *A service productivity framework is presented and applied when discussing cost efficiency, service production, and customer interfaces.*
- *Cost efficiency, revenue efficiency, and capacity utilization are three profitability-generating strategies whose interrelations must be taken into consideration.*

In order to study how both increased cost efficiency and improved service quality can be achieved, a conceptual service productivity model proposed by Ojasalo (1999) is used. While productivity can be defined in terms of e.g. revenues per employee, Ojasalo (1999) believes that the best measure of service productivity is to define it as revenues from a given service divided by costs of providing it. Thus, service productivity can be formulated as:

$$\text{Service productivity} = \frac{\text{revenues from a given service}}{\text{costs of producing this service}}$$

One must however be aware that there are occasions when measuring profitability per service can be problematic and sometimes even misleading as a productivity measure. For companies in a monopoly and oligopoly position price is not always reflecting customer perceived quality and this is e.g. the situation for Saab Aerosystems. In addition, profitability does not explain changes in productivity or sudden bottlenecks, and it is very often difficult to accurately derive costs to activities. Further, business systems can be obstacles for gaining data on activity and customer level.

The service productivity model in Figure 2 consists of three elements of which internal efficiency are the service provider's and customer's inputs to the service process, and external efficiency is how the service quality is perceived by the customer. Vargo and Lusch (2004) argue that **companies can only make value propositions; it is the customer that must determine the value and create it in a co-creation process**. The offering (with either a product or a service core) is an input to this value-creating process, illustrated in Figure 2 as the service production process. Goods are seen as physical embodiments of the company's knowledge and as distribution mechanisms for service provision used in the customer's value-creating processes.

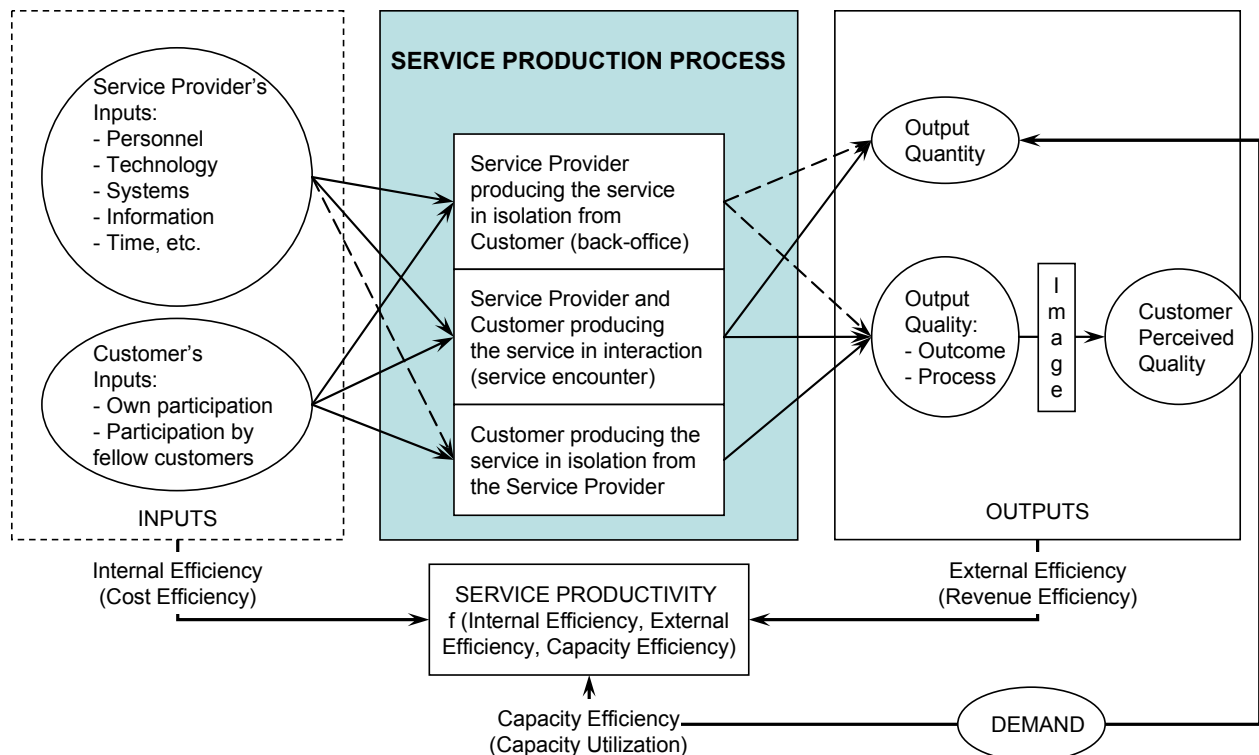


Figure 2. A service productivity framework (from Grönroos and Ojasalo 2004, p. 418).

Cost Efficiency

Cost efficiency is an internal efficiency in the sense that it derived from the company's internal processes, both front office and back office. **The customer (and possibly service partners) also contributes with inputs** to the service production process and this involvement creates customer interfaces and also input uncertainty. Therefore, it is important to consider this uncertainty. The remote monitoring service offered by ELS has led to a reduction in travels by service technicians, thereby reducing front-office costs and improving cost efficiency. Similarly, the PDA solution implemented at BT Europe e.g. reduced the cost for administrative personnel (back office).

Revenue Efficiency

Revenue is an external efficiency measurement linked to both the **output quantity** and the **output quality**. In the short-term, it is often associated with the number of activities performed but in the long run, customer perceived quality is not least important. Quality is affected both by the concrete output and by the service process as such; an unfriendly service technician may solve the customer's problem as good as a helpful one, but the customer would prefer the friendly one. Outputs are affected by both the provider's and the customer's competences and the customer's processes thereby have an influence on both output quantity and quality.

Although relying solely on customer satisfaction measurements when evaluating services can be misleading, customer perceived quality is a better measure of profit than the output-based measure of number of service activities per unit of time. An example of the latter would be to measure the productivity of a call-center solely by the number of calls received per hour, which would clearly increase if the call-center personnel would focus on reducing the phone call time instead of ensuring that the customer calling actually received the help he or she expected.

If a customer lacks knowledge about how to properly operate the equipment there is an evident risk that the performance will be reduced and the perceived quality likewise, regardless of how the provider acts in the service process. If the provider instead would train and instruct the customer about how to best utilize the products, both parties would presumably make a profit on it. Having a database with the company's installed base (i.e. the products sold and installed at customers' sites) is an example of a possibility to e.g. improve the revenue efficiency. This information gives the company better knowledge about its customers and facilitates the service personnel to know what equipment the customer has in advance.

In spite of being similarly produced, a transportation service could be perceived very different by two customers due to their gap between expected and perceived service quality, and the same logic applies to manufactured goods. The subject of heterogeneity is therefore not a matter of goods versus services but an issue of whether to take a producer or customer perspective. Thus, service providers have to recognize the heterogeneous standards of customers when creating their service offerings.

