SUPPLY CHAIN OF PRODUCT-SERVICE SOLUTIONS - CASE STUDY

MATUSEK Mirosław[1]

Silesian University of Technology, Faculty of Organisation and Management, Institute of Management, Administration and Logistics, Zabrze, Poland, EU, mmatusek@polsl.pl

Abstract

The main purpose of the paper is identify the key actions of servitising manufacturers in the supply chain market business-to-business context. The chosen method for this paper is an explorative, in-depth, single case study. It adopts a case study in the product-service supply network of multinational company operates in in the field of industrial automation and dedicated IT solutions for its products. It was assumed that due to the growing range of services offering by producers and the increased role of interaction with intermediaries, competitors and customers, one can specifies activities that are crucial for them. At the end of the paper, the conclusions in terms of the theoretical contributions and managerial implications are presented.

Keywords: Supply chain, services, case study

1. INTRODUCTION

For several decades in business practice and management field, the growth trend of specialisation of enterprises has been observed. As a result, there is a need for access to resources available to outside companies. Academics, using the resource-based view, stressing the importance of and the need to focus on the key resources and competencies. [1, 2, 3] The nature of servitisation dictates that it is mainly used by organisations that supply complex, long-life products that require through-life support.[4] Manufacturers, suppliers, intermediaries and customers are mutually connected by three levels: actors, their activities and resources.[5, 6] In place of the individual transactions, the focus has moved towards a relational exchange (co-creating value) and building long-lasting business relationships.[7] This trend is consistent with the characteristics of the phenomenon of servitisation. In general, the concept of servitisation is understood as an increase in the share of services in the structure of the researched phenomenon. [8] In manufacturing companies, servitisation is the development and delivery of innovative solutions through integrating the goods and services. The manufacturing company moves from exchanging goods with the customer toward delivering solutions. It can be said that this allows companies to try to gain competitive advantage not through low cost or distinctive quality, but by changing product and market strategy [9] and creating a more sustainable approach to business [e.g. 1, 10, 11, 12]. As a result, companies are able to provide customers with a broader range of offerings, increased sales revenues and increased profitability. [13]

Studying the phenomenon of changing the business model of manufacturers towards service-oriented business is still at an early stage and requires further effort to know it. [13] The cognitive gap results for at least three reasons. First, knowing the essence and defining what (industrial) services are, as opposed to goods, is still insufficient. In addition, the use of theories and techniques already developed in “pure” service industries (such as banking, commerce, healthcare, etc.) directly to industrial services is often impossible to apply. Manufacturers of industrial goods, to transform themselves into suppliers of servitised products (integrating goods and services into solutions) must face the challenge of choosing the right manner of delivery. Secondly, research into the transformation of manufacturing companies towards service dominant logic focuses primarily on changes within the organisation. It examines configurations such as organisational culture, human resources management, organisational structure, information systems and decision-making processes.[14] However, the transformation from goods dominant logic to services dominant logic requires changes both within the organisation and external relationships with suppliers, customers or competitors.[6, 8, 15] Supply

chain literature suggests closer coordination between its actors and a greater degree of integration of the supply chain.[e.g. 6, 16] Ellram et al. (2004) suggest that the differences in the delivery of solutions already require specific supply chain management strategies. Unfortunately, research into the integration of supply chains of goods and services is often carried out separately for them. [18]

In this paper is assumed that the phenomenon of servitisation affects the structure of the supply chain. Due to the growing range of services offered by manufacturers and the growing role of interaction with intermediaries, competitors and customers, it is possible to identify key processes within supply chains for servitised products.

Hence, the main research question in this article is: what are the key activities of manufacturers on the path of service provision in the business-to-business (B2B) supply chain in categories such as the content of the proposed offer to customers and the operations and processes required to deliver the product or market services?

In the rest of the article the research design and sample was described (section 2). The case study findings are in section 3. In section 4. analysis of the results obtained were presented. Implications for logistics filed and practice as well as the limitations of this research are discussed in Conclusion, too.

