

## **The transition from selling capital goods to providing solutions in manufacturing**

Changing corporate strategies and business models

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*Published in:*  
Proceedings of the Spring Servitization Conference

*Publication date:*  
2018

*Document Version*  
Publisher's PDF, also known as Version of record

*Citation for published version (APA):*  
Møller, J. K. (2018). The transition from selling capital goods to providing solutions in manufacturing: Changing corporate strategies and business models. In A. Bigdeli, T. Frandsen, J. Raja, & T. Baines (Eds.), *Proceedings of the Spring Servitization Conference: Driving Competitiveness through Servitization 14-16 May 2018 Copenhagen, Denmark* (pp. 198-206). Aston University.

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Dr Ali Bigdeli – Advanced Services Research Group, Aston Business School  
Dr Thomas Frandsen – Copenhagen Business School  
Dr Jawwad Raja – Copenhagen Business School  
Prof. Tim Baines, Advanced Services Research Group, Aston Business School

## Acknowledgements

We would like to thank Copenhagen Business School for hosting the Spring Servitization Conference this year (SSC2018). We would also like to thank all of the contributing authors, reviewers, and delegates for the high quality of papers and reviews submitted and the variety of topics addressed. For their hard work and dedication thanks should also go to the organising team specially the conference secretariat, Jill Forrest, Christina Merolli Poulsen and Maria Podsiadly.

Tim Baines, Ali Z. Bigdeli, Thomas Frandsen and Jawwad Raja

*SSC2018 Conference Chairs*

*May 2018*

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Aston Business School  
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ISBN 978 1 85449 448 1

Aston University  
Printed in the United Kingdom by Airdrie Print Services  
Website: [www.airdriepprint.co.uk](http://www.airdriepprint.co.uk)

Welcome to the seventh Spring Servitization Conference 2018.

Since its inception, the mission of Spring Servitization Conference (SSC) has been to play a key role in the development of a better understanding of servitization and to demonstrate the potential impact upon businesses and society. SSC continues to fulfil this mission and provide the major forum for academic researchers from across disciplines including operations management, strategic management, service innovation, marketing, information systems, etc. to constructively share and debate their findings, generate new ideas, network and forge research partnerships. Each year it is encouraging to see a year on year increase in abstracts, from both returning academics and those new to SSC. This year we are pleased to see contributors are travelling from across Europe, North America, and Asia.

The Spring Servitization Conference 2018 is being jointly run by Copenhagen Business School and Aston Business School and as in SSC2017, this partnership has enabled the conference to extend its range of speakers. This has given us greater reach and whilst there is a long way to go, we are beginning to achieve our goal of generating greater interest in the topic of servitization, and how it can bring financial sustainability and operational scalability to the business community both large and small.

Tim Baines, Ali Z. Bigdeli, Thomas Frandsen and Jawwad Raja

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Jørn Kjølse Møller

#### ABSTRACT

**Purpose:** This paper aims to investigate the transition in manufacturing from producing capital goods to providing solutions, the manufacturer's choice of corporate strategies on solutions market and the change in their business models.

**Methodology:** It is based on a review of the literature on this transition from products to solutions in manufacturing together with a case study of corporate strategies and business models in the solutions market of the wind power industry.

**Findings:** The investigation shows that manufacturing companies must develop capabilities to design, sell and deliver services and the ability to integrate these services into customer-specific solutions. The chosen corporate strategy of the manufacturing firm depends on, whether it wants to become a 'system selling' firm (developing capabilities internally), a 'system integrating' firm (buying capabilities externally and integrating them into a service solution) or choose a 'mixed' strategy.

**Originality/Value:** The paper gives a clarification of the service infusion and transition in manufacturing with a focus on the solutions market, corporate strategies for organizing the business in this solutions market and servitization as a business model in the production of goods and services.

**KEYWORDS:** Service infusion, corporate strategies, business models, service capabilities, service culture, solutions market.

#### 1. INTRODUCTION

'Servitization' as a concept to describe and understand the move of manufacturers from offering capital goods and products to complex services and solutions have been around for a while in the literature (See Kowalkowski, Gebauer, Kamp and Parry 2017 for an 'overview'). It also describes the manufacturer's reorientation of their value propositions and business model from selling products alone to providing customer-specific, high-value solutions. Making this move from products to solutions depends on the development of capabilities that facilitate the integration of products and services, as well as the development, selling and delivering of services (Paiola et al. 2013).

