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# Procurement as driver of sustainable product-service innovation

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## Introduction

### Background

Transition towards sustainability requires radical changes in the way we produce and consume. By shifting focus in the buyer-seller situation from physical artifacts to the function to be provided, new systems may evolve, often referred to as product-service systems (PSS). PSS have potential to contribute to a sustainable society while also creating business opportunities and user/buyer benefits (Baines et al. 2007; e.g., Mont 2004; Tukker et al. 2006). A PSS includes a mix of tangible products and intangible services designed and combined so that they are jointly capable of fulfilling final customers needs (Tukker and Tischner 2006). However, the market adoption of PSS brings with it significant challenges. The demand side is still hesitant to ownerless consumption and the supply side faces economic and company culture-related challenges (e.g., Baines et al. 2007; Isaksson et al. 2011; Mont 2004). The role of the procurement function in overcoming some of these challenges has not been fully explored. The procurement function is in a position of strength in the value chain and has links to both developers and end-of-life actors and thus has a significant potential to drive change.

### Purpose

The purpose of this study is to illuminate how the potential of procurement practices to drive sustainable PSS innovation is currently exploited and, from that understanding, to suggest some improvements of the procurement function.

### Methods

This paper mainly builds on three case studies (Yin 2009) at two Swedish companies and one public organization. Two of the actors are viewed as customers and one is viewed as provider. Three cases, including a shift of focus from procuring or offering of pure physical products to procuring or offering of functionality, have been studied. Information was collected through semi-structured interviews. Additional understanding was gained through discussing also other cases in the interviews and through workshops

where several other organisations participated in addition to the above mentioned main case organizations. The interviewees and participants in discussions include procurers, sustainability managers, business developers and one product developer. A Framework for Strategic Sustainable Development (FSSD) (for references see Ny et al. 2006) has been used as a theoretical basis for the study.

## **Results**

### **Case study 1 - Provider of lighting to the public and private market**

#### **What / Background**

The company is in a process of shifting from offering long-life light sources to offering a total lighting solution with an increased energy saving potential, including, e.g., light control systems, education and financial support. To be able to offer a full lighting solution, a leading supplier of products and systems for lighting control has been acquired.

#### **Why / Incentives for selling functionality**

The main incentive is expected improved competitiveness by being able to offer a combination of increased sustainability performance and decreased life cycle costs through system solutions customized to the users' needs. A market survey on trends in professional purchasing criteria, commissioned by the company, points to durability and life cycle cost as the most important criteria. Additional customer feedback indicates that environmental impact and access to lighting expertise are aspects of increasing importance. This is reflected in the company's new value proposition; to sell total lighting solutions that include long-life low-energy lamps and that utilize the full energy saving potential of such solutions. Since the cost of replacing lamps is significantly higher than the purchasing price for any lamp, the economic argument for long-life lamps combined with control systems is strong. However, within public procurement the purchasing price is still the most significant factor (weighted as 90 % of all factors).

#### **How / Who**

A dialogue meeting is normally initiated prior to any new procurement process. In this dialogue the lighting provider presents its portfolio and often suggests criteria and motives for these criteria directly to the procurer. To create conditions for competition and remained credibility at least one other provider needs to be able to meet the criteria. In these early dialogues the presence of sellers and procurers is the norm, but occasionally a business controller from the provider also takes part. During the contract period the communication takes place mainly between purchasers (which are usually not the procurers that negotiated the contract) and regional sellers.

The company has 80 % of the public market for light sources in Sweden. However, the shift towards total solutions is slow within the public sector. The company perceives this sector as not being inclined to base decisions on the full life cycle cost. Also the private sector is perceived as slow when it comes to adopting total lighting solutions. Only two private customers within all of Europe currently lease total lighting solution. To quote the business developer of the case study company: *the customers are not ready yet.*

The company has decided 'to become a sustainable company', which includes involving their suppliers in the sustainability work. A code of conduct has been developed that the company uses when doing inspections at their suppliers. Regarding material handling, the company today pays an external actor for handling discarded lamps. Reuse of materials is currently not considered as economically profitable, although technically possible. The company does not believe that reuse of material will become economically viable in the future either, but recognize the possibility that customers will require reuse of the material. If so, the company believes this will lead to more expensive solutions for the customer.

## **Case study 2 - County Council for health care – procurement of a multifunction machine service**

### **What / Background**

The county council is shifting from procuring multifunction machines to procuring the functionality of that machine, including maintenance, spare parts and consumable spare parts (toner, etc). The functionality does not include electricity and paper. The shift also includes a huge reduction in the number of printers, since most personal printers will be replaced.

### **Why / Incentives for buying functionality**

The county council expect this procurement model to be economically preferable. This expectation is based on shared experience within a network of public procurers. The shift is also expected to reduce the energy consumption caused by printing, to decrease employees' exposure to hazardous substances and to free-up time among employees for more 'core purpose' tasks.

