

Increasing value capture by enhancing manufacturer commitment – Managing the servitization process

Andreas Schroeder*, Tim Baines, and Tomohiko Sakao

* Corresponding author

Abstract

The interest in servitization has grown among manufacturers worldwide. Manufacturers recognize that shifting from a product to a service focus offers them opportunities to expand their competitive positioning and address key sustainability objectives. In this paper we share several key findings from the industrial servitization research. Specifically, we provide a summary of the core motivations for servitization and outline the stages manufacturers commonly go through in their transformation towards becoming effective providers of advanced services. We outline the importance of developing a comprehensive performance measurement system to manage and align the progress of the various initiatives that form part of the transformation process. We also describe the critical role of digital technologies in the development and delivery of service value propositions. Our paper concludes with a summary of our key learnings regarding manufacturer servitization.

Key words

Servitization, advanced services, product-service system (PSS), product-as-a-service (PaaS), manufacturing.

The case for servitization

Manufacturers are increasingly exploring servitization as a strategy to expand their competitive focus from selling products to selling product-service systems (PSSs) in order to create better customer value (Baines et al., 2009). More than 70% of global manufacturers have started servitization initiatives (Infosys, 2018), with business leaders reporting 10–15% growth of their service business (Accenture, 2019) and more than twice the profit margins compared to their product business (McKinsey, 2019).

Servitization is sometimes described as a *subscription business model for products*, but this only captures part of the picture. Although servitizing manufacturers will often choose a subscription or pay-per-use revenue model to capture some of the service value they have created, servitization goes far beyond the revenue perspective: it covers the transformation required by manufacturers and their networks to create and deliver these services.

While manufacturers often have long traditions in providing product excellence, the corresponding services have frequently been neglected and considered a cost rather than a value-creation opportunity. In order to servitize successfully, manufacturers need to develop new capabilities and processes that go beyond their established product focus.

Even though servitization is a challenge to change there are multiple reasons for so doing:

Threat of commoditization: Manufacturers are threatened by low-cost competitors in their product market and see servitization to differentiate from this competition.

Opportunities of digitalization: Manufacturers have carried out substantial investments in the digitalization of their products and are exploring mechanisms for monetizing these investments.

Introduction of new technology: Manufacturers struggle to position their innovative technologies through traditional business models on the market and are exploring new business models to develop these technologies.

Supporting the net-zero agenda: Manufacturers seek to maintain a close interaction with their products beyond the factory door and contribute to the efficiency of their products in the field; especially with respect to fewer carbon emissions.

Supporting transformation to a circular economy: Manufacturers see servitization's potential for realizing circular flows of products while maintaining or even improving their economic performance.

Extending the application of their expertise: Manufacturers can expand the application of their substantial expertise beyond the development and manufacture of products to their usage.

Overall, manufacturers often embrace servitization as a solution to address a variety of issues and opportunities.

Those organizations who interpret servitization as a quick fix or as a marketing initiative do not understand the fundamental and diverse challenges that it will create for manufacturers. Servitization is a transformation, which may be wide ranging and complex and often requires significant organizational change involving operating processes, capabilities and platforms (Baines & Lightfoot, 2013).

Most manufacturers have already been providing spare parts and warranty services—*base services*—for decades; some have also sought to provide maintenance, repair and overhaul services—*intermediate services*. The objective of servitization is to transform organizations to go beyond these established levels of services to offer *advanced services*—complex value propositions whereby manufacturers focus on providing performance *outcomes* to customers¹.

These outcomes often include: (i) revenue payments structured around product usage; (ii) performance incentives—such as penalties for product failure when in service; (iii) long-term contractual agreements, spanning five, ten or 15 years, and cost-down commitments (Baines & Lightfoot, 2013); and (iv) lifecycle environmental improvements such as carbon footprints (Sakao, 2022).

An iconic example of an advanced service includes Rolls-Royce Aerospace's Power-by-the-Hour offering (Ng et al., 2012), where the product (the jet engine) and the service (proactive engine health monitoring) are provided as a single offering. Customers are charged for the extent of use of the product-service-bundle—which includes the numbers of passengers moved or mileage travelled. Rolls-Royce offers its jet engine in the form of an advanced service, covering a ten-year contractual service relationship with performance incentives (including penalties for the lack of engine uptime), rather than a transactional equipment purchase.