2. RESEARCH DESIGN AND SAMPLE

A case study, one of the qualitative scientific research methods was selected for the research. This case study is an empirical inference that affects the phenomenon in its natural context, especially when the boundary between the case study and its context can not be uniquely defined. [19] In the literature, the case studies are perceived as an attractive method for solving problems in the field of economics, business theory, strategic management, organisational culture, decision making, networking, strategic marketing and international management. In this case, qualitative research provides an empirical, in-depth insight into the structure of the global supply chain in the context of the servitisation phenomenon. The case study is well suited to research in new areas and/or in the case of unrecognised areas of knowledge about the complex phenomenon (herein, the phenomenon of servitisation and a global network of enterprises consisting of many entities). As emphasised in the literature, the choice of a qualitative approach is not due to the researcher's preferences. The use of this method should be based on the nature of the research questions raised. R. Yin (2013, p. 10) recommends using the case study method in situations where it is necessary to find answers to exploratory questions, such as "how" and "why". In the research described, the research question was formulated as: what key actions on the manufacturer's side are implemented within the structure of the global supply chain of servitised products?

Case study was performed through semi-structured interviews. Then, on the occasion of the annual partner meetings, a workshop was organised to verify and supplement the data collected during previous interviews. Semi-structured interviews were used as the main method of data collection (n = 12). However, other sources of data such as workshops, source documents provided by the company, and information on the official website of the investigated company and intermediaries were used to validate the data collected to ensure the reliability of the study.

Respondents were selected on the basis of their role in the company. Informants included the employees responsible for new products and services development, sales and marketing, establishing and developing partnerships with suppliers/distributors and other intermediaries in the supply chain.

The informants were mainly managers (n = 8) but also workers at operational level (n = 4). The interviews focused on topics such as internationalisation, sales and marketing, customer relationship management and collaboration with intermediaries. The interviews focused on the characterisation of the product and service offerings offered by the company, their authorised distributors and dealers and the forms of their cooperation

in practice. They were also asked to identify factors that would favour and impede cooperation with intermediaries. The time of interviews ranged from 1 hour to 2 hours.

3. CASE FINDINGS

The company is a manufacturer of industrial automation and IT solutions. In addition, the company is a leading global supplier of industry solutions for drive technology, control and software. The scope of services provided by the surveyed company includes: sales, technical advice, technical support 24/7, management of install base projects, implementation of comprehensive production systems, customer and partnerships training at both primary and advanced levels. Its services and products are delivered to more than 80 countries around the world. The company employs around 22,000 employees, its annual revenue for 2014 was 6.62 billion U.S. dollars (with a net income of over 800 million U.S. dollars). The manufacturer's customers are manufacturing and service companies from various industries. To list but a few, they include: heavy industry, transport, food and catering, pulp and paper, electronics, telecommunications, automotive, pharmaceutical and medical technologies. Its production facilities include, inter alia, in USA, Mexico, China, Poland. In Poland, it has two production sites, a software development centre, a technical support centre, a financial service, a sales and service centre.

In order to meet individual customer requirements, the company actively develops a network of relationships with partners whose role is to support the broadening of the offer through their capacities and competencies in various industries and the possession of technological know-how. To this end, various affiliate programs were developed and implemented. They support the creation of enterprise networks that participate in the development and delivery of servitised products. Delivered servitised products help customers increase productivity, support innovation and sustainability. By developing an affiliate program, a company can offer a wide range of solutions, create conditions for easier access to knowledge (for himself, and for their partners and customers) and improving customer business results. The multipartner network of focus firm consists of: 1. strategic alliances, 2. sales and supply companies, and 3. companies providing additional products and technologies. Below is a brief description of their characteristics.

Strategic partners form four companies (leaders in the global market in their respective industries), covering the following areas: 1. IT networks, 2. instrumentation for process measurement (control and measurement equipment), 3. software, information and IT technologies, and 4 Physical IT infrastructure. Such partner configurations allow you to integrate your competencies into the solutions offered, including intelligent solutions, Internet things, data security, convergence of telematics networks, cloud computing, Big Data analysis, virtualisation and mobility. Developed customer solutions contribute to their development through initiatives so-called as “Industrie 4.0” (in Europe) and Smart Manufacturing Leadership Coalition (in USA). In this way, customers receive value in the form of "Time to Market," improving and optimising financial performance, improving product life-cycle, improving productive processes, remotely solving problems (optimising travel costs), and improving overall equipment effectiveness (OEE).

