The Journal of Asia Entrepreneurship and Sustainability RESEARCH ARTICLE

Data-Driven Digital Capability and Servitization in Manufacturing: A Pilot Study of Service Innovation and Competitive Advantage

Mr. Parag Raut[1], Mr. Dattatray P More[2]

[1]Research Scholar (AIMS Baramati) Affiliated to Savitribai Phule Pune University, Eamil Id: paragraut22@gmail.com

[2]Research Guide AIMS Baramati Affiliated to Savitribai Phule Pune University, Email ID: dr.dpmore@aimsbaramati.orgail

Abstract
Servitization is a growing trend that is transforming manufacturing with a focus on blending physical products with digitally enabled services. Its organisational capabilities that use digitalisation as a means to create servitization and thus competitive consequences, however, are not yet sufficiently integrated. This is a pilot study to investigate the role of data-driven digital capability, servitization capability, service innovation capability and competitive advantage in manufacturing companies. The study design was quantitative with cross sectional approach and data was collected from the manufacturing professionals (N = 60) through a structured questionnaire. Descriptive analysis, reliability measure and correlation and regression analysis were used as preliminary analysis in data analysis. The results indicate certain level of initial support of the hypothesized relationships: data-driven digital capability is positively related to servitization capability; servitization capability is linked to service innovation and competitive advantage. But there is positive relationship between service innovation capability and competitive advantage. The results provide a preliminary stage in empirical validation of the proposed model by a bigger study.
Keywords: Servitization; Digital Capability; Digital Servitization; Service Innovation; Competitive Advantage; Manufacturing;

Keywords: Servitization; Digital Capability; Digital Servitization; Service Innovation; Competitive Advantage; Manufacturing;

1. Introduction

Firms have always competed with each other by offering their products at a lower price, increasing the output and improving the quality of their products. But as customers have come to demand more than just a product, those strategies are no longer adequate. They might also have to be maintained, supported, trained, monitored and solutions provided that enable them to get better out of the product they buy. This shift has led manufacturers to embrace servitization, a shift towards generating value from products after they have been sold (Baines et al., 2009).

Servitization is no panacea with a few after sales services. For a number of manufacturers it means a shift in the organisation's thinking, particularly regarding their customers and how they offer value. An equipment commercializer, for instance, could shift operations over time from equipment sales to a maintenance contract system, remote monitoring, technical consultancy or performance based. Thus, the manufacturer—customer connection becomes more of a continuous process, and the manufacturer becomes more closely integrated with the customer in the use of the product.

The technological advancement has made this transition easier. The Internet of Things (IoT), cloud computing systems, artificial intelligence and data analytics allow manufacturers to collect data from the connected products and leverage them to "gain insight into the performance of their products. This opens the possibility of resolving issues earlier, offer predictive maintenance and/or create services based on real customer needs. Thus, digital servitization is an emerging field of manufacturing research. As demonstrated in this systematic review of 30 years of research by Minaya et al. (2024), digital technologies are reshaping how manufacturers are generating value through products and services.

But having access to digital technology does not mean that a manufacturer is digitally capable. Businesses can gather a ton of information and fail to leverage it for growth. It's the organisation's capacity to gather appropriate information and to analyze it and transform the knowledge into meaningful business and service decisions that matters. This competence is known as data-driven digital competence. The authors of the empirical study on 246 manufacturing companies conducted by Chen, et al. (2023) concluded that data-driven digital capabilities can help to embrace servitization and add to competitiveness. They studied and found digital collection, digital analysis and digital application capabilities to be key parts of this process.

Dynamic Capability Theory can be used to explain the

connection between digital capability and servitization. Manufacturing companies exist in a continuously changing environment of technologies, customer demands and competitive situations. They must consequently identify new opportunities, maximize available resources and upgrade their current capabilities. By applying data-driven digital capability, companies can gain insight into shifting market and customer needs and by using digital information, develop new product-service offerings. From this point of view, the digital capability can be of critical importance for successful servitisation.

Servitization may also have an impact on service innovation. When a company begins to utilize multiple products and services, the nature of the services should be re-examined and rethought in terms of their design, delivery and improvement. This can result in new maintenance concepts, remote monitoring, predictive maintenance, to customised services and outcome-based solutions. Service innovation is thus a relevant aspect of transitioning from merely selling products to selling integrated solutions. Recent studies show the increasing linkages between servitization and innovation and technological change (Xing et al., 2023).

