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Original citation:

Velikanov , Ivan, Macintyre, Mairi and Angelis , Jannis. (2013) Service strategy transition : product and service offerings in medical devices. WMG Service Systems Research Group Working Paper Series (Number 04/13). ISSN 2049-4297

Permanent WRAP url:

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**WWMG Service Systems Research Group
Working Paper Series**

**Service Strategy Transition – Product and
Service Offerings in Medical Devices**

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Mairi Macintyre
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About WMG Service Systems Group

The Service Systems research group at WMG works in collaboration with large organisations such as GlaxoSmithKline, Rolls-Royce, BAE Systems, IBM, Ministry of Defence as well as with SMEs researching into value constellations, new business models and value-creating service systems of people, product, service and technology.

The group conducts research that is capable of solving real problems in practice (ie. how and what do do), while also understanding theoretical abstractions from research (ie. why) so that the knowledge results in high-level publications necessary for its transfer across sector and industry. This approach ensures that the knowledge we create is relevant, impactful and grounded in research.

In particular, we pursue the knowledge of service systems for value co-creation that is replicable, scalable and transferable so that we can address some of the most difficult challenges faced by businesses, markets and society.

Research Streams

The WMG Service Systems research group conducts research that is capable of solving real problems in practice, and also to create theoretical abstractions from or research that is relevant and applicable across sector and industry, so that the impact of our research is substantial.

The group currently conducts research under six broad themes:

- Contextualisation
- Dematerialisation
- Service Design
- Value and Business Models
- Visualisation
- Viable Service Systems and Transformation

WMG Service Systems Research Group Working Paper Series

Issue number: 04/13

ISSN: 2049-4297

September 2013

Service Strategy Transition – Product and Service Offerings in Medical Devices

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If you wish to cite this paper, please use the following reference:

Velikanov I, Macintyre M, Angelis J (2013) Service Strategy Transition – Product and Service Offerings in Medical Devices. Proceedings of the European Operations Management Association (EurOMA) Conference 2013, Dublin, 2013 Interim location: *WMG Service Systems Research Group Working Paper Series*, paper number 04/13, ISSN 2049-4297.

Abstract

This study explores how, by undertaking customer-oriented service analysis, a company follows a non-linear approach to product-service provision which is contrary to the approach advocated in the servitisation literature. The case study verifies applicability of existing service models using the example of a global manufacturer of medical products. Open-ended interviews serve as the main source of data to reveal the change opportunities for product-service provision. Study findings suggest that customer orientation is the key element causing the change in pattern; while the analysis of consumer operations provides understanding of the planned change initiatives.

Keywords: servitisation, product-service, medical devices

Introduction

Providers of orthopaedic equipment have traditionally viewed their business model as that of a traditional manufacturing organisation. Competitors have vied for the attention of medical staff with the introduction of more sophisticated products variants, such as improved material properties, longer lifetime performance, and improved design. The focus stayed on tangible outputs, whereas the level of services was limited to supportive solutions such as delivery and revision of instrument kits. The trend was dictated by the complexity of the surgical procedures necessitating use of tools and techniques established by manufacturers of orthopaedic implants. Long-term relationships were built between contracting hospitals and manufacturers ensuring specialized orthopaedic surgical devices, full compatibility and interdependability of the orthopaedic implant and surgical equipment.

The studied company is a recognized international leader in the production of orthopaedic products and additional equipment for surgical procedures. The company management understands the importance of customer value creation leading to mutually beneficial terms between customers and producers as enabling surgeons to achieve excellence in their orthopaedic surgical practices through products that solve unmet needs and tailored educational initiatives. The changing power of stakeholders has enabled more focus to non-clinical stakeholders as operations and procurement managers holding budgets and making financial decisions. As a result, versatile product and service mixes were established to meet increasing requirements of both clinical and non-clinical sides; these measures have a potential to offer greater benefit for the healthcare systems- reduce operational risks, enhance productivity, allow greater competitiveness and maximisation of revenues on the market.

Theoretical Background

Service orientation strategies allow companies to create added value by establishing appropriate product-service mixes or independent services that better fulfill a given customer need than pure product offerings. Moreover, due to service intangibility and labor dependability established product-service solutions may be

more difficult to realistically replicate and thus provide the incumbent firm with a competitive advantage (Heskett et al., 1997; Vandermerwe, Rada, 1988).

