Procuring industrial service solutions, Exploring enablers for co-creating value

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Abstract

Optimizing complex hardware and services into service solutions may significantly reduce the total product life-cycle cost for a customer. Research regarding the customers’ perspective is still scarce, however. Hence, the purpose of this paper is to explore value perceptions among buyers of industrial service solutions developed for complex product platforms. The study is based on the experiences of one commercial and three governmental customers procuring service solutions for aviation products. As could be expected, direct financial benefits in the form of cost reduction were an important motive for the studied organizations. In reality, however, it turned out to be difficult to verify if these goals had been fulfilled. This may be seen both as an indicator of the complexity of the business, and the lack of clear baseline data, when the new service provider entered the field. Still, the customers were satisfied with the partnership, with several of them eager to learn from the provider, even if the learning process was painful. During the procurement process itself the quality and richness of the relationship with the new partner was important for signaling capability. End-users, however, seemed to be under-used and not sufficiently involved in the relationship during this process. The results also show that continuous proposals for improvements from the service provider are highly valued among customers.

1. Introduction

According to some estimates, service solutions which optimize hardware and services may reduce 30-40% of the total product life-cycle cost for a customer of complex capital goods with long life cycles [1]. The benefits for such customers from procuring service solutions include reduced maintenance costs but also increased availability, the ability to focus on core operations, and create more value for their own customers [2]. Studies indicate that many providers seek to grow beyond their core product business by developing ancillary service offerings [3]. The providers may exploit untapped markets, become strategic partners to their customers, and even out the cyclicality of revenues [2,4,5]. Value is delivered through co-creation between the firm, the customer and various networks [6]. Still, procuring and providing services is a dyadic business and needs to be based on a win-win relationship [7]. Consequently, both the provider and the customer need to know the basics about each other’s business, incentives and resources [8]. Procurement of industrial service solutions can be a great opportunity but also a great challenge to both supplier and buyer.

In this paper we focus on services to products late in their life-cycle, i.e. services to already existing fleets. Hence, procuring solutions imply a focus on services to products designed many years ago instead of a joint optimization. Therefore we use the term service solutions to denote such service packages. The aviation industry constitutes a fertile field to study these issues. The supplier’s perspective has been explored by many researchers, but research regarding the customers’ perspective is scarce [9,10]. Aarikka-Stenroos and Jaakkola [11] examine value co-creation in knowledge
intensive business services from different perspectives. In their discussion about generalizability they argue that their findings probably are applicable also to the service solutions context. Also Macdonald et al. [12] try to bring more clarity regarding customer perceived value. They argue that not only the service itself should be evaluated, but also the usage process and value-in-use. According to Jaakkola and Hakanen [13] customer’s value perceptions are not limited to reduced costs of the services and operations. Relational aspects, the interaction process and performance improvements are also important. The purpose of this paper is to further explore value perceptions for buyers of industrial service solutions in a context with complex product platforms. This is specified in four research questions:

RQ1: What goals do procuring organizations have regarding industrial service solutions?

RQ2: Are the potentials for co-creation of value fulfilled?

RQ3: Which important indirect customer benefits occur?

RQ4: Which main enablers for co-creation of value occur?

2. Theoretical framework

2.1. Procuring service solutions

A prospective procuring organization has to consider several aspects before buying a service solution. Two major questions are ‘should we make or bye?’ and ‘should we aim for automatic or manual execution?’ [14].

Regarding the first question, the nature and relevance of the underlying process are important aspects to consider. Standardized supporting processes can easily be sourced out, but critical and frequently used processes may lead to a make decision, i.e. to conduct the service in-house [15]. Further, highly specific and very complex processes might lead to high interaction and negotiation costs which may also lead to a make decision [15]. Other important aspects concern resources and capabilities. If the customer is willing to take a high initial cost, a make approach might be wise due to the chances for lower long-term costs [16]. Furthermore, availability of equipment, areal capacity and know-how among employees might affect the choice between a buy or a make approach [14]. Finally, a third aspect concerns the management style in the potential procuring organization. Risk-willingness and openness to change are two examples of this feature [14].