The strategic significance of these changes will ultimately vary with whether they lead to competitive advantage. The development of digital technologies and new services needs financial resources, technical and organisational resources. So for manufacturers it is essential to be aware if these investments aid them to differentiate their products, better respond to their customers and compete successfully. Previous studies indicate that there is a generally positive association between servitization and firm performance, which, however, depends on the organisational and environmental contexts (Li et al., 2022). That means that servitization should not be seen as a "natural" source of competitive advantage, but as a source of added value that needs to be "harvested" from the service using the proper capabilities.

Although now the research on servitization has significantly increased, an important question is what the role of digital capabilities are for manufacturing firm to shift towards servitization, and what impact can this shift have on service innovation and the gain of competitive advantage? While research conducted on these areas from various angles have already been done, there is still room to look at them together in a single study. We were given an important foundation by Chen et al. (2023), who connected data-driven digital capabilities and servitization with competitiveness as well as recent research on digital servitisation and service innovation that clearly indicated that empirical research was needed.

Hence, this study aims to analyse the linkage between data-driven digital capability and servitisation capability as well as how these capabilities are linked to service innovation capability and competitive advantage in manufacturing firms. As suggested in the proposed framework, manufacturers having more data-driven digital proficiency might be more capable of creating servitized services. Robust servitization competences can in turn foster service innovation and thus create a competitive advantage.

This study is a pilot study that is academically and practically relevant. Academically, it combines in a research framework aspects such as data-driven digital capability, servitization, service innovation and competitive advantage. In practice, it can be useful for manufacturing managers to know if the development of digital capabilities can be used to create service-oriented business models. The pilot study will also allow to evaluate the reliability and the applicability of the proposed measurement instrument before checking the framework with a large sample.

2. Literature Review

2.1 Servitization in Manufacturing

The process of servitization has been interacting with time and the perception of value creation by manufacturing companies has gradually been altered. Manufacturers are moving away from only selling understanding their products and are more and more beginning to sell products plus maintenance, technical support and consulting, training and other services. Servitization was identified as a key strategic move in manufacturing by Baines et al. (2009) and further studies have revealed that it requires broader changes in organisational capabilities, customer relations and business models. There is a shift in the way manufacturing firms generate and provide value in their products through servitisation, which can therefore be considered as a change in value creation and providing.

2.2 Digital Servitization and Data-Driven Capability (DDC)

In the light of the development of digital technologies, a new direction has been given to the development of servitization. For manufacturers, IoT, cloud computing and AI and data analytics can enable them to keep track of their products, learn about customer needs and deliver more personalised services. The recent systematic review of 157 research papers concluded that Digital Servitization has become an important research area, especially for its contribution to competitiveness and customer value (Minaya et al., 2024). Likewise, Leocádio et al. (2024) reported that digital technologies are spurring manufacturers towards offering more integrated and sophisticated services.

A crucial question is, however, can companies actually make useful services out of digital information? To solve this problem, Chen et al. (2023) created the concept of digital capabilities, which

includes digital collection, digital analysis and digital application capabilities. Based on the survey results of 246 Chinese manufacturing enterprises they determined that these capabilities have a positive impact on the servitization and indirectly promote competitiveness. They found that their results also indicated that digital Application capability is one aspect which is especially important when it comes to implementing Servitization.

2.3 Innovation and servitization are two key enablers of sustainable development in the future.

Servitization places pressure on manufacturers to rethink service design and delivery, as well. Companies can create performance based services, customised solutions and remote monitoring and predictive maintenance. As a result of a systematic review, Xing et al. (2023) state that servitization innovation is important as a link between manufacturing-servitization-technological developments. Their review reveals various types of servitisation innovations and that technological changes have opened opportunities for manufacturers to organise and provide services.

This indicates that servitisation capability could be a setting that could enable the firms to experiment and innovate new services. But the impact of servitization capability on service innovation is still to be explored empirically, especially taking digital capability as a precursor.

2.4 Servitization & competitive advantage

The value of servitization lies in its strategic benefits: Whether it boosts a firm's performance relative to its competitors or not. Product and service integration can help manufacturers distinguish their products, build more loyal customers and develop more copy-resistant capabilities. Overall, research in the field suggests a positive relationship between servitization and competitiveness or firm performance, but these results are not direct and may require organisational capabilities and conditions of implementation (Li et al., 2022).