¹ Such advanced services are also known as pay-per-use contracts, outcome-based contracts, performance-based contracts, capability contracts (Kindstrom & Kowalkowski, 2014; Martinez et al., 2017).

There is also Xerox's Print Management offering (Baines & Lightfoot, 2013), which bundles printing equipment and maintenance services. Customers are charged for the use of the product-service-bundle on a per print basis. Another is MAN's pay-per-kilometer offering (Bustinza et al., 2015), which bundles truck, maintenance and driver-management services, where customers are charged for the extent of the use of the bundle—such as the distance driven. To offer these advanced services manufacturers engage in a lengthy servitization process in which they carefully reconsider their products, customers and entire business models.

This paper is the second of a two-paper series on product-based services. In the first paper Sakao (2022) focused on the design of the value co-creation system and the wider opportunities PSS's can provide to organizations, customers and the wider society. In this paper, we explore the organizational transformation that is required to make such product services a core focus of manufacturers' strategies.

In the remainder of this paper we explain the key steps in the manufacturer transformation and factors that affect the transformation progress. We then describe challenges with assessing manufacturer servitization progress and outline measurement tools. We describe the link between servitization and digitalization; explaining how critical digitalization is for manufacturer transformation.

How do manufacturers servitize?

Servitization is often presented as a decision taken by manufacturers choosing to expand their portfolio to include advanced services offerings (Dahmani et al., 2016; Lertsakthanakun et al., 2012). Critical decisions will be made to launch and direct manufacturer servitization. In reality the journey starts well before these formal decisions are made and continues well beyond them. Instead of thinking of servitization as a decision, it is more helpful to think of it as a long-term organizational transformation which involves a diverse range of challenges and nuanced decisions that shape its trajectory.

A servitization stage model

Servitization as process has been developed. The servitization process unfolds across a series of stages and can be used to structure a range of challenges and activities that manufacturers go through.

One model comprehensively describes the servitization process along the four stages of *exploration*, *engagement*, *expansion* and *exploitation* (see Figure 1) (Baines et al., 2020b).

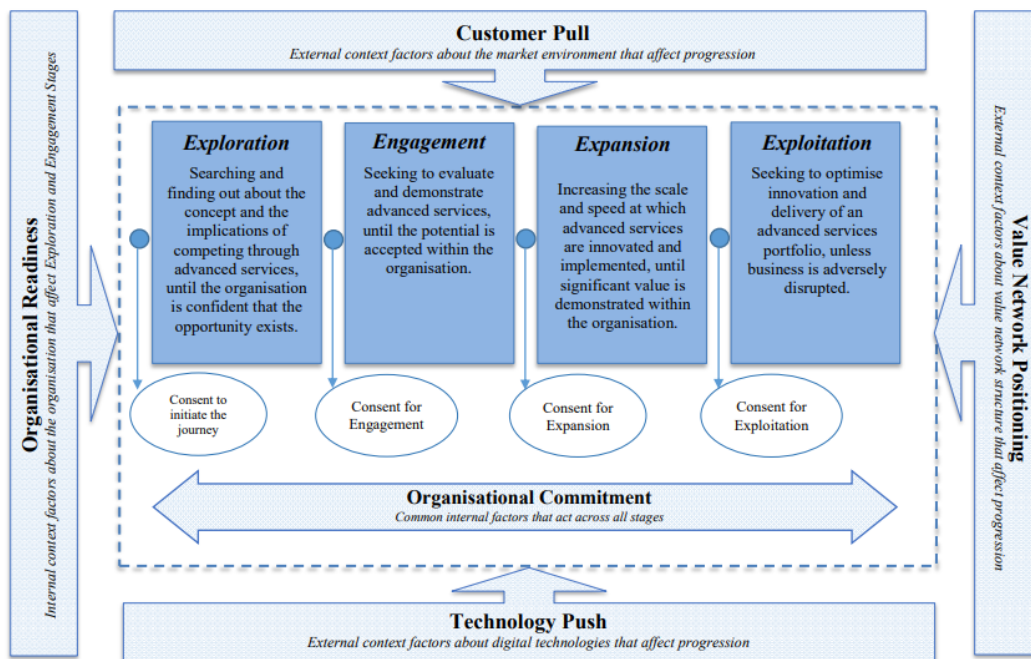


Figure 1. A servitization progression model (Baines et al., 2020b)

