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# Servitization: A Pathway Towards A Resilient, Productive And Sustainable Future

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## DESIGNING OVERARCHING SERVITIZATION STRATEGIES IN B2B MANUFACTURING INDUSTRY

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### ABSTRACT:

**Purpose:** This paper addresses designing overarching servitization strategies in the B2B manufacturing industry, creating resilience to overcome disruptive events and achieving an overarching servitization strategy for a future business context.

**Design/Methodology/Approach:** We practised action research, carrying out and evaluating strategic design interventions in the case company.

**Findings:** We composed a framework to map and assess product-service value propositions co-created by ecosystem actors. We designed and evaluated sequential workshops that foster strategy design by participants without design skills.

**Originality/Value:** We explore how B2B manufacturers can transition towards resilient organizations and extracts some implications for the servitization and strategic design literature. It contributes to new methods for practitioners to guide overarching servitization design.

**KEYWORDS:** Overarching Servitization Strategy, Design Roadmapping, Ecosystems, Platform Strategy, Strategic Design, User Experience

### 1. INTRODUCTION:

This paper reports overarching servitization strategy design in the industrial manufacturing business, as part of a longitudinal case study of servitization design practices within a Dutch B2B company, with ca. 6.500 employees manufacturing capital goods for worldwide aviation business.

Covid-19 triggered the way manufacturers think about their current business (Belhadi et al., 2021; Huang & Farboudi Jahromi, 2020). Suddenly, the Covid-19 pandemic disrupted many businesses, particularly manufacturers that offer product-service value propositions such as the ones based on outcome-based or pay-per-use business models (Bond et al., 2020). Despite the initial advantage of pursuing a servitization strategy as a means of revenue growth, certain business models related to service design seem to have become a disadvantage. The wake-up call of an unexpected pandemic event challenged the resilience of many service-oriented companies (Bond et al., 2020). It catalyzed to reconsider their servitization design strategy as it changed the perspective of their current business. Furthermore, servitization scholars argue that building platform-based ecosystems engaging multiple partners with complementary capabilities and resources are more resilient to a disruptive change (Kapoor et al., 2021; Ostrom et al., 2015).

To address disruptive impact, we explore the case company's resilience and capability to design new business strategies and build overarching servitization-based ecosystems, co-creating product-service propositions and their associated business models.

This paper contributes to the servitization literature to understand the role of design as a driver for business growth and resilience by pursuing overarching servitization strategies and designing product-service ecosystems. It articulates overarching servitization design strategies and shows how servitization strategies and strategic design processes contribute to customer value, thus contributing to the design literature.

### 2. THEORETICAL BACKGROUND

#### 2.1. DESIGN

Studies in the literature stream of design argued that a design-driven approach successfully creates product-service value propositions (Dong, 2015; R. Price et al., 2018). In particular, the aerospace industry research by Price et al. (2019), triggered by earlier research initiatives by Dong (2015),

showed that design-driven innovation leads to successful results for organizations and industries. Price et al. (2019) captured cases across the Dutch aviation industry, analyzing the use of design to promote strategic innovation. She presented a classification of three typologies of innovation results. Increasingly designers have moved beyond integrated product engineering and user-interface design, developing innovation strategies within the organizational context (Calabretta et al., 2017). The field of strategic design is emerging as designers become increasingly involved in strategic innovation activities in companies and industry networks (Micheli et al., 2018). Strategic design distinctively addresses long-term sustainability and meaningful impact of product-service systems (Manzini & Vezzoli, 2003). In essence, strategic design puts designers in a new position of leading innovation closer to business and management (Canales Durón et al., 2019). This calls for designers to develop new processes, organizational capabilities, and methods to perform this role. Design Roadmapping is such a strategic design process that fosters competitive timing and innovation synergy in different organization levels (Simonse, 2018; Simonse et al., 2015), including four strategic design abilities: future visioning, modelling value exchange relations, orchestrating service co-creation, and transforming organizational networks (Canales Durón et al., 2019). In addition to Design Roadmapping of Simonse (2018), the Vision-in-Product method of Hekkert (2014) is another helpful strategic design process primarily focusing on creating value propositions aiming at end-users living in a future business context.