Recent literature also shows that digital servitization can help build competitiveness as it allows manufacturers to transition towards more integrated solutions and data-based value creation (Minaya et al., 2024). Leocádio et al. (2024) also suggest that the exploitation of digital technologies, business-model changes, and data analysis can be used to build competitive edge for manufacturers in a more and more service-oriented market.

2.5 Research Gap

The literature reveals that servitization, digital capability, service innovation and service competitive advantage are strongly interrelated, and have been explored in isolation. Data driven digital capability can enable servitization and consequently increase competitiveness, as shown by strong empirical evidence provided by Chen et al. (2023), but Xing et al. (2023) show the importance of innovation within servitization. Despite previous research examining each capability in isolation, research into how digital capabilities and servitization connect to service innovation and performance has been scarce, and there is a lack of empirical studies that combine all the concepts within a capability-based model. In particular, the sequential relationship, through which the data-driven digital capability contributes to the servitization capability, and the servitization capability contributes to the service innovation capability, and the innovation through services contributes to the competitive advantage has been poorly attended. This study attempts to address this deficiency by creating and testing an integrated empirical model for manufacturing industries.

With the aim of filling this lacuna, the present Pilot study introduces these four constructs into a single framework. It is inspired by Dynamic Capability Theory: Data-driven Digital Capability is the basis for Servitization while Servitization Capability is the basis for Service Innovation and Competitive advantage. The pilot study also allows to examine the reliability of the measurement instrument, and preliminary suitability for a larger empirical study, prior to use.

3. Research Methodology

3.1 Research Design

This study can be considered as a cross-sectional pilot study type to examine the relationship among data-driven digital capability, servitization capability, service innovation capability and competitive advantage in manufacturing companies as a quantitative type of study. The goal of the pilot is to develop data to evaluate the research design and the measurement tool (instruments) for use in the planned study.

3.2 Population and Sampling

Target population is a manufacturing firm that sells products and support and/or value added services. Respondents were managers and professionals in operations, production, procurement, supply chain, maintenance and engineering/service management.

There was the need to have persons with enough knowledge of their organization's digital capability, service activities and competitive position, which is why purposive sampling was used. In the pilot study, a target of 60 usable responses was chosen due to the main goal of the pilot being to test the clarity of the questionnaires, internal consistency of the questionnaire items and preliminary relationships between the proposed constructs, and not to provide a level of generalisation that would be required for a representation of the population. This sample is as such regarded as a methodological sample. Further full-scale testing with a significantly larger sample was performed to further strengthen the construct

validation and model testing.

3.3 Data Collection Instrument

The main sources of data obtained were through structured questionnaire that was adopted from the scaling instruments that were already available in literature. The questionnaire were cover four constructs:

1. Data-driven digital capability
2. Servitization capability
3. Service innovation capability
4. Competitive advantage

Five-point Likert scale was used to assess the main constructs, with the responses of 1 being Strongly Disagree and 5 being Strongly Agree. The questionnaire was reviewed with appropriate academic and industry experts and pre-tested for items that were unclear and/or redundant.

3.4 Measurement of Constructs

Digital capability based on data is the capacity to gather, evaluate and use digital data for organizational and customer decisions (Chen et al., 2023).

Servitization capability is seen as the capability of the firm in integrating products with services and creating product-service offerings.

Service innovation capability is defined as the capability to create, introduce and enhance new or significantly modified services.

Competitive advantage is the capacity which the firm has to secure a favorable competitive position by way of differentiation, value creation and organizational capabilities.

3.5 Data Analysis

The pilot data was analysed using IBM SPSS Statistics. To better understand the data, descriptive statistics, including mean and standard deviation, frequencies and percentages were first used.

This was accomplished by using Cronbach's alpha and corrected item-total correlations to examine the reliability of the constructs. Because of the small size of the pilot sample, EFA was taken as exploratory and was conducted if there was no evidence of inadequate sampling and adequate item-to-response ratios. In the full-scale study, Confirmatory Factor Analysis (CFA) was to be planned so that more robust construct validation would be achieved.

Pearson's correlation analysis was performed to investigate relationships between the constructs. Then the four hypotheses were tested using linear regression analysis:

The data-driven digital capability has a positive relationship with the servitization capability. Data-driven digital capability is positively associated with the servitization capability.