The exploration stage includes a manufacturer's initial efforts to clarify the concept and the implications of competing through advanced services. In this stage, key staff members become aware of general servitization concepts and advanced services. They seek to understand their market and explore how advanced services could play a key part in their organizational growth. In this early exploration stage executive sponsorship is likely to have the most influence on supporting progress (Baines et al., 2020b). There are examples where executive support only emerges in the following stage. The exploration stage continues until key staff are confident that the opportunity exists and managerial consent is provided to move to the next stage.

The engagement stage describes manufacturer efforts to evaluate and demonstrate the value of advanced services. Dedicated teams are formed to search for evidence of customer demand (customer pull), test the potential of technologies (technology push), experiment with new advanced service offerings and pilot innovative customer value propositions.

Progress at the engagement stage can be inhibited when manufacturers struggle to employ customers because they work through dealerships or distributors. The focus then shifts towards securing internal backing, both financially and organizationally until the potential is accepted within the organization and further progression takes place. At this stage it is helpful to use in-depth—and ideally independent—customer analysis, empathizing techniques, and structured experimentation with new service offerings at carefully chosen customer sites.

The expansion stage includes manufacturer efforts to increase the scale and speed at which advanced services are innovated and implemented. Pilots are translated into commercial offerings and the creation of significant value is demonstrated and communicated internally. In this stage, manufacturers also experience increasing tensions between the support and growth of new service offerings and the

established (production-centric) business model. This tension is likely to result in turbulence around staff that bridge these roles, organizational priorities, incentives, and structures.

In the final exploitation stage, manufacturers seek to continuously optimize the innovation and delivery of their advanced services portfolio. Manufacturers continue to develop new offerings and scale these up. They also invest in initiatives to improve the reliability and efficiency of the delivery of these services at scale. Efforts also include a focus on integrating servitization across different business units and on designing their products with the features required for the efficient delivery of advanced services. The eventual split in product and service business that manufacturers may achieve differ according to industry type, with factors such as product lifetime and value-adding opportunities playing a major role (McKinsey, 2019).

Practical implications of the servitization stage model

Baines et al's (2020b) analysis also provide insights into manufacturer servitization progression dynamics. On a macro-level, progression from stage to stage appears linear and unidirectional, yet, within each stage, activities to progress servitization are often organic, intuitive and repetitive. Progress from one macro-level stage to the next is punctuated by *tipping points*, which need to be overcome to change focus and activities, and progress to the following stage. Example tipping points include major senior-level endorsements, explicit commitments, and pilot projects with high-value customers.

These tipping points are so significant that manufacturers progress at very different speeds. In some cases, the servitization journey may stall or even fail entirely. The time taken to progress through the four stages of the servitization process can be significant. It may take between five and ten years for manufacturers to achieve mature capabilities.

Manufacturer progression along these stages is affected by internal and external context factors (Baines et al., 2020b; Dmitrijeva et al., 2020). Internal context factors such as manufacturer capabilities or product reliability and performance affect progression throughout the servitization journey (Dmitrijeva et al., 2020). The impact of the external context is especially critical in the intermediary engagement and expansion stages.

Factors affecting progression include the customer pull for advanced service offerings and the technology push, such as digital technology innovations. Manufacturer progress in the intermediary stages—which have a service evaluation and development focus—is more exposed to external context factors than in the initial and final stages of the servitization process, which have a learning and optimization focus.

How can manufacturers assess the servitization process?

The ability to measure and assess servitization progress is important for its effective management. Measuring servitization is critical for communicating and aligning the various organizational activities across the organization, investigating the effectiveness of targeted interventions, and benchmarking the transformation across the industries.

Servitization involves a wide range of manufacturer activities; specific assessment tools are required to capture these activities and to evaluate the transformation dynamics. Given the diverse activities, there is a risk that their progress is not identifiable. Progress may also be slowed as other short-term priorities arise and the transformation loses its momentum. The tools we mention can help alleviate progress concerns.

