Challenges when developing services supporting the customers: The case of energy services

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Abstract

Energy services provided by energy suppliers have been identified as important in supporting sustainable development. However, the energy suppliers struggle in developing services that support the end-users energy efficiency, due to e.g. limited customer engagement and competition from actors with expertise in e.g. data analytics. The purpose of this paper is to investigate challenges faced by energy suppliers when developing services aimed at improving the end-users' energy efficiency. A single case-study identifies challenges for energy service development that relate to capabilities and organisation, respectively.

Keywords: Service development, End-users, Service supply chain

Background

Energy services carry a great potential to contribute to the transformation towards environmentally sustainable development. They link up-stream capability and technology to generate power based upon renewable resources to the down-stream ability to convert this into consumable units, and to even further improve end-user's energy efficiency through e.g. services or educational initiatives. By combining energy services with the growing area of service development, this paper provides a perspective on challenges facing energy suppliers when developing new services, as well as prerequisite needed to overcome these challenges.

Traditionally, the energy sector has acted as a "supply oriented system" (Gaspari et al., 2017) in that energy suppliers have focused on production and distribution of energy such as electricity and heating to both private household (B2C customers) and buildings and facilities management (B2B customers). Whilst much focus has been put on the technology and infrastructure needed to generate this, these providers have to a lesser extent focused on the commercial part and the user side of their supply chain. Driven by

multiple disruptive factors such as regulation, technological development and intensified competition from new players (e.g. Rymaszewska et al., 2017) the energy sector is now undergoing major changes. One response has been that energy providers are becoming more concerned with provision of energy services that contribute to decrease in the client's energy costs as well as improved energy efficiency (e.g., Marino et al. 2011).

Recent customer satisfaction studies in the energy sector suggest that customers take high quality energy delivery for granted, and that the competitive advantage of a certain energy provider builds on "everything surrounding the delivery" (Sverigekollen, 2017). Hence, customer satisfaction is related to experiences of how the energy is supplied – experiences created by the energy providers' services. Interestingly, though, the energy sector can be regarded as traditional in its approach to engagement with customers and end-users (e.g. Petri and Jacob, 2016); customer engagement regarded as limited. This opens for new actors with expertise in e.g. data analytics to enter the supply chain and potentially take a leading position in the customer-interface built on digital connectivity and remote technology (Grubic and Peppard, 2016). In summary, there is consequently a need for service-led development strategies (engaging with and understanding end-user expectations and experiences), as well as technology-led strategies (exploiting opportunities enabled by digitally connected devices). On the background of this, the purpose of this paper is to *investigate challenges faced by energy suppliers when developing services aimed at improving the end-users' energy efficiency.* To understand these challenges, this paper brings together the perspectives of energy services, servitization, and service development and improvement. The overall contribution lies in generating knowledge on service development that considers a particular context (cf. e.g. Biemans et al. 2016), in this case, energy services; and in extending existing literature on servitization and service development outside the manufacturing context, which it often focuses on.

Frame of reference

Conceptually, this study builds upon three pillars: energy services, servitization, and service development and -improvement.

Energy services: Energy is increasingly seen as a service (Hyytinen and Toivonen, 2015). Based upon a review of the energy literature, Fell (2017) presents a definition of energy services as "those functions performed using energy which are means to obtain or facilitate desired end services or states". Herein, energy services can be e.g. 'transport' or 'water heating', and the desired end services or states as being at a shop (location) or a hot shower. The Swedish Energy Agency suggests four main categories of energy services: (1) *Information*, e.g. about energy consumption; (2) *Analysis* of this information, and other contextual factors (building, etc.) at the customer end; (3) *Action/improvement efforts:* efforts that lead to improved energy efficiency, e.g. educational initiatives; (4) *Contracts:* contractual relationship with the energy user outlining terms and conditions for e.g. incentives and responsibilities. An example of *contracts* is provision of "thermal comfort" in buildings (Fell, 2017).

