

CONFIGURATION OF NETWORK CAPABILITY: MAIN VALUE DRIVERS IN STEEL SERVICE CENTRES

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Abstract

The aim of the paper is analysis the linkages between the types of services (product-centric and knowledge-centric services) that steel service centres deliver to their customers and key network capabilities required. Many firms operating in mature industries as steel or petrochemicals are today facing increased global competition, especially from low-cost producers. Increased competition has forced many traditional industrial firms to upgrade their offerings to more specialized and customized products. Hence, firms are shifting their focus from production to other areas, such as services, logistics, business development - increasing number of services in their portfolios. There is a potential area for growth and revenue generation (e.g. due to the added value the service component provides). This extension into new services has been referred to as "service infusion" or "servitization". Manufacturing companies should focus more on improving customer perspectives by providing diversified value-added product-service offerings as well as developing close long-term partnership with customers. Buyer-supplier relationships are therefore critical for successfully providing services. Nonetheless, buyer-supplier relationships in servitized contexts have received little research attention until recently. The main research question is: what underlying organizational competences does a steel service centres (a supplier) need in order to enhance its capacity to create value proposition for their customers? To explore the causal relationships a DEMATEL technique is adopted. Using sample data from Polish steel service centres, this study finds that when moving from product-centric to knowledge-centric services, the technical information needed by a supplier should be coupled with an increasing degree of knowledge of customers. More specifically, empirical evidence suggests that steel service centres relies on network capabilities such as: customer-oriented way of working, high quality and reliable operations, communication capabilities, negotiation capabilities, ability to engender trust and conflict management skills.

Keywords: Steel service centres, network capability, servitization, DEMATEL method, customer value

1. INTRODUCCION

Network capability refers to the ability to build, handle, and exploit relationships. [1] According to Capaldo and Petruzzelli (2011) the concept of inter-organizational relational capabilities needs to be developed further. [2] Competition is no longer solely based on products or services. Since the late 1990s, a range of researchers has studied the adoption, development and implications of servitization as a competitive strategy. [3] In order to gain competitiveness from selling products to selling an integrated product and service, service suppliers require processes, guidelines and strategies for their production and operations that differ from those associated with traditional manufacturing. Although many benefits are associated with servitization [4] further investigation is required to understand which capabilities better enable manufacturers to develop and deliver successful services. Raddats et. al (2015), state that buyer-supplier relationships in servitized contexts have received little research attention until recently. [5] In particular, research to date has not investigated how buyer-supplier relationships are linked with the types of services. [6] To the best of the author's knowledge, that is the first work analyses the linkages between the types of services (product-centric and knowledge-centric services) that steel service centres deliver to their customers and key network capabilities required. To explore the causal relationships a DEMATEL technique is adopted. Using sample data from Polish steel service centres, this study finds that when moving from product-centric to knowledge-centric services, the

technical information needed by a supplier should be coupled with an increasing degree of knowledge of customers. More specifically, empirical evidence suggests that steel service centres rely on network capabilities such as: customer-oriented way of working, high quality and reliable operations, communication capabilities, negotiation capabilities, ability to engender trust and conflict management skills. The paper is organised as follows: Section 2 provides a literature review on network capability and their roles in value creation. Main operators in steel distribution was described in Section 3. Section 4 illustrates the research methodology. Section 5 describes the empirical findings, which are then discussed in Conclusion in the light of the extant literature. Implications for research and practice as well as the limitations of this research are discussed in Conclusion, too.

2. NETWORK CAPABILITY AND THEIR ROLES IN VALUE CREATION

The main idea for a supplier and customer firm engaging in a relationship is to work together in a way that creates value for them. [7] Literature regarding value creation and value delivery can be found in a variety of disciplines, mainly economics, management and accounting. Value can be regarded as a trade-off between benefits and sacrifices. [8] Some use value definition includes monetary or non-monetary revenues (such as competence, market position, and social rewards). [7] More recent marketing literature has developed two distinct research streams: the value of (augmented) goods and services, and the value of relationships. [9]