This paper aims to fill a gap in the literature concerning the kind of corporate strategies chosen by OEMs (Original Equipment Manufacturer) in the transition from selling capital goods to providing solutions with a focus on the 'system selling' firm as the dominating strategy. The research aim is also to identify some of the driving forces that are causing this transition from a primarily Goods-Dominant to a Solutions-Dominant Logic and the choice of 'servitization' as the Business Model creating innovation in both value propositions and revenues of the Wind Turbine Industry.

To secure the transition from products to solutions a company must develop capabilities to design, sell and deliver services (service capabilities) and to integrate these services into customer-specific solutions (integration capabilities). It also requires a business model that builds on skills which provide value to the customers and secure revenues to the company (Teece et al. 1997). The capabilities can be developed either internally (by the company itself) or externally (outsourced to suppliers and partners). The decision

to generate these internally or externally depends on strategic choices (the corporate strategy) by the manufacturing firm. Does it want to become a 'system selling' firm, i.e., choosing a single vendor approach in which it develops all the capabilities associated with the 'product-service system' internally? Alternatively, become a 'system integrating' firm, i.e., choosing a multi-vendor approach buying from external partners and integrating the capabilities for delivering product and service components or adopting a mixed approach (Paiola 2013).

The driving forces behind these choices are varied, but in the following, we built on a specific set of hypotheses. Firstly, the structure of a particular market, the number of significant customers with the capability of an in-house maintenance department, influences the strategy of the manufacturers to become a single vendor or not. Secondly, the complexity of the offering impact on the competitiveness of the manufacturers vis-a-vis individual service providers promoting a multi-vendor approach. Thirdly, the increasing use of 'big data' is becoming crucial for manufacturers of sophisticated capital goods given them new opportunities for delivering extensive services to their customers. Fourthly, differences in institutional regimes and energy policies on critical geographical markets mean variations in public procurement of investment in energy-saving technologies. Lastly, specific customer relations due to historical circumstances create long-lasting loyalty between manufacturers and their customers.

The formation of corporate strategies can be understood and observed as a strategy development process, which has a resemblance to what James Quinn (Quinn 1980 and 1989) described as logical incrementalism (cf. also Kowalkowski et al. 2012). It means the development of strategy by "experimentation and learning from partial commitments rather than through global formulations of total strategies" (Quinn 1980).

In the analysis of the 'servitization' of manufacturing firms delivering capital goods and services, we look upon service innovation and solutions as a systemic process spanning the whole lifecycle of a given capital good or plant from the stages of design and construction to the full operation and maintenance of the investment. The main purpose of the business, its value proposition and business model, is thereby to deliver the optimal 'value-in-use' and cost-saving potentials to the customer, i.e., the 'serviceability' during the whole operational life of the capital good, product or plant.

#### 2. SERVICE INFUSION, CORPORATE STRATEGIES, AND BUSINESS MODELS

The role of services in providing value to the customers and revenue to the manufacturing companies has become so important, that there is an increased interest among manufacturers in adding value through the provision of services to widen the spectrum of their products. Thus 'services' spread into every part of the value chain in manufacturing (Mont 2002).

This development is referred to as the 'servitization' of manufacturing, a term coined by Vandermerwe & Rada (1988), describing a shift from selling products to selling an integrated combination of products and services that deliver value-in-use for the customer (Baines et al. 2007). Closely related to the process of servitization is the term 'product-service system (PSS)', defined as "a marketable set of products and services capable of jointly fulfilling a user's need (Goedekoop et al. 1997).

Most classifications of product service systems (PSS) make a distinction between three main categories of PSS (Tukker 2004). The first category is product-oriented services. Here, the business model is still mainly geared towards sales of products, but with some extra functions added. The second category is use-oriented services. Here, the traditional product is again playing a significant role, but the business model not geared towards selling products. The product stays in ownership with the provider, and is made available in a different form, and sometimes shared by several users. The third and last category is result-



oriented services. Here, the client and provider in principle agree on a result, and there is no pre-determined product involved (Tukker 2004).