The service concept has been the subject of much debate, with many definitions of service suggested. For application, the relationship between the service provider and its customers has to be developed so that understanding of the key requirements can be integrated to the value creation process (Vladimirova et al., 2011). Shifting from discussions on differences between services and goods, recent definitions have primarily been externally oriented with a stronger customer focus (Vargo, Lusch, 2008). Many product-oriented companies have recently drawn their attention to the establishment of supplementary service offerings in addition to existing product offerings. Baines et al. (2007) classify such combination of product and service solutions aimed at a final result rather than pure service or product realization as Product Service Systems (PSS). Tukker and Halen (2004) expand on the categorization of various product-service solutions into three groups: product-oriented (realization of products with additional related services such as maintenance and consulting); user-oriented (selling possibility of using the product characterized by rent, leasing, etc.); and results-oriented (selling final solution instead of a product, which often remains the property of the service provider with all ensuing obligations aimed for further maintenance).

Following these categories, providers may choose the extent of service integration to their original product offerings. This provides a competitive differentiation strategy that offers unique products and services based on providers' product competencies that customers are willing to pay for (Tan et al., 2009). However, as noted by Smith et al. (2012), PSS is conceptually a product-oriented or centric activity that seeks provision of additional product value through the establishment of related services.

Further, studies by Vargo and Lusch (2004) explore the importance of services in the service-dominant logic framework, which has a strong element of customer contribution to the value creation. This finds support in studies by Ng (2009) and Smith et al. (2012) that explores the need for understanding customer roles in process establishment, making active customer participation in value realization a necessity for successful offerings. Further studies have emphasised the importance of customer roles in the development of models with product-service combinations (Ballantyne, Varey, 2006). However, since such models are generic and not necessarily applicable to the specific context, the employment of a product-service model may require modification to fit with the case situation.

As noted in several studies (Olivia, Kallenberg, 2003; Manzini, Vezzoli, 2002; Tan et al., 2009; Osterwalder et al., 2009), moving from pure product to more service-oriented offerings, similar to the shift explored in PSS, covers several linear steps (Vargo, Lusch, 2004; Smith et al., 2012; Johnstone et al., 2009):

- First, assignment of market opportunities and customer requirements is needed. A clear understanding of possible outcomes of service

implementation including risks, opportunities, customer wants and overall market attractiveness have to be considered.

- Second, an internal capabilities analysis should follow. The step covers analysis of existing service solutions and methods according to the internal capabilities and resources of the company. The analysis is marked by an assessment of the value proposition inherent in the existing service solutions. Identified limitations of current methods can induce development of modified service offerings.
- Third, the formulation of an appropriate product-service strategy is made. This stage defines the way of value proposition by means of structured system development consisting of products, services and infrastructural elements organized in accordance with customer requirements.

Olivia and Kallenberg (2003) suggested illustrative description to the ‘gradual transformation process’ to service provision among manufacturing firms. The diagram, which could be referred to as a classical servitisation model, defines the start point with sole product offerings gradually expanded to pure service solutions and a combination of product-service value propositions in the middle of the transition:

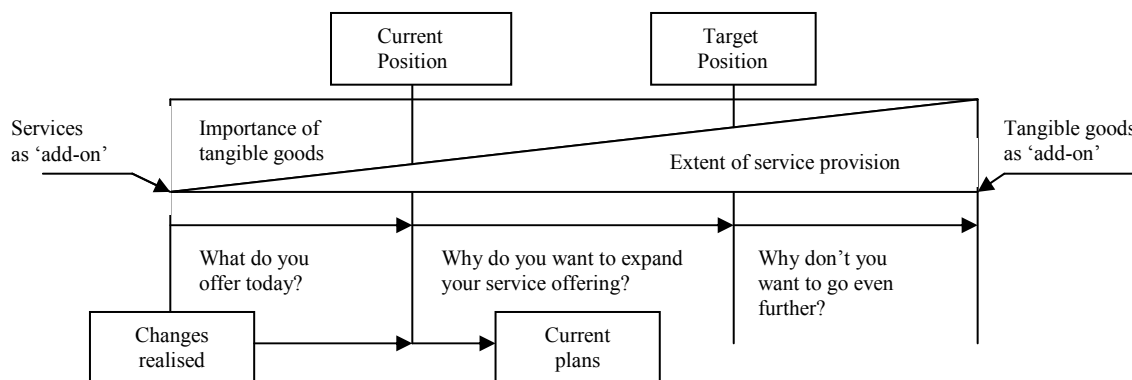


Figure 1 – Transformation from products to services

A number of different examples from the healthcare industry have shown the need for further understanding of the establishment and ongoing improvement of product-service solutions (Abdalla et al., 2005). The transition towards service provision is a complicated process requiring certain level of accuracy and precision in each of the stages involved. Hence, data concerning possible service utilization by the end user should be considered, as well as additional characteristics measured during the performance phase (Mont, 2002).

Shifting the business model towards a more service-oriented one may require education of customers and the front line orthopaedic sales staff to help them understand this shift in value proposition. Having the ability to see the processes of their customers, managers at the case company are able to analyze processes in terms of effectiveness and efficiency and report the results back to their customers

on how operations can be improved. Process management and monitoring is important at this stage, with cost saving options and overall performance levels considered.

Methodology

The aim of the study is to explore how a medical device company furthers its service provision. For this purpose a case study was conducted. Based on the established three-staged approach to servitisation, the research revealed distinctive case characteristics giving a scope to refine conventional model. Following details reflect the algorithm of data analysis and acquisition.

The study utilised semi-structured and open-ended interviews with case company respondents from the worldwide marketing department. The interviews lasted between 45 and 60 minutes. They were arranged through email requests to individuals identified as relevant to investigated topic. Close cooperation between the researcher and interviewees facilitated intensive and comprehensive communication. To gain deeper insight into specific themes, follow-up clarifying questions were given individual interviewees in some cases.

The interviewer was the main evaluator of information validity from the meetings. Therefore, it was essential that the researcher had sufficient prior knowledge and expertise to direct dialogues and deal with unexpected issues.

The following table summarises the in-company meetings that were held, all conducted in a group format at the company site in the UK:

Interview dates	Interview group composition
23 January, 2012	Group Product Manager
10 April, 2012	Product Manager
6 July, 2012	Marketing Manager
26 July, 2012	Health Outcomes Analyst

Table 1 – Interview group composition

The nature of enquiry in each meeting was considered with regard to prior investigation of existing literature, helping to define the main issues of product-service provision. Table 2, in a structured way, the fundamentals of service strategy proposition, covered in the transition model described in the literature:

Authors: Olivia, Kallenberg (2003), Davies et al (2006), Tan et al (2009), Osterwalder, Pigneur (2009), Vargo, Lusch (2004), Smith, Ng et al (2012), Johnstone et al (2009)	
Topic	Issue
1. Objectives and opportunities	<ul style="list-style-type: none"> • Understanding the outcomes of new strategy implementation; • Identification of requirements set by the parties concerned;
2. Available capabilities	<ul style="list-style-type: none"> • Specification of the current internal situation; • Review of existing methods towards value proposition;
3. Proposition of a new strategy	<ul style="list-style-type: none"> • Identification of advantageous methods of value proposition involving direct customers • Development of a business scenario with respect to posed requirements, offered solutions, available infrastructure and success measures
4. Continuous development	<ul style="list-style-type: none"> • Development of partnership relations between customers and producers • Permanent proposition of collaborative solutions
5. Implementation	<ul style="list-style-type: none"> • Process management • Process monitoring
6. Improvement	<ul style="list-style-type: none"> • Continuous improvement • Analysis • Optimization
7. Expansion	<ul style="list-style-type: none"> • Escalation of the business • Introduction of new strategic solutions

Table 2 – Fundamentals of service strategy proposition

Four sets of relevant qualitative data were obtained from the interviews. The topics addressed reflected market requirements, the company vision on customer information, and technical aspects of the new strategy propositions. The researcher analysed which sources of information were more important than others, specified indicators of success, defined issues requiring more attention in the future and finally came up with sources of evidence for drawing conclusions. Follow up individual questions helped to identify potential biases; while the presence of an academic representative ensured broader understanding of the servitisation concept applied with regard to existing models of product-service provision.

Results and discussion

The study results indicate how a medical device company focused on production of orthopaedic products has turned towards establishment of related services such as surgical equipment provision. The strategy was formed on the grounds that high levels of orthopaedic product complexity require utilization of specialized instruments for operations. As a result, a set of multiuse surgical tools for installation of orthopaedic implants was developed. Due to relative complexity and high cost of such equipment separate sales of instruments were not justified.