Also the decision on automatic or manual execution [14] can be broken down further. The procuring organization can choose between at least three possible strategies; buy everything separately, keep integration in-house but outsource work and planning; or outsource the complete process including integrating [17]. ‘Decentralized separate purchase’ is judged as the alternative with the lowest expected value due to larger dependency risks, difficulties to achieve cost-reduction and great transaction costs [17]. ‘Integrate work’ has moderate value expectation; here the potential lies in operational advantages [17]. The highest value expectations are related to the complete outsourcing category. In this category the customer relies on strategic partnership with a shift of network planning, building, and maintenance activities to the service provider [17]. Hence, mutual transfer of information and operational capabilities are crucial.

2.2. Value of service solutions

The perception of a solution often differs between provider and customer. Customers tend to focus on relationship process [7]. Suppliers normally focus on direct monetary benefits [11] and tend to be quite product-centric [7], but might also develop an expanded understanding of the solution and related issues [11]. Both the provider of the solution and the customer contribute to value creation. To explain customer perceived value, Macdonald et al. [12] argue that not just service quality, but also usage process quality and value-in-use should be studied, adding that also relationship quality and network quality contribute. Töllner et al. [18] specify three major roles in the buying organization. The first, users, are mainly interested in customization of the solution. The second, buyers, are interested in signaling of the provider and definition of requirements. The third role, decision, often shows strong interest in inter-process management.

Previous studies have shown that customers of knowledge intensive services value long term benefits after the solution has been put to use. The value experienced originate in direct monetary benefits (i.e. costs and revenues), indirect monetary benefits (such as reliability and usability), and non-monetary benefits (such as a sense of relief and changed image) [11]. Beyond the value from the solution itself, the customers might increase their understanding of what to expect, the range of solutions that are available, pricing and negotiations [11]. Further, customer goals and perceived value are not static. As propositioned by Macdonald et al. [12] p 679; “The value-in-use sought tends to shift from preventive goals to promotional goals as the former are satisfied.”

The sacrifices perceived by the customer seem to be predominantly located to the initial phases and to monetary costs. Time and efforts invested in diagnosing the need and formulating a joint view of the optimal solution are the most important of the customer sacrifices. On a higher level, customers may feel dependent on their supplier, experience a fear to loose know-how and also perceive purchase of complete service solutions as more risky, and less transparent than stand-alone products [9]. Further, uncertainty regarding their own future needs, challenges of evaluating the solutions, unexpected demands for change processes, and induced long term relationships may result in new and increased risks [10].

Another issue concerns pricing. Three pricing strategies can be used for solution pricing. The first, a traditional strategy, is predominant on products and may not be optimal for service solutions. The next, the information symmetry model, relies on accurate and shared knowledge between provider and customer. If parties lack such knowledge, cost-plus pricing could be beneficial, and when the partners’ independent knowledge is high, competitive pricing could be preferred [7]. Another option is value based pricing, where it is not necessary for the actors to exactly know the costs [7].

2.3. Customer and supplier co-creating value

Aarikka-Stenroos and Jaakkola [11] examine key activities of value co-creation. It has to be emphasized that the activities are not necessarily executed sequentially. Töllner et al. [18] complement Aarikka-Stenroos and Jaakkola [11] with valuable parts starting with signaling. For customers in the capital goods industry the initial process prior to choosing a
supplier is crucial. Here, suppliers need to signal experience, competence, references, and commitment to reduce risks [18].

The actual co-creation begins with an identification of needs and the goal for the exchange [11]. This diagnosis typically requires professional involvement. An inexperienced customer has to rely on supplier to propose the diagnosis and to elucidate needs, budget, schedule, usage, and business context [11], but may involve external consultants to balance this asymmetry. Mapping customer processes, supplier processes and interaction processes to identify co-creation opportunities is part of this diagnosis [19]. Requirement definition involves getting insight into business model, operating process, as well as specific needs and problems [18].