The county council has an environmental procurement policy and objectives for the procurement function but no formulated PSS strategy to outsource parts of the organization.

### **How / Who**

A pre-project group is formed with the aim to build acceptance for the shift within the organization by pointing to the incentives above. This process started two years ago and is still going on. When the final decision was taken, another project group was formed which currently set the tender specification including the criteria. Prior to the tendering process, a meeting with the main providers of multifunction machines was held. Officers from the procurement unit and an environmental security officer from the county council met with sellers from the providers. The purpose for the county council with this meeting was to get more general market information. No criteria or wider collaborations forms were discussed. In the contract that was later written, the county council has agreed to pay per printed paper. Furthermore, the provider will get more money per printed unit if the multifunction machines are used instead of the remaining personal printers.

The county council chose to set environmental criteria on the multifunction machines although they will not own them. The reason is that the machines will be placed on their premises and use their electricity. The environmental criteria are developed by a Swedish governmental expert body for sustainable procurement.

## **Case study 3 - Hotel – procurement a soap distribution system**

### **What / Background**

The company is in the process of procuring a combined soap/shampoo for the hotel rooms and a dispenser with the functionality to minimize the soap/shampoo consumption as well as total waste per hotel guest while keeping guests satisfied. The solution also includes a dispenser that is easy to handle and refill. This means that the provider should be able to sell a distribution system that minimizes the soap/shampoo consumption within it.

### **Why / Incentives for buying a function**

The added function of minimizing soap/consumption with remained hotel guest satisfaction is driven by a combination of sustainability performance and cost reduction reasons. The procurement manager does not chose to lease a soap system since this solution are found to be more costly and due to that this solution is not possible for the eco-labelled soap/shampoo the hotel company wants to procure.

### **How / Who**

The procurer eventually chose a new and small supplier. The chosen partner was found to be more responsive and flexible to adapt their product to the desires of the hotel company and was therefore regarded as a partner with which the company could work over time and develop the soap/shampoo system. The new solution now being developed is regarded as innovative by the procurement manager. The product as such exists on the market, but it is being refined and adapted to the desires of the hotel company.

The company is advanced as regards sustainability performance, and has chosen to communicate this via an eco-label. They therefore also require an eco-labelled soap/shampoo. The hotel company always share their definition of sustainability with the suppliers, and a code of conduct and supplier declaration are currently being developed.

The criteria for the soap/shampoo are developed and verified by an eco-labelling organisation with no connection to the procurement process. The hotel company collects credit points within the hotel eco-labelling systems if an eco-labelled soap/shampoo is procured.

## Main findings

The main findings from the studied cases can be summarized as:

- 1 The customers in the cases studied get added value by more customized solutions and reduced costs – all driven directly by the procurement function.
- 2 Providers can find new markets by focusing more on selling functionality and adding services based on their deep product knowledge.
- 3 Society at large also gain from the solutions in studied cases, since the procured product-service solutions will lead to reduced use of resources and reduced waste per satisfied need. However, the dialogues within the studied procurement processes misses to recognize how short- and long term win-win-win (provider – customer – society) situations can be built systematically by integrated solutions. Fundamental economic relationships create provider incentives for increased consumption and contracts are not written so that both the customers and the providers would benefit economically from supporting societal transformation towards sustainability.
- 4 The studied procurement functions indicate that the procuring actors do not have clear guidelines or routines that direct the procurement processes towards the final need of the procuring organization. For example, in case 2, printing is not the fundamental need. Instead it is to communicate, which printing is not always needed for.
- 5 The relative size on the market of actors involved or invited to dialogues seems to highly affect the innovation space and thus the outcome of the procurement dialogues.
- 6 The studied procurement practices and dialogues essentially only include one actor, the first tier, and other layers or presumptive value chain collaborators are either communicated with separately or not at all. Except for minimizing of waste, end-of-life solutions are not driven by the studied procurement functions. Moreover, the direct communications with the providers are primarily only involving the seller and neither business nor product developers are directly involved in pre-procurement dialogues.
- 7 No clear and solid and shared understanding of sustainability is informing the procurement dialogues.
- 8 The most prominent barrier to integrated, innovative and sustainability-driving solutions seems to be lack of experience and knowledge, as well as clear guidelines and organizational support for how the procurement function can exploit the full sustainability potential of PSS in a strategic way.