Original Equipment Manufacturer (OEM) partners is a network of manufacturers of machines and production lines and their instrumentation. The researched company is expanding its offer by accessing innovative machinery and equipment that can be easily integrated into existing production operations. The company works with many OEMs around the world who design (also together with the researched company), create and deliver innovative tools and solutions that deliver value to customers.

The developed system of co-operation with OEMs in the course of its development imposes the need to give the partners a proper rating (status). Each OEM is assigned a status from "Supplier", through "Participant" to "OEM Partner". The latter are the most committed in OEM-vendor relationships, using the products of the investigated company as part of their product portfolio.

Another group of partners are companies that provide additional products and technologies. This category of suppliers provides products that extend and/or improve the solutions provided by the investigated company. This allows you to combine the technical and commercial resources of your researched business with your partners, while creating a path for information exchange and the development of new solutions. Partnering with a co-operation program must meet several key criteria. Products offered by a partner must extend the functionality of the test enterprise's products, enhance and extend existing solutions through built-in architecture compatibility offered by the investigated company, or be a key component to support customer service in industries in which the company may or may not exist.

The next group of participants in the supply chain are integrators of system solutions. This is a way to gain access to businesses (and, above all, to industry-specific engineers who understand customer needs) that have the ability to deliver solutions to their customers. For systems integrators who have joined the program, the company under study offers a product support program, training support for the capabilities and application of new technologies. As in the case of OEM companies, a co-development program of three levels has also been developed here. The first includes the ability to offer and sell software including their own products and acquire the competence to develop them. The second level includes integrators who have acquired the required competencies and have the required knowledge of the product offering, and commit themselves to mutual relationships with sales units and/or distributors. The third, highest level of engagement concerns the integrators who are leaders in the industry, who have acquired the highest competencies and knowledge of the product offering, and who offer solutions that complement and/or expand.

The last identified group of participants are authorised distributors. They have knowledge of the products and solutions offered by the surveyed company and other (previously mentioned) partners. Their primary task is to provide assistance in the design, implementation and support of automation investments. In addition, distributors are local training centres, where both open and dedicated workshops are run for the specific customer. Distributors often have their own sales network in a given country and therefore know local and regional practices. With this knowledge, they provide a supply chain structure tailored to the specific needs of the customers. Knowledge of product offerings and solutions allows for quick and complete transfer of know-how directly to end users (system integrators, machine manufacturers, too) in the country.

4. DISCUSSION

The discussion below on the results of the study was limited to two (from the four previously mentioned dimensions) of the integrated product and service offerings, i.e. the scope of the offer and the processes required to deliver it to the customer.

While the company in question aims to maintain a consistent brand image, it cares about tailoring its offerings to local circumstances - the needs of different markets and groups of business customers. Respondents as the key to success in servitising have indicated the need to acquire knowledge of local markets and business clients. This knowledge is needed to differentiate the offers due to the needs of the customers. Not all markets are mature enough to implement complex solutions or knowledge-based services. With this situation, the manufacturer often has to deal with developing or under-developed countries. Therefore the callers emphasised the "basic" service. Spare parts supply or maintenance also have a significant impact on the success of servitising.

Difficulties in access to knowledge about local markets have been identified as difficulties in servitising. This knowledge is mainly collected by intermediaries (distributors, system integrators) and is not always complete and may not reach the manufacturer in a timely manner. In addition, if the offer consists of more than one service, the manufacturer may find it difficult to find intermediaries who understand and are able to present and sell it to customers. This is due, among other reasons, to the need to involve employees with different competencies for different customer segments and different solutions. From distributors and system

integrators, you can learn the wide repertoire of your products and services. They are owned not only by the manufacturer but also by his other strategic partners in the supply chain. In turn, the development of new products and services requires managers, responsible for the development and continuous decision-making on changing the way sales and delivery solutions are managed.