After the diagnosis phase, the parties undertake a negotiation process [11]. The more knowledge-intensive, and customized the solution is, the more interaction and collaboration between the actors may be needed and the more critical for solution effectiveness it is that the both parties gain an understanding of the need, the content of the solution and the co-creation process [8]. Normally the supplier proposes the value-in-use potential of different solution options and the customer evaluates the propositions. Customers search for solutions that meet their business problems. Therefore, it is crucial for the supplier to design, modify, and select products and services which fit into the customer’s environment [18]. However, customers can act as co-designer, not at least concerning branch specific issues. It is common that lead users are deeply involved in development, which tends to result in highly customized service offerings [20]. Designing the solution is the most important activity in optimizing value-in-use, but also very time consuming [11] and might require a lot of coordination [20].

Another key activity is organizing the problem solving and allocating required resources. Sometimes suppliers have to support inexperienced customers [11]. Suppliers often adopt the role of value process organizer as they identify, activate, collect, and integrate relevant resources to make the process working and value creation possible. The outputs from the problem solving process generally need to be implemented for expected benefits to be reaped [11]. Depending on situation the implementation can be executed by the provider, the customer or in combination [11]. In addition to the implementation of the solution, also running trials, and providing detailed manuals, staff training and workshops can be relevant [18].

Post-deployment support refers to providing spare parts, operating information, routine maintenance as well as deploying new products for evolving requirements [18].

Finally, some different sub-processes can be aggregated into inter-process management [18]. Coordination is one sub-process. Suppliers need to understand not only the customer needs regarding the core solution content, but also the customer’s preferences regarding their role and control in the co-creation process [8]. Customers seem to prefer providers who coordinate all sub-contractors involved and act as a one-point contact [18]. Another sub-process is incorporation and improvement. Providers need to rapidly respond on unpredictable contingencies and evolving requirements. A third sub-process is proactive support. Customers expect a trusting atmosphere with a reliable partner who communicates openly, including incidents. They require continuous assistance with intensive support and advice.

3. Method

The paper is based on a case study covering one commercial and three governmental customers procuring industrial service solutions. Two of the governmental customers concern military operations and act within the same organization Customer-F, but only one of them concerns military aircrafts. The case study was initiated after a four year longitudinal case study at the four customers’ common supplier of service solutions. Hence, valuable background information concerning the solution businesses is available to the researcher via this separate case study. The new case is deemed important due to the lack of research regarding the customer perspective [9,10].

The data was collected during 2014, mainly based on semi-structured interviews regarding goals, expected value, as well as development, implementation and improvement of the new solutions. To ensure that the four units of analysis were treated equally we used a protocol for questioning, such as “What was your goal with entering the total commitment solution?” To be open for new turns in the answers we used follow-up questions whenever it was found suitable.

The common provider operates service solutions to all the customers studied here. The contract for the commercial Customer-A covers both aircrafts and helicopters. Due to ongoing critical negotiations between the customer and the provider we have chosen to postpone interviews with the representatives for the helicopter part. In total four strategic interviews have been executed with one key personnel at each of the four customers procuring service solutions. The use of four case organizations will limit the possibilities to generalization of the results. On the other hand side, the purpose of the paper is to explore, which can be possible with a relatively small sample [21]. Some of the main results are visualized in a table to “…indicate how the focal construct is “measured”, thus increasing the “testability” of the theory and creating a particularly strong bridge from the qualitative evidence to theory-testing research.” [21] (p29). The analysis was based on identification of patterns, in a repetitious process [21] including comparisons with similar cases reported in the literature.

4. Results

4.1. Customer-A

The overarching goal for the private company Customer-A is expansion and it has increased its flight-hours with 5-10% annually during recent years. The strategy is to focus on core business and thereby outsourcing the maintenance. The customer has a goal connected to its maintenance cost, measured in percent of total turn-over. This goal is in the region of 20%. True to its strategy, Customer-A procured an external service solution that covers the years 2010-2018. The contract includes base maintenance (planned and major) and line maintenance (up-comings) and also an initial transition of personnel and tools etc. to the provider. The details of the contract include maintenances of aircrafts, with engines excluded. When it comes to mission equipment this can be divided in two parts: The first is equipment assembled in the aircraft, and included in the certificates. The second is
ancillary equipment, owned by the end-user and contracted and approved separately. The volume of flight hours is 4500 hours per year, see Table 1.

