



SSC

2026

## **PROCEEDINGS**

The Spring Servitization Conference  
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# **Servitization as a Multilevel Transformation: Business Models, People, Organisations, and Ecosystems**

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Located in the heart of Europe in the dynamic metropolitan region of the Ruhr, Ruhr-Universität Bochum (RUB) with its 21 faculties is home to 38,000 students, among them 6,000 international, who study in some 190 Bachelor and Master programs or pursue a doctoral degree. As a comprehensive campus and public research university, it unites the humanities, social sciences, natural sciences, engineering, and medicine. Driven by its commitment to interdisciplinary and globally engaged research, RUB stands as one of Germany's leading universities.



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The Chair for Industrial Sales and Service Engineering (ISSE) focuses on the intersection of sales, service, and innovation management. Based within the Faculty of Mechanical Engineering at Ruhr-Universität Bochum, the team explores how digitalization and servitization are reshaping industrial value creation. While the chair strives for international academic excellence, its core lies in interdisciplinary collaboration to tackle complex challenges. In this context, research and teaching are seen as more than just a means to achieve high-level results; they are about fostering innovation that works in practice. This collaborative spirit is central to the chair's strong commitment to the ZESS, where Prof. Jens Poeppelbuss as the head of ISSE also contributes as a member of the Board of Directors.

## **Introduction**

The Spring Servitization Conference (SSC2026) is dedicated to understanding how organisations develop and adapt their business models through servitization and advanced services. The 2026 conference will be held in Bochum, Germany, with the overall theme of 'Servitization as a Multilevel Transformation: Business Models, People, Organisations, and Ecosystems'. The conference will bring together the world's leading researchers, practitioners and doctoral students to debate and engage with the theory and practice of servitization.

SSC2026 will comprise the Servitization Doctoral Symposium (Monday 18 May) and the main Spring Servitization Conference (Tuesday 19 and Wednesday 20 May). On Monday 18 May, we will host our doctoral symposium for PhD students whose research focuses on topics related to servitization (including Product-Service Systems, services-centric business models, and service-dominant logic, etc.).

On Tuesday 19 and Wednesday 20 May, we will follow the established format of a single stream where contributors have an opportunity to present to the whole conference audience and engage in both structured and semi-structured panel sessions to discuss their work. The programme is designed to encourage extensive debate and bridge research theory and industrial practice. The conference will also feature keynote addresses from senior executives of leading manufacturing businesses. We will also dedicate some sessions to the early-stage research, which comprises interactive keynotes by leading academics in the field, debates around emergent research themes, and poster reviews of proposed projects and doctoral research. A certificate of attendance will be provided on request after the conference by email to the conference organising team.

**Co-Chairs of the 2026 Spring Servitization Conference**

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# Exploring Sustainability and Value Co-Creation in Smart Waste Service Ecosystems

Simon Weisskopf, Nico Meier

## RESEARCH MOTIVATION

Smart waste management is increasingly discussed as a promising field for digitally enabled Product–Service Systems (PSS). By combining sensor-equipped waste infrastructure with digital platforms and data-driven route planning, such systems can improve operational efficiency, reduce unnecessary collection trips, and support more sustainable municipal services. At the same time, their implementation raises challenges that go beyond technical optimisation. The value of smart waste solutions depends not only on the performance of sensors, data flows, and routing logic, but also on how municipalities, providers, service operators, and other actors interact within a broader service ecosystem.

This paper addresses this issue by examining a smart waste use case developed with the Swiss company AntaSwiss AG. Rather than treating the solution as a stand-alone technical innovation, the study conceptualises it as a data-driven PSS embedded in a multi-actor ecosystem. This perspective makes it possible to analyse how sustainability-related benefits and value creation emerge through the combination of technological functionality, organizational routines, and stakeholder relationships.

Empirically, the study draws on a qualitative case study based on six semi-structured interviews with relevant ecosystem actors. These interviews are complemented by insights from the implementation context and by operational observations from test municipalities. The material was analysed using qualitative content analysis with a focus on stakeholder roles, value creation mechanisms, governance issues, and sustainability-related implications. The analysis is guided by a relational economics perspective, according to which value emerges through cooperative relationships in which actors contribute distinct resources, capabilities, and legitimacy to a shared value-creation process. From this perspective, the smart waste solution is not merely a technological artefact, but part of a relational business system in which provider, municipalities, operational actors, and institutional stakeholders jointly shape outcomes. In addition, the case provides insight into critical operational thresholds, such as fill-level rules for waste collection, and how these interact with practical implementation conditions. In this way, the study contributes to a better understanding of how smart waste solutions generate value in real-world contexts and how this value is co-created across actors.

## CONTRIBUTION TO THEORY AND PRACTICE

The paper contributes to theory by extending research on smart PSS and servitization with an ecosystem-based understanding of value co-creation in smart waste management. The findings suggest that value does not arise from IoT technology alone, but from the interaction between physical waste infrastructure, digital monitoring and routing services, municipal work practices, and the alignment of stakeholder interests. The case highlights that smart waste systems create value through several interconnected mechanisms, including improved transparency, reduced collection effort, and better coordination across actors.

At the same time, the study demonstrates that the benefits associated with co-created value are conditional rather than automatic. The realization of value depends on relational and institutional factors such as trust, interoperability, governance arrangements, data access, and the willingness of actors to adapt existing routines. The paper therefore argues that value co-creation in smart waste

ecosystems should be understood as a negotiated and relational process rather than a purely technological outcome.

For practice, the paper offers insights for waste service providers, municipalities, and technology suppliers seeking to implement smart waste solutions in a sustainable and scalable way. The findings indicate that successful implementation requires more than the deployment of sensors and analytics. It also requires alignment between operational needs, municipal decision structures, and service arrangements across the ecosystem. The case further suggests that critical thresholds matter: for example, collection logic based on fill-level thresholds can improve efficiency, but the practical value of such thresholds depends on service expectations, local conditions, and organizational acceptance. Overall, the study provides guidance for designing smart waste solutions that are technically viable, relationally embedded, and more explicitly oriented toward sustainability and value co-creation.

## **KEY DISCUSSION POINTS**

- Smart waste management should be understood as a data-driven PSS embedded in a relational service ecosystem, not merely as a technical optimisation tool.
- Value is co-created through stakeholder interactions, as providers, municipalities, partners, suppliers, and users contribute complementary resources, capabilities, and legitimacy.
- The AntaSwiss case shows that important value dimensions include improved transparency, collecting efficiency, service quality, and ecosystem coordination.
- Critical operational thresholds such as fill-level triggers are relevant for efficiency gains, but their practical effectiveness depends on local service expectations, organizational routines, and implementation conditions.
- From a relational economics perspective, value creation does not occur within a single firm, but through structured and continuous cooperation across the ecosystem.
- The success and scalability of smart waste systems depend on trust, governance arrangements, interoperability, data access, and stakeholder alignment.
- Smart waste ecosystems can generate not only direct functional benefits, but also relational rents, meaning additional value that actors can only achieve through cooperation.
- Sustainability benefits are present, but they are often regarded as an additional co-benefit rather than the primary goal of technology deployment.
- Future research should further examine how threshold conditions and relational governance jointly shape the long-term scalability and sustainability of smart waste service systems.

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# Navigating Uncertainty in Emerging Service Ecosystems: Strategic Alignment Mechanisms for Value Co-Creation and Co-Destruction

Lisa Drees, Timon Urs Knapp

## RESEARCH MOTIVATION

The rapid growth of digital services as complements to physical products has disrupted non-digital markets (Herterich et al., 2023). As digital servitization accelerates, incumbent firms are increasingly participating in platform-based service ecosystems (Kohtamäki et al., 2022), defined as “a self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange” (Vargo & Lusch, 2016, pp. 10–11). Whilst these ecosystems present considerable opportunities for scalability and co-innovation, the empirical record is sobering: Only 15% of ecosystem initiatives succeed in the long term (Reeves et al., 2022). While digital services facilitate value co-creation and scalability, resource integration among actors is frequently constrained (Anzivino et al., 2024). Hence, wrong governance choices represent the single most prevalent ecosystem failure mode, which is caused by the uncertainty regarding the right level of openness for participation and commitment rules among partners (Pidun et al., 2020). For example, B2B platform ecosystems such as Siemens MindSphere often underestimate the amount of change induced by the introduction of a platform regarding value creation (Wlcek et al., 2023).

Despite growing scholarly interest, research remains biased toward successful cases, suggesting a high rate of successful ecosystem initiatives (Li & Tuunanen, 2022). Nascent digital service ecosystems, particularly in B2B domains, face substantial challenges during emergence, yet the difficulties arising across actor interaction levels remain poorly understood. Value co-destruction, defined as a reduction in actor well-being resulting from resource misintegration (Lumivalo et al., 2024), operates at the systems level, where technological, institutional, and social contexts jointly determine whether co-creation or co-destruction prevails (Makkonen et al., 2026). Whilst research commonly posits value co-creation and co-destruction as two sides of a continuum (Keeling et al., 2020), the mechanisms governing their interplay, particularly during emergence, remain largely unexplored (Tuunanen et al., 2024). The high uncertainty during ecosystem emergence complicates strategic alignment (Dattée et al., 2018). Yet research on service ecosystem emergence is still nascent (Drees & Poeppelbuss, 2025). Addressing this gap is thus both timely and essential.

This research accordingly draws on practice theory as its primary method theory, conceptualising value co-creation and co-destruction as functions of alignment or misalignment within and between practices (Skålén, 2026). Resource integration theory complements this lens by explaining how resources are combined to drive value outcomes (Echeverri & Skålén, 2021). To fully grasp the phenomenon of value co-destruction, services must be understood as bundles, with varying interdependencies causing higher uncertainty (Skålén, 2026). Strategic alignment mechanisms are conceptualised as coupling elements mediating the fit between practices and resources. This research thus aims to answer two questions:

1. How do different types of uncertainty during the emergence of digital service ecosystems influence the design of strategic alignment mechanisms?
2. How do these mechanisms shape value co-creation and co-destruction outcomes?

To investigate these dynamics empirically, this study employs a single-case study design (Yin, 2018) of a German incumbent manufacturer in the commercial vehicle sector that is actively launching a digital platform to orchestrate its emerging service ecosystem. Its vision is to enable digital servitization through the launch of a complementary future-oriented service portfolio represented on a digital

platform. Currently, as it is launching its portfolio, it is developing a strategy to orchestrate the selection and implementation of services within its emerging ecosystem. Therefore, a longitudinal approach is appropriate. Interviews with various stakeholders constitute the primary data. In the first interview wave, current and prospective resource settings, practices, roles, and institutional arrangements will be treated. Both the platform operators and clients testing the prototype will be interviewed. Furthermore, monthly meetings with the platform managers will provide longitudinal insights regarding the development of the platform.

The data will be analysed using Grounded Theory Methodology (Gioia, 2021) to inductively develop insights from rich qualitative evidence. Practice theory and resource integration serve as guiding lenses to further theorise abductively about the strategic alignment mechanisms of value co-creation and co-destruction.

## **CONTRIBUTION TO THEORY AND PRACTICE**

By answering the research questions, this study enriches the literature on service ecosystem emergence by elucidating how strategic alignment mechanisms foster value co-creation under conditions of uncertainty and adapt as ecosystems evolve. It advances empirical understanding of value co-destruction by identifying causes for resource-practice misfits among all actors with a dynamic perspective during ecosystem emergence. These insights will inform design science research on the configuration of alignment mechanisms under structural uncertainty during service ecosystem emergence.

Practically, the study provides evidence-based guidelines for selecting and aligning digital services within firm strategy. Specifically, the first interview wave will provide recommendations for “predictive governance”, that is, insights into how firms can pre-configure an emerging ecosystem to enable the optimal combination of resources and practices for value co-creation. This encompasses the role of governance directives in calibrating the balance between platform standardisation and customer-driven individualisation during the critical emergence phase.

## **KEY DISCUSSION POINTS**

- Novel insights into the emergence of service ecosystems will be provided, including the dynamics of value co-creation and co-destruction processes that unfold as incumbent manufacturers launch and orchestrate digital service portfolios on platforms
- Strategic alignment mechanisms that mediate the transition between value co-creation and co-destruction in emerging service ecosystems will be assessed, with particular attention to the conditions under which co-creation deteriorates into co-destruction
- These mechanisms will be conceptualised as forms of interplay between practices and resource integration, elaborating how the coupling of actor practices with human and non-human resources determines value outcomes during ecosystem emergence
- A longitudinal empirical perspective on value co-creation and co-destruction will be contributed by tracking ecosystem actors, their enacted practices, and governance arrangements over time

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## **Beyond Orchestration: Strategic Role Positioning in Service Ecosystems for B2B Servitization**

Dr. Bart Bluemink, Prof. Dr. Sicco Santema, Dr. Lianne Simonse

### **RESEARCH MOTIVATION**

Servitization has become a central strategic pathway for B2B manufacturers seeking to move beyond product sales towards integrated product–service value propositions. By combining products, services, and digital capabilities, firms increasingly aim to deliver outcome-oriented solutions that generate long-term value for customers and end-users. However, such solutions are rarely delivered by a single organisation. Instead, they typically emerge through collaboration among multiple actors, including suppliers, partners, customers, and technology providers.

This shift has led researchers to conceptualise servitization increasingly through the lens of service ecosystems, in which value is created through the integration of complementary capabilities across organisational boundaries. Within these ecosystems, different actors collaborate to create value that no single organisation could deliver independently.

Much of the existing ecosystem literature implicitly assumes that the focal firm—often the manufacturer—acts as the orchestrator of the ecosystem. In this role, the firm coordinates activities, governs relationships between partners, and captures value by controlling the ecosystem architecture. While orchestration may be advantageous in some situations, this assumption does not always reflect the reality of many industrial settings. Manufacturers frequently operate within complex networks where other actors may already possess stronger market authority, platform control, or customer proximity.

In such situations, orchestration may not be feasible or strategically desirable. Instead, firms may participate in ecosystems through alternative roles such as system integrator, specialised technology provider, or knowledge partner. Despite the growing importance of ecosystems in servitization, limited empirical research examines how firms explore such alternative roles during innovation processes.

This study addresses this gap by investigating how B2B manufacturers position themselves within service ecosystems when developing new product–service innovation opportunities. The research is based on a longitudinal action research project conducted within a large manufacturer of industrial capital goods undergoing a transition towards servitization. Over a period of six months, multidisciplinary innovation teams developed and evaluated 69 product-service concepts centred on future end-user contexts.

To support these explorations, the study introduces the *Roles & Relationships framework*, a visual design tool that enables organisations to map ecosystem actors, explore collaboration structures, and discuss potential value exchanges between participants. By supporting the systematic exploration of ecosystem configurations, the framework helps organisations identify viable strategic positions within emerging service ecosystems.