## Recommended guidelines

Our main recommended guidelines for procurement functions to be more driving of sustainable PSS innovation include:

- 1 The real need should be identified and used as a basis for all further dialogues.
- 2 A creative dialogue should be included prior to any competitive tender situation, informed by a robust and mutual understanding of (i) the real need, (ii) the possibilities of technology and business models to satisfy this need and by (iii) a shared understanding of sustainability and the long-term strategic business potential of sustainable innovation.
- 3 Dialogues in line with the above bullets should include a wider range of actors such as product developers, business developers, sustainability managers, sub-suppliers, end-of-life actors, transport/logistic actors, and if needed and possible professional criteria developers and professional financial advisors. This is to not miss the potential for integrated PSS solutions. These dialogues should embrace, e.g., the issues of shifted ownership, risks and opportunities and payment systems..
- 4 Contracts should be written so that they generate win-win-win situations; for providers, customers and society.
- 5 A long-term perspective needs to be considered to allow for predictability and management of risks and opportunities. This includes to understand where, in line with first bullets, the joint venture is heading and how current decisions could lay the ground for forthcoming solutions that are even more efficient as regards functionality, sustainability and economy. This also includes to avoid repercussions caused by abrupt changes of material costs, legislation, waste management, insurances, etc.

- 6 The dialogues and exchange of information should continue during the user phase for optimal management of risks and opportunities and to allow for further predictability as regards forthcoming procurement processes.
- 7 Top level support for procuring integrated product-service solutions should be expressed in the organization. Internal awareness of the procurement strategy and its objectives is important for what decisions that are taken on a daily basis.
- 8 If needed, a strategic actor is chosen to coordinate the PSS collaboration and with which the procuring organization writes the formal contract.
- 9 If criteria development at the procuring organization could coincide with the early phases of PSS development at the providers, there is great opportunity for win-win-win solutions.

A suggested procurement process is presented in figure 1.

## **Concluding discussion**

A shifted focus from procuring physical products to procuring the desired functionality may speed up the market introduction of system solutions. In turn, this may lead to higher performance as regards the desired functionality, lower costs for end-customers and reduced sustainability impacts per satisfied need. Procurement practices are developing towards being more driving of sustainable innovation, but the development has so far been characterized by small steps rather than by innovative and effective changes that would promote system solutions for the satisfaction of real needs (Leire 2009; Wijkman et al. 2011). This is confirmed in the case studies of this paper. At the same time, businesses exposed to increasing global competition recognize that competitiveness can be increased by adding services to the physical product based on their deep product knowledge and at the same time make the new business model harder to copy (e.g., Mont 2004).. However, there are challenges with realizing PSS and especially for successful offering of functionality. One major challenge is to understand the voice of the customer more profoundly than merely obtaining the requirements (Ericson 2007) and according to Tischner and Tukker (2006) “the starting question for any sustainable PSS consideration should be which consumer/customer needs to be fulfilled and how to create as much value as possible for the customer...”. The recommended guidelines of this paper, aims at creating a room within the procurement function to answer these questions and thus drive sustainable PSS innovation. The procurement function is in a position of strength in the value chain and has links to both developers and end-of-life actors and thus has a significant potential to drive change. To speed up the transition to sustainable consumption and production, an improved procurement process, including the above mentioned guidelines, is suggested in this paper.

The two companies and the public organization studied are advanced as regards sustainability performance. Therefore the shortcomings found, but not necessarily the strengths of the studied procurement functions, can be expected to be found in other organizations. Future work includes to more deeply explore how end-of-life activities can be driven by the procurement function so that win-win-win (provider – customer – society) solutions are recognized and realized, including the issue of ownership of the material.