## 2.2. SERVITIZATION

Servitization is a valuable strategy for B2B manufacturers to extend their current product portfolio with linked services. Kohtamäki et al. (2018) defined servitization as a transition process from selling products to selling product-service systems. New product-service systems often use data platform technologies that open up many opportunities for differentiation in product-service propositions. A particular category focuses on engaging customers in value creation. Setting up data platforms is a servitization strategy newcomers commonly use to disrupt established markets. Therefore, technology-intensive manufacturers in the capital goods industry have shown a growing interest in servitization in their plans to develop a competitive advantage. Previous studies in the stream of the servitization literature learned that manufacturers that adopted servitization could increase their business profitability (Baines et al., 2010; Burton et al., 2017; Visnjic Kastalli & van Looy, 2013). In his servitization scoping review, Bluemink et al. (2020) uncovered a gap in servitization research, introducing overarching servitization strategies, providing product-service ecosystems addressing future end-users' needs and concerns. The case company decided to adopt a servitization strategy to increase its service business by offering services combined with its product offerings. Besides the traditional services like installed-based maintenance and spare parts supply, the company set up a UX design department to explore value propositions that deliver end-user experiences and services.

## 2.3. ECOSYSTEMS

There is a growing interest among researchers in interpreting and understanding an ecosystem as a collaborative effort in which multiple actors work together to develop and create a user value proposition. The mutual benefit of collaborating with business partners in a networked structure is that all actors in the ecosystem can capture value from the jointly generated revenue stream. Since they individually lack the necessary capabilities and resources to create a value proposition for an end-user in their joint business context, they combine their complementary strengths creating new business opportunities and increasing their resilience. Recent studies of Adler and Kapoor discuss and examine ecosystems in relation to business models, digital platform, coopetition, technology systems, supply chains, strategic alliances, and value networks. They shed light on organizational aspects, risks in ecosystem collaboration, and a framework to structure ecosystems elements (Adner, 2017; Adner & Kapoor, 2010; Kapoor et al., 2021). Other servitization scholars emphasize the vital role digital platforms play in connecting the product-service ecosystem actors in co-creating value propositions for the end-users. (Geliskhanov & Yudina, 2018; Hein et al., 2018; Lehtinen et al., 2019;

Yarali, 2018). In a recent paper, Jovanovic et al. (2021) studied platform technology's value to support and govern ecosystem relations and value transactions.

Despite research efforts in the three above domains, designing product-service ecosystems improving a B2B company's resilience and strengthening its strategic position has not been studied yet. How strategic design processes relate to servitization strategies and product-service ecosystems contributing to B2B manufacturers' resilience is understudied. In particular, we uncovered a lack of understanding of the strategic design's integrative role in creating overarching product-service ecosystems, addressing the latent needs, behaviour, concerns and values of end-users in a future business context (Bluemink et al., 2020).

This paper addresses the research question: how can B2B manufacturers design overarching servitization strategies and build resilient overarching ecosystems. It reports ongoing research as part of a longitudinal case study of servitization design practices. Three years ago, the case company decided to embrace *user-experience design* (UX) and *design thinking* (DT) to think much more from an end-user perspective and integrated UX and DT into the R&D organization. As the next step, the UX department's former manager joined the *systems-architecture* department to set up a strategic design initiative exploring resilient product-service ecosystems scenarios for a future business context. Supporting this initiative, we started designing and evaluating design interventions, articulated in a set of sequential workshops.