### **CONTRIBUTION TO THEORY AND PRACTICE**

This research contributes to both academic literature and managerial practice.

First, the study contributes to servitization research by highlighting the importance of ecosystem role positioning. While much of the existing literature focuses on service capabilities, business models, or

organisational transformation, this study demonstrates that firms must also determine how they position themselves within collaborative value networks when developing new service-based offerings.

Second, the study contributes to ecosystem theory by providing empirical insights into role configurations within service ecosystems. Rather than assuming that manufacturers must orchestrate ecosystems, the findings show that firms can create and capture value through multiple ecosystem roles. In the analysed innovation concepts, the focal manufacturer frequently envisioned positions such as integrator or specialised supplier rather than orchestrator.

Third, the research introduces the *Roles & Relationships framework* as a design-oriented method that supports ecosystem exploration during innovation processes. The framework visualises relationships between manufacturers, customers, end-users, and ecosystem partners, enabling innovation teams to analyse collaboration structures and evaluate potential ecosystem roles.

From a managerial perspective, the findings suggest that organisations should not automatically assume the orchestrator role when exploring ecosystem opportunities. Instead, firms should assess how their capabilities, technological expertise, and market authority align with different ecosystem roles. Allowing teams to explore multiple role configurations can significantly expand the innovation opportunity space and reveal market opportunities that might otherwise remain overlooked.

## KEY DISCUSSION POINTS

The contribution raises several discussion points relevant to both researchers and practitioners interested in servitization and ecosystem innovation.

- **Is orchestration necessary for value capture in service ecosystems?**  
The findings challenge the common assumption that focal firms must orchestrate ecosystems to benefit from them.
- **How can firms systematically explore ecosystem roles during innovation processes?**  
The Roles & Relationships framework illustrates how design-led tools can support ecosystem exploration.
- **What capabilities are required for effective ecosystem positioning?**  
Servitization may require organisations to develop capabilities not only in service design but also in managing inter-organisational relationships.
- **How do ecosystem roles evolve over time?**  
Firms may initially participate as specialised partners or integrators and later move towards more central roles as their influence in the ecosystem grows.
- **How can organisations balance ecosystem collaboration with strategic control?**  
The findings suggest that value creation in ecosystems often depends on flexible role configurations rather than strict hierarchical control.

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## **Servitization as social innovation**

Ahmad Beltagui, Marina Vicini, Enobong Udondian, Shuai Qin

### **RESEARCH MOTIVATION**

Modern society is increasingly defined by wicked problems: complex, systemic challenges characterized by incomplete, contradictory, and changing requirements. These problems involve multiple stakeholders with conflicting objectives, making them resistant to traditional policy interventions or isolated product innovations. As these problems involve multiple stakeholders with conflicting objectives, they require social innovation, the development of novel solutions that are more effective and sustainable than existing ones, where the value created accrues primarily to society rather than private individuals. This paper explores how servitization can be a bridge to social innovation by shifting the focus of organisations from selling products or services to guaranteeing outcomes.

The servitization literature has long established the framework for economic and environmental sustainability, emphasising recurring revenue, risk mitigation, dematerialisation and resource sharing. Meanwhile the social aspects of sustainability have received much less attention in servitization literature. Spadafora and Rapaccini offered one of the few studies demonstrating how servitization can drive social impact through systemic change. Unlike innovation in products or services, servitization requires reorganisation of the networks and systems for value creation and capture. This is indeed central to the nature of social innovation, which can be understood as the development and diffusion of innovations motivated by social needs. While the literature often focuses on organisations that have a primarily social purpose, we examine how servitization can enable a wider range of organisations to offer both economic and social outcomes through systemic change to address wicked problems.

To understand the role of servitization in addressing social challenges, we studied two organisations through a design science approach that allowed us to co-produce knowledge with practitioners while implementing innovation towards outcome-based services:

1. Case 1 (Commercial to Social): A manufacturer of assisted living technologies developing “Proactive Care”, an advanced service aimed at using digital technology and ecosystem innovation to offer greater value for public funds while improving social outcomes.
2. Case 2 (Social to Commercial): A charity supporting employability and integration of refugees and migrants, which provides training to beneficiaries and supports employers with recruitment and integration. This case focuses on development of a commercial business model that can scale up the social impacts and make the organisation more economically sustainable.

### **CONTRIBUTION TO THEORY AND PRACTICE**

Working with these firms, we segmented customers, analysed Our findings suggest that a customer-centric process to innovate towards outcome-based services helps organisations transform their perspective and enables them to combine both social and economic value.

- Internally – the customer-centric focus stimulates innovation and cross-functional collaboration, bringing those responsible for developing products or services closer to those who sell or deliver them. In Case 1 (Assisted Living), involving sales teams in segmentation

workshops allowed those who are familiar with the customer to influence product development for the first time. Similarly, in Case 2 (Refugee Integration), the business model blueprint served as an artifact that empowered the training and business development teams to contribute to strategic decisions.

- Externally – the focus on customer empathy deepens relationships and insights. In both cases measuring the impact, defining the outcomes and determining who pays are all challenging. In complex value networks, the beneficiary may not be the payer. Case 1 illustrates the challenge of proactive care, where the investment is made by social care departments, but the monetary savings (e.g., £500/day in reduced hospitalizations) benefit the healthcare system. Moreover, servitization offers the route to innovation by delivering outcomes as opposed to isolated products or services, and this leads to better commercial results. Case 2 is aiming to transition from a purely social mission to a business-centric value proposition by using retention data as a key performance indicator. By framing refugee employment as a solution to a ‘business pain’ (staff retention), they are aiming to engage commercial partners like Ikea and Starbucks on a more sustainable economic footing.

Through these two lenses, we highlight the social impact of service business model innovation. We demonstrate the importance of the innovation process and its ability to generate social impacts in commercial organisations as well as commercial benefit in social enterprises. Furthermore, we draw closer links between the literatures on servitization and design thinking through the emphasis empathy and problem framing in the service innovation process.

For organisations seeking social innovation, we offer practical insights through these two cases, highlighting the challenges and opportunities. Internally, organisations can use servitization as a means to motivate collaboration and innovation. Externally, organisations can use the process to deepen their relationships with customers and introduce novel solutions.

#### KEY DISCUSSION POINTS

- Does social impact happen as an **unintended consequence** of servitization?
- How should the social impact of servitization efforts be **measured**?
- When does a social purpose **help or hinder** servitization efforts?
- Does recognition of social impact influence customers’ **willingness to pay** for outcome-based services?
- How should revenue models be designed in contexts where the primary **beneficiaries are not the paying customers**?

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## **Development of a Meta-Model for Harmonizing Maturity Assessments in Digital Servitization**

Pierre Włodarczyk, Jens Poeppelbuss

### **RESEARCH MOTIVATION**

The ongoing digital transformation of industrial business models is accelerating the shift from product-centred offerings to service-oriented, data-based and results-oriented solutions. In this context, concepts such as digital servitization, pay-per-X, and X-as-a-service are becoming increasingly important, as they combine physical products with digital technologies, enhanced service offerings, and new value propositions. Companies, therefore, need approaches to systematically assess their maturity and ability to shape such transformation processes.

Maturity models are a key tool for this. However, research to date does not provide a uniform picture: different models have been developed for different transformation targets and logics, such as Industry 4.0, servitization or smart product-service systems. These models differ significantly in terms of their focus, structure, maturity logic, number of dimensions, weighting of individual indicators or capabilities, and assumptions about the desired target state. As a result, the maturity assessments generated with them are not directly comparable, even when applied to the same company.

This lack of comparability creates both theoretical and practical problems. From an academic point of view, it complicates the cross-model interpretation of results and creates an unwieldy accumulation of numerous maturity model dimensions. From a business or practical perspective, it increases the risk of misinterpretation and complicates the selection of a suitable maturity model or relevant dimensions for specific transformation projects. Against this background, the paper addresses the need for an overarching structuring framework that enables comparable assessments of heterogeneous maturity aspects without simplifying the specific underlying model logics.

### **CONTRIBUTION TO THEORY AND PRACTICE**

The paper makes a theoretical contribution by developing a meta-model that serves as a common frame of reference for comparing different maturity models in the context of digital servitization. Based on the comparative application of seven established maturity models to an industrial case company, structurally and functionally similar capability areas are identified across models and grouped into seven meta-dimensions: data, ecosystem, strategy, organisation, culture, processes, and product. This creates a consistent conceptual structure for interpreting maturity assessments of different models across common servitization dimensions.

The meta-model shows that differences between maturity assessments are often less due to actual differences in organisational maturity than to model-related assumptions, target systems and different understandings of 'maturity'. The study thus expands maturity model research with a dimension-based comparison framework that enables a structured analysis of how key areas of transformation differ in terms of content, relevance, and interaction across models. This improves the comparability of existing maturity model research without eliminating the diversity of existing model logics.

In practice, the meta-model provides companies with a clearer basis for interpreting maturity assessments. Instead of viewing maturity scores as universally valid. Decision-makers can assign results

to specific areas of development and better understand why different models arrive at different maturity profiles. This reduces the risk of misleading conclusions, facilitates the identification of transformation gaps, and allows measures for complex transformations, such as digital servitization or pay-per-X, to be prioritised more effectively. Furthermore, the paper enables the derivation of a more holistic maturity profile by revealing dependencies and imbalances between individual capability areas.

#### **KEY DISCUSSION POINTS**

- Digital servitization maturity is not clearly defined across models. Different maturity models approach transformation progress in different ways.
- Divergent results are not automatically contradictory. They often reflect different analytical perspectives and target systems.
- Maturity assessment scores can only be interpreted in the context of the respective model – without reflection, there is a considerable risk of misinterpretation.
- Comparability requires an overarching frame of reference. Only by bundling similar capability areas into meta-dimensions is it possible to achieve a systematic overview.
- Meta-modelling complements existing maturity models but does not replace them.

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# ATTRIBUTES OF SCALABLE EaaS OFFERINGS: A CONFIGURATIONAL ANALYSIS

Martin Ebel, Timon Urs Knapp, Eva Lexutt, Claudio Lamprecht

## RESEARCH MOTIVATION

Manufacturing firms increasingly complement traditional product sales with advanced service offerings in which providers commit to delivering specific outcomes or capabilities rather than merely supplying equipment. A prominent manifestation of this trend in the industrial segment is Equipment-as-a-Service (EaaS), where customers pay for the use or performance of equipment instead of purchasing the asset. Such models promise recurring revenues, stronger customer relationships, and sustainability benefits through improved asset utilization and lifecycle management (Oliva & Kallenberg, 2003). Despite these advantages, the widespread adoption of EaaS models has proven difficult, even decades after research has first recognized the concept and practice has started adopting it. While many manufacturing firms experiment with such offerings, only a limited number succeed in transforming initial pilots into scalable business models that can be deployed across multiple customers or markets (Sun & Oliva, 2025). In many cases, EaaS initiatives demonstrate value in individual projects but prove difficult to replicate efficiently at larger scale. Consequently, the key managerial challenge often lies not in introducing advanced services, but in making them scalable.

Servitization research has identified numerous conditions influencing the success of advanced service initiatives. Prior studies emphasize organizational enablers such as service-oriented structures, dedicated capabilities, and strategic orientations aligned with service logic (Heirati et al., 2023; Heirati et al., 2025). Other research highlights the role of product and offering characteristics, including technological complexity, connectivity, and the measurability of performance outcomes. Additional work points to contextual factors such as customer maturity, contractual arrangements, and the competitive or institutional environment shaping service adoption (Bock et al., 2023). However, existing studies rarely examine scalability as a distinct outcome, and empirical research identifying the conditions that enable scalable EaaS models remains limited. This gap is surprising given that scalability is increasingly considered a key organizational capability underlying the expansion of new business models (Coviello et al., 2024). Moreover, recent research suggests that servitization outcomes often emerge from configurations of multiple conditions rather than single success factors (Lexutt, 2020; Paiola et al., 2022). Building on this configurational perspective, the present study investigates how combinations of product-related, organizational, and market-specific attributes enable EaaS offerings to move beyond isolated applications and become scalable business models. Accordingly, we ask: *Which configurations of product-related, organizational, and market-specific attributes enable the scalability of Equipment-as-a-Service models?*

## CONTRIBUTION TO THEORY AND PRACTICE

This study contributes to the servitization literature by explicitly focusing on scalability as a distinct outcome of EaaS models. While prior research has primarily examined the adoption and performance of advanced services, comparatively little work has investigated the conditions that enable such models to scale beyond pilot implementations. Building on conceptual work by Coviello et al. (2024), we conceptualize scalability as an organizational capability emerging from the coherent alignment of a firm's technological architecture, organizational architecture, and business model. This multidimensional conceptualization implies that scalability unlikely depends on isolated attributes but instead results from specific combinations of organizational, technological, and contextual conditions.

Reflecting this premise, the study adopts a configurational perspective, investigating how different constellations of attributes jointly enable scalable EaaS models. In line with Coviello et al. (2024), we treat the business model dimension as the focal outcome context and examine how characteristics of

the technological and organizational architectures, together with relevant market conditions, interact to shape the scalability of EaaS offerings. Methodologically, we therefore chose Qualitative Comparative Analysis (QCA), which allows identifying multiple sufficient pathways leading to the same outcome and capturing the causal complexity inherent in servitized business models (Pappas & Woodside, 2021).

The empirical analysis builds on a dataset of approximately 50 EaaS cases drawn from a digital platform that documents pay-per-use and outcome-based industrial offerings across several manufacturing industries. To ensure conceptual rigor in selecting causal conditions, we conducted a structured expert study with 15 researchers and experienced practitioners in the field of advanced services. While some factors, including the capabilities of field service technicians and salespeople, as well as closeness to the customer and investment volume and criticality of the equipment stand out as particularly relevant, the results also reveal substantial divergence in expert assessments regarding the relevance of individual factors, suggesting that the scalability of EaaS models depends less on single success factors and more on complex interactions among multiple attributes. This finding further underlines the suitability of a configurational approach. Regarding measurement, the study operationalizes scalability using the existing scale developed by Zhao et al. (2013), based on earlier work by Bharadwaj et al. (1993). At the same time, responding to recent calls for more comprehensive empirical measures of scalability (Coviello et al., 2024), we complement this operationalization by developing additional items that capture organizational and technological aspects of the concept more explicitly. Data on scalability and case-specific attributes are collected through a survey administered to representatives of the case companies and combined with the platform's structured case information.