Effective servitization measurement tools should be able to measure servitization *progress* and *outcome* (Ziaee Bigdeli et al., 2018). Servitization *progress* identifies how much manufacturers have advanced in their transformation. Servitization *outcome* identifies quality improvement in services provided. While it is desirable for timely servitization progress pace, it is also critical to ensure that the services delivered are of high quality.

An effective way to comprehensively evaluate the variety of initiatives and objectives that form servitization is through using the balanced scorecard logic (Kaplan & Norton, 1992) as part of the servitization measurement framework—see Table 1. This logic includes financial, internal business, customer, and innovation and learning perspectives for comprehensive assessment of the manufacturer servitization development. Each is now overviewed.

Financial perspective: This perspective identifies advanced services value for different stakeholders. Over a dozen financial performance measures provide a scope of parameters for understanding the value of advanced services development. Measurements include current transformation *outcomes* in the form of profitability-related financial measures, and transformation *progress* in the form of investment-related measures which inform the extent that manufacturer servitization business transformation has advanced.

Internal business perspective: The internal perspective identifies the extent of business processes support for advanced services. Several measures can describe critical internal business aspects for assessing the manufacturer transformation *progress*, such as: the legal system (i.e., the capability to produce and structure outcome-based contracts), the financial system (i.e., the capability to develop and offer outcome-based revenue models) and service innovation process (i.e., the capability of innovating the offering).

Other measures focus on the internal *outcomes* created by a manufacturer's transformation, such as: (1) customer intimacy and understanding (ranging from 'distant relationship' to 'intimate relationship'); and (2) service innovation process (ranging from 'lagging' to 'leading').

There are also specific scales to indicate the competency or proficiency for each of these measures. The internal business perspective cannot be captured sufficiently by quantitative values or ratios—which is usually easier to do for the financial performance perspective.

Customer perspective: This perspective evaluates the customer perception of the servitization offering. There are five over-arching *outcome* measures and corresponding scales—given that absolute values were identified as impractical to operationalize. These measures assess the perceived attractiveness, innovativeness and performance of the servitization offering.

Innovation and learning perspective: This perspective determines the extent to which manufacturers continue to innovate and improve the service offering. There are *progress* measures that capture the

development of service innovation capabilities and *outcome* measures that capture customer perception of the service innovations.

Table 1. Framework for measuring servitization progress and outcome (Ziaee Bigdeli et al., 2018)

	Financial Perspective	Internal Business Perspective	Customers Perspective	Innovation & Learning Perspective
Principal Questions for 'Advanced Services'	How valuable are our services, and especially our 'advanced services', to our shareholders?	How well do our business processes support services, and especially 'advanced services'?	How do our services, and especially our 'advanced services', appear to our customers?	Can we continue to innovate and improve our services, and especially our 'advanced services'?
Measures for Assessing the Transformation towards 'Advanced Services'	<ul style="list-style-type: none"> Gross profit split between product sales and all services Gross profit split between all services and 'advanced services' Gross profit from all services as a percentage of the revenue Gross profit from 'advanced services' as a percentage of the revenue Gross profit as a percentage return on the investments Gross profit as a percentage return on the investments supporting 'advanced services' Gross profit growth over time for all services Gross profit growth over time for 'advanced services' Value of revenue from all services Value of revenue from 'advanced services' market positioning of all services Market positioning of 'advanced services' Budget as a proportion of revenue set aside for investment in all services Budget as a proportion of revenue set aside for investment in 'advanced services' 	<ul style="list-style-type: none"> Customer intimacy and understanding Service innovation process Performance measurement Facilities and structure People and culture Information and communication technologies Processes and procedures Network structure Legal systems (contracting) Financial systems 	<ul style="list-style-type: none"> Customer relationship Perceived size of our portfolio Attractiveness of our advanced services Perceived innovativeness of our offerings Perceived performance of our offerings 	<ul style="list-style-type: none"> Actively recognise the opportunity to innovate Actively committed to innovate Actively realising innovation Our customers recognise that we should innovate Our customers are committed to helping us innovate Our customers are beginning to adopt our innovation
	Transformation outcome focus	Transformation outcome focus	Transformation outcome focus	Transformation progress focus
	Transformation progress focus	Transformation progress focus	Transformation outcome focus	Transformation outcome focus

The framework supports servitization dynamics and provides manufacturers with suitable measures for assessing their servitization process, each aiding in a systematic management. Manufacturers can adopt individual measures suitable for their context. The framework can help integrate diverse stakeholders in their servitization initiative.