Hua Song et al. (2016) distinguish three dimensions of customer value in servitization context: the overall economic value of a supplier, the value of the relational/support service, and the value of the technical/core service. As the authors state, these “three dimensions represent the essence of business service value”. [8 p.118] Economic value refers to an organizational buyer's overall benefit and cost assessment of a supplier relative to alternative suppliers. The benefit component is mainly associated with service quality, while the cost component includes price or the monetary terms of a service offer. Technical value refers to the technical and professional performances of a service provider relative to alternative providers. [8]

Research on supply chain management or innovation emphasize business relationships as the main source of competitive advantage [e.g. 10, 11, 12]. Walter et al. (2006) conceptualize and operationalize network competence and capabilities.[13] According to Ritter et al. (2002, p. 120), network competence is “the degree of network management task execution and the degree of network management qualification possessed by the people handling a company's relationships”. [13] Walter et al. (2006, p. 546) defined network capabilities as “abilities to initiate, maintain, and utilize relationships with various external partners”. [14] They distinguished four types of capabilities: coordination, relational skill, partner knowledge, and internal communication. Dyer and Singh (Dyer and Singh 1998) defining relational capabilities, they stressed that are the strategic activities which provide common benefits for all involved partners.[15] Similarly, Johnsen et al. (2000) suggest targeting mutual benefits as the factor distinguishing networking from other activities.[16] In the present study was assumed, according to Mitrega et al. (2012, p.741), that network capabilities are the set of activities and organizational routines which are implemented at the organizational level of the focal company to develop business relationships for the benefit of the company. [10]

3. MAIN OPERATORS IN STEEL DISTRIBUTION

There are several intermediaries in a supply channel from the mill to the product producer: steel service centres (SSC), stockholders, contract manufacturers and component suppliers. Trading companies involved in the steel supply chain could be divided into three categories: (1) manufacturer-related, (2) general trading company affiliated, or (3) independent. Manufacturer-related trading companies have a capital relationship with their parent steel manufacturer. General trading company affiliated steel trading companies separate the steel product business of their parent companies (sometimes without separating it as another company) and integrating businesses. Independent steel trading companies do not have affiliation with either manufacturers or general trading companies. Generally, intermediaries add value to the product by processing standardized

raw materials or stockholding according to customer requirements. Intermediaries operate as a coordinating link in the middle between the mill and the OEM (Original Equipment Manufacturer). Hence, product producers have four choices among direct and multi-tier channels. First is a direct delivery from the mill to the manufacturer stocking. Producers process and/or assemble the items. Second, involves stockholders who keep a selection of items available. Third, the manufacturer purchase products from service centres or/and a component supplier. Steel service centres stock the raw materials, transform base products to customized parts and components according to customer requirements and distribute the steel (other metal products, too) in the exact quantities, the exact form and at the exact time required by customers. [17] Fourth, manufacturers may extend their outsourcing to assembly operations by adding a contract manufacturer. The roles of intermediaries vary between different countries. Almost 70% of the steel volume is delivered direct from mills to the customers in the Polish distribution network. [18] Distributors share in total sale of steel products is about 30%. In this circumstances, steel service centres are still beginners that providing services (among others, stockholding, processing activities). Nonetheless, steel service centres have become key operators in the intermediary services. [17, 19]

4. THE RESEARCH METHOD

The research process consisted of four phases: (1) framework development - identified network capabilities and service types based on literature reviewed, (2) conducted nine expert interviews to obtain the direct-influence matrix derived from the pair comparisons, (3) analyzed the in-depth of the interrelation among the network capabilities configurations and relation between network capabilities and service types by utilizing the DEMATEL method, and (4) result interpretation.