By integrating configurational theorizing with empirical data on real-world EaaS implementations, the study contributes to a more nuanced understanding of how scalable advanced service models emerge in manufacturing contexts. Academically, the study advances servitization research by conceptualizing scalability as a distinct and measurable outcome and by demonstrating the value of configurational approaches for analysing complex service business models. For practitioners, the results provide insights into which combinations of product characteristics, organizational arrangements, and market conditions are associated with scalable EaaS models, thereby supporting managers in designing and evaluating their own service-based business model initiatives.

## **KEY DISCUSSION POINTS**

- Expert insights highlight offering characteristics such as asset price, criticality for customer processes and connectivity of the equipment as key attributes influencing scalability.
- Organizational capabilities such as service network structures, sales competencies, and governance of EaaS also appear central, while experts diverge strongly on other factors.
- Market conditions including competitive intensity, regulatory frameworks, and subsidy landscapes may shape the scalability of EaaS models, but expert opinions vary.
- Strong disagreement among experts regarding individual factors suggests that EaaS scalability likely emerges from combinations of factors, pointing to a configurational nature of scalability.
- The study also explores how scalability can be operationalized empirically across heterogeneous EaaS offerings by combining existing scales with newly developed measurement items.

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## **SELLING SERVITIZED SOLUTIONS:**

Vicky Story, Judy Zolkiewski, Jamie Burton, Shaun West

### **RESEARCH MOTIVATION**

Most servitization research has been conducted at a strategic or organizational level, focusing, for example, on investigating capabilities, processes and mindsets, and associated challenges and tensions that impede success. Work also considers differences in service types, including advanced services, digital servitization, and solutions, and recognizes that networks and ecosystems are important for servitization success. Much less attention is given to how manufacturers sell solutions and to what new sales-oriented processes, capabilities, skills and mindsets are needed to facilitate this. This is important because understanding challenges to selling servitized solutions should aid servitization implementation success, and leads to the following research questions: What is the current state of knowledge about selling servitized solutions; What factors support servitized selling success?

In terms of theoretical context, one of the factors that is often argued to differentiate business markets from consumer markets is the relative importance of personal selling, with relational selling, value-based selling and elements of co-creation considered the norm. In terms of selling in servitizing ecosystems, work draws on Service-Dominant Logic, ecosystem and network theories, as well as sales managers' characteristics and motivations. Recent work also explores the impact of digital technologies on the development and sales of servitized solutions, and the complexity of managing the B2B customer experience across multiple touchpoints, including sales. However, this work lacks cohesion, and there is limited empirical exploration of the whole selling process within servitization. Managers would benefit from more integrated sales guidance to help them maximise the benefits that can be accrued from introducing advanced service solutions.

### **CONTRIBUTION TO THEORY AND PRACTICE**

Bringing together a current understanding of selling servitized solutions through a thematic literature review and qualitative insights from managerial interviews, we contribute to the body of knowledge on this phenomenon and offer recommendations for future research. The thematic review enables us to search for emergent themes associated with the phenomenon studied, providing a theoretically flexible approach that supports the identification and description of patterns and the synthesis and translation of key constructs that may be conceptually similar but expressed differently in extant theory. We have also been guided by principles of a structured literature review (SLR), to help identify relevant literature in a rigorous, transparent, and unbiased way. We use several keyword combinations (e.g. servi\*, soluti\*, sale\* sell\*) for the initial search of databases (including Scopus and Web of Science), to identify the broadest range of relevant publications. We then reviewed and selected publications explicitly focused on the context of interest (servitized offerings) from peer-reviewed journals, written in English, published between January 1988 and July 2025, with full text. This combined approach strengthens the review process, aiming to draw more insightful conclusions. The in-depth, semi-structured interviews with managers from a range of organisations and sectors, that are attempting to or have developed servitized solutions, provide actionable insights into the challenges and approaches adopted and enable us to compare these findings with those from the thematic review to better understand any gaps in extant knowledge.

Managerially, the summarising of extant knowledge and testing this knowledge with practicing managers will allow us to offer real-world implications, particularly in terms of key antecedents and consequences of different selling approaches and activities.

### KEY DISCUSSION POINTS

- Our results provide a more structured understanding of how servitized solutions might be sold.
- The origins and triggers for growth in services differ across organisations and sectors, as does the internal reaction to the change in focus.
- Service portfolios typically evolve from more traditional base services through to advanced services, but:
  - Some firms identify plentiful growth opportunities in base and intermediate services ('low hanging fruit'), reducing the need to develop and offer more complex, advanced services.
  - Advanced services need to be developed with 'buddy customers' who have high relationship trust.
- In terms of selling services:
  - Firms often set up 'sales support teams' – employees with a technical background, to provide specialist support to the service sales teams.
  - When operations staff are embedded within customer sites for extended periods and involved in service delivery, they can play a key role in facilitating future sales.
  - Staff need training to avoid retaining a product-centric approach and to encourage them to listen to customers to fully understand their business processes, 'pain points' and desired business outcomes. Related to this, the sales manager's rewards need to evolve from a units-sold focus to more sophisticated rewards focused on customer outcomes.
  - Selling provides key touchpoints in customer journeys, impacting B2B customer experiences as customers, providers, and further network actors undertake servitization transformations. Thus, sales personnel need to possess greater intra- and inter-organizational relational networking capabilities.
  - Digitalization provides opportunities around the automation of selling processes, but can also lead to tensions related to systems integration, high investment costs, and impacts on key inter-organisational human-to-human relationships between buying and selling teams.
  - Selling can also be challenging when potential customers aim to retain a degree of control over operational territory and seek to avoid the complete outsourcing of some service processes. Service sales staff need to develop resilience and flexibility in their approach.
  - Advanced services entail associated cost implications, and productized or modularized service offerings can simplify the sales process and facilitate easier cost control for the firm and its customers.
- Analysis is ongoing, especially on consequences, and preliminary results will be presented at the conference.

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# **RISK TRANSFER AS A VALUE PROPOSITION IN BUSINESS-TO-BUSINESS SERVICES: A PHILOSOPHICAL ANALYSIS**

Hans Lind

## **RESEARCH MOTIVATION**

Risk traditionally carries negative connotations in business operations as something to avoid or minimize. This conventional understanding obscures a potentially transformative business model: the deliberate transfer of risk as a value proposition through service offerings. While insurance companies have long operated on this principle, the concept remains largely unexplored in other business-to-business contexts. Existing servitization literature has examined execution risks in hybrid offerings and the operational risks faced by manufacturers transitioning to services, but has largely overlooked risk transfer itself as a source of customer value. Crucially, this literature has also neglected the philosophical dimensions of risk; in particular, the distinction between calculable “casino risks” and uncertain “jungle risks,” and the normative judgements embedded in any risk assessment. This research addresses these gaps by examining how capital goods manufacturers can evolve from suppliers of physical products to providers of services by conceptualizing and operationalizing risk transfer as part of their value proposition. Using the context of commercial vehicle manufacturers offering Truck-as-a-Service, this study argues that risk transfer can serve as a legitimate benefit creation mechanism, but only when grounded in sound risk analysis, ethical risk acceptance criteria, and an honest acknowledgement of the limits of risk quantification.

## **CONTRIBUTION TO THEORY AND PRACTICE**

Theoretically, this research applies philosophical frameworks on risk to servitization literature, revealing that risk transfer legitimacy depends on four conditions: acknowledging inherent limitations in risk analysis and distinguishing calculable risks from fundamental uncertainties; satisfying ethical criteria of consent, fairness, and risk-utility balance for all affected stakeholders; resisting the temptation to treat all business risks as calculable probabilities; and recognizing the legitimate role of emotional dimensions in risk appraisal without exploiting them. These conditions challenge prevailing assumptions in servitization literature that treats risk transfer primarily as a technical or financial mechanism, and they call for a richer, philosophically informed understanding of what it means to assume another party’s risk.

Practically, this research provides actionable guidance for both service providers and customers. Providers must resist false precision in pricing uncertain risks, develop genuine specialization across large customer bases to justify risk absorption, and explicitly address how risk distributions affect different stakeholders over time. Customers, in turn, must recognize that risk transfer transforms rather than eliminates risk: they may exchange multiple familiar operational risks for concentration risk arising from single-provider dependence. The framework developed here helps both parties evaluate whether a specific risk transfer arrangement meets legitimacy conditions beyond immediate economic calculations.

## **KEY DISCUSSION POINTS**

- Risk transfer as a value proposition: capital goods manufacturers can offer services that absorb customer risks (technology, maintenance, regulatory), transforming the supplier-customer relationship.

- Philosophical challenges: providers face inductive risks in evaluating customer exposures, information asymmetries create moral hazard, and many business risks are “jungle risks” that resist probabilistic calculation yet are often treated as calculable “casino risks”.
- Conditions for legitimacy: risk transfer models are defensible when providers develop genuine specialization, reduce transaction costs, satisfy ethical criteria of consent and fairness, and acknowledge the limits of risk quantification.
- Customer perspective: risk transfer transforms rather than eliminates risk. Customers may exchange multiple familiar risks for concentration risk from single-provider dependence, requiring careful evaluation beyond immediate economic calculations.

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## **A Data-Driven Servitization Intensity Typology for UK Manufacturing: Clusters, Stage-Specific Enablers and Predictive Modelling**

Shereen Fouad, Raveen R. Menon, Anwar Adem, Tim Baines, Ali Bigdeli, Andreas Schroeder, Nigel Driffield, Giuliana Battisti, Abdallah Abdelhameed

### **RESEARCH MOTIVATION**

Servitization has become a core strategic pathway for manufacturers aiming to enhance competitiveness, deepen customer relationships, and develop more resilient revenue models. Despite its growing importance, empirical evidence on how firms progress through different stages of servitization and which factors shape that progression remains limited.

The initial servitization studies are mainly conceptual, addressing the reason behind the switch from products to services at the strategic level and the related organizational problems. The researchers then introduced the idea of maturity models and typologies that posited a division of companies into three groups: product-centric, hybrid, and service-centric. Even though these concepts had a significant theoretical impact, they used qualitative measures or binary indicators to determine the level of service adoption which was a drawback on their empirical precision.

Studies advocate for quantitative, revenue-based indicators which are able to show the economic weight of services in the firms' business models. The early research in clustering studies emphasized companies concerning services they offered or their organizational features, while the latest studies apply big data analysis to find out about digital servitization paths and innovation profiles. However, most clustering-based research in servitization is based on categorical indicators instead of on the continuous service revenue compositions, and there are very few studies that combine unsupervised clustering with supervised predictive models. The current study addresses these gaps by developing an empirically grounded and scalable framework for analyzing the intensity of servitization by applying robust clustering of UK firms with predictive modelling of servitization intensity.

Using survey data from 379 UK manufacturing firms, we measure the revenue share associated with different service offerings and corroborate this with secondary financial data. We operationalize servitization intensity as a revenue-weighted index that captures three levels of service maturity: basic, intermediate, and advanced services.

We employ a multi-stage data-analytics pipeline that consists of data preparation, feature selection and unsupervised clustering. Further, we use Random Forest model to rank variables by importance, the top 80 features are retained, and PCA reduces dimensionality while retaining 95% of variance for subsequent clustering and prediction tasks.

We apply K-Means algorithm to determine the best number of clusters by means of the Elbow Method and we further confirmed it using silhouette scores, resulting in the three powerful clusters. The clusters are designated as Low, Medium, and High Servitization, thus introducing a defensible, stage-based typology that is based on empirical structure rather than just a purely conceptual categorization.

### **CONTRIBUTION TO THEORY AND PRACTICE**

Firms with Low Servitization still focus mainly on products and offer only limited and basic, mainly transactional services and have very low scores of service intensity. Firms with Medium Servitization have more balanced product–service revenue mixes and a broader set of installation and maintenance offerings, while firms with High Servitization have revenue structures that are service-centric, with significant shares from installation, maintenance, repair, and other advanced services.

The analysis of facilitating variables - size, structure, manufacturing profile, resources, and operational readiness - indicates that these enablers are stage-specific rather than cumulative. For instance, certain organizational configurations and scales are most prominent in the Medium cluster, facilitating the transition from product-centric to hybrid models. In contrast, High Servitization firms are characterized by a more varied structural profile that is in line with multiple service-intensive configurations.

Theoretically, the determinable facts support the Resource-Based View, Dynamic Capabilities, and Service-Dominant Logic, indicating that the different resource bundles, reconfiguration routines, and value logics are the backing of the groups derived empirically and their stage-specific enablers. From a practical and policy perspective, the revenue-based intensity measure, validated three-cluster typology, and high-accuracy predictive models provide a solid evidence base for servitization adoption.

### **KEY DISCUSSION POINTS**

- The empirically derived three-cluster structure reinforces the need to move beyond purely conceptual maturity models and ground servitization stages in observable revenue compositions and organizational characteristics.
- The evidence that enablers differ across Low, Medium, and High Servitization firms indicates that progression is shaped by differentiated configurations of size, structure, manufacturing profile, resources, and operational readiness rather than a single cumulative pathway.
- The transitional prominence of specific configurations within the Medium cluster suggests that movement from product-centric to hybrid models requires distinct organizational adjustments rather than incremental service expansion alone.
- The diversity of structural profiles within High Servitization firms highlights that service-centric revenue structures can emerge through multiple configurations rather than converging toward a uniform end-state.
- The integration of clustering and machine-learning regression demonstrates the value of combining unsupervised and supervised techniques to strengthen empirical precision in analysing servitization intensity.
- The revenue-weighted intensity index provides a robust mechanism for capturing the economic weight of services within manufacturing firms, offering a scalable foundation for future quantitative research in servitization.

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## **Value-Driven AI for Industrial Smart Services: A Multilevel Framework Linking Risk, Value, and Pricing**

Jürg Meierhofer, Andrea Tenucci, Jochen Wulf, Thomas Herrmann

### **RESEARCH MOTIVATION**

Industrial firms increasingly rely on AI-enabled services—such as predictive maintenance and AI-assisted operations—to advance their servitization strategies. These services fundamentally reshape how organisations design business models, develop capabilities, structure business processes, and collaborate within ecosystems.

Designing viable pricing and service models remains challenging, as firms struggle to align unpredictable AI performance with context-specific customer value and complex ecosystem risk-sharing.

Current research provides valuable insights into business models, customer value, and AI performance, but these streams remain fragmented. A unified perspective is needed to link AI's technical uncertainties with the economic viability of AI-enabled services, organisational decisions, and ecosystem-level interactions.

This study addresses this gap by a multilevel conceptual model that translates technical AI risks into economic terms; hence directly linking customer value creation and business process design with pricing strategies for more effective servitization.

### **CONTRIBUTION TO THEORY AND PRACTICE**

#### Theoretical Contribution

This research develops a multilevel framework connecting AI reliability with servitization business models, customer value systems, and organisational and ecosystem transformations. It conceptually integrates previously disconnected domains—AI performance, value creation, risk modelling, and pricing logic—into a coherent architecture.