Whereas the context of energy focuses on "functions performed", the service literature, on the other hand, refers to services as an "application of specialized competences for the benefit of another actor of the self" (Lusch and Nambisan, 2015, p. 155). In a servitized context, services can support the product in use, the customers (e.g. Mathieu, 2001) or even entail the provider taking over the end-user's operations (Oliva and Kallenberg, 2003). Benedetti et al. (2015) combine the services and energy literature

and draw upon the Product-Service Systems classification by Tukker (2004). Product-oriented energy services are offered during the use phase and can include advice and consultancy on heating. For use-oriented services, the energy supplier takes over ownership and operation of e.g. the customer's heating system. Finally, result-oriented services would entail that the energy suppler takes over the energy management of the customers by offering comfort (Fell, 2017) rather than kilowatt-hour(s).

Servitization: The energy sector is undergoing changes such as market liberalization, a growing contribution of renewable energies, and flattening energy demand. This in turn calls for more innovative services as part of a new business model to support "the transition toward a more sustainable and decentralised energy sector because such plans [business models] encapsulate how suppliers, customers, and operators will interact" (Gaspari et al., 2017, p. 19). The transition, affecting the energy sector as a traditional supply-oriented system (Gaspari et al., 2017), pushes towards services (e.g. in energy efficiency) created in a customer-oriented system with the interface to the customer becoming increasingly critical. This transition resembles the servitization in the manufacturing context, referring to a transition from products to services as core of the customer offering (Smith et al. 2007; Smith et al. 2014). Servitization as a transition is challenging for many manufacturing firms as they have "typically exhibited a product or technology orientation and many of them are relatively new to a service logic" (Kindström and Kowalkowski, 2009, p. 157). In the following two areas related to servitization are in focus: capabilities and organization/processes.

Moving from basic services enhancing the performance of a product (services supporting the product, SSP) to more advanced services designed to enhance the customers own activities (services supporting the customer, SSC) entails changes in the capabilities and competences needed (Mathieu, 2001). Sousa and da Silveira (2017) show that more basic services (e.g. SSP) might be supported by manufacturing capabilities already existing in the firm, e.g. knowledge about product/process engineering, requirements over a product's lifecycle, and specialized production technologies. However, moving to more advanced services (e.g. SSC) requires specific service capabilities, supporting e.g. frequent customer interactions, service-centred employee values, and flexibility and speed in responses to customer complaints (Sousa and da Silveira, 2017).

Facing the need for new capabilities and supporting a service transition, some firms have created separate and dedicated service organizations (Sousa and da Silveira, 2017; Oliva and Kallenberg, 2003). In general, leadership commitment supports a service transition (de Brentani, 2001), and for service development in specific, it has been shown that a "service champion" can be a success factor in supporting the implementation of new services (de Jong and Vermeulen, 2003). Besides changes in in organizational structure, culture and customer relationships, the core processes of a firm, such as the development processes, also need to be changed (Gremyr et al., 2010).

Service development and improvement: This study follows the view of Biemans et al. (2016, p. 383) that service development and -innovation can be considered as synonyms and are defined as the process of devising a new or improved service, from idea or concept generation to market launch. A more instrumental view is provided by Lusch and Nambisan (2015) that view service innovation as a "rebundling of resources" into new resources (referred to as capabilities in this study) which is of benefits for actors in a given context (in this study referred to as organisation). For firms with proximity of services to physical products 'new service development' (NSD) is challenging, and it is

argued that product-centric/goods dominant processes such as new product development is not well suited to drive NSD (e.g. Biemans et al. 2016). Accordingly, purer services need a different approach for development and improvement. First, development processes need to be adapted to a service logic; second, customer involvement and engagement need to be in focus; and third, a multi-actor approach to development is needed.

First, from an early stage the literature on NSD has drawn on existing concepts stemming from a product-logic, such as quality (Edvardsson, 1997) and the notion of exploitation and exploration to characterize the process and output of NSD (Menor et al., 2002). Further to this, services should not be seen only as add-on to physical products, rather, pure services are also seen as key in the creation of new markets (e.g. Berry et al., 2006). The theoretical backbone of NSD has evolved further and has become associated with concepts such as organizational learning that supports NSD (Stevens and Dimitriadis, 2004), organizational learning that supports service improvements (Caemmerer et al., 2010), dynamic capabilities enabling service innovations (Kindström et al. 2013), and even service modes (Gremyr et al., 2014). In practice, all the aforementioned concepts could be encompassed in a NSD process if it is flexible enough to allow for new service ideas based on customer interactions in which customers' experiences and needs are captured (Kindström and Kowalkowski, 2009; Gremyr et al., 2014).