### 3. RESEARCH METHOD:

To answer the research question, we used Coghlan's et al. (2001; 2017) action research method, building knowledge on overarching servitization strategy design. We set up action cycles for the intervention design, following Coghlan's four operational stages: experience, understanding, judgment, and decision. We went through different action cycles, capturing data by observing, understanding, reflecting and learning on three levels; the first-, second-, and third-person's voice (Coghlan & Shani, 2017). The first-person data concerns the researcher's observations, notions of the process, reflections and learnings. We generated second-person data by engaging with the workshop participants, interviewing them concerning their observations, experiences, reflections and learnings. The third-person inquiry concerns observations, notions, reflections of people in the outer circle, not directly involved in the action research.

We began with intervention design to guide the process of strategic design. The goal of the workshop interventions is to design an overarching servitization strategy, manifested by a related strategic roadmap navigating the company into its future business context providing overarching product-service value propositions. The unexpected Covid-19 event catalyzed the intervention design process in April 2020, following the usual concept design iterations and testing steps. A team, consisting of two industrial designers and two user-experience designers, set up a sequential set of strategic design workshops, applying the Design Roadmapping method of Simonse (2018) and the strategic design method Vision in Design of Hekkert (2014). Although the research goal is twofold (the strategic design interventions and exploring an overarching servitization strategy), we do not report the overarching strategy for confidentiality reasons, only the design interventions.

In a first action research cycle, we designed a set of sequential workshops supporting and facilitating innovation project teams to create servitization strategies. We iterated through three design cycles, using online Miro-boards for analyzing, conceiving, testing, and evaluating the strategic design workshops' activities, finally resulting in the workshop program presented in the next paragraph.

### 4. FINDINGS

#### 4.1. DESIGN INTERVENTIONS

The result of our action research interventions is twofold. First, we created a sequential series of remote strategic design workshops and practised it in the B2B context of the case company. Second,

as an (expected<sup>1</sup>) outcome of the workshops, we formulate a shared future vision and an overarching servitization design strategy for the case company's future business (articulated as a strategic design roadmap containing product-service solutions, scheduled on a three-horizons time scale).

As the Covid-19 situation forced employees to work from home during the workshops as of April 2021, we converted the workshops to an online version, using the online interactive Miro-board and the Microsoft Teams™ environment. We faced additional challenges for all participants working remotely and getting familiar with using new online tools. Above that, we set up the workshops in such a way that participants without design skills can contribute to the design process.

We carefully prepared a list of participants ensuring a broad representation of the vital disciplines in the workshops. Because the strategic workshops are new activities and not yet embedded in the existing business processes, we have ensured the managers' commitment to workshop participation of their employees.

To update and align the workshop process's outcome, we scheduled two review sessions with the stakeholders and decision-makers after workshop 3 and workshop 5.

In Table 1 below, we report the workshops program

0	Kick-Off Workshop	<b>Engaging Stakeholders and Workshop Participants.</b>	
		Team Introduction	Introduction of the facilitation team,
		Ice Breaker	<ul style="list-style-type: none"> <li>• Introduction of workshop team members, Getting familiar with online tools,</li> <li>• Setting the rules for online collaboration</li> </ul>
		Introduction Strategic Exploration Process	<ul style="list-style-type: none"> <li>• Explaining the why, what, how of the workshop series</li> </ul>
		Proces Overview	<ul style="list-style-type: none"> <li>• Overview of workshops 1, 2, 3, 4, 5 &amp; 6</li> </ul>
		Mapping of current Knowledge & Expertise,	<ul style="list-style-type: none"> <li>• Creating a shared understanding of the current business context,</li> <li>• What do we already know; data exchange between company's silos,</li> <li>• Identifying knowledge gaps,</li> <li>• Latest experts' opinions; sharing interview results</li> </ul>
		Current Users	<ul style="list-style-type: none"> <li>• Aligning on current Personas</li> </ul>
		Current Product-Service Solutions	<ul style="list-style-type: none"> <li>• Mapping of current PSS's in a Servitization Ecosystem Framework</li> </ul>
		Presenting preliminary Trend Research and Mapping Results	<ul style="list-style-type: none"> <li>• Presenting collected trend maps on demographic, economic, political, ecological, technological and social trend clusters</li> </ul>
		Sharing Expectations	<ul style="list-style-type: none"> <li>• Personal Expectations,</li> <li>• Case company's Expectations</li> </ul>
1	Workshop Trend Research	<ul style="list-style-type: none"> <li>• <b>Discover what trends drive the future user context. Discover relevant and interesting trend patterns.</b></li> </ul>	
		Deep Dive in Trends	<ul style="list-style-type: none"> <li>• Discussing homework (trends) of workshop participants,</li> <li>• Discussing Trend Research outcome and Trend Cards,</li> <li>• Identifying Trend Clusters and Patterns,</li> <li>• Trends mapping on a timeline</li> </ul>
		Strategic Fit	<ul style="list-style-type: none"> <li>• Exploring strategic fit of trends, future user values and company's values</li> </ul>
		Preparation for next workshop	<ul style="list-style-type: none"> <li>• Discuss homework and input for Workshop 2</li> </ul>