The model clarifies how AI-related risks and customer value jointly inform service design choices, contractual mechanisms, and the structuring of advanced service offerings. It further establishes theoretical linkages between risk-management capabilities, customer contexts, and the economic viability of AI-enabled services.

#### Practical Contribution

For practitioners, the proposed framework provides an actionable approach to quantify and communicate AI-related uncertainties in economic terms. It supports managers in designing commercially viable AI-enabled services by linking technical performance parameters with pricing strategies that reflect customer-specific contexts, risk-sharing arrangements, and ecosystem interdependencies.

Furthermore, it aligns AI model optimization with business value, ensuring that technical (re-)training decisions directly improve customer outcomes and financial performance.

## KEY DISCUSSION POINTS

- Economic quantification of AI uncertainty: Translating false positives, false negatives, and other AI error types into economic metrics enables clearer communication and informed decision-making for both providers and customers.
- AI-induced risk as a transformation enabler: The framework highlights how AI performance uncertainties influence customer value creation, provider capabilities, and ecosystem coordination.
- Context-dependent customer value: Customer value varies significantly across operational settings; therefore, value modelling must incorporate heterogeneous risk profiles, economic impacts, and operational conditions.
- Value-driven AI (re-) training: AI optimisation should not focus solely on technical accuracy but integrate business value and cost considerations, enabling training strategies aligned with service performance and financial outcomes.
- Business model implications: AI performance characteristics shape viable service architectures and required organisational and ecosystem capabilities, influencing transformation across multiple layers.
- Contingency-based pricing: Pricing mechanisms—subscription, usage-based, outcome-based, or risk-sharing—must match the interplay between AI uncertainty, customer risk tolerance, and value potential.
- Ecosystem alignment: AI-enabled services require coordinated roles, responsibilities, and incentive structures across providers, customers, and partners for sustainable value creation.

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# Designing an AI-Enabled Data Platform for Social Services Ecosystem

Eileen Feind, Mahei Manhai Li, Jan Marco Leimeister

## RESEARCH MOTIVATION

Individuals whose ability to participate in society is restricted due to disability are legally entitled to receive assistance in Germany. With more than one million beneficiaries and public expenditures exceeding €28 billion annually, integration assistance represents one of the largest social service provision programs in Europe. Social service provision can be described as "*Leistungsdreieck*", involving three main stakeholders: beneficiaries, service providers, and local authorities. Beneficiaries utilize social services, providers deliver the services (e.g., clinics, welfare associations), while local authorities manage authorizations, regulations, and financing. Within this triangle, local authorities take a central coordination role at the individual level by matching beneficiaries with suitable service offerings, and at the regional level, by negotiation service portfolios and compensation structure with providers. In both cases the overarching aim is person-centered service provision.

However, effective coordination is constrained by information deficits on the service provision side. Local authorities have no reliable data on non-professional support structures such as self-help groups or neighbourly assistance. Provider specializations are obscured by coarse service catalogue categories, and no standardized quality or performance data exists for benchmarking providers. Furthermore, existing digital platforms offer little relief, as they rely on manual data entry and require constant maintenance, leaving them with incomplete and inaccurate data. As a result, social workers at local authorities face considerable effort in identifying suitable services. Where this effort falls short, beneficiary needs remain unaddressed, mismatches between supply and demand occur, and available services remain underutilized.

Against this backdrop, the KIDaS project (KI-gestützte Datenplattform für Soziale Services) investigates how an Artificial Intelligence (AI) enabled data platform with a shared data space can be designed to improve the coordination of social services. By using agentic AI, autonomous software agents capable of independently executing tasks, KIDaS automated the collection, updating and validation of service provider data. Thus, eliminating the manual maintenance burden that existing platforms have. Additionally, a *Service Sonar* continuously monitors supply-demand gaps, enabling the platform to identify mismatches and open space for new actors to develop solutions addressing unmet needs. By bringing together stakeholders across the "*Leistungsdreieck*" and enabling the exchange of data, KIDaS aims to make service landscape visible and comparable.

The project employs Action Design Research (ADR) and Value-Sensitive Design (VSD) as its methodological foundations, combining iterative artifact development with qualitative field research. Both the design and implementation of KIDaS are carried out in close cooperation with three local authorities in Germany, who are collectively responsible for the social service provision of one third of the German population. Working at this intersection of AI, public administration, and social service provision reveals a gap that existing research has yet to fill. Designing such a platform in a way that is technically robust, ethically grounded, and accepted by all stakeholders is precisely the challenge KIDaS addresses.

## CONTRIBUTION TO THEORY AND PRACTICE

Practically, the platform creates value across stakeholders of the social service ecosystem. For local authorities, it reduces manual coordination effort by aggregating and standardizing service information, improving the visibility, comparability, and searchability of both professional and non-professional offerings. These data-driven insights support not only individual case coordination but also regional strategic planning. For beneficiaries, the platform enhances agency by enabling needs-matched service discovery and preserving informed decision-making. Rather than passively receiving services allocated by local authorities, users can actively explore the service catalogue, compare alternatives, and take ownership of their decisions. For service providers and the broader ecosystem, the platform establishes a shared data space that increases the visibility of their service offerings and competencies. This reduces fragmentation across the service landscape and enables the formation of competency networks. At the same time, the platform can act as an innovation environment for social-technology solutions, such as needs-based health or care applications developed by start-ups.

This research contributes to three intersecting streams of literature. First, it extends digital platform ecosystem theory to social service contexts. Existing research on platform dynamics e.g. network effects, lock-in, and scalability is predominantly grounded in commercial settings. KIDaS examines how these mechanisms translate into a commons-oriented, multi-stakeholder ecosystem where governance, data ownership, and participation incentives follow fundamentally different logics. Second, the research advances the emerging literature on agentic AI system. While conceptual work in this area is growing, empirical instantiations in regulated, ethically sensitive domains remain scarce. KIDaS contributes design knowledge for human-in-the-loop architectures in which autonomous agents operate within non-dyadic stakeholder constellations. Third, the research contributes to service system design theory by introducing the *Service Sonar* as a mechanism for anticipatory, demand-driven service innovation. Thus, extending service engineering from reactive coordination toward proactive identification of structural supply-demand mismatches.

## KEY DISCUSSION POINTS

- Service providers may perceive data sharing as a burden rather than a benefit. What value proposition must the platform offer service providers to motivate participation and data contribution? What might incentivize service providers to join the platform?
- Service seekers often carry prior negative experiences with institutional systems and may be sceptical of digital platforms claiming to act in their interest. How can the platform be introduced in ways that make this trust-building possible, especially for groups with low digital literacy or deep institutional mistrust?
- The platform brings together stakeholders who operate under diverging legal frameworks and institutional logics. How can a shared data space be governed in a way that satisfies data protection requirements?

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## **Exploring the linkages between resilience and servitization: a research framework and agenda**

Mario Rapaccini, Maria Spadafora

### **RESEARCH MOTIVATION**

Servitization has emerged as a major transformation of traditional manufacturing business models, wherebntric logics toward the provisiof servi,,y firms shift from product-ces and integrated product–service solutions. A growing body of literature highlights that servitization can generate significant benefits in terms of productivity, economic performance, business stability, and sustainability outcomes. At the same time, the literature emphasizes that innovations should not be limited to efficiency and technological advancement but should instead balance productivity increase with human-centricity, sustainability, and resilience. Resilience, in particular, is increasingly recognized as a key capability to navigate volatile, uncertain, complex, and ambiguous (VUCA) environments. Despite the intuitive complementarities between servitization and resilience, their relationship remains underexplored and insufficiently theorized. Existing research has largely investigated servitization in relation to performance, innovation, and sustainability, while resilience studies have mainly focused on supply chains, risk management, and crisis response. As a result, there is still limited conceptual clarity on how servitization-related capabilities contribute to firms' ability to anticipate, absorb, and adapt to disruptions.

This research seeks to conceptualize the linkages between servitization and business resilience by developing an integrative research framework grounded in the resilience capability perspective and servitization literature. Specifically, the study aims to clarify how service-oriented strategies and capabilities support both anticipatory and reactive dimensions of resilience, as well as how they interact with broader organizational and infrastructural antecedents.

Through an integrative literature review, the study systematically compares and synthesizes micro-foundational capabilities discussed in resilience and servitization research streams. This approach enables the identification of conceptual overlaps, complementarities, and gaps, leading to the development of a unified framework that explains how servitization contributes to organizational readiness and responsiveness in the face of disruptions.

The findings contribute to an evolving understanding of resilience as a dynamic and generative capability rather than a static attribute. In particular, the study distinguishes between *ex ante* (anticipatory) and *ex post* (response) capabilities, showing that servitization enhances resilience not only by supporting recovery after disruptions but also by strengthening preparedness through monitoring, learning, and proactive risk management practices.

### **CONTRIBUTION TO THEORY AND PRACTICE**

This study makes a significant contribution to both the theoretical and practical discourse on servitization and resilience by providing a structured conceptual framework that integrates these two research domains. By bridging previously disconnected literature streams, the paper advances a more holistic understanding of how the move to service-based business logics can support the development of resilience in industrial firms.

From a theoretical perspective, the study expands the existing literature by clarifying the conceptual linkages between servitization and resilience within a capability-based view.

contribution is the distinction between anticipatory and responsive resilience capabilities and their alignment with servitization-related organizational practices. In particular, the framework highlights how servitization fosters organizational readiness through enhanced monitoring of installed bases, closer customer relationships (intimacy), continuous learning, and data-driven decision-making. These elements strengthen preparedness, alertness, and proactive risk management, which are central components of resilience. Furthermore, the study contributes to resilience theory by emphasizing the temporal and processual nature of resilience. Rather than viewing resilience solely as the ability to recover from disruptions, the framework conceptualizes it as a dynamic capability that unfolds over time and may lead to renewal and superior performance (“bounce forward”). In this sense, servitization is interpreted not only as a growth strategy but also as an infrastructural enabler of resilience, supporting financial robustness, organizational learning, and adaptive flexibility. From a practical standpoint, this study provides actionable insights for managers operating in manufacturing and industrial service contexts. The framework suggests that investing in servitization capabilities and developing long term contractual services—can enhance firms’ capacity to anticipate disruptions and respond more effectively to crises. Managers are encouraged to design servitization strategies not merely as revenue diversification mechanisms but as resilience-enhancing organizational configurations. This research also offers guidelines for policymakers interested in fostering resilient industrial ecosystems in line with Industry 5.0 principles. By recognizing servitization as a driver of more stable, sustainable, and adaptive industrial systems, policy initiatives can support service innovation, digital infrastructures, and collaborative ecosystems that strengthen systemic resilience.

## **KEY DISCUSSION POINTS**

- How servitization capabilities (e.g., monitoring, customer integration, and lifecycle services) contribute to both organizational readiness and responsiveness
- The role of anticipatory (ex ante) versus reactive (ex post) capabilities in shaping adaptive and transformative resilience
- The alignment between Industry 5.0 principles and service-led business model transformation
- The infrastructural antecedents of resilience, including financial soundness and organizational culture, in servitized firms
- Future research directions at the intersection of servitization, resilience, and sustainable industrial transformation.

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## **Orchestrating Customer Adoption of Product-as-a-Service Offerings**

Heiko Gebauer, Christian Kowalkowski, Lars Witell

### **RESEARCH MOTIVATION**

Product-as-a-Service (PaaS) offerings are gaining traction in capital-intensive industries because they promise recurring revenues, closer customer relationships, lifecycle efficiency, and sustainability benefits. Yet adoption remains uneven. Many customers are reluctant to move away from ownership-based models due to perceived risks, limited cost transparency, established procurement routines, and concerns about losing control. Existing research has generated important insights into the provider-side transformation required for PaaS, but it says less about how customer adoption unfolds over time and how firms can actively shape it.

This paper addresses that gap by treating PaaS adoption not only as a business model innovation challenge, but also as a service innovation and adoption challenge. Drawing on a longitudinal case study of an aerospace manufacturer from 2007 to 2024, the study shows that PaaS adoption is not simply a passive market response. Rather, it is a staged, provider-managed process in which firms can deliberately influence who adopts, when they adopt, and under what conditions adoption broadens across the market. The case demonstrates how one provider moved from a single anchor-customer pilot to a global business line by actively orchestrating adoption across customers, products, services, and ecosystem partners.

### **CONTRIBUTION TO THEORY AND PRACTICE**

The paper contributes to theory by shifting attention from provider-side transformation alone to provider-managed customer adoption in PaaS. It reconceptualizes adoption as a strategic, staged diffusion process rather than as a one-off decision by individual customers. More specifically, the paper identifies four interdependent provider activities that shape PaaS diffusion over time: customer portfolio design, product fit, service bundling, and ecosystem orchestration. Through these activities, providers can guide customers through successive stages of adoption, from innovators to early adopters, early majority, and late majority. This perspective adds a longitudinal, demand-side view to research on servitization, service innovation, and business model change.

The study also identifies two mechanisms that help explain scalability in PaaS adoption: intra-program replication and inter-program transfer. These mechanisms show how providers can learn from early implementations and extend adoption across products, customer segments, and regions. In doing so, the paper offers a more dynamic understanding of how PaaS business models diffuse in practice and how adoption co-evolves with offering design and ecosystem development.

For practice, the paper shows that managers should not wait for customer demand to emerge naturally. Instead, they can actively accelerate adoption by carefully selecting and sequencing target customers, ensuring strong product-offering fit, designing modular but customizable service bundles, and building ecosystems capable of delivering credible and scalable performance. This provides a practical roadmap for managers seeking to scale PaaS in conservative, risk-sensitive industrial markets.

## **KEY DISCUSSION POINTS**

- How can providers deliberately manage PaaS adoption as a staged diffusion process rather than treating it as a passive market outcome?
- How can providers deliberately manage PaaS adoption as a staged diffusion process rather than treating it as a passive market outcome?
- What roles do customer portfolio design, product fit, service bundling, and ecosystem orchestration play in moving from early pilots to broader market adoption?
- How do the mechanisms of intra-program replication and inter-program transfer enable scalable learning across products, customers, and regions?
- What distinguishes successful orchestration of PaaS adoption in capital-intensive industries from more conventional servitization or business model innovation processes?
- How can managers balance modularity and customization in PaaS offerings to reduce customer risk while maintaining scalability?
- What ecosystem capabilities and partnerships are needed to ensure credible delivery of outcome-based or use-based service models?
- How should providers adapt their commercialization strategies across adopter categories, from innovators to the late majority?