Second, as service innovation builds to a great extent on customer needs (Kindström and Kowalkowski, 2009) and customer orientation (Wang et al., 2016), a high level of proximity to the customer is needed. Such customer orientation is further encouraged by e.g. Kowalska-Pyzalska (2018), who calls for a good feedback system for users and suppliers to overcome barriers in developing innovative energy services. A key reason of focusing on the provider-customer interface of energy services is that *user acceptance* is a significant barrier to adoption of sustainable product-service systems (Vezzoli et al., 2015). The criticality of customer focus is enhanced when services are designed to support the customer's own processes (SSC), services that provide access to customers and insights into their needs (Salonen et al., 2017), but also challenge existing actor constellation at firm level and in the supply chain (Gremyr et al., 2017).

Hence, and third, the customer's role and the role structure in the service supply chain is changing, and service development is not limited by the boundaries of one a single firm but could rather be seen as a multi-actor phenomenon. As such, services have a strong inter-organizational connotation both with respect to service provision and development; Edvardsson (1997) refers to services as "produced in a customer process", and Carbonell (2009) explain how effectiveness of interacting with customers and customer involvement is relevant to NSD. Sampson and Spring (2012) regard service supply chains different from manufacturing supply chains; the characteristics of services entail that provider-customer relationships in the supply chain are "bidirectional" – customers are both receiving and providing resources into that constellation.

Research design

The challenges and processes for developing services that support the end-user can be seen as a contemporary phenomenon that connects the connects the customer-facing part of the organisation (i.e. energy services) with the underlying operations processes such as production and distribution of energy. An in-depth, single-case study was conducted to identify mechanisms, organisational principles, and ways by which energy services are developed and improved. The broad range in the organisational scope as well as the complexity of the service process itself, which has not been well-defined or articulated in

the case company, required a research design based on multiple sources of evidence: individual interviews across several divisions, document studies of both company reports (secondary evidence), and material and perspectives provided upon request of the research team (primary evidence), and collaborative meetings where cross-functional teams of the organisation met with the research team to both provide insight but also to discuss problem area as well as preliminary results.

The data collection process involved four steps. First, initial interviews with the key stakeholder in the organisation, namely the Research and development manager to identify a relevant focus. Second, a collaborative workshop was organised to introduce the research team, and for the case company to present their view on challenges and opportunities in their customer orientation and service development. Third, to prepare for the first interview round in the company, five divisions prepared written material that described current challenges and opportunities with regard to the topic of the project. At this stage, the case company also identified a set of four services for further scrutiny in order to ensure relevant depth in the study, but also to ensure that the study would capture both B2C and B2B as well as basic vs. advanced services. Fourth, a series of seven semi-structured interviews were conducted with different divisions in the case company (n=5) and customers (n=2). The unit of analysis is services and their underlying processes/mechanisms bound in the context of energy utility service provider.

Findings

The company operates in Sweden and is heavily vertically integrated by controlling up-stream operations of energy utility, production of energy sources such as heating and electricity, and down-stream delivery to the market of heating and electricity, as well as related services that aim to improve the customer's energy efficiency. In addition, growing market for e.g. e-mobility and PV-related services is considered as a pathway for further growth. The foundation of the company's delivery to the market is district heating, which is the primary focus of this study. Building on this, the company seeks to extend this delivery into different solutions that range from to basic services and control through operations and maintenance towards the provision of "comfort" in the customer's buildings. This study departs from extending the current offering of renewable energy towards energy services that help customers in improving their own energy efficiency requires energy suppliers to improve their *engagement with end-users* of energy. Rather than summarising the efforts that lead to that outcome as a service development process, i.e. following a strict view of an NSD, the results of this study are categorised by challenges related to capabilities, and organization and processes. Building on an understanding of service innovation as re-bundling of resources into capabilities that takes place in a given organisational structure, the findings can be summarised in two overall categories in Table 1 and 2.

Challenges related to capabilities: As regards the capability to develop and deliver services that support the end-user, a set of four challenges were identified as described in Table 1.