<sup>1</sup> Since the company kicked-off the workshop program in April 2021, we cannot report results yet

2	Workshop Empathizing with end-user	<b>Creating a mutual vision and plan towards the far future, combining strengths with external expertise to conceive user scenarios and explore product-service value propositions creating value for future end-users.</b>	
		Future Users	<ul style="list-style-type: none"> <li>Creating Personas for a future business context, understanding the needs, wants, behaviour, desires and values of future users</li> </ul>
		Future User Scenarios	<ul style="list-style-type: none"> <li>Exploring future Use Scenarios,</li> <li>Prioritizing Future Use Scenarios,</li> <li>Creating Artifacts illustrating Use Scenarios</li> </ul>
		Preparation for next workshop	<ul style="list-style-type: none"> <li>Discuss homework and input for Workshop 3</li> </ul>
3	Workshop Future Visioning	<b>Creating a shared future vision based on trend patterns, future user values and use scenarios</b>	
		Recap outcome of Workshop 1 and 2	<ul style="list-style-type: none"> <li>Future Personas,</li> <li>Future Use Scenarios,</li> <li>Relevant Trends on a timeline</li> </ul>
		Creating a Shared Future Vision	<ul style="list-style-type: none"> <li>Detailing Personas and Use Scenarios</li> <li>Creating a Future Vision Statement</li> <li>Creating an Artefact, articulating the Future Vision Statement</li> <li>Conceiving a Future Business Strategy</li> </ul>
		Preparation for next workshop	<ul style="list-style-type: none"> <li>Discuss homework and input for Workshop 4</li> </ul>
F	Review Session	<b>Update and align decision-makers and stakeholders on the outcome of workshops 1, 2 and 3</b>	
		Presenting Workshop Results	<ul style="list-style-type: none"> <li>Explain Results of workshops 1, 2 and 3</li> </ul>
		Review	<ul style="list-style-type: none"> <li>Discuss, Adjust Company's Future Vision Statement,</li> <li>Validate Company's Future Vision Statement</li> </ul>
4	Workshop Brainstorming Product-Service Value Propositions	<b>Conceiving Product-Service Value Propositions in the context of Company's Future Business Strategy and preferred Use Scenarios</b>	
		Brainstorming	<ul style="list-style-type: none"> <li>Ideate and Conceive Product-Service Value Propositions,</li> <li>Define Selection Criteria,</li> <li>Review and Select</li> </ul>
		Resources and Capabilities	<ul style="list-style-type: none"> <li>Identify Resources and Capabilities needed to develop selected Product-Service Value Propositions</li> </ul>
		Define Product-Service Typologies	<ul style="list-style-type: none"> <li>Map and Classify the selected Product-Service Value Propositions on the Servitization Ecosystem Framework</li> </ul>
5	Workshop Ecosystem Roadmapping	<b>Creating a Roadmap with a three-horizons timeline containing the selected Product-Service Ecosystems</b>	
		Plotting on a timeline, creating three horizons	<ul style="list-style-type: none"> <li>Emerging Trends and User Values,</li> <li>Product-Service Value Propositions,</li> <li>Resources and Capabilities needed,</li> <li>Engaged Collaborative Partners in the Product-Service Ecosystem</li> </ul>
		Conceiving a Strategic Roadmap	<ul style="list-style-type: none"> <li>Company's Draft Strategic Roadmap to its Future Business Context</li> </ul>
B	Review Session	<b>Update and align decision-makers and stakeholders on the outcome of workshops 4 and 5</b>	
		Presenting Workshop Results	<ul style="list-style-type: none"> <li>Explain Results of workshops 4 and 5</li> </ul>
		Review	<ul style="list-style-type: none"> <li>Discuss, Adjust Company's Draft Strategic Roadmap,</li> <li>Validate Company's Strategic Roadmap</li> </ul>