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## **Impact of gendered personality traits on service innovation in manufacturing**

Natalia Rogova, Eva Lexutt

### **RESEARCH MOTIVATION**

Manufacturing firms are increasingly transitioning from product-centric to service-centric business models, a process known as servitization. This shift requires firms to innovate not only their offerings but also their organizational capabilities and processes. Successful servitization further depends not only on firm-level resources, but also on the actions of individuals, who initiate and support service-related strategies.

The emerging field of microfoundations research demonstrates the importance of individual-level characteristics such as personality traits for organizational change and innovation. Servitization research, however, has largely overlooked the role of individuals as drivers of servitization, with few exceptions.

Furthermore, servitization research is gender blind, even though research in other domains shows that gender influences innovation, organizational change and firm performance.

The purpose of this study is to address these gaps by investigating how gendered personality traits influence servitization in terms of the existence of a service strategy, service orientation of corporate culture, non-financial service performance and service profitability, and how these relationships are mediated by transformational leadership.

We specifically examine the trait of androgyny, i.e. the balanced possession of both masculine and feminine traits. Androgynous leaders have been shown to contribute to transformational leadership, leadership effectiveness, and intergroup cooperation, which foster innovation. Servitization research hints that both masculine traits (e.g., emotional stability) and feminine traits (e.g., commitment to helping others) contribute to service innovation and success, but no coherent framework has integrated these insights.

Our conceptual framework is based on Coleman's "boat" framework, which illustrates the existence of causal mechanisms between and within the micro-level (individual-level traits such as managers' androgyny and transformational leadership) and the macro-level (servitization outcomes at the organizational level).

### **CONTRIBUTION TO THEORY AND PRACTICE**

We empirically test our framework using survey data from 317 managers in German manufacturing firms actively undergoing servitization. Conducting independent sample t-tests, we find that androgynous leaders report higher levels of service strategy, service orientation, non-financial service success and service profitability in their firms, in comparison to managers with non-androgynous gender identities. Androgynous leaders also showed the highest levels of transformative leadership style. Conducting a series of mediation analyses with the use of PROCESS Model 4, we find that these relationships are mediated by transformational leadership style, emphasizing leadership as a key underlying mechanism through which gendered personality traits shape servitization outcomes.

By tracing the process from androgyny to transformational leadership and finally to servitization performance, our study offers a structured explanation of how gendered individual differences drive service innovation in manufacturing.

This study advances microfoundations research in servitization by applying Coleman's "boat" framework to enhance theoretical rigor. Despite its potential, this framework has not been used in servitization and contributes to the field's theoretical plurality, offering the potential to further incorporate individual-level constructs beyond gender.

By centering gendered personality traits, this study adds a relevant but overlooked dimension to the gender-blind field of servitization. By illuminating the importance of androgyny and transformational leadership for servitization, our study helps managers of servitizing companies recruit, train and promote individuals particularly suitable as change agents and leaders for servitization.

Finally, by showing that it is gendered personality traits instead of categorical gender that influence servitization outcomes, our study adds to research on the roles of gender and diversity in innovation.

## **KEY DISCUSSION POINTS**

- Theoretical, conceptual and methodological soundness of the model.
- Ideas for additional theoretical mechanisms that explain the impact of (gendered) individual traits on the decision to servitize and on servitization performance.
- Multi-level research in servitization. How to design and execute a quantitative study that captures the interplay of individual-level factors and organization-level outcomes.
- The role of individuals in servitization practice and managerial insights / best practices for championing servitization change agents and leaders.
- Reasons for and risks of gender-blindness in servitization research and practice.

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## APPLYING SERVITIZATION MATURITY AS A HOLISTIC TRANSFORMATION FRAMEWORK: FIVE ARCHETYPAL STRATEGIES FOR MANUFACTURING FIRMS

Frank Marks, Devrim Eskiyeerli, Yvonne Kirkels

### RESEARCH MOTIVATION

Manufacturing firms increasingly pursue service-oriented business models to secure growth, stabilize revenue and strengthen customer relationships. Yet the organizational transformation required for servitization remains difficult to orchestrate. Existing maturity models provide conceptual guidance but often lack empirical grounding, holistic scope or actionable mechanisms for managing change across business, operating and performance models. This limits both academic understanding of the servitization process and practitioners' ability to design and control transformation trajectories.

This study addresses these challenges by applying the Servitization Maturity Model (SMM), a strongly actionable framework co-developed with practitioners and subsequently refined through cumulative empirical validation. Drawing on a longitudinal dataset of 119 company assessments, the study investigates how a servitization maturity model can be deployed as a diagnostic and transformation framework in manufacturing firms. The research examines how maturity configurations can be used to diagnose servitization strategies and identifies five archetypal transformation profiles that characterize how firms progress through the servitization journey.

### CONTRIBUTION TO THEORY AND PRACTICE

The SMM contributes to servitization literature by integrating three core system models - the Business Model (system output), the Operating Model (system inputs) and the Performance Model (system control) - into a coherent and actionable maturity framework. These models are operationalized across six critical transformation dimensions that together capture how firms diagnose, design and deploy their servitization strategy:

- *Business Model (system output)* - The service vision, value logic and strategic ambition that define how the firm intends to create and capture value through services.
- *Propositions & Processes (system input)* - The service value propositions and the associated commercial and delivery processes required to operationalize them.
- *Management & Organization (system input)* - The structural, governance and decision making arrangements that enable coordinated service delivery and transformation.
- *Information & Systems (system input)* - The information architecture, data flows and digital systems that support service design, sales, delivery and performance management.
- *People & Culture (system input)* - The mindsets, skills, behavioral norms and cultural enablers required to adopt and sustain service-oriented ways of working.
- *Metrics & KPIs (system control)* - The measurement systems, performance indicators and control mechanisms used to monitor service value creation and guide decision-making.

This analysis draws on a cumulative database of 119 company assessments from manufacturing OEMs and system integrators. The dataset covers both large multinational firms and SMEs across a wide range of capital-goods industries. For their servitization ambition, companies aspire one of the

following maturity stages: Product Manufacturer, Value-Added Manufacturer, Full-Service Provider, and Integrated Solutions Provider.

Maturity scores do not always fall neatly within a single stage. Instead, they are distributed across adjacent stages and intermediate values. Because these scores are assessed across six transformation dimensions, firms exhibit distinct profiles. Empirically, the study identifies five inductive transformation archetypes that capture these patterns and illuminate how firms navigate their servitization trajectory:

- A. *Ad hoc* - Limited or no deliberate servitization strategy; maturity levels vary widely and show no coherent pattern across dimensions.
- B. *Balanced* - A deliberate and coordinated servitization strategy in which all six transformation dimensions exhibit a comparable level of maturity.
- C. *Capability-driven* - Servitization is primarily driven by customer service departments responding to customer issues and operational pain points, resulting in higher maturity in operating model dimensions.
- D. *Digital push* - The strategy is initiated by technological or digital innovations, with maturity concentrated in digital capabilities and information systems.
- E. *Entrepreneurial* - Servitization is propelled by strategic ambition, vision, or opportunity recognition, typically championed by entrepreneurial leadership, leading to elevated maturity in business-model-related dimensions.

For practitioners, the SMM offers an actionable roadmap that reduces the risks of large-scale, disruptive changes by favoring incremental adjustments. It provides managers with a diagnostic tool to align strategic intent with organizational capabilities, ensuring system balance that maximizes performance.

#### KEY DISCUSSION POINTS

- *Holistic integration* - Successful servitization requires synchronized evolution of the business, operating, and performance models; focusing on one dimension in isolation often leads to sub-optimal results.
- *The power of archetypes* - Identifying transformation archetypes allows firms to recognize their unique path and tailor their servitization trajectories based on their specific drivers (e.g. digital-led vs. customer-led).
- *Actionable empirical precision* - The SMM combines granular descriptiveness across six transformation dimensions with over a decade of empirical data from OEMs and SMEs, resulting in a validated framework that supports rigorous academic analysis while offering practitioners a concrete, actionable basis for planning and control.
- *Maturity versus strategic intent* – The distribution patterns across the six dimensions show that maturity should not be interpreted as a linear “higher-is-better” progression. Firms pursue a specific servitization ambition and intentionally develop the capabilities required for that stage, meaning that maturity profiles reflect strategic choices rather than a universal path toward ever-higher levels.

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# MODULAR GO-TO-MARKET STRATEGIES FOR GLOBAL SCALING OF SOLUTION OFFERINGS

Timon Urs Knapp, Shaun West

## RESEARCH MOTIVATION

Manufacturing firms have increasingly transformed their business models from product-centric offerings toward integrated solutions that promise stronger customer relationships, more stable revenue streams, and sustainable competitive advantage. Yet despite this strategic emphasis, global solution businesses often struggle to scale. Solutions that perform successfully in home markets frequently prove difficult to replicate abroad – not because the value proposition itself is flawed, but because firms struggle to deliver them across international contexts. In many cases, the challenge is less about designing the solution and more about the architecture through which solutions are delivered to the customer: the go-to-market (GTM) system (Davies 2001). In the context of solution business, we define GTM as the set of activities required to create value along the solution lifecycle, including opportunity shaping, system integration, commissioning, and lifecycle support (Storbacka, 2011; Ulaga & Reinartz, 2011). Coordinating these activities is particularly challenging in international settings. Multinational firms must balance the pressures of global integration, standardisation and local responsiveness when organising their operations across diverse markets (Prahalad & Doz, 1987; Bartlett & Ghoshal, 1989). For solution providers, this tension is amplified because solution delivery depends on close customer interaction, contextual adaptation, and coordination among multiple actors, including headquarters, subsidiaries, various partners, and customers themselves (Hakanen et al., 2017). Recent research conceptualises this structural challenge as the *servitized internationalisation paradox*, highlighting that the very characteristics that make solutions valuable – customisation, relational proximity, and lifecycle integration – also make them difficult to replicate and scale globally (Shleha et al., 2023).

Despite its strategic relevance, the architecture of GTM systems in the solution business remains under-theorised. Existing research has primarily examined the design of solution offerings and value propositions, while paying comparatively little attention to the organisational structures through which solutions are delivered internationally (Kowalkowski et al., 2017; Raddats et al., 2019). As a result, many firms rely on GTM arrangements inherited from their product businesses, often leading to locally improvised constellations of responsibilities among headquarters, subsidiaries, dealers, and service partners. This creates a patchwork of delivery arrangements that is difficult to compare, coordinate, and scale across the multinational organisation.

## CONTRIBUTION TO THEORY AND PRACTICE

This paper advances the argument that modularity provides a powerful yet underutilised perspective for addressing the challenge of scalable solution delivery. While modularity has been widely applied to the design of solution offerings, its potential for structuring solution delivery systems – and GTM architectures in particular – remains largely unexplored. Modularity research conceptualises complex systems as architectures composed of discrete, semi-autonomous modules coordinated through standardised interfaces (Ulrich, 1995; Baldwin & Clark, 1997). In contemporary interpretations, modular systems are characterised by the separability and recombining of their components, the clarity of their interfaces, and the manageability of their overall architecture (Bask et al., 2010; Campagnolo & Camuffo, 2009). These properties allow systems to balance stability and change, enabling components to be replicated, adapted, or reassigned without disrupting the integrity of the whole. From this perspective, the servitized internationalisation paradox can be understood not merely as a strategic dilemma but as an architectural challenge that can potentially be addressed through modular system design. Building on this premise, the present study analyses how GTM

responsibilities are distributed across headquarters, subsidiaries, partners, and customers in the delivery of industrial solutions. Guided by modularity theory, GTM systems are decomposed into activity modules – discrete elements of the solution delivery process – and organisational modules representing the actors responsible for these activities. This enables the abstraction of empirically observed responsibility configurations into modular GTM patterns. Accordingly, the study asks: (1) what GTM responsibility configurations international solution providers employ across their global operations, and (2) which modular GTM patterns can be derived from these configurations. Extending the modularity logic to GTM (Bask et al., 2011) means conceptualising GTM architectures as combinations of activity modules and organisational modules connected through contractual, informational, and procedural interfaces. Based on this logic, we developed a GTM responsibility matrix that maps activity modules along the vertical axis and the actors involved in solution delivery along the horizontal axis. The activity modules were derived from the literature on solution business and industrial sales. This matrix was then used to map 30 empirical vignette cases of GTM architectures in a standardised and comparable manner.

Comparing these matrices qualitatively revealed two key dimensions that differentiate GTM configurations: (1) process ownership and (2) centralisation of control over the delivery system. Three forms of ownership emerge along the solution delivery process: commercial ownership (responsibility for pre-sales activities), delivery ownership (operational responsibility for deployment and maintenance), and lifecycle ownership (responsibility for customer success and further solution development). The allocation of these ownerships across actors represents a central distinguishing feature between cases. In addition, using the RACI framework from project management allowed us to assess the degree of coordinative control within the delivery system, capturing whether delivery activities are centrally orchestrated or distributed across multiple actors.

Based on these dimensions, we identify clusters of GTM configurations and abstract a set of modular GTM patterns, together with contextual contingencies that influence their effectiveness in solution sales. Responding to recent calls for greater attention to downstream actors in solution delivery (Hullova et al., 2019; Hakanen et al., 2017; Capanni et al., 2025), this study extends modularity theory from value proposition design to the architecture of value delivery systems. In practice, it provides firms with a conceptual basis for systematically mapping and designing scalable GTM architectures for a global solutions business.

## **KEY DISCUSSION POINTS**

- Modular GTM architectures create transparency and flexibility, enabling firms to deliberately (re-)design their solution delivery systems to align with capability and resource distribution.
- Customer ownership in the solution business is distributed across the lifecycle, not simply tied to the actor facing the customer. Distinguishing commercial, delivery, and lifecycle ownership reveals how customer relationships are actually governed.
- Applying the RACI framework exposes the hidden structure of value delivery systems, making control, capabilities, and coordination across actors more transparent.
- Modularity offers a powerful lens for addressing the servitized internationalisation paradox, enabling firms to reconcile global scalability with local responsiveness in solution delivery.
- GTM configurations vary systematically along two key dimensions, process ownership and delivery system centralisation, revealing patterns of how firms organise solution delivery.

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## Unlearning and Intentional Forgetting in Organizational Change and Servitization Literature: Two Comparative Scoping Reviews

Hannah Böckmann, Sophie Berretta, Sven Hennemann, Martin Ebel

### RESEARCH MOTIVATION

Servitization has become a central strategic transformation for manufacturing firms seeking to sustain competitive advantage by adopting a more service-related logic and offering advanced services. Despite its strategic potential, many firms struggle or even fail to achieve lasting transformation, often constrained by limited managerial commitment, slow capability development, and low scalability. These challenges reveal that servitization is not only a structural and strategic transformation but a deep *organizational change* that profoundly affects individuals, teams, and the entire organization. Previous studies describe servitization as “multi-stage transformation”, “organizational change”, or “transformational process”, underscoring the profound impact on the organization and highlighting the importance of service-related capability development.