The development and implementation of performance measurement frameworks often stimulate important discussions among decision-makers and contribute to the establishment of common ground around key strategic objectives (Johanson et al., 2006). As the balanced scorecard is widely understood and adopted by manufacturers (Rigby & Bilodeau, 2009), the framework provides opportunities for manufacturers to integrate the measures directly into existing management systems.

What is the role of digitalization in servitization?

Servitization relies heavily on the digital infrastructure and capabilities of manufacturers. Some manufacturers approach servitization as part of their digital transformation or even as a business model to monetize their prior digital investments. It is critical for manufacturers to understand the interdependency between the two transformation efforts so they can effectively align their servitization and digitalization.

Effective digital infrastructure and capabilities can help manufacturers to *leverage their products*, develop *consulting expertise*, *reduce the dissonance* between manufacturers and customers, and advance their organizational *professional education* (Schroeder et al., 2019). Examples of each are now provided.

Leveraging of products: Digital infrastructure and capabilities can effectively modify the manufacturers' established product offerings and position them within an advanced services context. *Maintenance optimization* opportunities are important digitalization affordances. Offering a PSS implies that the manufacturers take on the ongoing product maintenance responsibility—optimizing can reduce cost and unplanned downtime.

Digitalization helps manufacturers to: (i) understand the individual product's risk of failure, and (ii) identify the optimal time for maintenance and planned downtime (for predictive maintenance), taking into account risks, costs, and both customer and manufacturer processes.

Importantly, to benefit from maintenance optimization, manufacturers need to have digital technology and data resources in place. They also require a trusting relationship with their customers. Maintenance optimization requires several information subsystems—including thresholds, algorithms and accumulated product histories—for manufacturers to effectively utilize captured product-use data. Clear thresholds are necessary to interpret – or *fingerprint* – the product-use data, determine its failure risk, and identify the maintenance requirements.

Mutually trusting manufacturer–customer relationships can overcome customer concerns and helps facilitate the manufacturer access to the critical product-use data. While digitalization provides manufacturers with the technical tool to access the critical product-use data, trusting social relationships facilitate the access permission to derive the necessary insights to optimize product maintenance.

Digital technology and capabilities that can help manufacturers establish their product offerings and position within an advanced services context are summarized in Table 2.

Developing the consulting function: An effective digital infrastructure and capabilities can help manufacturers move beyond their manufacturing knowledge and develop the business expertise to support their customer needs (Schroeder et. al, 2019)).

Digitalization provides manufacturers with the ability to offer customers well-grounded advice on the product use within a specific context—as required when offering *optimization services*. Specific analytical elements include: (i) context interference diagnostics—to establish how the customer context affects their product use; (ii) product choice optimization—to establish the product type best suited for customers’ use patterns; (iii) product use efficiency assessment—to establish the context-based efficiency and utilization rates; and (iv) process output analysis—to establish the customers’ overall process performance.

The viability of optimization services value propositions depends on the manufacturer’s ability to apply their expertise to the product and context insights.

Reducing manufacturer–customer dissonance: Manufacturers can use their digital infrastructure and capabilities to mediate and maintain their customer relationships—including joint problem-solving and conflict resolution. Digitalization supports the manufacturer–customer relationship by bringing about a shared understanding of advanced services value. For example, digital monitoring is critical to achieve the value that has been created (e.g., uptime) but also to evidence product misuse and clarify the responsibilities if a fault does occur.

Professional education: Manufacturers can use their digital infrastructure and capabilities to develop and manage the critical advanced services expertise for themselves and their partners. Digitalization helps to develop a fine-grained understanding of the PSS and helps to refine the value propositions which it can support. For manufacturers, advanced service value propositions such as optimization services represent new organizational ventures for which they are still lacking a complete understanding.