Hence, customer perceived quality is vital to take into consideration when discussing services and the quality aspect cannot be dealt with separated from productivity in the case of services. In opposite to traditional, closed manufacturing systems, the service process is largely an open production system where customers and possibly service partners also take part in the production and affect the production process as well as the outcome. Consequently, **there are other premises and conditions to service productivity than to the manufacturing of goods** and variations in service quality occur not only because of heterogeneity (internal factors) but also due to the influence of customer participation (external factors).

Capacity Efficiency (Utilization)

The third element is capacity efficiency (management of demand) which has to be taken into consideration as services are perishable; i.e. not possible to produce in advance and store. If demand exceeds what currently can be managed it will have a negative effect on customer perceived quality as demand will not be met or it will be produced insufficiently, decreasing external efficiency and thereby reducing service productivity. On the other hand, low demand means low capacity utilization and higher overhead costs. Thus, **both low demand and excess demand reduces productivity**.

How to handle the customers' demand is connected to what predictability of demand there is and how demand fluctuates. Depending on what flexibility is needed, service production can be provided by either the own organization or by a service partner. SLAs give a better planning horizon since one knows in advance when some preventive maintenance etc. is to be made. Utilization of capacity is especially critical for personnel-intensive services.

Customer Interfaces in Service Production

- *The service process is largely an open production system where customers also take part in the production and affect the production process as well as the outcome.*

Well-established relationships with customers are seen as important in order to defend the existing service business as well as to develop new services and thereby further developing the relationship. Hence, a relationship marketing approach was adopted when analyzing the cases, positing that the provider and the customer interact at least to some extent and that value is co-created in these interactions.

In a relationship approach, the customer is viewed as a resource with which the company can create a solution. Mutual dependencies and cooperation is a strategy improving both parties' results. Customers can play an important role in contributing to the innovative industrial process. **New services must be developed in close co-operation with key customers in order to reach a fit with the market.** Direct customer involvement in the company's service development is likely to increase revenues by a beforehand guaranteed sale and it is necessary for the company to have a strategic view on customer involvement. Although there could be situations where adopting transactional intent and creating transactional marketing strategy can be more profitable as not all customer segments are valuing relationships, relationships with key customers are of strategic importance and they can possibly be further developed through partnerships and joint ventures.

An example of a joint venture is AllWin Technical Services Inc., ABB's 50-50 full-service partnership with the Canadian pulp producer FCCL to service its three Canadian pulp mills. Worth US\$ 220 million, this five-year venture was the largest-ever full service agreement ABB has undertaken when signed in 2000. FCCL had already ABB as a supplier and had for many years focused on strict cost control, to the point where some critical plants were incapable of expanding capacity. The joint venture aim at upgrading the manufacturing processes and maintain them at peak performance levels. Under this agreement, ABB controls aspects of the process that are essential to the expected value creation, guarantees minimum cost-improvement gain, offer technical expertise, employee retraining, and best-practice benchmarking. In addition, both partners provide each other with fuller access to their respective intellectual assets. Accordingly, with a service-centered and customer-centric view the service offering can be developed by relationship-based interactions. As seen in the companies in this project, and also valid in the ABB case, advanced SLAs and fixed-price contracts are often the result of an incremental process in which the relationships develop over time in connection with the development of the service offering.

Another aspect affecting service productivity is the relationship continuity; long-term relationships with customers are considered important as the activities performed are continuously improving as the relationship becomes deeper. The "learning curve" often illustrates productivity improvements made by a company, and "learning the relationship" can likewise have a positive effect on service productivity (see Figure 3).

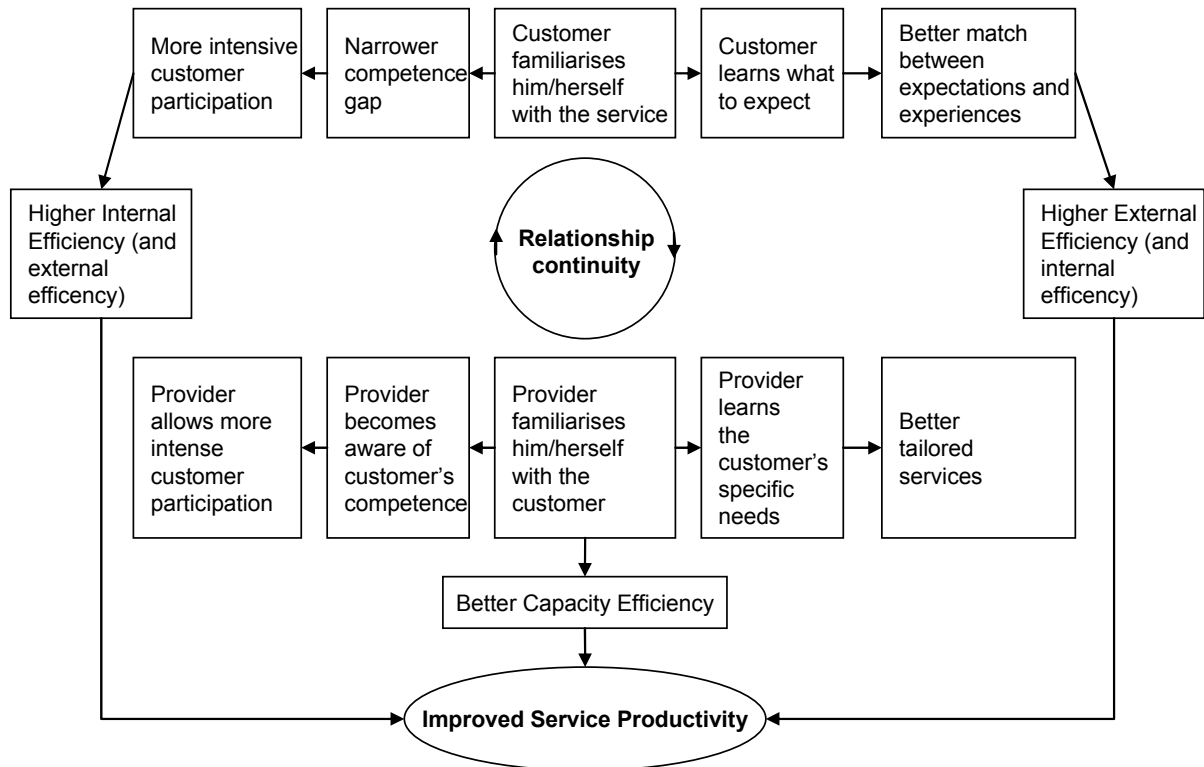


Figure 3. Effects of learning relationships on service productivity (Grönroos and Ojasalo 2004, p. 419).