However, while prior servitization research emphasizes that distinct service-related capabilities are relevant and need to be created by manufacturers for successful transformation, this perspective remains limited in its consideration of the persistence of existing organizational contexts. Additionally, recent studies increasingly acknowledge the relevance of individual mindsets, attitudes, and habits in shaping servitization processes; such individual patterns are often embedded within established organizational routines and capabilities. These structures that once ensured stability and success can foster rigidity, as deeply rooted habits impede the adaptation required in processes of organizational change toward service-related logics. Consequently, successful servitization demands not only creating new capabilities, but also a fundamental realignment of existing ones across all organizational levels. From an organizational change perspective, this aligns with **Unlearning (U) and Intentional Forgetting (IF)**, processes of purposefully discarding outdated knowledge to enable adaptation. Despite their centrality to organizational change theory, U and IF remain theoretically underdeveloped within servitization literature.

Previous research distinguishes between the terms of “unlearning” and “forgetting” to describe the process of knowledge disposal. Unlearning encompasses abandoning organizational norms and values, as well as behaviours, dominant logics and cognitive structures. Organizational unlearning therefore enables a more efficient and effective change process and failing to unlearn is considered a critical weakness in organizations, particularly when existing knowledge is perceived as an obstruction to new knowledge. Forgetting is seen as an unintentional knowledge loss and can be caused for example by employee turnover or the natural decay of knowledge over time. Nevertheless, forgetting can also reduce complexity, and enable innovation and change if intentionally and actively managed. Despite its relevance, the literature on U and IF remains conceptually fragmented: definitions vary, related terms are used inconsistently, and the factors that enable or inhibit unlearning are dispersed across studies.

A closer examination of servitization literature reveals that existing studies acknowledge the need to let go of entrenched routines and mindsets, but do not systematically draw on U/IF concepts or identify the factors that influence knowledge disposal during service transformation. To address this gap, this study conducts two comparative scoping reviews to juxtapose the conceptualization of U and IF in general organizational change research against their treatment in servitization literature. By synthesizing these distinct streams, the study identifies critical gaps and outlines a path for integrating U/IF into servitization frameworks.

## **CONTRIBUTION TO THEORY AND PRACTICE**

This study contributes to theory by establishing a conceptual link between organizational change literature and servitization research. First, it synthesizes the partly ambiguous literature on U/IF and clarifies their definitions, mechanisms, as well as enabling and inhibiting conditions within organizational change. Secondly, it identifies a significant theoretical gap within servitization research. Although scholars frequently acknowledge the challenges of overcoming entrenched product-centric logics, existing studies rarely draw on theoretical frameworks that explicitly address the discarding of obsolete knowledge, routines, and mindsets. By introducing U/IF as a theoretical lens, this study integrates insights from different research streams and thereby offers a novel analytical perspective for examining servitization processes.

Beyond its theoretical contributions, this study also offers practical insights for organizations undergoing servitization transformations. It examines key enabling and inhibiting factors as well as practices associated with successful unlearning, thereby providing a foundation for understanding how organizations may support the abandonment of obsolete routines and contribute to successful transformation processes.

## **KEY DISCUSSION POINTS**

- The role of entrenched routines, product-centric mindsets, and established logics deserves greater attention as potential barriers to successful change processes.
- While many studies provide valuable case-based insights into barriers and challenges of servitization attempts, approaches explaining how these obstacles can be overcome remain limited.
- In this regard, servitization should be discussed not only as a process of capability development but also as a process that requires the deliberate abandonment of obsolete knowledge, routines, and mindsets.
- Future studies should further explore micro-level mechanisms of unlearning, the interaction between individual and organizational levels, and practices that enable organizations to overcome obsolete behaviours that were once successful but have become barriers to transformation.

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## A tertiary literature review on servitization

Beheshte Momeni, Chris Raddats, Marko Kohtamäki

### RESEARCH MOTIVATION

Over the last 15 years, servitization has become increasingly important for organizations and academic communities. For organizations, servitization is essential for competing through services rather than just products. As a transition process, servitization manifests in industries where organizations adopt new business models, moving toward advanced or outcome-based offerings to meet changing customer needs. Moreover, the momentum of Industry 4.0 and the rise of digital technologies, such as Internet of Things (IoT) and Artificial Intelligence (AI), have introduced new ways of using digital technologies to improve efficiency, offer greater customer value, and competitive advantage. The application of new digital technologies in this field has been termed digital servitization.

In academic communities, understanding servitization involves aligning the concept with different theoretical perspectives and exploring links to organizational change, business model innovation, and organizational performance. The high level of interest in servitization in academic communities has led to the emergence of several special conferences and events, such as the Spring Servitization Conference (SSC) and the International Conference on Business Servitization (ICBS), as core academic events. Equally, the ASAP Service Management Forum is positioned in an industry-university nexus, and the Vaasa Servitization Workshop and the Smart Service Summit focus on specific servitization topics, such as business models, sustainability, and smart services. Moreover, the institutionalization of the research field through scholarly communities focused primarily on servitization has helped shape servitization as a distinct domain, encouraging conceptual work and field mapping. From 2010 to 2025, 64 reviews on servitization literature have been published in Academic Journal Guide (AJG) 2\* (and above) journals to consolidate the field, with reviews in engineering, management, marketing, operations, and service journals, among others.

The rapid accumulation of reviews on servitization signals epistemic maturity but also meta-level fragmentation. Addressing servitization from different intellectual perspectives leads to parallel but weakly connected knowledge streams, such as paradigmatic assumptions, theoretical lenses, definitions and terminologies, and so on. Thus, the coexistence of multiple reviews has created second-order fragmentation in the field. At the same time, the increase in the number of reviews from different communities may raise the entry barriers for academics wishing to understand the field, who must navigate multiple overlapping syntheses to gain an understanding of servitization.

As the field matures, opportunities for groundbreaking conceptual advances appear to be narrowing. This study is motivated by this particular moment in servitization literature, where many recent contributions tend to offer incremental refinements and extend established frameworks rather than fundamentally new perspectives. Therefore, the objective of this study is to conduct a systematic review of review papers on servitization, a tertiary review, to structure, evaluate, and integrate the research field. This review addresses the following research questions:

RQ1. What are the characteristics of literature reviews on servitization?

RQ2. How have systematic reviews of servitization shaped and developed the field over time?

RQ3. Where do these reviews converge and diverge conceptually?

RQ4. How has the servitization future research agenda evolved over time, and which underexplored directions provide opportunities for new perspectives and conceptual advancement?

## CONTRIBUTION TO THEORY AND PRACTICE

By conducting a tertiary (i.e., a third level) review of 64 reviews on servitization, this paper makes four main contributions. First, the paper develops the field from fragmented parallel syntheses to a unified knowledge structure. Second, the paper develops a convergence-divergence-evolution framework by clarifying inconsistencies in terminology and classification, competing terminologies, and conceptual boundaries. By doing so, the paper identifies dominant and emergent narratives in servitization and argues the reasons for possible inconsistencies. Third, this tertiary review analyzes the future research agenda of the review papers to investigate the research directions proposed over time, where they overlap or conflict, and the unanswered questions that remain despite multiple reviews. Combining these findings with temporal analysis of how review topics/themes have evolved (i.e., dominant vs. emergent themes), the paper assesses saturated versus underdeveloped areas. The results lead to the final contribution, which is to strategically prioritize gaps to direct future research toward the frontier with the highest potential for theory development rather than saturated areas.

## KEY DISCUSSION POINTS

- Descriptive analysis
  - Temporal analysis:
    - Early stage of the field (2010-2016) with empirical studies dominant and theoretical foundations still emerging;
    - Consolidation phase (2017-2024) with a significant upward trend driven by the maturation of empirical research, special issues, and emerging concepts, such as sustainability, circular economy, and AI;
    - Start of declining phase (2025 forward) that may signal the field saturation and increased barrier to publication of reviews.
  - Review methods: Articles on servitization have been predominantly studied through systematic literature reviews as well as bibliometric and co-citation analysis. Some recent reviews went beyond standard thematic analysis and employed advanced machine-learning techniques. The other methods include narrative analysis, structured review, integrative review, mixed methods, quantitative meta-analysis, and qualitative meta-synthesis.
- Thematic analysis
  - *Innovation and offerings*, which set out how developing new service offerings has been at the core of much servitization research.
  - *Organizational change and capabilities*, which explains the change from product- to service-focus and the required capabilities to do this.
  - *Service strategy and performance*, which articulates the dilemmas manufacturers face around developing a successful servitization strategy.
  - *Business models*, which build on the service strategy theme to encompass the range of elements required to build a successful strategy.
  - *Multi-actor evolution*, which demonstrates that servitization is inherently a multi-actor concept.
  - *Research communities and theoretical assumptions*, which bring together teams researching servitization and the theoretical lenses that have been utilized in these communities.

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## **Conceptualizing Strategic Nonlearning in Servitization**

Tuomas Huikkola, Marko Kohtamäki

### **RESEARCH MOTIVATION**

Why some firms learn how to servitise and some firms fail to adapt service-logic is relevant for both practitioners and business managers because both successful and failed cases provide insights into organisational processes that either facilitate or hinder organisational learning and business renewal. This paper focuses on scrutinising organisational processes that hinder manufacturing organisations to learn and renew themselves when servitising their businesses.

Our initial findings show that a manufacturing company operating with product-logic may face following challenges when attempting to become a more service and software-savvy company: 1) Organisation is unable to scan the disruptive changes coming from outside the industry/ecosystem, 2) organisation is unable to make decisions that could potentially cannibalize their existing business operations, and 3) organisation is not able to develop and realign its capabilities to meet the new requirements and demands in service and software business.

### **CONTRIBUTION TO THEORY AND PRACTICE**

Theoretical contributions of this article are twofold. As a first theoretical contribution, this longitudinal and in-depth historical single case study expands the extant dynamic capability literature by presenting key processes of how organizations fail to adapt service-logic. This paper thus contributes to the discussion of the lack of dynamic capabilities and organizational nonlearning. As a second theoretical contribution, this paper contributes to the discussion of service and digital transition by showing how organizational path-dependencies hinder and prevent product-oriented firms to become service-savvy companies.

### **KEY DISCUSSION POINTS**

- How managers and executives can better respond to disruptive threats that may arise outside the existing industry/ecosystem? (e.g., analogical thinking)
- How to avoid strategic myopia? (e.g., scanning changes in other ecosystems)
- How to cannibalise existing business? (e.g., structural separation)
- How to avoid organisational indecision? (e.g., constructive conflicts)
- How to create and build new capabilities? (e.g., attracting new talents, training personnel, making industry more attractive)
- How to access external organisations? (e.g., M&As, alliances)
- How and when to shed existing assets? (e.g., production capacity)
- How and when break organisational path-dependency? (e.g., when existing capabilities become a burden for an organisation?)

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## **Quantifying Viable Service Ecosystems: A Time-Dynamic Model of Multi-Actor Value Creation and Capture**

Jürg Meierhofer, Jochen Wulf, Nikola Pascher, Erica Santini, Nicola Saccani

### **RESEARCH MOTIVATION**

Servitization increasingly unfolds within interconnected service ecosystems, where multiple actors jointly create, exchange, and capture value. In such settings, value flows become interdependent and dynamic, making ecosystem viability a critical concern.

While prior quantitative models have described bilateral value creation, the servitization domain lacks formal tools to assess whether multi-actor ecosystems remain viable over time. Firms require methods to evaluate how value creation and capture accumulate, how margins evolve, and whether actors can sustainably participate in shared service offerings.

This research addresses this need by developing a time-dynamic quantitative model that evaluates viability at the ecosystem level. It identifies conditions under which value flows stabilise, oscillate, or collapse, and provides a basis for designing sustainable collaboration, pricing, and resource-allocation mechanisms across multi-actor ecosystems.

### **CONTRIBUTION TO THEORY AND PRACTICE**

#### Theoretical Contribution

The study is anchored in service dominant logic (SDL) and advances servitization research by operationalizing ecosystem viability as a property emerging from multi-actor value-flow feasibility and dynamic stability. It extends existing bilateral value-creation models into a networked, time-dependent context, enabling analysis of intertwined value creation, value capture, and cost structures.

The work integrates foundations from service ecosystems, systems theory, and quantitative value modelling, offering a unified model that captures how operant resources, value-realization effectiveness, and revenue distribution jointly influence ecosystem viability and sustainability. It also provides new conceptual clarity on the emergence of stable, oscillatory, or non-viable states in service ecosystems.

#### Practical Contribution

The model equips managers with a quantitative approach for ex-ante evaluation of ecosystem viability. It supports decisions on ecosystem composition, revenue-sharing arrangements, service-design adjustments, and investment in operant resources such as data-driven capabilities.

By making value flows and viability conditions transparent, the approach helps firms prevent value imbalances, avoid the servitization paradox, and design service collaborations that are economically sustainable for all actors over time. It also enables scenario testing to anticipate how changes in value capture, pricing, or contribution propensity affect stability.

## KEY DISCUSSION POINTS

- Ecosystem-level viability condition: An actor remains viable only if, over time, its total created value for others is balanced with the value it captures, while ensuring margins cover operational and development costs.
- Dynamic behaviour of value flows: Numerical evaluations show three possible system outcomes:
  - stable states with convergent or bounded value accumulation,
  - non-viable states where value starvation or disproportionate capture destabilizes the ecosystem, and
  - oscillatory states driven by time-lagged adjustments such as adaptive pricing.
- Sources of non-viability: Ecosystems destabilise when actors fail to create sufficient value, when value-capture patterns become unbalanced, or when operant resources (e.g., data, capabilities) are under-utilised, reducing service effectiveness.
- Role of operant resources: Effective use of data, capabilities, and service configurations is critical to achieving high value-creation efficiency and avoiding ecosystem collapse.
- Impact of pricing and revenue sharing: excessive value capture (e.g., by misaligned pricing) by one actor, or insufficient margins for others can lead to non-viability; rebalancing mechanisms can restore stability.
- Scenario-based decision support: The model enables exploration of “what-if” scenarios related to service performance, operating conditions, contribution propensity, or pricing structures to anticipate system behaviour.
- Implications for servitization strategy: Firms can use the model to evaluate ecosystem partnerships, prevent long-term imbalances, and design service offerings that generate sustainable, mutual value across actors.