In parallel with the growing attention that the service-transition phenomenon has received, the 'service-dominant logic' (S-D logic), first proposed by Vargo and Lusch (2004) and extended in subsequent works (2006, 2008 and 2016), has emerged as the most important marketing concept in the last decade. S-D logic has also received increasing attention about topics such as 'servitization' and PPS-development, lifecycle management, business model innovation, customer value, and solutions market.

What Vargo and Lusch initially emphasized was how a provider's knowledge, resources, and core competencies, i.e., the capabilities of the provider, are fundamental to the providing company's value propositions and business model. They are the basis for business interaction in business networks and on the solutions market. The underlying thought behind S-D logic is to reduce or even erase the distinction between products/goods and services. The value of the economy is determined in, and by, the customers' use, and not accumulated by a refinement of raw material in a production process. The concept of 'value-in-use' therefore changes the business logic and places importance upon understanding the value-in-use situation and the user, e.g., the performance and outcome of the user's operations.

The controversial issue with regards to value-in-use is that every business then becomes a service business because they all sell the serviceability of goods in use. Furthermore, under S-D logic, business innovation is repositioned and made possible through value co-creation together with customers. The shift in focus, from a producer to a customer perspective (Grönroos 2007) and then from a customer perspective to value-in-use, is a shift from a focus upon the product to one based upon the use of the product. Thus, a transition to S-D logic implies much more than emphasis upon the manufacturing business' product-service system: it means a reframing of the whole purpose of a company, i.e., the business model of the manufacturing company, and its collaborative role in value co-creation.

Altogether, the product-service transition and the transition from G-D to S-D logic due to Kowalkowski (2010) become two distinct aspects of the 'servitization' of manufacturing. The first reflects a strategic repositioning of the manufacturing company in the marketplace through the addition of new services to its core offerings (its business model), and the second indicates a changed perspective on value creation.

A comparison between S-D logic (SDL) and other approaches such as Service Logic (SL) and Customer-Dominant Logic (CDL) show that in SDL (Vargo and Lusch 2016) the primary focus is on systems and co-creation between generic actors on a societal level (nested in Service Eco-systems). In contrast, SL emphasizes the interaction between the provider and the customer (Grönroos 2006). The CDL focuses on 'customer logic' and the customer's constellation of activities, actors, and experiences and the role of providers in a Customer Eco-system (Heinonen et al. 2010). It means that with an SDL approach there is a strong emphasis on 'value co-creation', whereas SL refers to 'value-in-use', and CDL promotes 'value formation' in addition to value-in-use. Understanding customers when providing offerings on the solutions market are therefore commonly seen as a critical aspect of business practice for firms to improve their performance in increasingly competitive markets (Heinonen and Strandvik 2015).

By acquiring new service capabilities and changing the design approach companies not only move along the product-service transition line but also along the transition from goods-dominant to service-dominant logic and even in the direction of a more Customer-Dominant Logic, i.e., change their position in the provider – customer relation. Applying both an S-D Logic and Customer-dominant logic as their market orientation also means that the traditional division of goods sales from after-sales services and solutions

are no longer discrete functions, and this elevates the strategic importance of the whole lifetime value of customer's relationship, regardless of the combination of services and goods.

Specialized skills and knowledge is then a prerequisite for the ability to offer new types of services and PSS. It means that active organizational learning, as well as the ability to unlearn G-D practices and mindsets, is needed. It implicates a strategy development process with an apparent resemblance to what James Quinn (Quinn 1980 and 2003) described as logical incrementalism (cf. also Kowalkowski et al. 2012). It means the development of strategy by "experimentation and learning from partial commitments rather than through global formulations of total strategies" (Quinn 1980)

### 3. METHODOLOGY

This paper has as its starting point a more conceptual approach. It, therefore, contains a contextual analysis of various corporate strategies on the solutions market in the literature from previous studies of service development in manufacturing. But in its nature, it is more empirical by giving examples from the Danish wind power industry and especially insights from the Danish global wind power OEM (Original equipment manufacturer) and player Vestas to illustrate some of the central tenets in the analysis. Given that the phenomenon under investigation is in the early and developmental stages of research, a case study improves the understanding of the transition of manufacturing business into a more complex product-service system. An exploratory case – Vestas – is thereby used to point out factors that may be important in this PSS transition. As a global player on the wind power market, Vestas serves as a case organization considered as an example of a PSS strategy and 'servitization' as the business model in the manufacturing of wind turbines. The organization's O&M (operation and maintenance) program includes whole-life support of wind turbines and wind farms (up to 20 years), energy-based availability guarantees, yield optimizing and performance management systems by using 'big data' etc.