In terms of implemented processes and operations, the respondents stressed the need to focus on developing and improving existing processes (effectiveness) with an emphasis on customer focus. It should be noted that the researched enterprise is already at a higher level of maturity of the servicing process. Efficiency is achieved by standardising services or optimising logistics processes. Expect other answers to the business at its earliest stages. It can be expected that those who are starting to develop servitisation will rather focus on gaining new markets and building processes and operations in the global supply chain. As was the case with the scope of the offer, and with service processes, their development requires local orientation. Due to the cost of customer service, it is often more efficient to enter into contracts with local distributors. This, in turn, forces manufacturers to seek effective technical support solutions and provide training to intermediaries. Such research opportunities are also sought by the company by developing remote services that it can provide without being present in the local market. Further, in the case of solutions requiring very specialised knowledge (i.e. knowledge-based services), the manufacturer may choose to provide such solutions without the intermediaries. Despite the justification for the use of intermediaries close to the customer, the fact that the manufacturer is not in direct contact with him, causes serious problems for him. This is especially important if one takes into account that increasing customer orientation is crucial in the servitising process. The more intermediaries there are between the manufacturer and the customer, the more customer knowledge is dispersed. The manufacturer must constantly struggle with the coordination and collection of relevant, up-to-the-minute, real-time information. The respondents pointed out that it is not always possible to trust the credibility of the knowledge transferred by the distributors. Intermediary cooperation with the manufacturer depends on the proximity of its (dealer) to the customer, acquired knowledge from long-term customer relationships, and thus its position in the supply chain. Hence, partners are not always willing to convey credible knowledge, especially knowledge that would act against their interests and threaten their position in the supply chain.

5. CONCLUSION

The supply chain of services and solutions is fundamentally different to chains or production networks. Many models and solutions that are successfully used in the latter often can not be used in supply chain management of integrated solutions for goods and services. The purpose of the research was to identify the key tasks of the manufacturer in the supply chain in the four dimensions of such an offer, i.e. its scope, operations and the processes necessary to deliver it to market, customer experience and the effect of the solution provided. This article is limited to discussing the first two.

During the process of servicing where there is a change in the business model the offer presented to the customer and the nature of the exchange with the customer changes also in all elements of the concept of the integrated solution. The research results are supplemented by knowledge in management sciences, particularly in supply chain and marketing. The results of the study identified the key activities of companies that provide integrated solutions consisting of a combination of goods and services, through a global supply chain. The results suggest that in such situations tailoring the offer to local conditions is an aspect that requires special attention from the managers of the manufacturing companies. Among the key tasks are: understanding customer needs, customer relationship management, coordination of delivery solutions, co-production with various network partners.

Frequent lack of direct contact between the manufacturer and the customer, especially from the perspective of services and solutions, reveals challenges in customer service, delivery and value. Knowledge, especially customer knowledge, access to it and ways of sharing it, appear as key resources and actions. An empirical case study analysis confirmed the assumptions articulated in previous studies. Thorough understanding of

customer needs requires a focused effort to share the intermediaries with the manufacturer of hidden knowledge. It can therefore be said that effective exchange of knowledge should be regarded as a necessary precondition for the success of the change of the manufacturers' orientation of the "push" of products by intermediaries towards the delivery of servitised products.

It should be noted that like most studies, this study has its limitations. The first limitation is the number of companies participating in the study. Choosing one case study is a big limitation in the generalisation of the results. Nevertheless, the results obtained, even on the basis of one case study, may be applied to similar undertakings in a similar context. The results of the study suggest that servitisation has an impact on the producers themselves, their actions or the structure of the supply chain. This justifies continuing research in this area. As potential areas for further research, we can point to: 1. examine the relationship between different types of product and service offerings (e.g. product oriented services versus knowledge-based services, standardised services vs. personalised services) and supply chain organisation, or 2. search for global sustainability and the local aspect of the manufacturer's actions in the global supply chain.