Servitization capability to service innovation capability

The relationships are shown below:

H5: Genuine knowledge creation capability → Competitive advantage

Results of the regression included R, R^2, adjusted R^2, β, t, F, p-values and confidence intervals.

3.6 Ethical Considerations

The participant responses were voluntary and the goal of the academic study was explained to the participants. Participants were assured of confidentiality and anonymity, and data were only reported in aggregate form.

3.7 Pilot-Study Purpose

The pilot study tested the clarity of the questionnaires, reliability, preliminary validity, and feasibility of the proposed relationships. The results were used to make sense of how to improve the measure tool prior to the "for real" study. More solid evidence of the proposed research model could be gained through the Confirmatory Factor Analysis (CFA) and the Structural Equation Modelling (SEM) with the larger sample.

4. Research Objectives

The total aim of this pilot study could be to discover out how digital capabilities via information-driven support can contribute to servitization and to service innovation and competitive advantage in production corporations.

Specific objectives are:

RO1: To explore the effect of the data-based digital capability on manufacturing companies' capability for servitisation.

RO2: To analyse the influence of the servitization capability on the service innovation capability of manufacturing companies.

RO3: To examine the effect of Servitization Capability on Manufacturing firms' competitiveness.

RO5: To examine the influence of innovation capability of the service on competitive advantage of the manufacturing company.

5. Research Hypotheses

From the proposed conceptual framework, the following hypotheses are formulated, based on the literature used:

H1: Digital capability has a positive and significant impact on servitization capability in manufacturing companies through data-driven approach.

H2: The capability of servitization positively and significantly influences the capability of service innovation in manufacturing companies.

H3: Servitization capability positively and significantly affects the competitive advantage in

manufacturing companies.

H4: The level of service innovation capability has a positive and significant relationship with competitive advantage in manufacturing companies

6. Hypothesis Testing and Statistical Results

6.1Respondent Profile

Variable	Category	Frequency	Percentage (%)
Position	Senior management	12	20
	Middle management	24	40
	Technical/Professional	18	30
	Supervisory/Operational	6	10
Work Experience	<5 years	9	15
	5–10 years	18	30
	11–15 years	17	28.3
	>15 years	16	26.7
Manufacturing Sector	Automotive	18	30
	Engineering/Industrial Equipment	17	28.3
	Electronics/Electrical	12	20
	Chemicals/Pharmaceuticals	7	11.7
	Other Manufacturing	6	10

Reliability Statistics

Construct	No. of Items	Cronbach's Alpha (α)	Decision
Data-Driven Digital Capability	5	0.874	Acceptable
Servitization Capability	5	0.891	Acceptable
Service Innovation Capability	5	0.903	Acceptable
Competitive Advantage	5	0.881	Acceptable

N = 60. Cronbach's alpha values for all the scales are greater than .70, which is acceptable. The corrected item-total correlations are above .30 which means that there is acceptable relationship between the items and the constructs.

Data collected from the pilot was analysed using descriptive statistics, reliability analysis, Pearson correlation and preliminary regression analysis. The statistical analysis was mostly used to evaluate the behaviour of the proposed constructs and to gain initial evidence for the hypothesised relationships. Results are interpreted with caution owing to the exploratory nature and small sample size, and do not make any claims of causality or population-level generalizability.

Prior to the regression analyses, the assumption of linear regression was explored. Residual plots were used to check the linearity and homogeneity of the variances, and graphical procedures were used to check the normality of the residuals. The independence of observations was also taken into account. For models involving more than one predictor in the full-scale study, multicollinearity were assessed using tolerance and variance inflation factor (VIF) statistics. The pilot analysis should be considered with caution as this sample size is relatively small.

H2: Data-Driven Digital Capability → Maintenance Capability Put in Practice (MIPI)

H1: Data-driven digital capability in manufacturing firms positively and significantly influences the servitisation capability in manufacturing firms.

The result shows that there is a positive relation between data-driven digital capability and the servitization capability. Results are presented in the model showing that 32% of the variance in servitisation capability has been explained (R^2 = .320; adjusted R^2 = .308). The regression model is statistically significant, F(1, 58) = 27.35, p < .001. Data-driven digital capability has a positive and

significant effect on servitization capability (β = .566, SE = .119, t = 5.23, p < .001, 95% CI [.38, .86]). Hence, H1 is accepted.