A methodology based on qualitative research seems to be particularly suitable in this context, where the research project concentrates on exploration and theory construction, i.e., the paper explores and discusses practice in a selected case (the wind turbine industry) viewed as an exploratory and strategic case. Studying collected data (narratives) about the process of service infusion in manufacturing and changes in strategies on the service solutions market in Annual Reports (2012-2017) from a specific company (Vestas) in the wind turbine industry.

The extent to which the case company has transitioned from pure product offerings and G-D logic to a more complex product-service setting dominated by S-D reasoning is, of course, an open question in the current stage of the research process and must be examined in more details afterward. But there is clear indication in the empirical data about Vestas that some factors are in play. For example, specific market conditions, the complexity of wind turbines (capital goods) and service offering, use of 'big data', institutional 'setups' on different geographical markets and customer relations have an important impact on the process of 'servitization' in the industry. Given these conditions, the case organization represents a 'strategic' and 'critical' case, which has the potential of providing empirical evidence about the realities of PSS-transition, S-D and customer logic and solutions markets. The case organization, therefore, offers a vibrant setting in which to address central research questions in the paper.

### 4. EXAMPLE: THE WIND POWER INDUSTRY (VESTAS)

#### 4.1 Background

Wind Turbines are today a proven source of clean energy in many countries in the world, but it also represents a sophisticated technology which demands maintenance and operational improvements. In the coming years, the increased use of a broader range of sensors and 'big data', capable of providing more



insight into performance and reliability will facilitate further optimization of the wind power systems (Wind Energy Update 2016). That is important to the customers and the future competitiveness of the energy market.

Today electricity from onshore based wind turbines is already cost-effective with traditional coal-fired power stations, but this is not the situation with energy produced by off-shore based wind turbines. With increasing focus on off-shore wind turbines, the next step is to optimize all parts of the supply chain in the wind power industry to bring down the cost of energy for off-shore turbines. (Danish Wind Power Association 2012).

The global economic crisis in 2008 and the following years (GWEC 2012), also meant that service agreements became the measure by which wind turbine manufacturers remained profitable. Since then the market for the service agreements and solutions have increased dramatically and is now becoming a crucial part of the business model and corporate strategies for the more significant wind turbine manufacturers (Vestas Annual report 2016).

#### 4.2 Market structure

But with the growth of the market for service agreements and solutions, there has also been a rush of new companies looking to grab a piece of the increasing maintenance market – many of these service providers owned by wind turbine manufacturers and larger wind farm developers and operators. Maintenance has, therefore, become a significant challenge to many manufacturers and developers, also because of problems in turbines emerging due to the aging and degradation of parts in existing wind turbines.

Developers and owners of wind plants are today expecting that wind turbine manufacturers widen their warranty period to five or ten years, or even more. Although often when the current warranty period expires, the large developers then decide to operate and service turbines with their own branch companies specializing in O&M (Operation & Maintenance). Other leading wind-farm developers create their in-house service teams, even though they have not established subsidiary maintenance companies. Smaller wind farm developers prefer to commission other turbine manufacturers or third-party enterprises to provide maintenance service after the warranty period expires.

By 2020, turnover and margins in the service and maintenance business are expected to be even more attractive than the construction of onshore and offshore wind farms. The Annual Report 2016 from Vestas (Vestas 2017), already illustrates this development by mentioning that the earnings from service contracts in 2016 exceeded the revenues from their primary activity in design and construction of wind turbines (manufacturing) and is even expected to increase at a higher rate in the years to come. That's why many OEMs, who typically have signed O&M agreements covering two to five years, now are seeking to retain their share of the O&M market by offering the wind power developer and operators long-term warranty contracts/ full-service agreements of up to twenty years for existing and new customers.