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## **A Multi-Level Framework Conceptualising Sustainable Servitization**

Mariana Kovačić-Lukić, Emel Arikan

### **RESEARCH MOTIVATION**

Servitization and product-service systems (PSS) have gained increasing attention as firms seek to respond to sustainability challenges and growing regulatory pressure related to environmental and due diligence issues. Service-led business models are seen as particularly promising as they support regulatory compliance and risk management while aligning with sustainability principles. By shifting away from ownership-based models, sustainable PSS have the potential to reduce environmental impacts by optimising products for use rather than consumption, contributing to the decoupling of economic growth from resource consumption while simultaneously creating potential for social benefit.

Servitization refers to the organisational transformation towards service-led and outcome-based offerings, while PSS denote the resulting service-integrated product configurations. Achieving sustainability-oriented outcomes through PSS requires sustainability to be embedded into system design and aligned with value creation from the outset. The concept of green servitization captures the environmental dimension of this transformation, emphasising practices such as reverse logistics, circular supply chains, and lifecycle assessment.

However, servitization and PSS are not inherently sustainable. Rebound effects and careless product use can offset potential sustainability gains. Moreover, sustainability assessments in servitization research often prioritise environmental performance, neglecting the social dimension of the triple bottom line and limiting holistic sustainability outcomes. These tensions highlight the need for a clearer conceptual understanding of sustainable servitization.

Despite growing scholarly interest, sustainable servitization remains conceptually underdeveloped. Recent literature frames it as the strategic integration of sustainability into servitization decision-making to enable long-term value creation across service ecosystems. While sustainability-based value propositions and long-term organisational commitment are increasingly emphasised, research continues to focus predominantly on environmental aspects, leaving the social dimension underexplored.

This study adopts a qualitative literature review of 130 peer-reviewed journal articles on servitization, PSS and sustainability. The literature was systematically analysed to identify conceptual levels and thematic patterns, which informed the development of an integrative framework for sustainable servitization. To assess the practical relevance and real-world applicability, expert interviews were conducted with practitioners and academics experienced in servitization and sustainability, providing validation and refinement from a practice-oriented perspective.

### **CONTRIBUTION TO THEORY AND PRACTICE**

The study reveals that sustainable servitization is conceptualised across multiple, interconnected levels. Four perspectives emerged from the coding process, highlighting the micro, meso, and macro dimensions of the field. While macro-level studies frame sustainable servitization as a (1) multi-actor,

multi-stakeholder system within an ecosystem, meso-level research focuses on (2) sustainability impacts and (3) design choices on the network level, and micro-level studies address (4) operational strategies within the organisation. Further observable is the negligence of the social dimension of sustainability as well as transdisciplinary perspectives engaging actors outside of academia to achieve system-level contributions. Methodological approaches such as forms of action research or intervention-based research show potential to bridge these gaps of actor- and stakeholder-inclusivity.

The expert interviews provide practical validation of the proposed framework and offer insights into how sustainable servitization operates in real-world contexts. They reveal which micro-, meso-, and macro-level factors are most critical in practice, how these levels interact, and which challenges and trade-offs firms face when integrating sustainability into servitization strategies, giving insights into contextual differences and organisational approaches that are not evident in the literature. Additionally, the real-life implications of each sustainability dimension will be explored and tested against the framework.

This study contributes to the emerging literature on sustainable servitization in three ways. First, it maps the intellectual landscape of the field, identifying dominant themes, conceptual approaches, and disciplinary intersections. Second, it reveals conceptual gaps in how sustainability is addressed, notably the underrepresentation of social dimensions and the prevailing focus on micro-level operational improvements over system-level outcomes. Finally, it advances a research agenda for sustainable servitization, proposing a framework that embeds sustainability more explicitly into servitization strategies to inform both future research and managerial practice.

The paper offers managers a structured framework for implementing sustainable servitization, highlighting the multi-level considerations that influence strategy and operations. By clarifying how sustainability can be integrated into servitization practices, it guides decision-making on product-service design, stakeholder engagement, and ecosystem-level collaboration. The findings help firms align regulatory compliance, environmental performance, and long-term value creation in real-world contexts.

#### **KEY DISCUSSION POINTS**

- A literature-based framework conceptualising sustainable servitization across three levels.
- A differentiation of servitization and PSS is offered, conceptualising sustainable PSS as potential outcome of sustainable servitization.
- The framework is tested in expert interviews to solidify the literature-based findings.
- Implications for each level are discussed and suggestions for action are proposed.
- Future research can look into testing the implications for each level in real-life scenarios.

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## **Assessing the Environmental Contribution of Servitised Business Models in Practice**

Luca Lussignoli, Nicola Sacconi, Veronica Arioli, Federico Adrodegari, Laura Scalvini, Fabiana Pirola

### **RESEARCH MOTIVATION**

In recent years, manufacturing companies have increasingly adopted servitised business models (Product-Service Systems - PSS) to improve competitiveness and align with ecological transition goals. While the literature suggests that PSS can reduce environmental impacts through extended product lifespans and optimized resource utilization, transitioning to a servitised model does not inherently guarantee sustainability. These benefits depend heavily on how services are designed and utilized, and a critical gap remains in the actual measurement of these environmental contributions. Firms often perceive the "green" value of their services intuitively but lack formal frameworks to quantify it.

To investigate this gap, our research initially conducted a broad empirical study involving 9 manufacturing companies and 1 technology provider. The findings revealed a structural lack of formalized measurement: sustainability in service divisions is predominantly treated as an indirect benefit or a side-effect, rather than a strategic, measurable target. Consequently, there is an urgent need to explore how manufacturing firms perceive the environmental role of their entire service portfolio and, subsequently, to identify mechanisms and metrics to objectively measure these contributions, especially in highly impactful areas.

### **CONTRIBUTION TO THEORY AND PRACTICE**

This study advances the servitization and sustainability literature by providing a progressive, driver-based approach to bridge the gap between service configuration and environmental impact.

As a first step, building on the empirical investigation, we developed a two-dimensional "Services-EVD" (Environmental Value Drivers) matrix. This conceptual tool allows companies to qualitatively map their entire service portfolio against specific environmental drivers, moving beyond generic assumptions of sustainability. It highlights the current maturity level of the industry, where awareness is growing, but systematic evaluation is lacking.

Secondly, recognizing that the most significant environmental impacts occur during the product's use phase (Middle of Life), the research performs a deep dive into maintenance services (corrective, preventive, and predictive). To address the measurement gap directly, the initial framework was evolved into a three-dimensional "Services-EVD-Metrics" conceptual model. This advanced matrix systematically links specific maintenance strategies to 16 Environmental Value Drivers and associates them with a structured set of metrics.

From a theoretical perspective, the study highlights that environmental value must be evaluated through a dual lens: explicit measurement of physical flows (e.g., energy, emissions) via direct metrics, and the improvement of operational efficiency (e.g., Overall Equipment Effectiveness) via indirect metrics. For practice, this dual-step research provides managers with pragmatic tools: first, to visualize the qualitative potential of their service portfolio, and second, to implement a quantitative, data-driven assessment for their maintenance contracts.

### **KEY DISCUSSION POINTS**

- The environmental benefits of servitization are not automatic; empirical evidence shows that most companies currently lack specific environmental targets or metrics for their service divisions.

- The transition from qualitative perception to quantitative measurement is essential. The proposed 2D "Services-EVD" matrix serves as a foundational tool for companies to map the theoretical sustainability of their diverse service offerings.
- Maintenance services (particularly predictive and preventive) act as primary catalysts for sustainability. By applying the 3D "Services-EVD-Metrics" framework, firms can actively measure their impact on asset lifespan extension and resource reduction.
- Evaluating sustainability requires both direct metrics (quantifying emissions, waste, and energy) and indirect metrics (using technical performance as a proxy for environmental value).
- Digitalization and smart PSS are crucial enablers, but they must be coupled with the proposed metrics and a shift in organizational culture to successfully align economic and environmental goals.

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# **RISK AND UNCERTAINTY IN SERVITIZED VALUE PROPOSITIONS FROM CAPITAL GOODS MANUFACTURERS: A SEMI-SYSTEMATIC LITERATURE REVIEW**

Hans Lind, Siri Jagstedt, Johan Netz, and Peter Magnusson

## **RESEARCH MOTIVATION**

Servitization is a well-established research field, yet how risk and uncertainty are conceptualized, transferred, and managed remains undertheorized and fragmented, particularly in capital goods contexts, where high asset investments and outcome or performance-based contracts shift responsibilities across organisational boundaries. While operational and financial risks have received attention in the literature, epistemic, ethical, relational, and systemic risk dimensions remain poorly integrated into servitization theory and practice.

This review addresses that gap by systematically mapping the literature on risk and uncertainty in servitized value propositions, developing a comprehensive risk taxonomy, and identifying dominant theoretical perspectives and practitioner implications. It is guided by three research questions: (1) Through what mechanisms does risk absorption in service offerings influence customer value perceptions and relationship commitment? (2) Through what mechanisms do risk mitigation strategies enable service revenue growth and business model transformation? (3) How can service-as-transfer-of-risk function as a mechanism for identifying and creating new services?

## **CONTRIBUTION TO THEORY AND PRACTICE**

The review makes three principal contributions. First, it develops a twelve-category risk taxonomy spanning epistemic, commercial, relational, and contextual dimensions, providing a shared vocabulary that currently does not exist across the fragmented literature. The taxonomy distinguishes knowledge risks, measurement and model risks, temporal and distributional risks, financial and economic risks, operational and performance risks, strategic and market risks, relational and behavioural risks, contractual and governance risks, psychological and emotional risks, systemic and environment risks, platform and digital ecosystem risks, and ethical and consent risks.

Second, it introduces service-as-risk-transfer as an analytical lens, arguing that risk is not merely transferred between provider and customer but is transformed, absorbed, pooled, and cascaded across organisational boundaries in ways neither party fully anticipates at contract inception. This framing opens theoretical territory that neither servitization nor risk scholarship has fully claimed.

Third, the review employs an innovative AI-assisted methodology in which purpose-built analytical prompts serve as systematic reviewers across the full corpus, complementing a four-researcher screening process. This demonstrates a replicable approach to large-scale literature analysis in emerging research areas.

## **KEY DISCUSSION POINTS**

- Servitization research has treated risk as a peripheral concern. This review argues it is central to value propositions, contract design, and the long-term viability of outcome-based business models.

- Epistemic, ethical, psychological, and platform ecosystem risks are substantially underrepresented in existing servitization research relative to their practical significance in capital goods contexts.
- Ethical risks, including lock-in effects, consent legitimacy, and capability erosion, and platform ecosystem risks reflect the digital infrastructure and power asymmetries inherent in modern servitization, with potential implications for competition law and regulatory oversight.
- The service-as-risk-transfer framing suggests that identifying transferable customer risks can function as a systematic mechanism for new service development in capital goods manufacturing.
- AI-assisted literature review methods offer promising scalability for semi-systematic reviews in fields where corpus size and interdisciplinarity challenge conventional approaches.
- The taxonomy provides practitioners with a diagnostic tool for identifying and allocating risk in outcome-based contracts prior to commitment, and a foundation for researchers to map where theory is mature, nascent, or absent entirely.

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**Servitization by design.**

**A product design framework for surfacing ecosystem entities in Smart Product-Service Systems.**

Elena, M., Dumitrana, Vimal Dhokia, Bryan, C., Clift, Debbie, J., Janson

**RESEARCH MOTIVATION**

As manufacturing industries face pressure to decouple economic growth from resource consumption, product-service systems have emerged as a pathway towards more sustainable models of value creation. Yet, despite the rising prevalence of Smart Product-Service Systems (SPSS) in everyday life and growing scholarly interest, there remains a challenge in the availability of design methodologies capable of supporting their inherent complexity. Existing approaches rarely provide a holistic, multi-disciplinary, actionable framework for early-stage design stage. Without a structured understanding of design decisions that underpin sustainable SPSS, organisations risk adopting service models that are not resilient in the face of everchanging customer needs and technology landscape.

In practice, SPSS development often unfolds across parallel product and service design processes, and different capability tracks (e.g. data and analytics, mechanical and electrical engineering, experience design), each drawing on established tools such as stakeholder and ecosystem maps, service blueprints. This separation limits teams' ability to reason about SPSS as evolving socio-technical ecosystems, where entities such as regulators, bystanders, infrastructures and AI subsystems frequently remain peripheral until they disrupt functionality, ethics or compliance. Existing approaches rarely invite design teams to interrogate why certain entities are central and others are excluded, nor do they explicitly support tracing how these choices shape value creation as manufacturers move from early service experiments towards scaling advanced solutions. What is missing from the existing design practice is not better tools within each track, but a bridging framework that surfaces the full ecosystem of entities before critical exclusions become costly constraints, leaving a blind spot at precisely the moment when foundational decisions about ecosystem scope, actor inclusion and value architecture are often unintentionally being made.

In response, this work introduces the Multi-Dimensional Entity Identification Framework (M-EIF), an early-stage design framework that treats entity identification as a reflexive design activity rather than a neutral listing exercise. Grounded in a systematic literature review of SPSS and informed by systems thinking and human-centred design, M-EIF organises entities into five categories - operational, value network, oversight stewardship, contextual and peripheral. This research positions product design as a foundational driver of servitization strategy, able to shape not only the early configuration of a solution, but the conditions under which value can be co-created and sustained across the SPSS ecosystem.

**CONTRIBUTION TO THEORY AND PRACTICE**

M-EIF offers the first design-theoretic formalisation of *entity surfaceability* - the likelihood of an entity to become critical for the operationalisation of a SPSS and disrupt functionality, experience or compliance of the SPSS. Ontologically, the framework reconceptualises SPSS not as a static composition of components or roles but as an evolving constellation of entities whose relevance is contingent on operational, organisational, contextual and peripheral domains. Epistemologically, it shifts entity identification from a descriptive exercise (e.g. cataloguing "stakeholders" around a predefined solution) to a reflexive inquiry in which designers interrogate assumptions about human and non-human entities to consider within the SPSS ecosystem. Building on servitization progression models the M-EIF offers a mechanism to design beyond an "immediate" solution, to think and design for a sustained value co-creation, in a SPSS that can evolve over time.

In practice, M-EIF equips (e.g. product, analysis, engineering) teams running design workshops with a structured tool that can systematically surface latent entities, extending from traditional stakeholder and ecosystem mapping tools, linking each category to specific design decisions (e.g. data architectures, modularity, lifecycle planning). A multi-layered visualisation map organised around the concept of *entity surfaceability* enables cross-functional teams to translate ecosystem awareness into functional and non-functional requirements, bridging product discovery to development activities.