Therefore, reusable instruments were provided not as individual products, but as supplementary service offerings giving surgeons the right to utilise those instruments within a specified time limit for installation of primary orthopaedic implants. Arguably, implementation of the very activities defined in the product-service transition model has resulted in provision of orthopaedic solutions characterised by both product and service components of the offer.

However, further development of the service model is subject to much debate among the respondents. The general transition model gave an overview of the basic strategy for product- service systems provision with regard to gradual stages to complement a product with a service offer. Despite the growing tendency of introducing a similar pattern among other manufacturing firms, the current situation is characterised by a different scenario based on the grounds of process research organised by the case company in a number of hospitals around the UK. According to interviewees, process study takes advantage of both quantitative and qualitative means of analysis, in this way not only defining subjective judgments of researchers, but also presenting data from customers' operations- quantitative measures of product-service utilisation. Quantitative indicators are determined through a system for process analysis provided to sales representatives to reflect the main stages of an operation. Such service strongly contributes to identification of inefficient processes intrinsic to the main surgical stages and provides the company with a crucial knowledge to improve the existing product- service mix.

Despite the on-going transition of the servitisation model, considerable disadvantages typical for the basic way of products- service systems development can be revealed at this stage. The following disadvantages inherent in the provision of multiuse equipment are outlined below:

- Complexity of conventional surgical equipment requiring use of a relatively high number of different tools in each operation
- Considerable number of tools utilized in each operation leading to use of cumbersome containers for their storage and transportation
- Large weight of containers and equipment
- Need for all equipment sterilization even in case only one item from a container is used
- Instances when instruments in a kit are missing or unclean, risks related to sterilisation
- High costs for instruments maintenance and sterilisation

In addition to these implications, results of process analysis organised by the company characterising critical time intervals in each surgical operation reveal:

- Considerable inconsistency of total processing times
- Considerable differences between surgeons' performance
- Notable correlation between total preparation-finishing times and total processing times

With regard to the problems identified, the company has focused on the development of new more convenient equipment. The new concept originates from single use surgery/patient specific supportive instrumentation providing stable positioning of cutting elements, allowing less variability, less labour intensity and consistent reproducibility of high quality results. Changes in product material, leading to reduction in weight, clear focus on a particular prostheses type contributing to reduction in container size and options for patient size specific tools, have a potential to provide hospitals with a scope for both quality and efficiency improvements. Beyond that, elimination of maintenance costs and related timings such as sterilisation and cleaning could broaden the scope for surgical efficiency enhancements allowing higher margins for both customers and providers.

In addition to that, separate free consultancy services by means of process analysis are provided. This very offer is not less important than the emerging single use solution. The service initiative does not only ensure a source of accurate data for investigation of hospital performance. This helps identify bottleneck processes, causes of inefficiencies and introduce more effective solutions to the market. Importantly, it also allows hospitals to understand strengths of new equipment and fully appreciate greater convenience, accuracy and cost savings generated through application of single use instrumentation. In this way, hospitals are free to choose which offering best suits their needs whether it is conventional equipment, new single use instrumentation or just a free of charge consultancy service.

Conclusions

The case described a business shift towards new, more customer oriented value proposition to satisfy the changing requirements of both clinical and non-clinical stakeholders. On one hand, this example indicates the need for a new product creation, rather than provision of multiuse instrument service practiced to this time. On the other hand, the very area of supplementary services provision plays a crucial role for new product introduction. From any perspective, the central theme is greater attention to customer needs and deeper analysis of customer operations. Particular interest of this example is the way the purpose of a product-service mix can be changed when greater detail to customer processes is provided. Such findings could indicate incompleteness of the existing models viewed as a stepwise process originating from simple additional to products services, such as after sales and maintenance, where the extent of service provision could gradually substitute the original, tangible products and lead to pure service rendering (Sundbo, Toivonen, 2011).

The phenomenon has to be explored further to obtain more evidence for the basic model revision through greater attention to customer needs via process analysis tools embedded in changing sales concepts. Studies are ongoing to validate current findings through introduction of additional expert opinions from other business units such as senior representatives of other marketing spheres, sales teams and clinical stakeholders.

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