Table 1 – Challenges related to capabilities

Capabilities	Challenges
People resources needed to engage with customers and end-users	• Leakage • Gap • Fragmentation
Agility and responsiveness	• Have size to take lead, yet, however, not as fast as

	smaller providers • Too self-sufficient, lack sense of urgency to keep an eye on external actors • Large customers in the lead, not following their pace • Long time-to-market • Competitors taking the digital lead • Importance-feasibility gap of new initiatives, that come to a halt
Supply chain dynamics	• Lack of commitment (customers leaving, new intermediaries arriving) • Dependence (supplier power, customer lock-in)
Customer engagement	• Direct contact to customer and end-user • Lack of customer feedback processes that connect back to the organization. • Multiple feedback channels (bypass, disintegrated, multiple sources)

First, *people resources needed to engage with customers and end users* were regarded as critical. *Leakage* refers to key staff that move to a competing energy supplier. External *gap* refers to the difficulty of matching the level provided by competitors, but also to keep up with customer's needs to deliver complex systems and solutions as well as energy savings. Also, an *internal gap* exists between sales and technical skills. Whilst sales may be able sell solutions such as electric charging infrastructure (plug-in stations for electric vehicles) based upon new technology, the company still needs technical skills to support the dispersion of these services. Finally, *fragmentation* due to a split between customer contract management and technicians, that results in a lack of co-organisation of the service delivery. Another example is a number of divisions involved in both provision and development of services, however, the work between these two tasks is not well established. Perhaps more importantly, though, the group of staff that has direct, face-to-face contact with customers, and is engaged in daily problem solving, i.e. the technicians, are not a direct part of service development. Moreover, IT-based services that deliver information (about e.g. energy usage) to customers are a joint responsibility of market-facing functions, namely business development and marketing & sales.

Second, a need for an *agile approach* emphasises *responsiveness* (i.e. quality of responding to customer needs and market dynamics). Here, the interviews reveal that although the company as the size to take a lead in e.g. adopting new technology, it is not as fast small providers in both doing so and turning that into service offerings. One explanation of this is that the company is too self-sufficient and lacks a sense of urgency across divisions to keep an eye on external actors. As results, the time-to-market for new ideas can be rather long. Another call for responsiveness is that large customers take a lead in energy-related questions, and the case company finds it difficult to follow their pace. This is further enhanced when competitors take a lead in opportunities enabled by digitalisation. New initiatives that are mobilised through pilot projects come to a halt as it turns out to that the gap between importance and feasibility – many of these come to a halt for these reasons.

Third, the ability to address supply chain dynamics constitutes yet another challenge for the development of services supporting the customer. One aspect herein is lack of commitment amongst actors in the supply chain; large customers are not renewing their contracts, and new intermediaries and service providers arrive to the market for energy services to fulfil needs, often driven by digitalization trends, that cannot be

accommodated by the current supplier base. Dependence upon customers and supplier does also influence the supply chain dynamics. A supplier-dominated power position arises from the company's lack of *access* to new technology such as control functions (provides real-time information of installed-base and allows for remote access) or need to make *use* of small-scale technology such as solar cells in combination with other offerings such as district heating. The dependence exists also at the customer end. A lock-in effect may occur when the company enters long-term solutions with customers by *combining* e.g. district heating with customers own heat pumps to increase the possibility of e.g. seasonal storage of heat (during summer to be used during winter). This reduces demand peaks at the energy supplier end but allows also for improved energy efficiency, and likely economic gains, at the customer end.

Fourth, *customer engagement* capability underlines the need to achieve and maintain *direct* contact with customers and end-users, which must be supported by customer feedback processes that connect back to relevant divisions in the case company. Moreover, customer engagement that supports service development must overcome the drawbacks of having multiple feedback channels, which include customers bypassing relevant divisions, lack of integration amongst divisions, and existence of multiple sources of customer feedback (ranging from censor created data to user's own experience).

Challenges related to organization and processes: For this category, Table 2 summarizes a set of three challenges emerged from the analysis of the empirical evidence.