The M-EIF is designed not as a stand-alone deliverable but as a generative input to the broader early-stage design process. The five categories map onto tools that teams already employ: operational and value network entities populate journey maps and business model canvases with ecosystem-aware content from the outset, whilst oversight, stewardship and peripheral entities feed into risk and compliance registers. The peripheral and contextual categories carry a particular longitudinal logic - entities marginal at the start of a servitization journey can become critical as the solution scales, encounter new contexts and reach unanticipated entities. A smart fridge for instance, begins as a product designed for the household user, however, as the service scales, energy supply companies may emerge as active participants. By nudging specific device functionality (e.g. lower freezing temperature, produce ice, etc.) during off-peak hours, they not only help deliver financial benefits to the owner and user of the smart fridge, but they effectively become users of the device themselves. Revisiting the M-EIF map at successive stages of servitization maturity allows teams to treat it not as a fixed snapshot but as an evolving design artefact- one that tracks how ecosystem relationships and responsibilities shift over time. At this stage, the framework's ethical contribution becomes most visible: by making latent actors (e.g. regulators, bystanders, affected communities) legible early and explicitly, M-EIF creates the conditions for anticipatory ethical reasoning, surfacing areas of risk and contested value before design commitments become difficult to reverse.

## KEY DISCUSSION POINTS

- Using M-EIF to clarify how ecosystem demands shift across servitization stages - from exploratory pilots to advanced services - and how proactive entity identification supports each transition with an appropriately configured network.
- Entity latency in SPSS: why peripheral, contextual and ethical entities only become visible at the point of disruption, and what this reveals about gaps in current design and servitization practice.
- M-EIF as a design-led servitization capability: replacing ad-hoc identification of “who matters” with a reflexive, repeatable inquiry into assumptions, roles and dependencies.
- The five M-EIF entity categories as a lens to examine how product design decisions shape roles, touchpoints and consequences across the SPSS ecosystem and its operating environment.
- How M-EIF can be used in early-stage product and service design workshops to surface overlooked entities, anticipate regulatory, ethical and operational risks, and translate systemic awareness into specific requirements and lifecycle strategy.
- Opportunities for visualisation of M-EIF as a multi-layered ecosystem map, positioning entity categories and their *surfaceability* against servitization stages.

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# Strategic Proximity to Agentic AI: Implications for Digital Servitization and Innovation Pathways

Arooj Mohib, Marko Kohtamäki

## RESEARCH MOTIVATION

Agentic AI has begun to reshape organizational strategic approaches by transforming firms' operational capabilities into autonomous, goal-oriented operations, thereby advancing beyond conventional AI-based processes. Rapid technological advancements are compelling organizations to reconsider their strategic positioning within autonomous systems. This study proposes to conceptually assess the proximity of strategic themes when agentic AI capabilities are embedded within organizational workflows as a baseline for conceptualizing firms' positioning within the emerging shift toward agentic AI and for incorporating this perspective as a transformational catalyst for digital servitization. The aim is to identify agentic AI capabilities, conceptually synthesize agentic capability dimensions, assess their coverage across strategic research, and uncover their relevance to digital servitization, thereby contributing to the evolution of organizational strategic services and innovation.

As industries experience this shift, the strategic implications of AI agents become increasingly significant, yet remain vastly underexplored in management research. This gap reflects the absence of consolidated knowledge to guide firms on how agentic capabilities reshape strategy, innovation and service models. Fragmented insights across strategy and agentic AI literature have produced a limited theoretical understanding of how these capabilities intersect with strategic processes, organizational capabilities and future business models. Addressing this fragmentation is essential to enable firms to develop a clear pathway for leveraging strategic autonomy, reasoning and collaboration within digital servitization workflows.

## CONTRIBUTION TO THEORY AND PRACTICE

Grounded in the capability-based view, this study highlights how the configuration of agentic AI capabilities, together with organizational and social capabilities, mutually shape digital servitization transformation, leading to multi-level strategic outcomes. This perspective underpins efforts to synthesize research on AI agents in the strategy and innovation domains, to conceptualize the proximity of existing strategic approaches to agentic AI, and to map underrepresented agentic dimensions.

As a contribution, this study identifies core agentic AI capabilities, maps their relevance to prior studies, and determines their coverage levels in the existing strategic management literature. It presents the results through heatmap analysis and develops a conceptual capability-based servitization framework that captures the components of each layer, producing strategic outcomes at the micro, meso, and macro levels. The evaluation results indicate the role of agentic AI capabilities within organizational strategies and reveal how far current research has progressed toward an agentic AI paradigm in terms of shaping digital servitization and innovation pathways. Conceptual insights indicate that stronger autonomy in decision-making, multi-agent collaboration, and adaptive learning capabilities position firms to advance toward more mature digital servitization models. This outlines clear practical implications. The findings emphasize the integration of agentic AI, human and organizational capabilities as a pathway to improved strategic outcomes and value-added digital servitization, supporting long-term competitiveness and transformative growth.

## KEY DISCUSSION POINTS

- AI technologies and, more recently, agentic AI, are reshaping strategic approaches by enabling the transition from traditional AI-based operations to more autonomous, goal-directed organizational processes.
- This study qualitatively assesses strategic proximity to agentic AI capabilities to conceptualize firms' positioning within the evolving autonomous paradigm and its contribution to digital servitization.
- A capability-based view highlights how strategic outcomes emerge through the configuration of agentic AI capabilities together with human and organizational capabilities, transforming digital servitization and shaping organizational outcomes.
- This research adopts a synthesis-oriented methodology combining a structured literature review with latent topic analysis using the Latent Dirichlet Allocation (LDA) algorithm and manual contextual analysis.
- The analysis examines strategic alignment with agentic AI capabilities, mapping the types of AI agents discussed in strategic management literature and assessing the extent to which core agentic dimensions, i.e., autonomy, memory-centered reasoning, planning, multi-agent collaboration and proactive interaction are emphasized or overlooked.
- Preliminary findings indicate that existing research is predominantly inclined toward generative AI and traditional language model-based studies, while strategic proximity to agentic AI remains limited.
- Stronger capability alignment around autonomous decision-making, feedback learning loops, and multi-agent collaboration positions firms to progress toward more mature digital servitization models.
- Overall, theory suggests that individually AI and humans do not possess the capability to offer enhanced outcomes; however, the integration of agentic AI capabilities with human and organizational capabilities offers a pathway to improved strategic outcomes and value-added digital servitization, supporting long-term competitiveness and transformative growth.

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## **Developing the Foundations of Scalability for Digital Servitization**

Amna Saeed Akkas, Odara Abeysinghe

### **RESEARCH MOTIVATION**

Manufacturing firms are increasingly integrating digital technologies such as sensors, automation and cloud-based platforms into industrial equipment to create value beyond the traditional product sales. Firms aim for delivering advanced services including predictive maintenance, remote monitoring, and operational optimization by integrating digital technologies in their service processes. These digital capabilities are often associated with the potential to improve service efficiency and enable service offerings that can be implemented across multiple operational settings. However, despite the growing interest in digital servitization, many firms struggle to move digital service initiatives beyond pilot projects. While it is generally assumed that digital technologies enable scalable service delivery, a major challenge remains in translating digital solutions into offerings that can be implemented broadly across diverse industrial operations.

These challenges exist particularly in process industrial contexts. Production systems are complex, tightly integrated and deeply embedded in physical infrastructures. Process industries have equipment with longer life-cycles and highly specialized production systems that often differ significantly across plants. Secondly, firms operating in these industries are highly knowledge intensive and rely heavily on specialized engineering expertise and operational know-how to design, operate, and maintain production processes. Much of this expertise remains tacit and embedded in experienced engineers and service technicians which makes it difficult to standardize and replicate service activities across different industrial environments. The empirical context of this study is a global industrial equipment manufacturer operating in a process industry. The firm has historically developed a strong market position through an extensive global network of field service operations and the ability to provide lifecycle services not only for its own equipment but also for components supplied by other manufacturers. In recent years, the company has intensified its digitalization efforts and established a dedicated digitalization and automation unit in 2022 to coordinate digital initiatives and expand its digital service offerings.

This study is motivated by the need to better understand how scalability emerges in digital servitization within knowledge-intensive process industrial environments. The goal is to examine how firms structure digital servitization in ways that allow expertise and service capabilities to be distributed across industrial operations. Our analysis shows three interconnected mechanisms through which scalability becomes possible, a) the creation of digital knowledge infrastructures that codify engineering expertise, b) the use of digital systems that augment industrial expertise, and c) the ability to replicate digital services across heterogeneous industrial systems. By examining these mechanisms, the study contributes to the literature on digital servitization and scaling by providing deeper insight into how scalable digital services emerge within complex industrial settings.

### **CONTRIBUTION TO THEORY AND PRACTICE**

This study contributes to the literature on digital servitization and scalability by examining how scalable digital services emerge in knowledge-intensive industrial environments. While existing research often assumes that digital technologies inherently enable scalable service models. However, our findings show that scalability does not arise automatically from technology adoption but it emerges through mechanisms that enable industrial expertise to be structured, distributed, and applied across multiple operational environments.

First, the study contributes to the digital servitization literature by highlighting the role of digital knowledge infrastructures in enabling scalable services. Prior research has emphasized digital platforms and data analytics as drivers of digital service growth. The findings extend this perspective by showing that scalability depends on the ability to codify engineering expertise into digital systems. Monitoring platforms, diagnostic tools and predictive analytics allow firms to translate tacit engineering knowledge into reusable digital formats that can support service activities across multiple industrial contexts.

Second, the study contributes to research on scalability and scaling in organizations by demonstrating that scalable digital services in industrial contexts primarily augment rather than replace human expertise. Rather than fully automating industrial processes, scalable digital services operate at the informational level by providing engineers and operators with enhanced diagnostics, monitoring insights and decision support. Digital technologies expand the reach and effectiveness of human expertise and enable service capabilities to be distributed across multiple operational environments.

Third, the study contributes to the literature on standardization and customization by analysing how scalable digital services can be implemented across heterogeneous industrial systems. The findings show that firms balance standardized digital cores with context-specific integration into industrial processes. This combination allows digital services to be replicated across different operational environments while accommodating the variability inherent in process industrial systems.

From a managerial perspective, the findings suggest that firms should approach digital servitization not simply as a technology initiative but as a process of structuring and distributing operational expertise. Managers can prioritize initiatives that will help the firms build towards scalability by focusing on first making expert knowledge available across service operations by capturing this knowledge in digital systems. Secondly, they can focus on more scalable digital tools that can be implemented across diverse operational contexts such as AI-supported troubleshooting tools, monitoring platforms etc.

#### **KEY DISCUSSION POINTS**

- Scalability in industrial digital servitization is fundamentally shaped by how firms structure and stabilize operational knowledge within digital systems.
- Digital servitization changes the organizational role of expertise by embedding it within digital infrastructures.
- Digital services are effective when the knowledge embedded in digital systems aligns with the expertise and routines through which industrial work is performed.
- Scalability in industrial digital servitization reflects a hybrid configuration in which standardized digital knowledge structures interact with heterogeneous industrial environments.

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# Firm Boundary Dynamics in the Era of Artificial Intelligence

Tayyab Ahmad Warraich, Khaled Abed Alghani, Tuomas Huikkola, Marko Kohtamäki

## RESEARCH MOTIVATION

The emergence of disruptive technologies such as Artificial Intelligence (AI) has fundamentally transformed organisations and, in some cases, has enabled the creation of entirely new firms. AI is the ability of a machine to perform tasks that typically require human cognition, such as decision-making, problem-solving, and creative reasoning. In organisational contexts, AI extends far beyond technical systems; it becomes embedded across multiple organisational domains and is increasingly recognised as one of the most consequential general-purpose technologies of the current era. Like the transformative effects of electricity over the past century and the internet over the past three decades, AI is expected to reshape organisations across industries and contribute significantly to economic growth.

This technological development affects firms far beyond the introduction of new products and services. AI also transforms business models, organisational structures, capabilities, and processes. Unlike many other advanced technologies, AI does not merely improve existing processes in terms of speed, cost, or quality. Rather, it becomes deeply embedded in organisational structures, relational systems, employee skills, capabilities, governance arrangements, data infrastructures, routines, work practices, and mechanisms of power and control associated with data ownership and algorithmic authority. Although AI adoption fundamentally changes how firms operate and compete, the literature has not sufficiently addressed how firm boundaries are redefined when organisations adopt AI and develop AI-based offerings.

This study addresses that gap by examining how AI adoption and the development of AI-based offerings reshape firm boundaries over time. It builds on the theory of organisational boundaries, which conceptualises firm boundaries through the lenses of efficiency, competence, power, and identity, while also emphasising their dynamic and evolving nature. Against this background, the study investigates how AI adoption reconfigures these dimensions of firm boundaries and what this means for organisational dynamics.

## CONTRIBUTION TO THEORY AND PRACTICE

This study contributes to the literature on AI and organisational change by extending the theory of organisational boundaries to the context of AI adoption. More specifically, it explains how AI reshapes firm boundaries not through sudden or discrete shifts but through gradual, ongoing reconfiguration. The study highlights how the integration of AI into organisational structures, processes, and governance systems alters the boundaries associated with efficiency, competence, power, and organisational identity.

A central theoretical contribution is the explanation of how AI-based offerings reconfigure the relationship between infrastructure-oriented activities and service-oriented activities. At the same time, AI adoption reshapes the boundaries surrounding specialised capabilities, data control, and decision-making authority. Rather than replacing existing organisational orientations, AI appears to layer on top of them, producing evolving hybrid boundary configurations.

From a practical perspective, the study provides insights for managers seeking to understand the broader organisational implications of AI adoption. It shows that adopting AI is not simply a technological upgrade but a transformation that affects how the firm defines itself, where authority resides, how resources and capabilities are organised, and how value creation is structured. Managers therefore need to pay attention not only to technological implementation, but also to the gradual reconfiguration of organisational arrangements that accompany AI integration.

## KEY DISCUSSION POINTS

- This study examines how AI adoption and the development of AI-based offerings reshape firm boundaries over time.
- The study builds on the theory of organisational boundaries, focusing on four key dimensions: efficiency, competence, power, and organisational identity.
- AI is treated as an organisationally embedded technology that extends beyond process improvement to influence structures, capabilities, governance, routines, and control mechanisms.
- The empirical analysis is based on a longitudinal single-case study conducted over three years, which is appropriate for examining complex organisational phenomena and supporting theory development.
- The case firm has retained its primary orientation toward IT infrastructure provision while progressively expanding into digital services and, more recently, AI-based services and solutions.
- The dataset consists of 20 semi-structured interviews and two workshops conducted across multiple phases of the firm's evolution.
- The findings are expected to show that AI reshapes firm boundaries through gradual reconfiguration rather than abrupt change.
- AI-based offerings are expected to blur and redefine boundaries between infrastructure and service activities while also reshaping the distribution of capabilities, data control, and decision-making authority.
- The study suggests that AI does not displace prior organisational orientations but instead creates hybrid boundary configurations that develop incrementally over time.

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