The interviewee’s opinion is that the result from the procured solution is very satisfactory. “I’m very satisfied. Of course there are some different opinions, but that is a sign of healthy cooperation.” For different reasons it is difficult to specify if maintenance cost have decreased. However, knowledge has been flowing from the provider to the customer. “When you cooperate with a big organization that has all the systems in place, you need to improve yourself.” The interviewee also mentioned that they now have better control than they had when they executed maintenance in-house.

The procuring process of the service solution was relatively free from problem. Approximately a year from the first meeting the contract was signed. One key for this relatively fast track, mentioned by the interviewee, is that they first wrote a contract regarding maintenance on one specific aircraft. After the signing of the solution contract the new operations should be up and running within 3 months, which was met without any great problems.

4.2. Customer-C

Customer-C is a governmental customer which has had service solution contracts with the same provider since the 1990s, but with somewhat different contents. Total economy is in focus, including costs for maintaining. The procurement of the current aircrafts and maintenance was done together. Maintenance in-house was an option, but was turned down for economic reasons. A contract covering three aircrafts was agreed on during 2006 and includes the years 2009-2014.

The actual contract is with a main-contractor, the manufacturer of the aircrafts, who is located in Canada. However, in practice this company does not influence the service solution very much, which is delivered by the Swedish service provider. The contract stipulates 3500 hours in air per year. The aircrafts are equipped with different customized mission systems. Preventive maintenance on the mission systems is included in the solution, but not corrective maintenance. To enable service of the mission system, Customer-C has created its own relationships with the sub-providers. This has been very time consuming, it took more than 2 years before routines were stable. However, according to the interviewee the result shows that this still was a more cost efficient alternative than including it in the overall service solution. For the customer it is a challenge having the manufacturer of the aircrafts on the other side of the Atlantic sea. Formally, they have quarterly meetings, but in practice the main-contractor of the aircrafts is represented by the provider of the service solution during those meetings.

The service solution provider was supporting the main-contractor during the procurement process and the customer hired an external expert for support. During implementation, the provider had prepared well, but still there were some minor initial problems, concerning service optimization and spare parts logistics. During operations the provider and customer conduct planning both on a long term horizon and by weekly meetings. Regarding changes on the fleet, the provider might propose changes and the customer assess the proposition and might do an order.

<table>
<thead>
<tr>
<th>Goal</th>
<th>% of turnover</th>
<th>Costs</th>
<th>Costs &amp; efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircrafts</td>
<td>7</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Flight h</td>
<td>4500</td>
<td>3500</td>
<td>2500</td>
</tr>
<tr>
<td>Engine</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Mission e. Parts</td>
<td>Separate</td>
<td>Preventive</td>
<td>Yes</td>
</tr>
<tr>
<td>Special arrang. helicopters</td>
<td>Contract via manufacturer</td>
<td>Customers share costs</td>
<td>Separate modification</td>
</tr>
<tr>
<td>Fulfilled goal</td>
<td>Very satisfactory</td>
<td>Cost-effective</td>
<td>Yes</td>
</tr>
<tr>
<td>Indirect benefits</td>
<td>Know-how</td>
<td>Proposed changes</td>
<td>Modifications proposed</td>
</tr>
<tr>
<td>Enablers A pre-contract</td>
<td>Aircrafts &amp; ext. support</td>
<td>Relationship</td>
<td>Competition, then directed</td>
</tr>
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</table>

4.3. Customer-F1

Customer-F1 has 75 years of experiences regarding service solutions from three external providers. The interviewee stated that the first solution goes back to 1939. Today’s provider has had several different service contracts with Customer-F1 in the last 28 years. The first and the last contract were procured in competition but the others were not. There is a trend within the complete Customer-F organization to reduce costs via outsourcing in order to focus more on its core business.