In addition to identifying how digital technology and capabilities enable advanced services, the relationships between manufacturers and customers are also important in the creation of these digital contributions (Schroeder et al., 2019). These relationships facilitate access to critical customer product-use data which manufacturers require to advance these contributions.

Digitalization and servitization efforts should not be managed as independent transformation projects. It is critical to align these two transformations to enable the advanced services to capitalize on manufacturer investments in digital technologies and capabilities.

Table 2. Digital contribution to advanced services (adapted from Schroeder et al., 2019)

Utility of the Digital Infrastructure and Capabilities		Contribution to Advanced Service Value Proposition
Leverage Product-service	Maintenance optimization	Contributes to product uptime value proposition by - minimizing unplanned downtime - reducing maintenance costs
	Repair efficiency	Contributes to product uptime value proposition by - optimizing repair preparation and minimizing risk of return visit - increasing speed of repair - reducing cost of repair
	Consumables/wear parts replenishment	Contributes to continuous consumables/wear part availability value proposition by - ensuring availability and responsiveness - reducing warehousing costs
	Fleet management administration	Contributes to administrative burden reduction value proposition by - optimizing the documentation requirements
Develop Consulting	Operational context advice	Contributes to optimization services value proposition by - effectively and efficiently advising on optimization potential
	Customer self-repair assistance	Contributes to product usage support value proposition by - effectively and efficiently make own expertise available for external usage
Dissonance Reduction	Service contribution	Contributes to product uptime value proposition by - effectively establishing objective insights
	Operational misuse alert	Contributes to product performance value proposition by - objectively demonstrating and mitigating misuse
Knowledge Creation	Learning and understanding	Contributes to optimization services value proposition by - developing wider insights across the organization

Summary

In this paper, we provide a general understanding and outline of the servitization process that manufacturers go through in order to offer advanced services to their customers. We also provide insights into the enabling role digitalization plays in the process.

This paper complements the paper by Sakao (2022) which focuses on the design of the value co-creation system that is needed to deliver these advanced services offerings effectively. Interested readers are invited to read practical handbooks on specific topics in servitization—these include Business Model Blueprint for Services (Naik, 2021), Customer Segmentation for Servitization (Naik et al., 2020), Servitization Contracts and Financing (Baines et al., 2020a); and other servitization-focused topics (ASG, 2022).

Overall, some major takeaways from this paper include:

- Servitization is a lengthy transformation process which creates far-reaching changes across manufacturing organizations.

- Manufacturers' servitization normally involves different stages, ranging from the initial exploration of the opportunities a service-focused business model could offer to the final stage where the service value proposition is delivered at scale.
- Servitization requires manufacturers to carefully co-create their value proposition with their customers, to ensure their business and service needs are identified and effectively addressed.
- To manage effectively the lengthy servitization process, a comprehensive measurement system is required to assess the transformation progress and align the different aspects of the transformation.
- Manufacturers benefit from digitalization when moving towards offering advanced services, but it is critical to align these two transformations.