Although inputs and outcomes have been discussed so far, the actual service production process needs to be further emphasized. It is important not only to **differentiate between differences in customer needs**, but also to **distinguish between active versus passive customer presence**; i.e. the customers' disposition to participate in the production process. How the production is divided internally between front office and back office is another important issue. BT Europe, ELS, and ITT Flygt have subsidiaries in most European countries (as well as other markets worldwide) and the division between front office and back office often corresponds to division between the local service organizations and the central one, especially since more and more back-office functions can be managed centrally.

Diversity of demand refers to the uniqueness of customers' demand. This includes both the uniqueness of the customers' products/processes to be serviced and the uniqueness of the desired outcome. High diversity refers to qualitative differences in demand whereas demand of the same service in different quantities is considered as low diversity of demand. Therefore, this dimension is related to the customization-standardization distinction often discussed, but a crucial difference is that this dimension represents external market conditions facing companies. Companies can subsequently respond to these conditions with more or less customized service design.

Customer willingness to participate is the extent the customer plays an active role in supplying inputs (e.g. personnel or information) to the service production process. In order to play an active role, customers have to prefer to produce the service themselves (possibly even without a price reduction) and/or they may feel that their active involvement is necessary to guarantee quality. The company can adapt to the customer characteristics both proactively through new service designs and reactively. Together, the two dimensions can illustrate a matrix with four different service modes (see Figure 4). The main locus of interdependencies in each quadrant is the most complex area of coordination in the respective service production process.

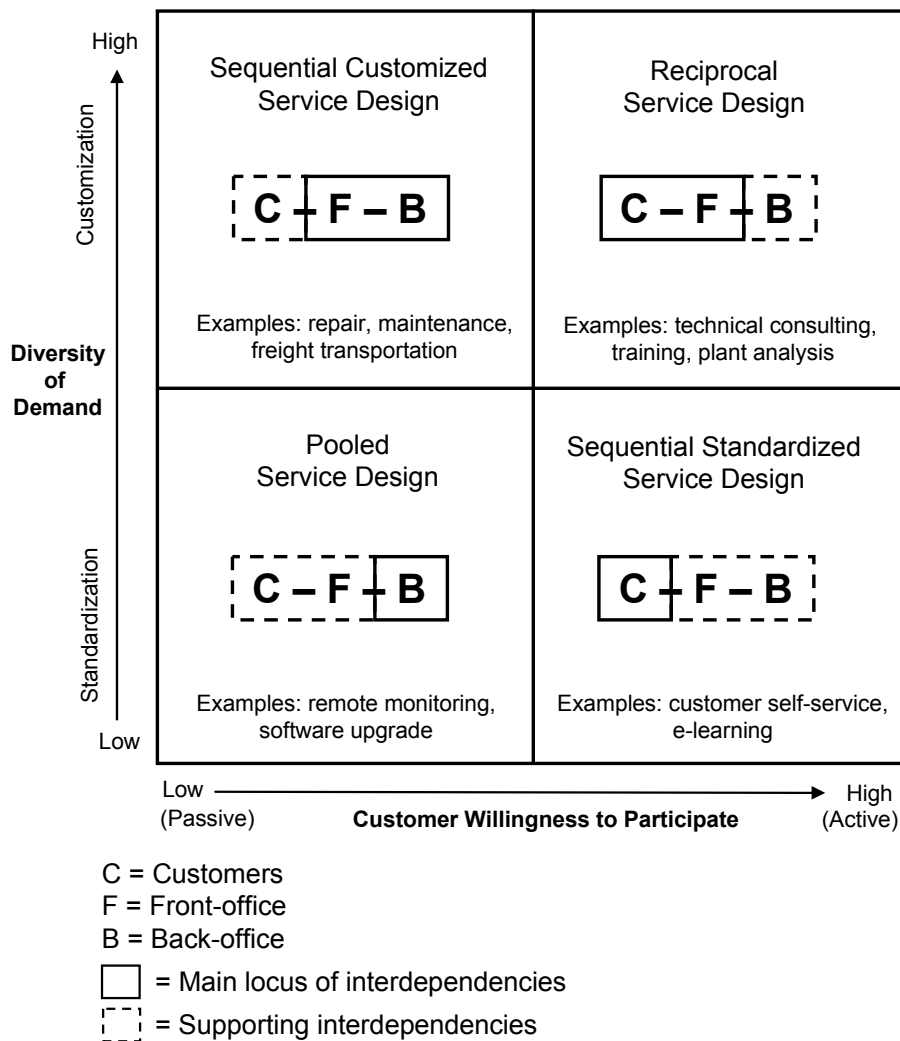


Figure 4. Service Production Process Interfaces. Larsson & Bowen (1989) p. 221

Pooled Service Design

These services can be relatively standardized and economies of scale utilized through services with quantitative rather than qualitative diversities in demand. This allows for allocating most of the production to **back-office operations** relatively **decoupled from most front-office activities** and **independent of the customer** (access to customer information and back office can however be required). Automatic software upgrades is an example of the type of service design. Another service is remote monitoring, which e.g. enables ELS to automatically supervise and connect information from customer processes. If an incident would occur, front-office personnel are contacted and another service takes by. Pooled service design is often highly automated and a technology investment can therefore be needed. These investments have traditionally been relatively extensive and the fixed costs associated have been considerable. Today however, new technology is not necessarily a major investment and an intelligent service design can enable pooled service design through ICT applications such as mobile broadband and RFID (Radio Frequency Identification) in spite of moderate investments.

Sequential Standardized Service Design

The customer, which is likely to be more price sensitive than other customers are, **takes an active part** in the value-creation process. Examples from the industry could be self-instruction activities (e.g. e-learning) or such banal things as customer reading off gages themselves. These standardized services enable **extensive decoupling between front and back office for service production**. What the company however has to do is to provide facility for these standardized service designs through a sufficient manual, customer training, webpage, etc.

Sequential Customized Service Design

Coupling between front 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, which is mainly an internal matter between front and back office. Many traditional after-sales services, such as installation, repair, and maintenance, can be mapped in this quadrant.

Reciprocal Service Design

The quadrant with active customers and a high diversity in demand represents complex and unique problems, implying that customers often are less sensitive to the price. Hence, **interactions between customer personnel and front office are required**. These services can be expertise services like lifecycle cost analysis, performance audit, technical consultation, and customer training. The main variable cost for these services is often the front-office personnel.

Implications

Although the service design model illustrates different constellations due to environmental factors linked to the customers, the company can actively influence the environmental variables. **It is possible to shape the customers' demand and perceived needs through a proactive service design process**. Managers have to ask themselves what role they want the customer to play in the process and what flexibility the system should have. The main questions are **what we have today** and **what do we want in the future** (i.e. **where do we want to play?**). A company with large back-office capacity can e.g. be able to handle major operations whereas it has limitations in offering reciprocal services with high demand on front-office competence. Another company may have very skilled front-office personnel and a very labor-intensive organization and thus have to take it as starting point when developing the service offering.