REFERENCES

[1] BAINES T. S., LIGHTFOOT H. W., BENEDETTINI, O., KAY J. M., The servitization of manufacturing: A review of literature and reflection on future challenges, Journal of Manufacturing Technology Management, Vol. 20, No.5, 2009, pp. 547-567.

[2] BEUREN F.H., FERREIRA M.G.G., MIGUEL P.A.C., Product-service systems: a literature review on integrated products and services. Journal of Cleaner Production, No. 47, 2013, pp. 222-231

[3] MATUSEK M., Configuration of network capability: main value drivers in steel service centres, METAL 2016: 25th Anniversary International Conference on Metallurgy and Materials. Tanger, Ostrava, 2016, pp. 1931-1937

[4] JOHNSON M., MENA C., Supply chain management for servitised products: a multi-industry case study. International Journal of Production Economics, Vol. 114, No. 1, pp. 27-39.

[5] GADDE L. E., Distribution network dynamics and the consequences for intermediaries. Industrial Marketing Management, Vol. 43, No.4, 2014, pp. 622-629.

[6] KRAMARZ M., The nature and types of network relations in distribution of metallurgical products, LogForum, Vol. 4, 2010, pp. 57-66.

[7] PIMENTEL C. D., OLIVEIRA C. P.B., Collaborative buyer-supplier relationships and downstream information in marketing channels, Industrial Marketing Management, Vol. 39, No. 2, 2010, pp. 221-228.

[8] KOWALKOWSKI C., WITELL L., GUSTAFSSON A., Any way goes: Identifying value constellations for service infusion in SMEs, Industrial Marketing Management, Vol. 42, No. 1, 2013, pp. 18-30.

[9] SZMAL A., Knowledge infrastructure for innovation ecosystem in the Silesian Voivodeship, Carpathian Logistics Congress. CLC'2013, Ostrava: Tanger, 2014, pp. 583-588

[10] BARAN J., JANIK A., RYSZKO A., SZAFRANIEC M., Eco-innovation in the V4 countries - Performance, Drivers, Barriers and Progress Towards Circular Economy. Proceedings of the 29th International Business Information Management Association Conference, Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth, Vienna, Austria, 3-4 May 2017, pp. 3258-3275

[11] BARAN J., Designing a circular product in the light of the semantic design areas, W: Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth. Proceedings of the 29th International Business Information Management Association Conference, Vienna, Austria, 3rd - 4th May 2017. Ed. Khalid S. Soliman. International Business Information Management Association (IBIMA), 2017, s. 3276-3291.

[12] RYSZKO A., Interorganizational Cooperation, Knowledge Sharing, and Technological Eco-innovation. The Role of Proactive Environmental Strategy - Empirical Evidence from Poland. Polish Journal of Environmental Studies, Vol. 25, No. 2, 2016, pp. 753-764.

[13] JACOB F., ULAGA W., The transition from product to service in business markets: An agenda for academic inquiry, Industrial Marketing Management, Vol. 37, No. 3, 2008, pp. 247-253.

[14] GEBAUER H., Identifying service strategies in product manufacturing companies by exploring environment-strategy configurations. Industrial Marketing Management, Vol. 37, No. 3, 2008, pp. 278-291.

[15] KRUCZEK M., PRZYBYLSKA E., ŻEBRUCKI Z., Znaczenie innowacji w zarządzaniu łańcuchem dostaw, Zeszyty Naukowe Organizacja i Zarządzanie, Politechnika Śląska, Vol. 78, 2015, pp. 221-233.

[16] OLSSON R., GADDE L. E., HULTHÉN K., The changing role of middlemen - Strategic responses to distribution dynamics, Industrial Marketing Management, Vol. 42, No. 7, 2013, pp. 1131-1140.

[17] ELLRAM L.M., TATE W.L., BILLINGTON C., Understanding and managing the services supply chain. Journal of Supply Chain Management, Vol. 40, No.4, 2004, pp. 17-32.

[18] HAKANEN T., HELANDER N., VALKOKARI K., Servitization in global business-to-business distribution: The central activities of manufacturers. Industrial Marketing Management, Vol. 63, 2016, pp. 167-178.

[19] YIN R.K., Case study research: Design and methods. Sage publications, 2013.