Table 2 – Challenges related to organization and processes

Organization and processes	Challenges
Dedicated role	• Time allocation: Stuck in admin, no time for development • Clear mandate to a role dedicated to 'product owner' (or product manager) • Consolidate in a division • Organizing for effective customer feedback processes • Focus: less internal, more on external environment and development
Sales channels alignment with service offerings	• Great variety in sales channels relative to customer usage • Sales channels not developed to support services • Customer-interface bigger than the sales channels • Become more proactive towards large customers and sell more of existing offerings.
Service strategy	• Direction: Lack of strategic point of reference for sales and delivery • Priorities: Consensus about what to prioritize and how to prioritize during product development • Focus: Focus on operations leads to great variety in tasks and lack of focus in improving energy efficiency

First, a *dedicated role* is needed to drive service development, which ranges from time allocation to individuals through giving a clearer mandate to a new role of 'product owners' responsible for both service delivery and development towards consolidation of product (or 'service') development in a new division. A related challenge is to revert from much internal focus towards focus on external environment and development. Also,

currently, customer feedback is generated by a number of divisions and individuals, which calls for a more effective organisation.

Second, *sales channels* need to be *aligned with service offerings*. The variety of sales channels is greater than the relative customer usage of these. Further, current channels have not been developed to support service development but focus on sales activities. One opportunity mentioned is to be more proactive towards large customers and try to sell more of existing offerings. Hereby, the respondents are not only emphasising services but rather the service exchange as key of alignment between channels and offerings. Finally, it appears from the interviews that the customer-interface of the company is much larger than the sales channels account for.

Third, a call for a more explicit *service strategy* was issued by the respondents to create a clearer *direction* for both sales and delivery of services. This should also guide priorities towards advanced services and service development rather than get caught in technical problem solving of tasks that are not relate to the core activity of the company (e.g. replacing filters vs. focus on energy efficiency improvements).

Discussion

In a market characterised by large changes, transitioning from a traditionally supply-oriented approach to a one focusing on service provision induces changes in many aspects, e.g. business models (Gaspari et al., 2017), organisational structures (Sousa and da Silveira, 2017), and actors needed in the supply chain (Grubic and Peppard, 2016). This paper identifies challenges faced by energy suppliers when developing services aimed at improving the end-users' energy efficiency; challenges related to capabilities, as well as to organisational structure and processes.

The challenges related to capabilities capture to a large extent the radical change needed to move from a supply-oriented to a customer- and service oriented organisation. Rebranding is not enough to support such changes; new capabilities are needed. All four capability-related challenges point to the need to enhance the provider-customer interface of energy services, confirming the criticality of "user acceptance" for sustainable product-service systems (Vezzoli et al., 2015). First, *people resources are needed that engage with the customers and users*; currently, service development has presence in market-facing functions, however, does to a lesser extent engage those who have direct technical contact with customers/end-users. Accordingly, the customer-engagement capability must be related to both service and information, i.e. marketing and sales, and then technology and problem-solving capability. Second, *agility and responsiveness* become critical, both to be able to compete with new actors at the market and to prevent customers form building their own internal units for provision of energy services. Third, *supply chain dynamics* are needed to face competition from new intermediaries as well as being responsive to customers and maintain their loyalty. Fourth, energy suppliers that have traditionally been in a monopoly situation and now face market liberalization (e.g. Rymaszewska et al., 2017), need to establish direct contact with customers and build capabilities for *customer engagement*. As argued by Sampson and Spring (2012), customer engagement need to be "bidirectional", in the energy supplier studied there is a bi-directional relationship, although limited to the specific interface between technicians and the customers. To exploit the potential in this interface, organisational structures and processes that support the use of the knowledge arising in this interface is needed.

Focusing organizational structure and processes three areas of challenges have been identified. First, a *dedicated role* focusing on service developments is about to be installed at the energy supplier studied. Many of the interviewees point to the need of someone with a clear mandate to act as 'product owner', similar to a service champion (de Jong

and Vermeulen, 2003). Such a role could also act in a way that consolidate efforts in the energy services area, having a dedicated organisation aligned to the logics of services (Sousa and da Silveira, 2017; Oliva and Kallenberg, 2003). Further, leading more practice-oriented work e.g. ensuring in creating a good feedback system in line with Kowalska-Pyzalska (2018) arguing the necessity of such a system to support development of innovative energy services. Second, *sales channels need to be aligned with service offerings*, in some cases the services provided are well-developed and established but the service sales and exchange is in need of development. As one example, the technicians' knowledge of what customers that can benefit most from energy services are not used as input to priorities of target customers. Third, there is a need of a *service strategy* to support internal priorities (linked e.g. to the challenge concerning people resources), and to provide sense of directions.