The existing contract covers flight operations based on two aircrafts. This includes maintaining aircrafts and mission equipment, but also non-core parts of the customer process. The goal with the latest procurement was to decrease the price compared to the previous contract. To enable this, the customer was prepared to slightly reduce its operations. The contract is based on two parts; fixed price to customer and a price per hour to its end customers. It covers approximately 2500 hours per year. Approximately 10% of the operations are complementary modification orders, which in many cases are based on suggestions from the provider. Procurement of modifications is often done in competition, but the existing provider specifies many of the requirements due to its unique competence. The procurement and implementation was rather uncomplicated since Customer-F1 has not changed provider for a long time.

The detailed planning of the operations is discussed between the end-users and the provider. However, end-users are heterogeneous and do not coordinate their plans. The involved actors have developed a good atmosphere and they solve most challenges. For example, they have been able to cut costs further by allowing the provider to use the product platform and mission equipment in other customers’ operations when they aren’t planned to be used by Customer-F1. As for the cost of the service solution, the interviewee perceived the procured service solution to be cheaper than having it in-house, but then company did not have any comparative data to support this assessment.
4.4. Customer-F2

By choosing an external service solution, the customer aimed for decreased costs with 25-30%, but also increased efficiency. The contract includes three versions of an aircraft platform. The contract was planned to include a major modification of the 35 aircrafts included in the service solution. However, the customer was not allowed to finance this modification the same way as the aircraft service is financed. Accordingly, a separate contract was signed for the modification. The procurement process was first made in competition and started with a request for information 2006, which resulted in few responses. The customer changed strategy and made a directed request for proposal to the supplier in 2008 and a contract was written three months later. The planned flight hour per year is 6500 hours. The contract stated a period for implementation of six months. Within this time period new certificates, flight management systems and equipment should be in place. Six months were tight, but the actual problems occurred in unexpected areas like follow up systems and other computer systems.

One change strategy mentioned by the interviewee was that the end-user used ‘highly respected’ persons to enable the great change within its organization. Nevertheless, some end-users complained about increased requirement on internal planning, inflexibility and too few aircrafts available. The first operation period identified problems with planning; unused but planned flights resulted in availability on up to 140% calculated according to the contract. However, the involved interviewee stressed that this publically exposed consequence would bring a more mature and disciplined organization and decrease costs also on other issues. Still, after approximately one year the contract was adjusted. The stipulated number of available aircrafts was increased from 8 to 10, which changed the price significantly. The end-user maintains responsibility for flight security, logistics and planning and the provider will have to optimize within the platform. The process for cooperation provider – customer – end-user still has some minor unclarified issues, but the goal to reduce costs with 25-30% is perceived by the interviewee as more or less fulfilled.

The major modification on the aircrafts executed as a separate order suffered from several great technical problems with decreased aircraft availability as a result. But the obstacles affected the provider more than the other stakeholders.

5. Discussion

The perception of a solution seems to differ between provider and customer. According to the literature, suppliers tend to be product-centric and focus on direct monetary benefits, while customers tend to focus on relationship process [7,11]. In the studied cases direct monetary benefits (costs) were the outmost important aspect also to the customers, but relationship and learning were also indicated as important. Costs were in focus for all four customers, and one express efficiency as well. Value-in-use [12] is not clearly pointed out as a key aspect in the cases, but is indirectly indicated as important to the customers. The case shows that there was no big difference between high-level goals of the customers with experience of service solution and those with no such experience.

The information symmetry model used for pricing [7] relies on accurate and shared knowledge between provider and customer. The case shows that both negotiations and competitive pricing could be used for complex industrial service solutions. Competitive procurement might initially be preferred, but it requires substantial resources and is hardly realistic in all service solution procurements. Interestingly, one customer changed during the procurement process from competitive procurement to request for proposal from one provider.

The content in the solutions differs somewhat, but also exhibit important similarities. The aircrafts are included, but extremely expensive components as engines are excluded from one of the contracts. Further, mission equipment are only partly included in the majority of the analyzed solutions. Customer-C claimed that it was a correct decision to exclude some maintenance on mission equipment, even if it took two years to create a smooth maintenance process with the providers of these services. For practical reasons a major modification was excluded from the solutions procured by Customer-F2. Hence, under different conditions the studied solutions might have a larger scope, including engines, mission equipment and major modifications.