Network capability (NC) includes the adoption of a long-term relationship, fostering of collaborative communication, design and use of cross-functional teams, and involvement of supply-chain partners, plays a key role in creating customer value [e.g. 20]. Networking capability can help to develop collaborative business relationships. [7] According to Mitrega et al. (2012) creation of value needs mutual learning in order to be able to develop and exploit shared resource configuration in the focal dyad. [10] NC can be viewed as all firm-level activities to increase mutual understanding, coordination, and adaptation, such as resource as well competence adjustments between cooperating companies. [10] Johnsen et al. (2000) and Walter et al. (2006) distinguished the following activities: information sharing, communication between partners, joint decision making, risk and benefit sharing, as well as knowledge sharing, coordination, managing relationship conflict. Cannon and Perreault's (1999, p.441) well-known model of business relationships presents a set of connectors, which the authors define as the "dimensions that reflect the behaviors and expectations of behavior in a particular buyer-seller relationship". [21] The authors specify five dimensions of buyer-supplier relationships: information exchange, operational linkages, legal bonds, cooperative norms and buyer-supplier adaptations. Conceptualization of NC proposed by Mitrega et al. (2012) and Raddats et al. (2015) was adopted in this study. Measurement model of NC included five components and some subcomponents: (1) leaders and personnel: my company's senior management are committed to growing the services business, my company's senior management have an intimate understanding of our customers' business challenges, my company's services staff are technical experts in their field, my company is able to retain its best services staff, (2) social: organize social events, motivate employees to create close social ties with business partners, socialize at networking events, establish relationships with multiple stakeholders (across functional areas), (3) services methods and tools: my company uses knowledge management to share best service practice, my company uses proven methodologies to enhance its services, my company's service business uses IT tools to enhance performance, (4) conflict management: formalized procedure on how to deal with conflict with business partner and across functional areas, train employees on how to handle conflict with business partner, (5) solution approach: offerings based on a good understanding of customers' business issues, understanding customers' customers. The importance to which customers perceive value depend on the type of service. Service value creation is examined by structural factors such as operant or operand resources, asset specificity or

collaboration dynamics, organizational leadership, and information systems. [8] According to Saccani et al. (2014), it is possible to outline four different service categories that may be included in servitized firms offerings: product support services, customer support services, process related services, process delegation services. [6] Beuren et al. (2013) distinguished two other service types: product-centre and knowledge-centre services, which were considered in this paper. [22] For the purpose of this study is assumed that: (1) product-centric services include processing standardized raw materials to the specific sizes, shapes and tolerances required by customers, engineering and construction services, stockholding, logistics services and (2) knowledge-centric services include business consulting, consulting over process optimization, product and process design, process-oriented R&D services, consultancy and professional services for process engineering, test, simulation, design and construction services, process-related training services, help desk for remote support, a website hosting product-related forums, FAQs and chats. The DEMATEL method is used to solve the complicated and intertwined problem group. It is a sophisticated method for establishing a structural model involving causal relationships among complex factors. [23] It is one of the methods which can identify the interdependence among the variables/attributes of a system. DEMATEL has been successfully applied to many research fields with the purpose to render sophisticated problems and transform complex systems into structurally causal and effect relationships. [23] Therefore, DEMATEL can be extended in solving causal relationship issues of core competences of an industry or company, which in turn, provide improvement options. [23] It not only provides a way to visualize causal relationships between criteria through an impact-relationship map but also indicates the degree to which criteria influence each other DEMATEL is also used for identifying critical success factors in a number studies. [e.g. 23] The DEMATEL model construction process consists of four main steps. [23] Step 1: Generating the direct-influence matrix Z . The measurement of the relationship between factors i and j requires construct scales of evaluations using pairwise comparisons of dimensions. The measurement criteria of 0, 1, 2, 3, and 4 are used to illustrate no influence, low influence, medium influence, high influence, and extremely high influence, respectively. The direct-influence matrix is constructed based on the degrees of relative impacts derived from the pair comparisons. The integer score x_{ij}^k is given by the k th expert and indicates the influential level that factor i has on factor j . Step 2: Normalizing the direct-relation matrix. On the basis of the direct-relation matrix Z , the normalized direct-relation matrix X can be obtained by normalizing the direct-relation matrix. The sum of each row j of matrix Z represents the direct effects that factor i gives to the other factors. Step 3: Attaining the total-relation matrix. Once the normalized direct-relation X is obtained, the total-relation matrix T can be calculated. Step 4: Producing a causal diagram. The sum of rows and the sum of columns are separately denoted as vector D and vector R . The vector $(D + R)$, named "Prominence," represents the importance of the criterion. Similarly, the vertical axis $(D - R)$, named "Relation," divides criteria into a causal group and an effect group. The factor belongs to the causal group if $(D - R)$ is positive, and the factor belongs to the effect group when $(D - R)$ is negative. The research was conducted among employees of two steel service centres located in south part of Poland. The steel service centres are a key partner for local customers and multinational companies in terms of the complete range of steel products with services of storage, processing, logistics, supply and transport. Each of the steel centres offer a wide range of services to its customers including processing (cutting, blending etc.), assembling, supply-chain-management, consulting, technical customer support, seminars, tailored packaging and transport solutions. Assessment of mutual influence of resource configuration was performed by nine experts. The experts were representing several different and distinct organizational functions within the steel service centres: chief executives, finance directors, production directors, R&D managers, business sector managers, senior market managers, technical sales managers, and those responsible for quality control. Each of them had at least ten years of experience in design, development and managing of services. The judgments were made in two rounds. The goals of first round were: (1) explained the factors evaluated (the resource configurations), (2) made the judgments by the experts and simultaneously, given explanations of judgments. Nine experts were interviewed in this round. The goal of the second round was to confirm/change previous assessments (explaining the reason of change his/her judgments). Seven experts were interviewed in the second round. Therefore, two expert judgments from the first round were not taken into account for further