Many new services are developed either in close co-operation with key customers or due to customer demand. These services are therefore rather customized and the diversity of demand in Figure 4 is high. As time goes, the service production process not only becomes more fine-tuned, but it also becomes more standardized as the service is offered to more customers and routine and internal processes (e.g. back-office procedures) have to become more streamlined due to cost pressure and competitors offering similar services. The service production process interfaces corresponding to a certain customer need are thus dynamic and change over time as services become more commoditized and/or efficient.

Operationalizing the Productivity Concept

- *New or changed service processes and applications influence cost, revenue, and capacity aspects.*
- *Internal marketing of service projects is facilitated by investment analyses pointing at profitability.*

The service productivity framework presented in Figure 2 can be operationalized by illustrating the three service productivity elements as the three dimensions of a “service productivity cube” (see Figure 5). When using this model one must however remember that the three elements must not be seen as three independent dimensions, but as three aspects that, in spite of their difference, are highly interrelated. Thus, **a change in one dimension also affects the other two.**

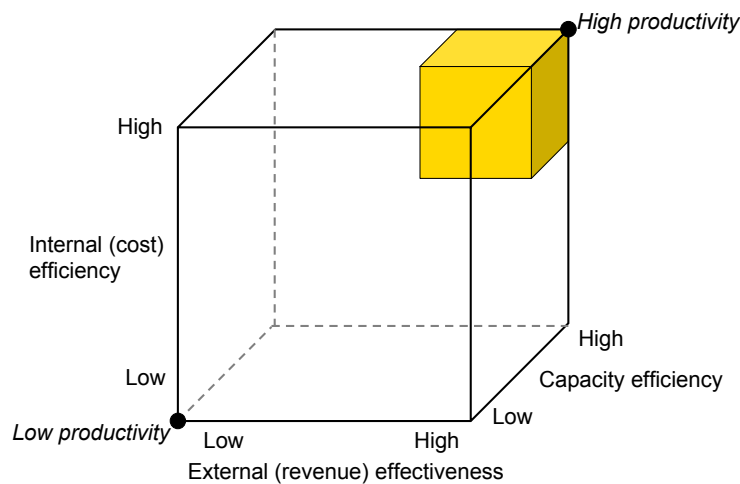


Figure 5. The Service Productivity Cube (from Ojasalo 1999, p. 161).

A purpose with this model could be to use it in connection to internal discussions regarding the introduction of a new or improved service, possibly through the implementation of new ICT applications. Since these changes often are associated with an investment of some kind, the payoff time will affect the cost efficiency negatively in the short-term. In the longer term however, a new/improved service can imply either reduced or increased fixed costs. Cost efficiency is influenced directly by both fixed and variable costs of production inputs, but also important is the indirect cause from external effectiveness and capacity utilization. The new/improved service will have an effect on all three dimensions and **this model can help highlighting the productivity changes** and the interplay between the three elements.

Capacity utilization is a main driver of profitability and the shift in focus from producer to customer perspective is a shift from the means to the utilization. It is not always possible to be in the orange box in the top of Figure 5; the optimum combination of elements depends on the specific company's revenue generating abilities and cost efficiency. Although this productivity model includes the customer and signals the heterogeneity and intangibility aspects of services, it has limitations as it does not have the ability to show bottlenecks or to explain reasons for changes in productivity. Further, revenues not always reflect perceived quality and it can be problematic to correctly assign costs to respective revenues.

Another problem many times is to communicate internally the believed benefits of an investment aiming at increased productivity. Suggestions may be questioned when service managers try to allocate money for a new project, especially if it involves new service processes and/or considerable investments in technology. Therefore, **there is a need to quantify the value of the service offering.** This can be made by e.g. calculating the cash inflow and outflow of the new service offering for a relevant number of time periods. The time span can be divided into years, quarters, months, or whatever is most relevant. Methodical cash flow estimations can be used to determine potential profits through:

- 1) Cash flow analysis / Payoff method, or
- 2) Net Present Value (NPV) method.

A Capital Investment Example

A hypothetical example is a more efficient and effective service production through the usage of handheld computers (PDAs) by service technicians. This is associated with an initial, non-recurrent investment as well as reduced operations costs and improved utilization of service technicians. Estimations of cash flow effects on e.g. front- and back-office activities can be derived for each year (see Table 5). Revenue benefits are improved cash inflows whereas cost benefits are reduction of outflows and investments are new outflows. Even if the investment in this example is non-recurrent, there are continuous investments needed in e.g. maintaining and managing the system, training, new PDAs, etc. In addition, all revenue and cost benefits are not necessarily achieved until the PDA system has been up and running for a couple of years when everyone is familiar with it and possible teething problems have been taken care of. By using the company's interest rate, is thereafter also possible to calculate the investment's NPV⁶.

Table 5. Calculation of cash flow for a PDA solution for service technicians (figures in mSEK)⁷.

Service Production Components		Year				
		1	2	3	4	5
Front-office	Revenue benefit	20	20	20	20	20
	Cost benefit	5	5	10	10	10
	Investment	-60	-10	-10	-5	-5
Back-office	Revenue benefit	10	30	30	30	30
	Cost benefit	40	40	40	40	40
	Investment	-140	-40	-5	-5	-5
Monthly customer-specified invoices	Revenue benefit	0	0	0	0	0
	Cost benefit	5	5	5	5	5
	Investment	0	0	0	0	0
Total offering cash flow		-120	50	90	95	95

⁶ In this example, cash flows are regarded as time-discrete events, which are discontinued to an NPV in accordance with:

$$NPV = \sum_{i=0}^N a_i (1+r)^{-i}$$

where a_i is the discrete cash flow a at time i , being discontinued with the company's given interest rate r . On the other hand, if cash flows are regarded as continuous streams, NPV is calculated in accordance with:

$$NPV = \int_0^T a(\tau) e^{-\rho\tau} d\tau$$

where $a(\tau)$ is the continuous cash flow stream at time τ discounted with the continuous interest rate $\rho = \ln(1+r)$.

⁷ Based on an example from Grönroos (2000, p. 145) Service management and marketing: a customer relationship management approach, 2nd edition, John Wiley & Sons Ltd.