Increasing Servitization Capability leads to increasing Service Innovation Capability.

H2: The capability of servitization positively and significantly influences the capability of service innovation in manufacturing companies.

In summary, the results indicate that there exists a positive relationship between servitisation capability and service innovation capability. The model results in R2 = .379 and an adjusted R2 = .368, meaning that servitization capability accounts for around 37.9% of the variance in service innovation capability. The regression model is significant, F(1, 58) = 35.49, p < .001. Servitization capability significantly predicts service innovation capability (β = .616, SE = .114, t = 5.96, p < .001, 95% CI [.45, .91]). Therefore, the statement H2 is true.

H3: Servitization Capability→ Competitive Advantage

H3: Manufacturing firms with a strong servitization capability have a positive and significant relationship with competitive advantage.

Based on the analysis results, it conveys that there is a positive correlation between the capability for servitization and competitive advantage. About 29.1% of the variance in competitive advantage is explained by the regression model (R^2 = .291, and R2 adj = .279). The model is statistically significant, F(1, 58) = 23.72, p < .001. Servitization capability demonstrates a significant positive effect (β = .539, SE = .117, t = 4.87, p < .001, 95% CI [.34, .80]). So, H3 is correct.

The third level indicates that Service Innovation Capability leads to Competitive Advantage.

H4: Service innovation capability positively and significantly contributes to competitive advantage in manufacturing firms.

The results of the study have shown that there is a positive relationship between service innovation capability and competitive advantage. The resultant model had an R-squared value of .350, indicating that it accounted for about 35.0% of the variance in competitive advantage (R2 = .339 when adjusted for number of independent variables). The regression model is significant, F(1, 58) = 31.31, p < .001. Service innovation capability has a positive and significant effect on competitive advantage (β = .592, SE = .113, t = 5.60, p < .001, 95% CI [.40, .86]). Hence, the H4 is accepted

.

Hypothesis	Relationship	β	R^2	Adjusted R^2	F	t	p	Decision
H1	Digital Capability → Servitization	0.57	0.32	0.308	27.4	5.2	<.001	Supported
H2	Servitization→ Service Innovation	0.62	0.38	0.368	35.5	6	<.001	Supported
H3	Servitization→ Competitive Advantage	0.54	0.29	0.279	23.7	4.9	<.001	Supported
H4	Service Innovation → Competitive Advantage	0.59	0.35	0.339	31.3	5.6	<.001	Supported

7. Discussion

Preliminary results show that the hypotheses postulated between data-driven digital capability, servitization capability, service innovation capability and competitive advantage are supported. In general, digital capability seems to act as a basis for servitisation and servitisation and service innovation can contribute to the competitive positioning.

7.1 Data-Driven Digital Capability and Servitization Capability

Data-driven digital capability was positively and significantly correlated with servitisation capability (β = .566, p < .001) which confirmed the hypothesis that servitisation capability is positively affected by data-driven digital capability. This indicates that companies that can gather, analyse and use the digital data might be better equipped to create product-service offerings.

This results aligns with the results obtained by Chen et al. (2023) identifying data-driven digital capabilities enable servitisation strategies. In the view of Dynamic Capability Theory, the capabilities enable companies to sense shifts in customer needs and to react by offering a new product-services solution (Teece, 2007).

7.2 Servitization Capability and Service Innovation

H2 was significant and had the highest relationship (β = .616, p < .001). This means that manufacturers

with higher servitization capabilities might be more likely to be able to design and enhance their service offerings.

This result is aligned with Xing et al. (2023), who consider innovation one of the servitization elements. Digital service innovation is another important enabler to value creation in servitised business models, as pointed out by Raddats et al. (2022). In this way, servitization can stimulate businesses to create new service ideas and offerings as well as new service delivery mechanisms.

7.3 The capability and the competitive advantage of Servitization

It was found that servitization capability positively and significantly influenced on competitive advantage ($\beta = .539$, $p < .001$). This indicates that product integration and service integration could be important ways for the manufacturers to develop a difference and add value to the customer.

The result is consistent with the works of Li et al. (2022) and Minaya et al. (2024) who demonstrate the possible ways to contribute through servitization to the performance and competitiveness of the firms. Nevertheless, servitization does not necessarily lead to competitive advantage, companies have to possess the technological, organisational and service capabilities to extract its value.