#### 4.3 Customer relations

The ability to plan, build, operate and service complete wind power plants customized for the customers (AOM programs) is increasingly becoming important for wind power manufacturers such as Vestas. Today customers are also demanding specific solutions that give them maximum performance at minimal risk. As a global wind power manufacturer Vestas, therefore must be able to deliver value, both, before, during and after the customer has invested in a wind power plant (Vestas, Annual Report 2012, 2013). And also accept that the customers define the value-in-use of their wind turbines, i.e., experience a growing Customer Dominant Logic.

This change into a 'performance related offering' also changes the business and revenue model of Vestas, and direct focus on producing and using 'big data' in their business development. Seen as a 'complex service system' (Neely 2011) the Active Output Maintenance program of Vestas can be described with the same common features of service complexity as identified in the literature of 'servitization' and Product-Service Systems (PPS), i.e., a tendency to:

- move into the service business that involves a closer coupling and integration with the customer and the development of new capabilities,
- increasing financial flows from service business,
- changed supply networks with a focus on package solutions,
- long-term and output-based contracting,
- create new forms of risk,
- focus on value-in-use and co-creation of value,
- a transition of the organization (the development of a service culture),
- increase in technological complexity together with an integration of product design, manufacturing, and services in the innovation process.

#### 4.4 The use of 'big data'

The complexity of the goods and services delivered by the wind turbine industry, also represent a driving force behind the process of 'servitization' of the manufacturing firms. That is by increasing the need for better analytical tools and data to be able to analyze complex products and services in detail, 'big data' about the daily operation of wind turbines and develop smart and customized solutions to the customers.

When developing new 'product-service system' (PSS) offerings or upgrading existing ones, design engineering must, therefore, consider how to integrate additional information and communication technology (ICT) into the system enabling a better collection of customer usage by exploiting insights from 'big data'. An example of this is Vestas' SCADA (Supervisory Control and Data Acquisition) system, which is a system that monitors and controls power plants around the world. By working together, the supplier and the customer can identify opportunities for innovation in which future value can emerge, and from an S-D logic perspective customer input should be an integral part of each phase in PSS development and design (Edman 2009).

#### 4.5 Institutional regimes

To a much greater extent than previously, the value in the wind power industry is generated through interaction between productions, knowledge, logistics, services, institutions and institutional arrangements. The dialogue and knowledge sharing process should focus on solving customer problems and challenges to the entire net chain of manufacturing. Tackling this process in the right way would probably lead to opportunities for substantial process innovation exploited through the transition of the product-service system and the use of a service-dominant logic and understanding of specific customer logic.

Continued development of the entire energy system, which both on-shore and offshore wind power plants are part of, depends on the 'institutional set up' on different geographical markets, i.e., how government and international organizations support and intervene in the production and consumption of energy ("energy policy"). If wind energy is going to develop further and strengthen its role in the future energy system, it is also vital to secure the development of a 'smart electricity grid', that automatically regulates



the production and consumption. And to ensure that the interconnected elements in the energy system are operating together in an optimal way (Danish Wind Industry Association 2012).

## 5. FINDINGS

Altogether the findings of this research in servitization processes in the Wind Power Industry show production of sustainable, clean energy technology influenced by a service-dominant logic (Vargo and Lusch 2008). And, a Customer-Dominant Logic (Heinonen and Strandvik 2015), where the principal competitive factors include such as the capability for continuous innovation, improved design and quality and customized goods and services, rather than the traditional manufacturing of large volumes of standardized products and energy technologies (Mont 2002). But also, the importance of changes in the service eco-systems and the specific markets, in which wind turbine manufacturing firms operate. Together with the deepening of their customer relations, the use of 'big data' and sophisticated software systems and the institutional set-up and regimes in different geographical markets (e.g., the US and Europe).

How the manufacturing companies, e.g., in the wind power industry, then decides to organize ('internally' or 'externally') their offerings and their corporate strategy in the service solutions market – are among other things determined by

- A change from operating in an immature market to a more mature market (e.g., active developers and professional customers), which increase the dominance of the customer vis-à-vis the provider.
- The complexity of their goods and services, which strengthen the manufacturer of wind turbines on the solutions market, but also gives individual service providers an opportunity to develop specialized offerings to the customers.
- Use of 'big data' and analytics to reduce 'risk' and optimize 'value-in-use', but also to increase the competitiveness of the wind turbine manufacturers.
- The institutional setup – the service eco-system on different geographical markets has an impact on the economy (demand and revenues) of the OEM and their suppliers.
- The presence of long-term customer relationships deepens the understanding of the customers 'customer logic' and customers Eco-systems, develop a service culture inside the organization of the OEM to benefit innovation in solutions and even the development of a Solutions-Dominant Logic.
- The corporate strategies among the manufacturing companies in organizing offerings on the solutions market either to sell 'life-cycle system' solutions, 'system integrating' solutions' or a 'mixed' solution, depending on the strategy of other actors (developers, operators) in the solution market.