- Revenue benefits from front-office processes are likely to occur due to better capacity utilization of personnel and better service quality, resulting in more orders. Cost benefits are attributed to less paperwork and errors made whereas investments mainly are the PDAs, but also training and running data cost (the estimation is based on the assumption that mobile data cost will decrease over time). The initial investment is derived from the investment in and implementation of the PDA system and the required training for service technicians (which is both a direct cost and a loss in terms of working-hours).
- Back-office benefits include faster order lead times (revenue benefit), increased capacity (revenue benefit), and reduced administrative personnel (cost benefit), while investments are needed especially in computer hardware and software.
- Monthly customer-specified invoices in Table 5 refer to a possible automated invoicing system connected to the digitally sent information from the PDAs in field to the back-office system. Even if it can be considered a back-office-related cost benefit, it is highlighted separately in the example because it was considered easy to specify individually (only cost benefit is affected). Nevertheless, all service production components that can be approximate relatively well should be likewise specified in order to increase the credibility and communicate a more convincing project plan.

A similar method can be used when calculating total customer benefits of a service offering. The payoff time and/or NPV can then be used in marketing communication and sales negotiations with customers.

Information and Communication Technology and Service Productivity

- *ICT applications can not only enable cost efficiency, but also more effective service processes and new offerings.*

Utilization of ICT has enabled manufacturing companies to increase output and at the same time reduce manufacturing costs. In spite of the interrelationship between customer and provider, ICT applications can make it possible for these companies to both enhance service productivity and reduce costs for providing services. Companies can use ICT to capitalize the flexibility of service provision but it can likewise be used to improve the internal efficiency through standardizing (and possibly automating or eliminating) processes. A holistic view has to be adopted when implementing ICT and ICT applications must enhance – and not disturb – the social processes that are associated with service production.

Customer perceived quality is improved through better quality control and higher quality possible by means of dematerialized information through ICT applications. In addition, customer perceived quality and productivity can be fully compatible if there are customers willing to trade price for some level of standardization and if cost-saving ICT applications can provide services within a “good enough” level of customization. Hence, companies will have to balance customization with standardization when discussing quality and furthermore balance quality with service productivity aspects. **There is a danger when saving costs that it will affect the service quality** and thereby in the long run lead to fewer customers and lost revenues instead of savings (poorly designed CRM systems are clear examples of this), although there are situations where a significant cost reduction is appraised to outweigh a minor reduction in quality. There are however measures that both can improve cost efficiency and increase the quality as perceived by the customer.

Thus, ICT applications can enable cost efficiency but also new service offerings. Technologies like GPRS and UMTS (3G) for mobile services and RFID tags (Radio Frequency Identification) for logistics services are not services in themselves but means for companies to render possible services; **although technology continuously develops, the business logic is nevertheless the same.** ICT applications can and should be used to support manufacturing companies’ strategic reorientation towards service offering and one part of this is dematerialization; e.g., software upgrades instead of replacements of physical components. In order to succeed, clear service development and production processes are needed, which not only includes better information exchange internally between departments/functions but also better exchange with customers.

A Framework for Service Orientation

To understand the conditions under which an industrial company provides services it is valuable to understand both to what extent the company is active regarding its customers in general and to what extent the company offers stand alone services or services in “bundles”, i.e. sold in combinations.

The relational content connected to the specific service can be arrayed along a relationship dimension. However, relationships can be developed and long-term even if the service itself is transaction-based. Social bonds developed during the relationships are due to e.g. customer lock-in through switching costs desirable for the provider but not necessary for industrial services like equipment transport to customer or installation services as such. Hence, the relational dimension can be seen as a reactive proactive continuum where **a proactive stance requires relationships but developed relationships do not necessarily imply a proactive position** and reciprocal interdependencies (see Figure 6). In addition, a company does not have to act reactively or proactively; it can also opt to be inactive, which would be a position further left on the scale than reactive-defensive. Being inactive, e.g. not respond to changing market conditions or internal capabilities, should however never be the normative goal for any company and such a behavior is therefore not discussed in the model.

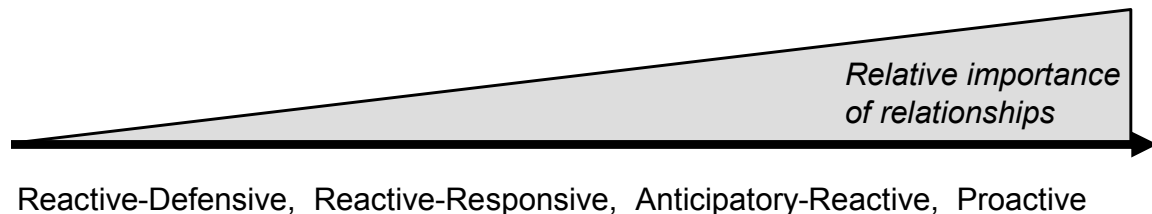


Figure 6. The reactive proactive continuum.

An example of the importance of relationships and knowing customer needs when being proactive is when Alstom developed fixed-price solutions where the customers' gas turbines were operated and maintained by Alstom personnel; a service not demanded by the customers⁸. A proactive stance corresponds to the ability to conceive and reconfigure the value-creating system illustrated by Normann (2001); leading companies described as prime movers set the rules for other companies by organizing value creation beyond their own boundaries and thereby not only creating new products and services, but designing a new business environment. Thus, markets are not static as in e.g. Porter's Five Forces model and **value is not only created when the offering is made cleverer, but also when customers are made more intelligent** through the companies' continuous reconsideration and redesign of competencies and relationships.

By bundling several services, differentiation can be achieved through modularization and these “**flexible service offerings**” will give companies greater latitude in pricing, increase value in use in proportion to costs, and supply companies with powerful resources for developing business with important customers (Anderson and Narus 1995). Integration can be seen as the interrelation between different service components being bundled together within a single offer to create value beyond the sum of the parts. In order to achieve technical integration, physical interoperability of components is needed (making an offering in analogy with systems selling philosophy). Beyond the reactive proactive continuum, a second dimension categorizing services in bundled or unbundled offerings can thereby illustrate the contents and integrative aspects of the offering (see Figure 7). Together, the two axes can serve as a point of departure when arraying industrial service strategies.

⁸ Serbin Wikner, S. and Andersson, P. (2004) Creating Business offerings - The Case of Integrated Solutions in Manufacturing Firms, 20th Annual Conference of the Industrial Marketing and Purchasing (IMP) Group, Copenhagen

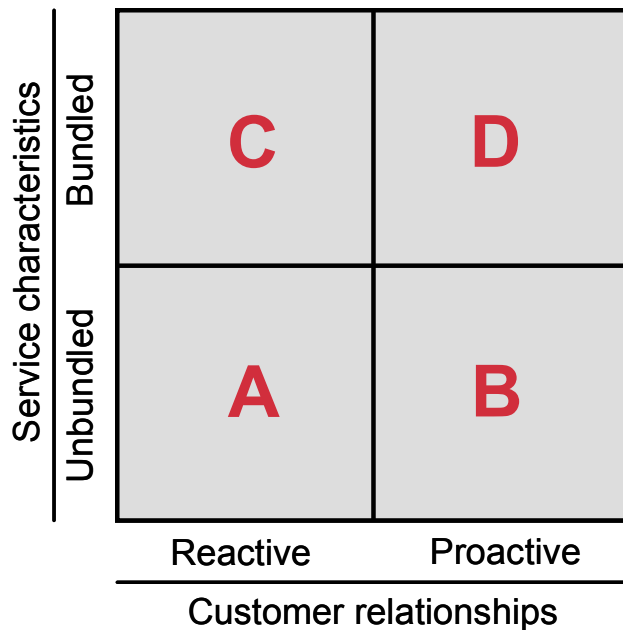


Figure 7. A framework for classifying service-offering strategies.