This paper contributes to knowledge on service development in the energy services, by identifying challenges arising in the transition of energy suppliers from supply-oriented to service-oriented organisations. Future research could further study these challenges and focus on the prerequisites needed to overcome them. In addition, the view of SDL, value is defined by the beneficiary (Vargo et al., 2017). Further studies on advanced services provided by energy suppliers, on the other hand, rely upon a dual recognition of the business model: provider produces energy and at the same time offers services to improve the customers energy efficiency.

Conclusions

This paper presents seven areas of challenges faced by energy suppliers when developing services aimed at improving the end-users' energy efficiency. Challenges related to capabilities are: *people resources needed to engage with the customers and users*, *agility and responsiveness*, *supply chain dynamics*, and *customer engagement*. Moreover, three areas of challenges attributed to organizational structure and processes have been identified, namely: lack of a *dedicated role*, *sales channels alignment with service offerings*, and the need of a *service strategy*.

References

Benedetti, M., Cesarotti, V., Holgado, M., Introna, V. and Macchi, M. (2015), "A proposal for Energy Services' classification including a Product Servcice Systems perspective", Procedia CIRP 30, pp. 251-256.

Berry, L.L., Shankar, V., Turner Parish, J., Cadwallader, S., and Dotzel, T. (2006) "Creating New Markets Through Service Innovation", *MIT Sloan Management Review*, Vol. 47, No. 42, pp. 56-63.

Biemans, W. G., Griffin, A., Moenaert, R. K. (2016), "New Service Development: How the Field Developed, Its Current Status and Recommendations for Moving the Field Forward", *Journal of Product Innovation Management*, Vol. 33, No. 4, pp. 382–397.

de Brentani, U. (2001), "Innovative versus incremental new business services: different keys for achieving success", *The Journal of Product Innovation Management*, Vol. 18, No. 3, pp. 169-87.

Caemmerer, B., and Wilson, A. (2010), "Customer feedback mechanisms and organisational learning in service operations", *International Journal of Operations & Production Management*, Vol. 30, No. 3, pp. 288-311.

Carbonell, P., Rodríguez-Escudero, A. I. and Pujari, D. (2009), "Customer Involvement in New Service Development: An Examination of Antecedents and Outcomes", *Journal of Product Innovation Management*, Vol. 26, pp. 536-550.

de Jong, J.P.J. and Vermeulen, P.A.M. (2003), "Organizing successful new service development: a literature review", *Management Decision*, Vol. 41, No. 9, pp. 844-58.

Fell, M. J. (2017), "Energy services: A conceptual review", *Energy Research & Social Science*, Vol. 27, pp. 129-140.

Gaspari, M., Lorenzoni, A., Frías, P., and Reneses, J. (2017) "Integrated Energy Services for the industrial sector: an innovative model for sustainable electricity supply", *Utilities Policy*, Vol. 45, pp. 118-127.