The scope of the implemented solutions differs significantly in one of the contracts. The most experienced customer (F1) included a non-core operation in the contract. Hence, the fulfilled potential is greater for Customer-F1 than for the other customers. Sharing costs with other customers is one opportunity found in the case of Customer-F1. According to the literature, the potential for total cost reduction in service solutions may be as high as 30-40% [1]. Surprisingly, the majority of the customers don’t seem to know if the expected cost goals are fulfilled or not. None of the customers shared any specific information regarding goal fulfillment. The reason could be unwillingness to share details, or the absence of such detailed data.

The theoretical framework included a discussion of the importance of signaling. This is also indicated in the cases. Customer-A signed a pre-contract for one part of its business and after that the negotiations and implementation of the service solution was fast. Customer-F1 had a long relationship with the provider. Unsurprisingly, the implementation of service solutions seems to be more uncomplicated for a second or third service solution compared to the first. Another factor that can affect the lead time is if the procurement is in competition or if it is executed with a preferred provider. Customer-F2 first tried procurement in competition, but succeeded only after changing to a direct procurement. After the change, the procurement process went relatively fast. According to the literature, suppliers may act as organizers and integrators to support inexperienced customers [11]. But customers do not have to rely on experienced suppliers in all matters. They can also take other initiatives. Customer-C used an external expert to support the procurement process. Customer-F2 used highly respected change agents to execute significant organizational changes in the end-user organization. One special arrangement highlighted in the study is the business set-up in connection to Customer-C, where the manufacturer of the aircrafts uses a local service provider as the deliverer of the service solution. This provider did support
the contractor both during negotiations and as the main actor in the delivery of the service solution. The literature has also highlighted the role of (end-) users, which are claimed to be mainly interested in customization of the solution [18] and sometimes deeply involved in the development of solutions [20]. Customer-F2 seems to have under-used this potential, and thus it took approximately one year to find out the optimal number of aircrafts that had to be available simultaneously.

According to the literature, providers in a co-creating environment need to rapidly respond on unpredictable contingencies and changed requirements, provide continuous assistance, support and advice, and safeguard a trusting atmosphere [18]. Accordingly, the value experienced by the customer is not only related to the solution, but also to the process of exchange [11]. In the studied cases, unique competence was appreciated and the provider could also propose changes on different issues. For Customer-F1 propositions for modifications are especially highly valued and approximately 10% of the service-turnover is connected to modifications. Many of those are procured in competition, based on requirements from the solution provider. Two of the customers explicitly mentioned that they valued the cooperation with the provider. The requirements for operation planning may increase due to the procurement of service solutions. On the other hand, the procuring organizations seem satisfied with this requirement since they perceived that this would lead to increased operational maturity.

6. Conclusions

The purpose of this paper was to explore value perceptions among buyers of industrial service solutions for complex product platforms. This was specified in four research questions. The first concerns the goals customers expect to achieve. Direct monetary benefits are in focus for the customers interviewed, for various reasons they have difficulties in verifying if this cost goal has been fulfilled. Nevertheless, they are satisfied with the availability of commercially successful industrial service solutions and their own procurement of such services.

The second question concerns fulfillment of potentials. Generally, solutions appear to have a somewhat wider potential than in the studied cases. Various factors had forced customers to exclude parts of the product systems from the service solutions. Further, one of the cases indicates that sharing the product platform with other customers can decrease fixed costs for some service solutions, and this might be possible also for other customers.

The third question concerns indirect customer benefits. Providers’ unique competences seem to be highly valued among customers, and some customers were actually eager to learn from the provider. Further, contractual requirements on more strict procedures regarding operations (such as detailed and directive planning) can result in a more disciplined and cost-conscious customer and end-user organization.

The fourth question concerns enablers for co-creation. Close relationships during the procurement process are important for signaling capability to deliver service solutions. Further, the end-users seem to be an under-used, but important stakeholder also regarding contract issues. During the service delivery phase, improvement proposals from providers seem to be highly valued by customers.

The case study has several limitations. One of them is the limited amount of data. It would be highly valuable both to expand the study to other cases and to do more interviews in the cases.

References