One purpose with this model is to illustrate and serve as a basis for discussing the scope of service offerings, the various customer relationships, and the company's service offering strategies. As the four cases in Chapter 2 illustrate, a company does not have to be in one of the quadrants only, and an interesting aspect is whether one's company is active in the cell/cells because of a proactive choice, due to reactively adapting to a changing market environment or due to both.

A: Reactive Behavior and an Unbundled Service Offering

Companies being in this quadrant are most often production oriented and paying little attention to the after-sales aspects. Services are seen as freebies that can be given away in order to land a new product deal and the company has a relatively weak position towards its customers.

B: Proactive Behavior and an Unbundled Service Offering

The company is more market oriented and customer focused. Developed customer relationships enable proactivity and this position can serve as a favorable platform for more advanced services.

C: Reactive Behavior and a Bundled Service Offering

Bundled offerings in this quadrant very often mean high profits for the customer at the expense of the provider taking a major operational and financial risk. Therefore, the provider has an ambition of developing the relationships and becoming more proactive, something extremely difficult on markets with powerful customers, particularly if the provider has one or few dominant customers only. The adaptation to customer needs result in unique solutions, which are difficult to get profitable. Therefore, knowledge and methods must be replicable and internal processes as similar as possible.

D: Proactive Behavior and a Bundled Service Offering

Offerings in this quadrant are extensive offerings suggesting that the provider and the customer have a relational strategy and view each other as equal partners. It is a win-win situation for both actors with high margins for the provider, although it can be associated with unpredictable revenues and costs. Possible benefits for the customer are reduced costs due to better service performance, reduced balance sheet total, and increased predictability of cash outflow. This position is the result of long-term relationships with customers that often have made use of the provider's increasingly advanced industrial services. Since the service scope is extensive, the provider must have the ability to handle increased risks.

4. Examples from Four Industries

In this chapter, a short description of the four case companies participating in the subproject is given.

Case 1: Saab Aerosystems



Saab Aerosystems is a 2,000-employee strong business unit of the defense and aviation company Saab, delivering air systems and subsystems primarily to the Swedish Air Force through FMV – the Swedish government agency for defense material administration and procurement – but also for exports. The business units' most important product is the Gripen system; a fourth generation combat aircraft.

Historically, FMV has been Saab Aerosystems' customer giving Saab Aerosystems assignments it has taken responsibility for. FMV has also had the main responsibility for serving the Swedish Air Force's installed base. Due to the major restructuring and downsizing of the Swedish Defense Forces, a new situation is evolving where Saab Aerosystems inevitably will have to take an increased responsibility for these services. The other customer that has bought the Gripen system is the South African Air Force and it is believed that Saab Aerosystems will have to take an increased service responsibility after the first Gripen fighters are operational in 2006. The Czech and Hungarian air forces have signed rental contracts with their Swedish counterpart for Gripen fighters and although Saab Aerosystems is not involved in this agreement, an occasion for procurement of services will come and will then be an extensive undertaking for Saab Aerosystems. Hence, service contracts guaranteeing aircraft availability are likely to be an important part of the company's business in a few years time.

The company has an "after-sales product portfolio" defined as the products offered to the customer after the delivery of a system. It consists of follow-on support – services enabling the customer to make use of the system in the most efficient way within the functionality given – and add-on sales – services adding new functionality to the system if the customer has new or changed demands. By bundling single services such as spare parts, repair, overhaul, aircraft modifications, technical publications, and pilot training broader offerings can be proposed to customers.

A service portfolio model is discussed in which services from different product lines can be bundled together in modules. It is necessary to offer solutions that are more extensive and possible offerings could be spare parts delivery solutions, service level agreements guaranteeing certain functionality, and solutions with contracts linked to e.g. flight hour costs. Because Saab Aerosystems has no spare parts monopoly for the Gripen system and its other products, Nordic subcontractors have made offensive maneuvers at the spare parts market in order to gain market shares.

Saab Aerosystems' management has been very clear on pointing out that services aimed at the customer's installed base are crucial for the future. In spite of the support, there are organizational obstacles regarding responsibilities and authorities; not only the after-sales program management but also other internal players are involved in the selling of service offerings and the relationships between these are often unclear. Responsibilities and authorities are also unclear in the contacts with FMV, which lacks a clear strategy towards the changing market conditions and is not being interested in having a proactive service provider. According to Saab Aerosystems, these attitudes are difficult to change.

Case 2: ITT Flygt



The second case company is the fluid technology company ITT Flygt, a subsidiary to the US based company ITT Industries. Flygt has approximately 4,000 employees, of which 2,500 are employed outside Sweden. The product portfolio contains submersible drainage pumps for dewatering of mines, submersible sewage pumps and mixers for pumping stations, and submersible propeller pumps for prevention of flooding. The Marketing & Sales unit consists of the business units Public Utility, Construction & Mining, and Industry, where the service market belongs to the BU Industry even though it serves all three BUs. It is a decentralized company with 44 wholly or partly owned sales companies around the world and representation in over 130 countries.

A major potential for industrial services has been identified but there are several obstacles to increase the market share; few resources are allocated and devoted to service selling and the sales force lacks proactivity. The sales companies have traditionally worked with industrial services independent of each other and a majority of the European companies makes losses on service hours.

Competitors are very often small local companies that are flexible and have good social relationships with customers. In spite of increased competition from interchangeable parts providers, the main revenue source is spare parts but many contracts are poorly designed with rebates on products and services, which have led to Flygt trying to standardize the contract forms. Not only competitors use less expensive interchangeable spare parts but also third-party service companies serving ITT Flygt's installed base. These service companies are very common at markets where the company's own service organization is less extensive and it is estimated that these players only use half the amount of original spare parts compared to ITT Flygt's own service organizations; the remaining half is believed to be interchangeable parts.

There are four levels of SLAs, from bronze contracts with basic preventive maintenance to platinum contracts with a complete bundling of services and fixed prices. Even though the majority of contracts are bronze or silver, the share differs between different European markets and is rather insignificant on many markets. There are often complex situations to enter where the customer has its own maintenance personnel and competence that Flygt might have to take over and there are risks associated with some application areas, which are not obvious today, making it difficult to make profits from these contracts. However, most service contracts are profitable and the contracts are also positive for the occupation ratio in the workshops and the increased possibilities to plan repairs.