Gremyr, I., Halldórsson, Á., and Hsuan, J. (2017), "Services supporting the customer: actor constellations and interaction mechanisms", 27th Annual RESER Conference, September, Bilbao, Spain.
Gremyr, I., Löfberg, N., and Witell, L. (2010), "Service Innovations in Manufacturing Firms", *Managing Service Quality*, Vol. 20, No. 2, pp. 161-175.
Gremyr, I., Witell, L., Löfberg, N., Edvardsson, B., and Fundin, A. (2014), "Understanding New Service Development and Service Innovation through Innovation Modes", *Journal of Business and Industrial Marketing*, Vol. 29, No. 2, pp. 123-131.
Grubic, T. and Peppard, J. (2016), "Servitized manufacturing firms competing through remote monitoring technology: An exploratory study", *Journal of Manufacturing Technology Management*, Vol. 27, No. 2, pp.154-184.
Edvardsson, B. (1997), "Quality in new service development: key concepts and a frame of reference", *International Journal of Production Economics*, Vol. 52, No. 1/2, pp. 31-46.
Hyytinen, K. and Toivonen, M. (2015), "Future energy services: empowering local communities and citizens", *Foresight*, Vol. 17, No. 4, pp.349-364.
Kindström, D. and Kowalkowski, C. (2009), "Development of industrial service offerings: a process framework", *Journal of Service Management*, Vol. 20, No. 2, pp. 156-172.
Kindström, D., Kowalkowski, C., and Sandberg, E. (2013), "Enabling service innovation: A dynamic capabilities approach", *Journal of Business Research*, Vol. 66, pp.1063–1073.
Kowalska-Pyzalska, A. (2018), "What makes consumers adopt to innovative energy services in the energy market? A review of incentives and barriers", *Renewable and Sustainable Energy Reviews*, Vol. 82, No. 3, pp. 3570-3581.
Lusch, R.S., and Nambisan, S. (2015), "Service innovation: a service-dominant logic perspective", *MIS Quarterly*, Vol. 39, No. 1, pp. 155-175.
Marino, A., Bertoldi, P., Rezessy, S. and Boza-Kiss, B. (2010), "A snapshot of the European energy service market in 2010 and policy recommendations to foster a further market development", *Energy Policy*, Vol. 39, No. 10, pp. 6190-6198.
Mathieu, V. (2001), "Service strategies within the manufacturing sector: benefits, costs, partnerships" *International Journal of Service Industry Management*, Vol. 12, No. 5, pp. 451-475.
Menor, L. J., Tatikonda, M. V., and Sampson, S. E. (2002), "New service development: areas for exploitation and exploration", *Journal of Operations Management*, Vol. 20, pp. 135–157
Oliva, R. and Kallenberg, R. (2003), "Managing the transition from products to services", International *Journal of Service Industry Management,* Vol. 14, No. 2, pp. 160-72.
Petri, J. and Jacob, F. (2016), "The customer as enabler of value (co)-creation in the solution business". *Industrial Marketing Management*, Vol. 56, pp. 63-72.
Rymaszewska, A., Helo, P., and Gunasekaran, A. (2017), "IoT powered servitization of manufacturing–an exploratory case study", *International Journal of Production Economics*, Vol. 192, pp. 92-105.
Sampson, S.E.; Spring, M. (2012), "Customer roles in service supply chains and opportunities for innovation", *Journal of Supply Chain Management*, Vol. 48, pp. 30–50.
Salonen, A, Saglam, O., and Hackling, F. (2017), "Servitization as reinforcement, not transformation", *Journal of service management*, Vol. 28, No. 4, pp. 662-686.
Smith, A.M., Fischbacher, M., and Wilson, F. A. (2007), "New Service Development: From Panoramas to Precision", *European Management Journal*, Vol. 25, No. 5, pp. 370–383.
Smith, L., Maull, R., and Ng, I. C. L. (2014),"Servitization and operations management: a service dominant-logic approach", *International Journal of Operations & Production Management*, Vol. 34, No. 2, pp. 242 – 269.
Sousa, R., da Silveira, G.J.C. (2017), "Capability antecedents and performance outcomes of servitization: Differences between basic and advanced services", *International Journal of Operations & Production Management*, Vol. 37, No. 4, pp.444-467.
Stevens, E., and Dimitriadis, S. (2004), "New service development through the lens of organisational learning: evidence from longitudinal case studies", *Journal of Business Research*, Vol. 57, pp. 1074–1084.
Sverigekollen 2017, Sammanfattning av SKI:s branchrapporter 2017, http://www.kvalitetsindex.se/wp-content/uploads/2017/12/Sverigekollen2017.pdf, accessed 10 April 2018.
Tukker, A. (2004), "Eight types of product–service system: eight ways to sustainability? Experiences from Suspronet", *Business Strategy and the Environment*, Vol. 13, pp. 246–260.
Vezzoli, C., Chesin, F., Diehl, J. C., and Hohtala, C. (2015), "New design challenges to widely implement 'Sustainable Product-Service Systems'", *Journal of Cleaner Production*, Vol. 97, pp. 1-12.
Wang, Q., Zhao, X., and Voss, C. (2016), "Customer orientation and innovation: A comparative study of manufacturing and service firms", *International Journal of Production Economics*, Vol. 171, No. 2, pp. 221–230.