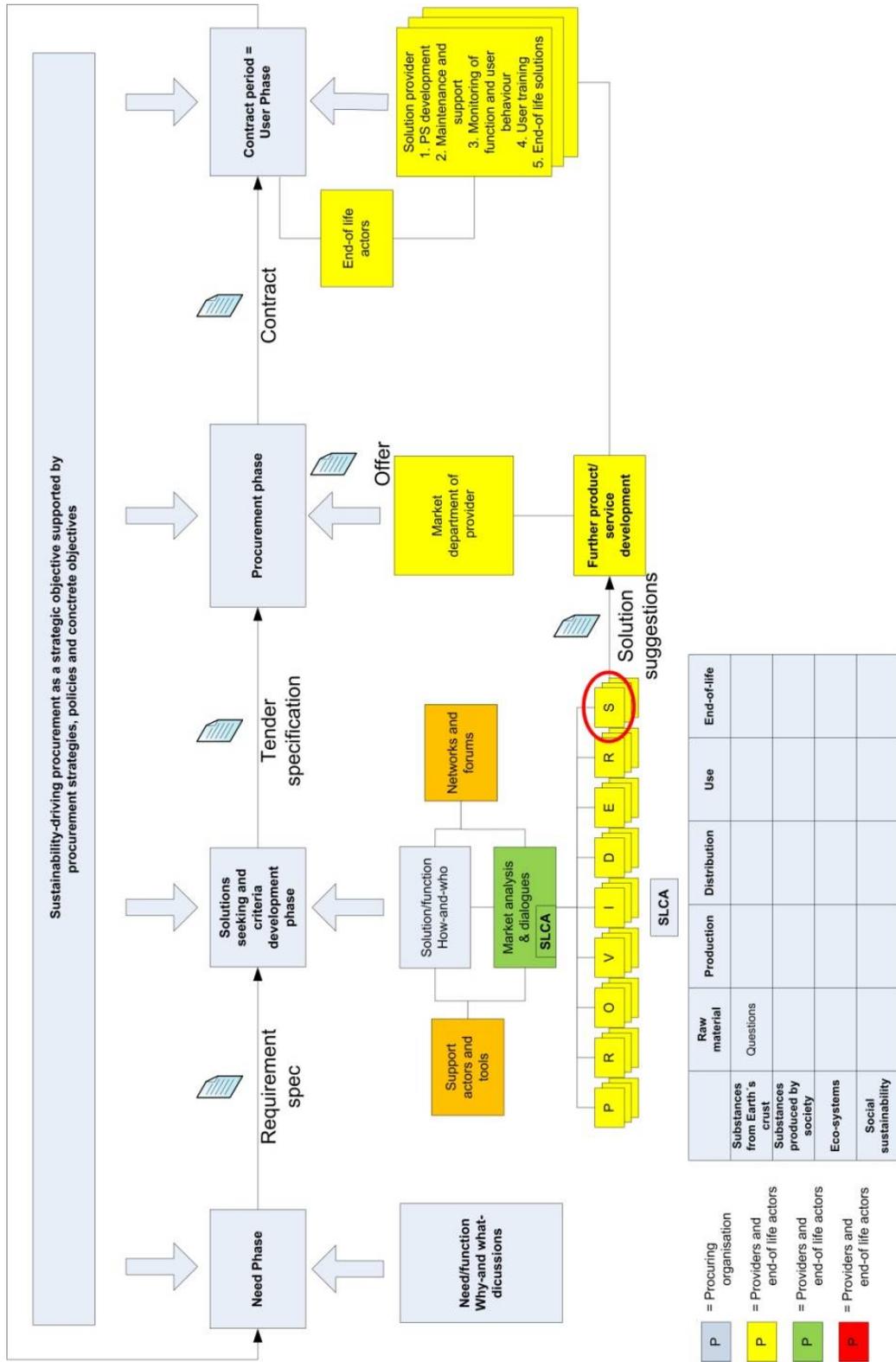


Figure 1

## References

- Baines, T.S., H.W., L., Evans, S., Neely, R., Greenough, R., Peppard, J., Roy, R., Shehab, E., & Braganza, A. 2007, "State-of-the-art in product service systems", *Journal of Engineering Manufacture*, vol. 221, no. 10, pp. 1543-1552.
- Ericson, Å. 2007, A need-based approach to product development, Thesis (PhD), Department of Applied Physics and Mechanical Engineering, Luleå University of Technology.
- Isaksson, O., Larsson, T., & Johansson, P. 2011, "Towards a framework for developing product/service systems", 3rd Cirp International Conference on Industrial Product Service Systems, eds. Hesselbach, J., and Herrmann, C., Braunschweig, Germany, pp. 44-49.
- Leire, C. 2009, Increasing the environmental and social sustainability in corporate purchasing - Practices and tools, Thesis (PhD), The International Institute for Industrial Environmental Economics (IIIEE), Lund University.
- Mont, O. 2004, Product-Service Systems: Panacea or Myth?, Thesis (PhD), The International Institute for Industrial Environmental Economics (IIIEE), Lund University.
- Ny, H., MacDonald, J.P., Broman, G., Yamamoto, R., & Robèrt, K.-H. 2006, "Sustainability constraints as system boundaries: an approach to making life-cycle management strategic", *Journal of Industrial Ecology*, vol. 10, no. 1, pp. 61-77.
- Tischner, U., & Tukker, A. 2006, "Towards an integrated approach to PSS design" in *New Business for Old Europe*, eds. Tukker, A., and Tischner, U. Greenleaf Publishing Ltd, Sheffield, pp. 338-349.
- Tukker, A., & Tischner, U. 2006, *New Business for Old Europe*, Greenleaf Publishing Ltd, Sheffield, UK.
- Tukker, A., van den Berg, C., & Tischner, U. 2006, "Product-services: a specific value proposition" in *New Business for Old Europe*, eds. Tukker, A., and Tischner, U. Greenleaf Publishing Ltd, Sheffield, pp. 22-43.
- Wijkman, A., Edman, Å., Henriksson, H., & Lundberg, S. 2011, Looking for the good deal - analysis and experiences of public procurement (in Swedish) SOU 2011:73.
- Yin, R.K. 2009, *Case Study Research - Design and Methods - 4th ed.*, Sage Publication, Thousands Oaks.