In order to eliminate the lack of commitment towards industrial services at Flygt, a service market organization working with business development and gathering the European service managers annually has been built up centrally. Together with the sales companies' service organizations, this organization has increased the Flygt's service market focus. The sales organizations are nevertheless still very product-focused, paying little attention to services. This situation together with market specific factors makes it difficult to sell industrial services and SLAs in connection to product sales. There is also an organizational problem connected to responsibility and decidability; e.g., who is selling the services, who is responsible for pricing, and who has the responsibility for service development.

Municipalities are the most important customer group and besides, there are often two other interested parties involved in the pump station sales process, a consultant and a contractor. These two players have very different interests and motives for their actions, making it more difficult for Flygt to act

proactively, and be met with sympathy about such things as life cycle cost aspects, which could save the customer money. The contractor usually has a strict unit cost focus when purchasing products from Flygt and other suppliers, whereas the consultant's role is to prepare the specification for the customer.

There are often advanced services with high value in connection to the product offer, not possible to charge because they are a condition for the product sale. Relationships are important with all these players and Flygt usually has long-term relationships with all of them. The relationship with the customer is seen as mutual, aiming at solving the customer's problem and it is also an important input to future product sales.

Case 3: Electrolux Laundry Systems



Electrolux Laundry Systems (ELS) is a worldwide supplier of professional laundry services and products include washer extractors, dryers, and finishing equipment. Approximately 1,500 employees work at the manufacturing entities and there are 23 national sales companies and an extensive network of importers serving customers. A majority of the service technicians are employed at external service partners linked to ELS through service contracts. On the part of ELS, there is an ambition to extend the service organization by taking over external service partners, thereby having increased contact with customers through the product life cycle. In connection with the equipment becoming increasingly complex, ELS has recognized a need of knowing not only what product knowledge the service partner has, but also the knowledge profile of each individual technician. Therefore, an online certification program has been launched to assure that also external service personnel have the skills needed.

The service market was previously seen as something unavoidable at ELS, but it is nowadays considered being of strategic importance. The long product life cycles and the fact that products are becoming increasingly similar make industrial services the differentiator between ELS and its competitors. The spare parts distribution system is a centralized Internet-based order system connected to real time information with delivery and payment options for the customer, and an example of a service where ELS has advantages over competitors. As a response to interchangeable parts providers gaining terrain with spare parts sales, ELS recently launched a direct online channel towards customers with basic spare parts and consumer goods. It is seen as an experiment and the price will be at an average level internationally.

A large share of the customers is global hotel companies and national laundries. Especially the largest hotel companies have the ambition to have similar laundry solutions at all continents, making e.g. capacity and cost per washed unit important selling points. These aspects are improved not only through product development, but also through service market knowledge and knowledge about lifecycle costs. Consequently, feedback from service technicians and sales personnel is vital. ELS have signed contracts connected to capacity and availability with some customers, and in these contracts the design and choice of equipment is critical for the profitability; instead of one large washer, two smaller ones can reduce the life cycle cost. In connection to this, ELS has developed CMIS, an online information system connected to the laundry equipment allowing e.g. remote optimization of laundry programs and trouble-shooting without having service technicians at the customer's site. Furthermore, a rental pilot where the customer pays in advance per washing is being launched at a European national market.

In the transition towards increased service-market focus and customer focus there is a clash between the traditional product-centric organization and the new, less hierarchical one. There are opportunities to increase the knowledge component in the service offerings but the organization is still partly a constraint. Examples of new industrial services can be consultancy services connected to profit sharing contracts; if ELS manages to decrease customer costs it will obtain a percentage of this reduction. There are consultancy services today optimizing the laundry process, but these services are only available in connection to product sales.

Case 4: BT Europe



BT Industries Group, with headquarters in Mjölby, Sweden, is a global manufacturer and supplier of warehouse trucks, counterbalanced trucks, manual trucks, and services. Since 2000, the former Swedish company is owned by Toyota Industries Corporation that except for automobiles also manufactures counterbalanced trucks. BT Europe has approximately 4,800 employees, of whom 2,300 are involved in service and maintenance. Sales are managed mainly through 22 wholly owned sales and service companies that are responsible for the business area's operations on the local markets in terms of marketing, sales and after-sales services. BT Europe aims at ensuring truck availability to its customers; its vision is to be best in service and have one hundred percent coverage of its active fleet.

There is a trend towards increased competition at the service market where interchangeable parts providers are expanding their offering and not only offering spare parts but also training and preventive maintenance although they are not able to serve more advanced products. In spite of increased competition from spare parts manufacturers, aftermarket activities and service contracts are profitable and there is potential to increase these sales; thus, the company strives at bringing service contracts earlier into the sales process. However, it is very difficult for a sales person selling products also to sell services and solutions containing e.g. both trucks and maintenance. During the sale, there can be much focus on the product whereas after-sales services are often considered secondary; hence, potential service sales can be lost. This can be explained by the sales person or key account responsible being very keen of entering the customer's business or because the customer has little interest in the product's life cycle cost, although this situation is gradually changing.

BT Europe is working actively to increase the control of its national sales companies of whom especially the major markets have gained considerable independence and still have a strong position in relation to BT Europe. An example of this is the fact that almost every sales company has its own warehouse. In order to increase the awareness of services and better coordinate service activities, a service market organization working with business development and with service managers from the sales and service companies meeting annually has been built up centrally. This has increased the internal focus on the service market; before there was only an organization for technical support, but no real commitment towards services.

BT Europe offers three levels of SLAs: Full service, Preventive maintenance, and Safety inspection. Other services are resident engineer, when a BT technician works full time on the customer's site; night care, which is service outside office hours; and BT Fleet Management. The business area also offers single services, including preventive maintenance and emergency repairs, spare parts supply and driver training. All services are available at the twelve sales companies but they are not always standardized. An example of this is that different national demands on safety inspections can occur. Many services are therefore adapted to local demand, while the international services are standardized. There is a trend towards more Key Account deals and these have to be standardized in order for the customer to perceive that BT's service personnel has the same knowledge at the different markets.

All sales companies have to offer the three levels of service agreements but in addition, it is possible for a single sales company to offer local agreements, e.g. Full service exclusive of forklifts. When it comes to profitability on different contracts, full service contracts are less profitable than rental contracts. In rental contracts, the salesperson has no mandate to bargain on the service and they can

therefore only reduce the product component of the rental price. Due to higher profits and better utilization, there are technicians working with rental contract trucks only. The reason for special rental technicians was due to the fact that profitability for internal customers (rental) was rather similar to profitability for operation – operating existing contracts – and field-technicians visiting non-contract customers. Separating technicians into these two categories made it less attractive for rental technicians to be wasteful with their time.