Table 1: Sequential Workshops and Review Sessions

## 4.2. PRODUCT-SERVICE TYPOLOGIES

During the intervention design process, we tried out all workshop activities. One of the activities in workshop 4 is defining product-service typologies. Based on the product-value propositions we came across analyzing the company's current product-service portfolio and earlier servitization design cases carried out by master students, we built a framework to classify and map product-service ecosystems' typologies. This framework depicted in Figure 1 is a coordinate system plotting the customer value chain's length along the x-axis. Along the y-axis, the number of collaborating partners 'B' involved in delivering the product-service value proposition.

We identified four roles, starting with the orchestrator 'O' representing a manufacturer delivering a value proposition to the second role, the customer 'C'. The third role is the end-user 'E', representing the last link in the value chain. The fourth role is a business partner 'B', delivering complementary capabilities and resources and collaborating with the orchestrator 'O' to provide a product-service solution.

In Figure 1, we mapped product-service typologies based on actors' relations and roles in their ecosystem. To not make the framework too complex, we decided to limit the horizontal x-axes to the lower-right cell (O-nC-E), representing all relationships with one or more (n) customers 'C' in the value chain (f.e. O-C-C-E). We, therefore, limit the vertical y-axes to the upper-left cell (O-nB-C), representing all product-service solutions with one or more (n) collaborating partners (f.e. O-B-B-C). The arrows represent all sorts of values that are in an exchange between the ecosystem actors. The typology framework showing the value transactions in play between all ecosystem actors helps strategic designers identify and create business models for product-service value propositions.