research evaluations. In the end, judgments of seven experts were the basis to build the direct-relation matrix Z. The impact of one factor to another was assessed using a five-item scale (from 0 to 4).

5. RESULTS AND ANALYSIS OF THE RESULTS

Following step 1 to step 4, the impact relation map (IRM) representing the relationships among dimensions are shown in **Figure 1**. The experts were asked to evaluate the direct impact of any factors using pairwise comparison. The two types of services were evaluated separately.

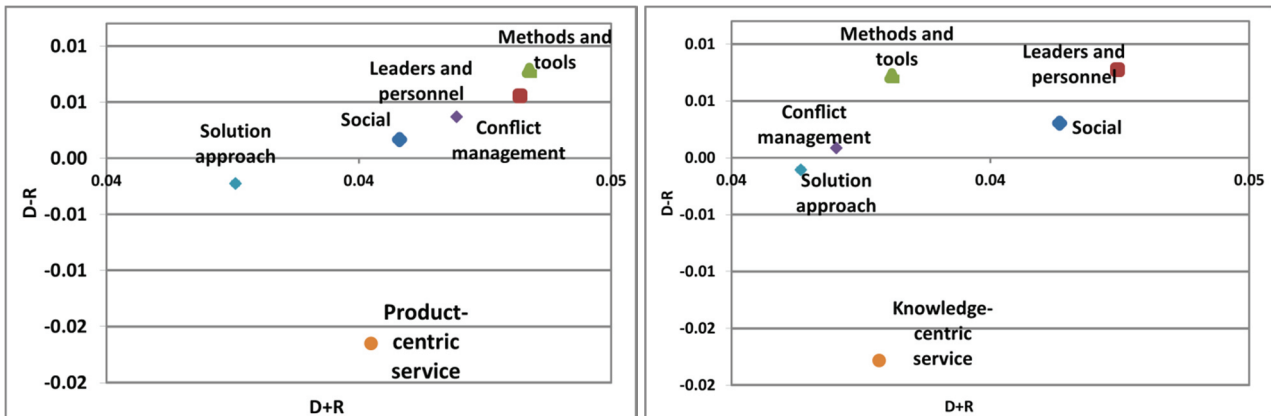


Figure 1 Impact relation maps (product-centric service - left side, knowledge-centric service - right side)

Overall, in product-centric service group, “Method and tools” is the most important factor with influence strength index ($d + r$) of 4.34, followed by “Leaders and personnel”, “Conflict management” and “Social”. On the other hand, “Solution approach” has the least influence on other criteria. The total difference - relation index also shows that “Method and tools” and “Leaders and personnel” have the greatest direct impact on other criteria with highest values of $(d - r) = 0.78$ and 0.56 , respectively. “Solution approach”, on the other hand, is the most easily influenced by other. Moving on to the knowledge-centric services, the most important factor with influence strength index ($d + r$) of 4.25 is “Leaders and personnel”, followed by “Social”, “Method and tools” and “Conflict management”. The total difference - relation index shows that “Leaders and personnel” and “Method and tools” have the greatest direct impact on other criteria with highest values of $(d - r) = 0.78$ and 0.72 , respectively. “Solution approach”, similarly to product-centric service, with value of $(d - r) = -0.11$, is the most easily influenced by other.