During the first three quarters of 2004, 40% of all sales in BT Europe were rental contracts, with a higher figure in Northern Europe exclusive of Germany. The ambition is to increase the number of rental contracts and developed relationships with customers are crucial in order to achieve this. Very often contracts with customers are gradually becoming increasingly advanced as the relationships develop and communication and mutual knowledge improve. Customers are also used in the service development process and relationships are necessary for BT Europe when proactively experimenting with new projects and services. The mobile PDA (personal digital assistant) solutions used by service technicians are an example of a service tested in the field before being implemented.

5. Conclusions

- *Service offerings should be standardized centrally but made flexible and thereby possible to combine so customer's individual needs can be fulfilled; one must not centralize at the expense of service quality.*
- *Bundled services can reduce competition and if both the provider and its customers have powerful positions, these offerings can create competitive situations for both parties.*
- *When increasing the service scope, consideration has to be taken to increased operating and financial risk, especially if the company has no powerful position relative its customers and if customer needs vary a lot.*
- *Knowing the profitability per customer and form of SLA is vital if the company wants to act proactively.*

Increased competition from interchangeable parts providers and third-party service providers on gradually more advanced services is a threat to spare parts and other unbundled services, driving companies in capital goods industries towards developing their customer relationships and bundled offerings. Working proactively with customers is also considered important for the development of new services, where customer input to the development process is important for how the new offering is received. Creating value through unique solutions towards customer needs can also include customer lock-in; something particularly important for these and many other manufacturers whose traditional customer lock-in through e.g. spare parts provision is being threatened – and in some cases already eroded – by interchangeable parts providers.

Customer demand for services suiting their specific needs, increased competition in the service market resulting in reduced margins, and ICT possibilities are factors driving manufacturing companies towards more advanced services and solutions. If companies would choose not to offer these services, they believe some customers will change to a provider that can meet their increasing demands and that the companies' role will be reduced to that of a subcontractor. In line with the reorientation from product-centric company to customer centricity, more emphasis is not only put on making more clever offerings but also on making customers more intelligent and aware of lifecycle costs.

There is a focus on modularized service offerings that will be standardized centrally but flexible in response to local needs and these offerings are developed both proactively and reactively depending on offering and company. **Possibilities include customer lock-in and an expansion of the current business to more extensive offerings** with the potential of being more profitable. Among the threats associated with this service maneuver are increased operating and financial risk as well as unpredictable costs and revenues. Risks are particularly high in association with customized offerings not possible to replicate.

Recently, one of BT Europe's customers suggested a contract with a price model linked to capacity usage; the more tons produced, the more BT Europe receives. These contracts already exist in some industries where there is a direct connection between uptime and customer profitability. However, the connection between a customer's produced tons of material and the usage of warehouse trucks is less clear. Although BT Europe manages the customer's truck fleet very efficiently, materials handling is seldom one of the customer's core processes that determine whether he will be competitive and profitable. The concept could be a possibility for BT Europe but it could also pose a threat to existing contracts if the customer is powerful relative BT Europe, altering the offering towards reactive-bundled. As a consequence, the customer would reduce risk and cost at the expense of BT Europe.

In order to sell modularized services and manage them strategically, companies must measure both the value delivered by each service and the cost of providing it. If a service is unprofitable, the companies have to improve the efficiency and effectiveness before it can be bundled with other services in order to expand the service offering. Remote monitoring and other ICT-based services can simultaneously reduce the companies' cost and increase the value for the customer. **The usage of ICT can be a means when centralizing e.g. back-office activities** in companies like BT Europe, ELS, and ITT Flygt where the European sales companies traditionally have held a strong position.

Being proactive towards customers is considered important by all companies, although most of them do not consider themselves proactive enough. Due to its close connection to the Swedish Defense Forces, Saab Aerosystems has been very reactive although they have the ambition of expanding their service offerings and become more proactive. The problem with Saab Aerosystems' situation is that they are gaining very little from being proactive; the customer is expecting them to be reactive in their response towards changing need. ELS and ITT Flygt are increasingly proactive and offering bundled services through a modularized service portfolio. However, clear obstacles for ITT Flygt are the customers' poor awareness of lifecycle costs and the fact that different actors with different priorities are involved in the product sales process. The result is customers' not receiving the best solution possible. In order to increase the share of solutions offerings – which potentially could lead to both reduced customer costs and increased profits – a possibility is to risk channel conflict with the consultancies and contractors involved.

It is essential for manufacturing companies to **recognize the characteristics of services** – e.g. that the quality aspect cannot be dealt with separated from productivity – **and thereby utilize the possibilities this implies**. If taking a service marketing and holistic approach to new technology, manufacturing companies are believed to have a good chance to increase their service productivity (i.e. profitability) when implementing new technology. Because revenues not always reflect customer perceived quality, one must nevertheless be aware of the limitation with measuring service productivity as profitability only. Except for cases when companies price their offerings too low, all case companies offer services that create much value for customers but are expected to be given away for free, included in the sale of the installed base (e.g. energy-saving consultation service).

As illustrated by the BT Europe case, much time was spent on mapping existing processes and designing new ones when developing the PDA invoicing solution. It is necessary to do a thorough effort as service development can be a very complex process and much attention should therefore be given to it. Because of the possibilities that new technology enable, the normative goal is not to automatically replace existing internal processes with more technically advanced ones, but to consider an extensive reconfiguration of processes and strategies to **find revenues from existing as well as unfamiliar sources**. However, service development does not necessarily always assume this far-reaching standpoint. In parallel, service development can be carried through in small, incremental steps; a minor advance leading to only moderate cost reductions is after all also an improvement resulting in a new, more profitable service offering.

6. References

Anderson, James C. and James A. Narus (1995), "Capturing the Value of Supplementary Services," *Harvard Business Review*, 73 (1), 75-83.

Grönroos, Christian and Katri Ojasalo (2004), "Service productivity: Towards a conceptualization of the transformation of inputs into economic results in services," *Journal of Business Research*, 57, 414-23.

Larsson, Rikard and David E. Bowen (1989), "Organization and Customer: Managing Design and Coordination of Services," *Academy of Management Review*, 14 (2), 213-33.

Normann, Richard (2000), *Service Management* (Third ed.). Chichester, UK: John Wiley & Sons, Ltd.

---- (2001), *Reframing Business - When the Map Changes the Landscape* (First ed.). Chichester, UK: John Wiley & Sons, Ltd.

Ojasalo, Katri (1999), "Conceptualizing Productivity in Services," Doctoral thesis, Swedish School of Economics and Business, Helsinki, Finland.

Vargo, Stephen L. and Robert F. Lusch (2004), "Evolving to a New Dominant Logic for Marketing," *Journal of Marketing*, 68 (January), 1-17.