## 6. DISCUSSION

Although S-D logic theoretically shifts the unit of analysis from manufacturing and products to value creation (services), in practice, it is, first of all, a mindset and an organizing framework rather than a fully developed theory (Vargo and Lusch 2008). The dominant position of G-D logic in business (and academia), and consequently its restricted view upon value creation about the provision of services in product-service systems, means that many opportunities for value creation and competitive advantage may be obscured or even lost due to a lack of understanding the customers and their customer logic.

One may argue that it would be more appropriate not to mention products (indirect service provision) and services (direct service provision) at all, but rather focus on the overall "application of specialized competencies" in business. That would most likely imply the abandonment of the integrated product-service system definition such as that of Grönroos (2009): "an integrated product and service offering that enables co-created value-in-use in the customer's processes, in a mutually beneficial way". In favor of a more generic concept such as the "integrated complex system" or "complex service system".

But such a definition would neglect the fact that the integration of products and services is specifically a crucial growing issue for many traditional manufacturing companies, and the question of how to best integrate these elements in business model innovation is a growing research area within both the manufacturing science and the marketing and management fields as well.

Even in new manufacturing industries such as the wind power industry, the findings presented in this paper shows a transition from a dominant G-D logic to S-D logic. A shift where wind power companies experience an increase in the importance of service offerings (Service Agreements) to their customers and an increase in their revenues from service business activities changing their business model and corporate strategies (illustrated by Vestas). But also, the variability in the impact on 'servitization' from driving forces such as the development of specific markets, the complexity of wind turbine technology, use of 'big data', customer relations and the 'institutional set up' on different geographical markets (the US versus Europe).

Overall the theoretical and practical implication is a need to develop the S-D logic argument (and theory) further both the classifications of different product-service systems with the aim of identifying specific types, factors, and processes of importance to PSS in manufacturing industries such as the wind power industry. But also, to changes in traditional supply, knowledge and value chains in these sectors caused by a more globalized economy with more complex knowledge and value networks and 'net chains' of suppliers, OEMs and service providers. And finally, to better understand the increasing customer dominance in the provider-customer relationship with an increased need to deliver customized solutions.

## 7. CONCLUSION

This paper has been focusing on the process of 'servitization' of a manufacturing industry such as the wind power industry, because service provision to developers and operators of wind power turbines and farms nowadays plays an increasingly significant role in the overall business activity and earnings of OEMs of this industry. The process of 'servitization' has been discussed in the light of different theories of product-service systems (Tukker 2004), S-D logic (Vargo and Lusch 2004) and Customer-dominant logic (Heinonen and Strandvik 2015). These perspectives give a better understanding of the challenge to PSS in operation and the factors influencing both the changes and processes of manufacturing and service provision among customers and providers in the wind power industry. The purpose has been to identify the various driving forces and service components in the development.

One implication of the findings is that it is crucial to look upon 'servitization' as a process and a business model, which includes the whole lifecycle of a given product including the design and construction stages through to full operation and maintenance over many years of the finished product in use. Either alone or integrated into a larger system and solutions (e.g., servicing both a wind power turbine and a wind power farm). It secures the optimal value-in-use and cost-saving potentials for the customer, which increasingly is becoming important to customers focusing on the effect or result of the product in use rather than the product itself. It changes the role of the manufacturing firm because the focus is increasingly on 'selling life-cycle solutions' and operating a 'performance related' activity offering 'value-in-use' to the customer rather than just selling capital goods and services. Overall it thereby changes the business and revenue model of the companies and creates a need for business model innovations focusing on 'servitization' as the theoretical and practical implication of this transition from a Goods-Dominant Logic to a Solutions-Dominant Logic.

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