References

- Accenture. (2019). *Servitization as a Product Strategy*. Retrieved from <https://www.accenture.com/us-en/blogs/industry-digitization/servitization-as-a-product-strategy>
- ASG. (2022). *Advanced Services Mini-Guides*. Retrieved from <https://www.advancedservicesgroup.co.uk/store/mini-guides/>
- Baines, T., & Lightfoot, H. (2013). *Made to serve: How manufacturers can compete through servitization and product service systems*. Chichester: John Wiley & Sons.
- Baines, T., Roy, R., Lightfoot, H. W., Benedettini, O., & Kay, J. M. (2009) The Servitization of Manufacturing. *Journal of Manufacturing Technology Management*, 20(5), 547-567.
- Baines, T., Ziaee Bigdeli, A., Breedon, R., Machan, I., Thompson, L., & Tumber, N. (2020a). *Servitization Contracts: Demystifying financing and contracts for advanced services*. Birmingham, UK: The Advanced Services Group Ltd., Aston Business School. Retrieved from <https://www.advancedservicesgroup.co.uk/store/mini-guides/servitization-contracts/>.
- Baines, T., Ziaee Bigdeli, A., Sousa, R., & Schroeder, A. (2020b) Framing the servitization transformation process: A model to understand and facilitate the servitization journey. *International Journal of Production Economics*, 221, 1-16.
- Bustinza, O. F., Ziaee Bigdeli, A., Baines, T., & Elliot, C. (2015) Servitization and competitive advantage; The importance of organizational structure and value chain position. *Research-Technology Management*, 58(5), 53-60.
- Dahmani, S., Boucher, X., Peillon, S., & Besombes, B. (2016) A reliability diagnosis to support servitization decision-making process. *Journal of Manufacturing Technology Management*, 27(4), 502-534.
- Dmitrijeva, J., Schroeder, A., Ziaee Bigdeli, A., & Baines, T. (2020) Context matters: how internal and external factors impact servitization. *Production Planning & Control*, 31(13), 1077-1097.
- Infosys. (2018). *Servitization is Leading Manufacturing's Advance into New Business Models*. Retrieved from <https://www.infosysconsultinginsights.com/wp-content/uploads/2018/12/servitization-leading-manufacturing-new-business-models-infosys-consulting.pdf>
- Johanson, U., Skoog, M., Backlund, A., & Almqvist, R. (2006) Balancing dilemmas of the balanced scorecard. *Accounting, Auditing Accountability Journal*, 19, 842-857.
- Kaplan, R., & Norton, D. (1992) The balanced scorecard: measures that drive performance. *Harvard Business Review*, 70(1), 71-79.
- Kindstrom, D., & Kowalkowski, C. (2014) Service innovation in product-centric firms: a multidimensional business model perspective. *Journal of Business & Industrial Marketing*, 29(2), 96-111.
- Lertsakthanakun, J., Thawesaengskulthai, N., & Pongpanich, C. (2012) Servitization decision-making framework for Thai manufacturing companies. *International Journal of Business Management*, 7(12), 147-158.

- Martinez, V., Neely, A., Velu, C., Leinster-Evans, S., & Bisessar, D. (2017) Exploring the journey to services. *International Journal of Production Economics*, 192, 66-80.
- McKinsey. (2019). *Aftermarket Services: The near-term growth opportunity in targeting the right customers*. Retrieved from <https://www.mckinsey.com/business-functions/operations/our-insights/aftermarket-services-the-near-term-growth-opportunity-in-targeting-the-right-customers>
- Naik, P. (2021). *Business Model Blueprint for Services: Understanding and building successful business models in the servitization journey*. Birmingham, UK: The Advanced Services Group Ltd., Aston Business School. Retrieved from <https://www.advancedservicesgroup.co.uk/store/mini-guides/business-model-blueprint-for-services/>
- Naik, P., Euchner, J., Machan, I., Tumber, N., & Baines, T. (2020). *Customer Segmentation for Servitization: How to identify customer groups for service innovation*. Birmingham, UK: The Advanced Services Group Ltd., Aston Business School. Retrieved from <https://www.advancedservicesgroup.co.uk/store/mini-guides/customer-segmentation/>
- Ng, I., Parry, G., Smith, L., Maull, R., & Briscoe, G. (2012) Transitioning from a goods-dominant to a service-dominant logic: visualising the value proposition of Rolls-Royce. *Journal of service management*, 23(3), 416-439.
- Rigby, D., & Bilodeau, B. (2009). *Management tools and trends*. Retrieved from <https://www.bain.com/insights/management-tools-and-trends-2009/>
- Sakao, T. (2022) Increasing value captured through enhancing commitment in the manufacturing sector – Designing a value co-creation system. *IEEE Engineering Management Review*.
- Schroeder, A., Ziaee Bigdeli, A., Galera Zarco, C., & Baines, T. (2019) Capturing the benefits of industry 4.0: a business network perspective. *Production Planning & Control*, 30(16), 1305-1321.
- Ziaee Bigdeli, A., Baines, T., Schroeder, A., Brown, S., Musson, E., Guang Shi, V., & Calabrese, A. (2018) Measuring servitization progress and outcome: The case of ‘advanced services’. *Production Planning & Control*, 29(4), 315-332.