7.4 Service Innovation & Competitive Advantage

H4 also held as the capability of service innovation positively influenced competitive advantage ($\beta = .592$, $p < .001$). Thus, companies with the ability to continually evolve their services and refine them might have more chances to set themselves apart and meet customer needs.

This is in line with the findings of Xing et al. (2023) and Raddats et al. (2022) which focus on the importance of innovation to generate value through servitisation. Competitive benefits therefore may not just be a matter of providing services but also a matter of how the firm can continuously innovate services.

7.5 Overall Interpretation

The overall results have some preliminary support for the proposed pathway:

Data-Driven Digital Capability → Servitization Capability → Service Innovation Capability → Competitive Advantage

These findings align with the Dynamic Capability Theory viewpoint, which appears to focus more on how companies build and reconfigure capabilities in order to address technological and market shifts (Teece, 2007). Digital capability can play a fundamental role in this process by allowing companies to manage information in an effective manner, while servitisation and service innovation offer possibilities to transform these capabilities into customer and market value.

This is a pilot study, so the results need to be analysed with care. They offer some initial support for the model suggested but are not sufficient to conclude causality and to be generalised across the manufacturing sector. The study could be expanded with more varied samples and more powerful analysis methods like CFA and SEM for more compelling evidence.

8. Limitations and Future research

There are several limitations in the study. Firstly, the sample group (60 respondents) was a representative group, which means the findings of this study are restricted. Secondly, there is respondent-selection bias in purposive sampling. Thirdly, the study is cross sectional in nature, which has certain limitations in terms of drawing causal and temporal inferences. Fourth, the self-reported nature of the data also could result in response and common-method biases. Last, because the study examines manufacturing firms across various sectors, and does not separate them into different categories, no differences between sectors are explored.

The proposed model should be validated in future studies with a larger sample and probability-based sample or appropriately stratified based on the feasibility of sample size. The measurement and structure validity can be strengthened by confirmatory factor analysis and structural equation modelling. Mediating and moderating factors like digital maturity, organisational agility, customer integration, technological turbulence, and firm size could also be studied in the future. The investigation of the servitization capabilities may be extended further in longitudinal research to understand how these capabilities evolve over time.

9. Conclusion

The purpose of this pilot study was to explore the relationship between Data-driven digital capability, Servitization capability, Service innovation capability and Competitive advantage in the manufacturing companies. The preliminary results support the proposed relationships and suggest that digital capabilities might serve as important basics for implementing servitization and that the latter and service innovation, in turn, might lead to a competitive advantage.

The study extends the growing body of literature on digital servitisation by combining four related capabilities in one framework, based on Dynamic Capability Theory. The study, however, involved a relatively small pilot sample, which suggest that the results have to be seen as preliminary, and not definitive. Results are used to improve the measurement instrument and to conduct an empirical study on a larger scale using stronger construct validation and structural modelling technique.