6. CONCLUSION

The empirical findings on polish steel service centres show that firms should develop different kinds of network capability configurations. It depends on types of services deliver to customers. In case of product-centric services, the most important of network capability configurations are "Methods and tools", "Leaders and personnel" and "Conflict management". In case of knowledge-centric services, the most important network capability configurations are "Leaders and personnel", "Methods and tools" and "Social". The product-centric services are based mainly on tangible resources: the capacities of engineering, component manufacturing, and assembly. Experts also underlined the importance of engineering expertise as a strategic asset. These resources are deployed through various service processes ranging from component deliveries. The effective production capability also contributed to the firm's specialized manufacturing expertise and its acquired knowledge of its customers' products. Experts strongly emphasized the continuous improvement of the technology. This is a challenging task, where importance role plays the committed personnel and “learning from customer feedback”. [27] Network capability is embedded in response to the rapidly changing needs of its customers (small-batch production, shorter lead times, reacting rapidly to customer claims and other

initiatives). The knowledge-centric services refer to the main role of leaders driving the transformation to such services. It would seem that services leadership is more necessary for developing and delivering knowledge-centric service than product-centric service with a greater need to manage conflicting demands between them. The services staff need to have both technical expertise and customer empathy [9]. Here, the manufacturer's methods and tools have different meaning from product-centric services. Sharing the knowledge of how a particular service was developed and delivered throughout the company is critical in a service environment, since developing repeatable and scalable processes is an important aspect of successful service and solution provision [5]. This finding therefore supports the importance of effective knowledge management during servitization. It requires technological readiness for electronic data interchange (EDI) and other inter-organizational IT systems, represent the tangible network related resources and skills to use such systems and strong knowledge of its customers' business and practices, represent the intangible network related resources. The second place was taken by "Social" group of the network capability configurations. The "Social" capability configuration included resource components which reflect the requirement to work with partners, such as other product suppliers, in order to provide multi-vendor offerings. [5] Kohtamäki et al. (2013) found that complex relational exchanges require relational forms of social capital, suggesting a need to develop relational capabilities for effective cooperation. [9] The experts pointed out several supplier and customer-oriented practices. SSC operate as a coordinating link in the middle between the mill and the OEM and supply their own products. SSCs have relationships with mills, other suppliers and their customers, therefore the contribution of this resource configuration to services success might be higher than if the resource configuration solely concerned customer relationships. Customer and supplier relationships management in general were highlighted and fast reactions, mutual openness, customer selection, and customer-specific services were also presented as important principles of activity. It is noteworthy, that network capability configurations, named "Solution approach", turned out as affected factors in both types of services (product-centric service and knowledge-centric service). Storbacka (2011, p.110) states that "solution provision is a firm-wide initiative which requires a completely different logic to that of a product business, with this perhaps a step that most manufacturers are unwilling or unable to undertake". It means that resource configuration needs further resource components to fully encapsulate it (e.g. ability to customize and integrate product/service offerings). [5] To sum up, then, in order to move from product-centric services to knowledge-centric services a cross-functional teams, such as marketing, application engineering and research & development, should cooperate to create high-end products for the customers. In order to provide highly-effective services, continuous improvement is needed. For this purpose, it is required analyzing customer requirements, regularly monitoring performance of products and providing feedback to production, technical support including metallurgical analysis and/or assisting customers in problem-solving for the smooth running of their production lines, cost-saving solutions by integration of customer production processes and inventory reduction. This study has limitations that could be addressed in future work. First, the findings were worked on too small sample. Therefore, the generalizability of the results cannot be proven. Second, DEMATEL model is highly dependent on the judgments of the experts. Thus, it is needed statistical analysis on a broader sample to confirm presented results.

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