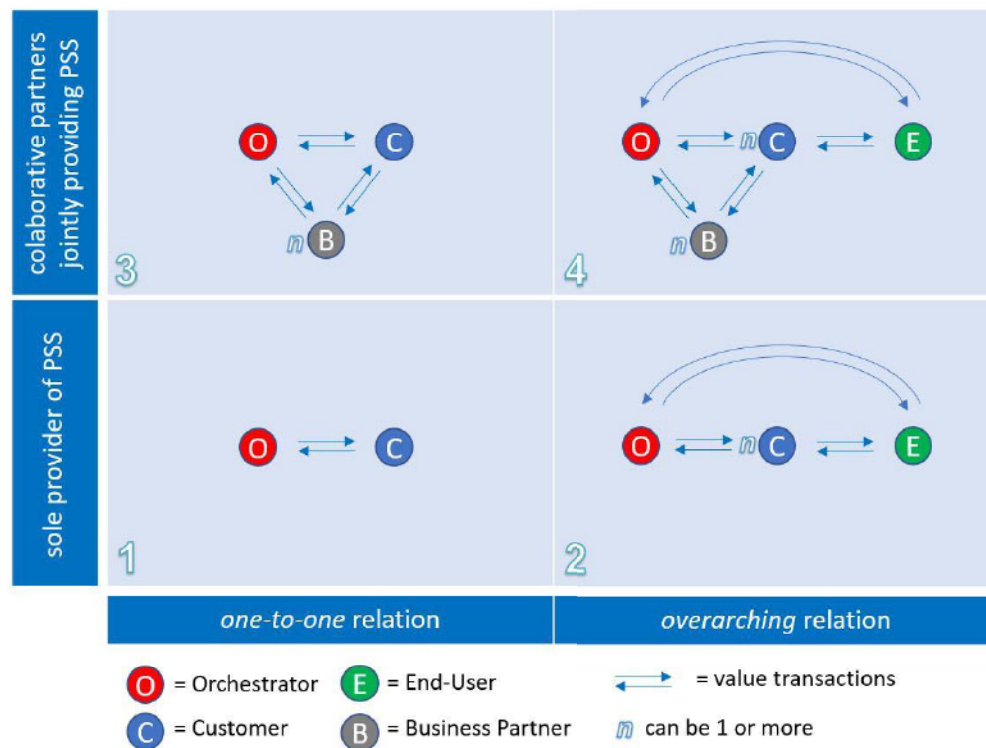


Figure. 1.: Servitization product-service typologies based on the ecosystem actors' roles and relations

- 1) Typology O-C in the lower-left cell represents the primary relationship of an Orchestrator solely offering a PSS to its direct customer 'C', who sells to an end-user 'E'. In this way, many companies set their first footsteps on their servitization journey by offering services to extend their product value propositions. For example, the company supplies maintenance and spare

parts services and generates a sustainable revenue stream by offering an additional service level agreement during the equipment's lifetime.

- 2) Typology O-nC-E in the lower-right cell represents an overarching relationship; the orchestrator 'O' offers a value proposition via its customer 'C' to the end-user 'E'. An example of this typology is Rolls-Royce, described by Visnjic et al. (2017). Its *Pour-by-the-Hour* solution offers a service level agreement addressing airlines' pains by taking care of maintenance services and 24/7 fleet monitoring. In this case, Rolls-Royce (O) collaborates with airlines (C) and the aircraft industry (2<sup>nd</sup> C) and co-created a product-service value proposition in a platform-based ecosystem.
- 3) In typology O-nB-C of the upper-left cell, an orchestrator 'O' collaborates with a business partner 'B', providing complementary resources or capabilities. Only jointly they can provide a product-service to their customer 'C'. For example, Company (O) sells baggage handling systems to international airports (C), combined with staff operational services by baggage handler companies (B).
- 4) The typology O-nB-nC-E combines quadrant 2 and 3, representing a complex ecosystem in which the orchestrator engages several actors 'B', serving several customers 'C' throughout its value chain. An example is a *Door-to-Door* baggage handling service by a start-up company (O) providing to an airline (C) the digital platform to manage the necessary data transactions, offering the baggage-as-a-service to an end-user (E), operated by a parcel courier (B).

## 5. THEORETICAL AND PRACTICAL CONTRIBUTIONS

Servitization is a field undergoing a significant change. This paper explores design interventions to initiate a strategic change towards resilient organizations and extracts some implications for the servitization literature and strategic design literature.

Moreover, it contributes to the field of practice to guide *overarching servitization* design interventions.

First, we developed overarching servitization design interventions, manifested by sequential workshops; companies can conceive a servitization strategy, focussing on value co-creation with the ecosystem partners and customers and update it annually. We set up workshops in a way that participants can develop strategies on different organizational levels or divisions.

Second, the servitization ecosystem framework, classifying and mapping product-service systems' typology, helps B2B manufacturers evaluate their product-service value propositions and compare those with competing companies. The framework is a tool to identify servitization practices in the current business domain and explore future business domains opportunities. It provides a classification of the offered value propositions on a scale of system complexity, indicating the degree of servitization resilience maturity by a degree of partners collaborating in a business domain.

Third, the strategic design method fosters an *outside-in* strategic DT and UX approach among the workshops' participants. Previous research showed that the B2B manufacturing industry tends to think inside-out, staying in its current comfort zone and building forth on its business legacy (Bluemink et al., 2020; Bustinza et al., 2015; Price et al., 2019)

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