References

1. Baines, T. S., Lightfoot, H. W., Benedettini, O., & Kay, J. M. (2009). The servitization of manufacturing: A review of literature and reflection on future challenges. Journal of Manufacturing Technology Management, 20(5), 547–567. https://doi.org/10.1108/17410380910960984
2. Chen, L., Dai, Y., Ren, F., & Dong, X. (2023). Data-driven digital capabilities enable servitization strategy—From service supporting the product to service supporting the client. Technological Forecasting and Social Change, 197, 122901. https://doi.org/10.1016/j.techfore.2023.122901
3. Chirumalla, K., Leoni, L., & Oghazi, P. (2023). Moving from servitization to digital servitization: Identifying the required dynamic capabilities and related microfoundations to facilitate the transition. Journal of Business Research, 158, 113668. https://doi.org/10.1016/j.jbusres.2023.113668
4. Coreynen, W., Matthyssens, P., Vanderstraeten, J., & Van Witteloostuijn, A. (2020). Unravelling the internal and external drivers of digital servitization: A dynamic capabilities and contingency perspective on firm strategy. Industrial Marketing Management, 89, 265–277.
5. Eloranta, V., Ardolino, M., & Saccani, N. (2021). A complexity management approach to servitization: The role of digital platforms. International Journal of Operations & Production Management, 41(5), 622–644. https://doi.org/10.1108/IJOPM-08-2020-0582
6. Favoretto, C., Mendes, G. H. S., Oliveira, M. G., Cauchick-Miguel, P. A., & Coreynen, W. (2022). From servitization to digital servitization: How digitalization transforms companies' transition towards services. Industrial Marketing Management, 102, 104–121. https://doi.org/10.1016/j.indmarman.2022.01.003
7. Gebauer, H., Paiola, M., Saccani, N., & Rapaccini, M. (2021). Digital servitization: Crossing the perspectives of digitization and servitization. Industrial Marketing Management, 93, 382–388.
8. Kamal, M. M., Sivarajah, U., Ziaee Bigdeli, A., Missi, F., & Koliousis, Y. (2020). Servitization implementation in the manufacturing organisations: Classification of strategies, definitions, benefits and challenges. International Journal of Information Management, 55, 102206. https://doi.org/10.1016/j.ijinfomgt.2020.102206
9. Leocádio, D., Guedes, L., Oliveira, J., & Gonçalves dos Reis, J. C. (2024). Servitization in digital age: A systematic literature review. Procedia Computer Science, 232, 2531–2539. https://doi.org/10.1016/j.procs.2024.02.071
10. Li, K., Wang, J., Feng, L., & Zhu, L. (2022). Re-discussion of servitization strategy and firm performance. Frontiers in Psychology, 13, 1022648. https://doi.org/10.3389/fpsyg.2022.1022648
11. Lombardi, S., Santini, E., & Vecciolini, C. (2020). Formulating service-oriented strategies for servitization of manufacturing companies. Sustainability, 12(22), 9657. https://doi.org/10.3390/su12229657
12. Martín-Peña, M.-L., Sánchez-López, J.-M., Kamp, B., & Giménez-Fernández, E. M. (2023). The innovation antecedents behind the servitization–performance relationship. R&D Management, 53(3), 459–480. https://doi.org/10.1111/radm.12586
13. Minaya, P. E., Avella, L., & Trespalacios, J. A. (2024). Synthesizing three decades of digital servitization: A systematic literature review and conceptual framework proposal. Service Business, 18, 193–222. https://doi.org/10.1007/s11628-024-00559-x
14. Mosch, P., Schweikl, S., & Obermaier, R. (2021). Trapped in the supply chain? Digital servitization strategies and power relations in the case of an industrial technology supplier. International Journal of Production Economics, 236, 108141. https://doi.org/10.1016/j.ijpe.2021.108141
15. Paschou, T., Rapaccini, M., Adrodegari, F., & Saccani, N. (2020). Digital servitization in manufacturing: A systematic literature review and research agenda. Industrial Marketing Management, 89, 278–292. https://doi.org/10.1016/j.indmarman.2020.02.012
16. Raddats, C., Naik, P., & Ziaee Bigdeli, A. (2022). Creating value in servitization

through digital service innovations. Industrial Marketing Management, 104, 1–13. https://doi.org/10.1016/j.indmarman.2022.04.002

17. Sjödin, D., Parida, V., Kohtamäki, M., & Wincent, J. (2020). An agile co-creation process for digital servitization: A micro-service innovation approach. Journal of Business Research, 112, 478–491. https://doi.org/10.1016/j.jbusres.2020.01.009
18. Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. Strategic Management Journal, 28(13), 1319–1350. https://doi.org/10.1002/smj.640
19. Tian, J., Coreynen, W., Matthyssens, P., & Shen, L. (2022). Platform-based servitization and business model adaptation by established manufacturers. Technovation, 118, 102222. https://doi.org/10.1016/j.technovation.2021.102222
20. Upadhayay, N. B., Rocchetta, S., Gupta, S., Kamble, S., & Stekelorum, R. (2024). Blazing the trail: The role of digital and green servitization on technological innovation. Technovation, 130, 102922. https://doi.org/10.1016/j.technovation.2023.102922
21. Xing, Y., Liu, Y., & Davies, P. (2023). Servitization innovation: A systematic review, integrative framework, and future research directions. Technovation, 122, 102641. https://doi.org/10.1016/j.technovation.2022.102641
22. Zhou, D., Yan, T., Dai, W., & Feng, J. (2021). Disentangling the interactions within and between servitization and digitalization strategies: A service-dominant logic. International Journal of Production Economics, 238, 108175. https://doi.org/10.1016/j.ijpe.2021.108175