VALUE CO-CREATION THROUGH DIGITALISATION: FROM A MICRO-LEVEL TO A MESO-LEVEL APPROACH

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This study identifies micro-to-meso level hindrances for value cocreation through digitalisation at port operations. Digitalisation in ports faces significant challenges due to complex, interdependent actor relationships. This study explores how micro-level hindrances affect meso-level value co-creation in a port digitalisation context. Based on an explorative case study of a RoPax port digitalisation project, we identified hindrances across levels could constrain and interdepend on each other. Micro-level hindrances within an organisation, such as – lack of digitalisation leads, limited operational data, outdated digital infrastructure and security concerns – could reinforce six hindrances on meso-level: 1) unaware co-creators, 2) lack of collective leadership for digitalisation, 3) limited data accessibility, 4) low inter-organisational resource compatibility, 5) misaligned or misunderstood value co-creation targets, 6) resistant to change. DOI https://doi.org/ 10.18690/um.fov.4.2025.12

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1 Introduction

With technological advancements, inter-organisational value co-creation has become more complex. Research on value co-creation enabled by information technology calls for going beyond dyadic relationships; co-creators range from customer and user, to digital solution provider, smart objects and partners (Zhang et al., 2024). This study follows Burton et al. (2024), focusing on two levels for value co-creation: micro- and meso-levels. Micro-level refers to the context where an actor, such as an organisation or company, can fully control the context and resources within its organisation, co-creating value focusing on its customers' needs. Meso-level goes beyond organisational boundaries, involving numerous direct value co-creating dyads between two actors, because an actor can be in several dyadic relationships simultaneously. Given the distinction, we address the research question: what microlevel hindrances affect value co-creation through digitalisation at the meso-level?

Digital technologies decentralise business roles (Vial, 2019), and value co-creation requires the collective coordination of multiple actors. However, studies on digitalisation's impact on value co-creation remained on specific activities, capabilities and resources (Sjödin et al., 2020; Tuunanen et al., 2023), or a single actor (Wieczerzycki et al., 2024). Eggert et al. (2019) encouraged broader examination at the collective level to create superior value. Service-dominant logic (SDL) positions co-created value as the research centre rather than specific actors or exchanged services (Vargo et al., 2020), and value co-creation could happen on diverse levels and for several actors simultaneously.

Transportation drives business activity concentration and significantly influences global trading (Rodrigue, 2024, p. 14). Maritime transportation, in contrast, has been slow in adopting digital technologies and innovations, such as shipping companies and ports are still working in silos within their organisations, remaining on micro-level value co-creation and slow in decision-making (Raza et al., 2023; Sanchez-Gonzalez et al., 2019). As transportation hubs, ports can significantly contribute to maritime transport efficiency and decarbonisation (Zis et al., 2020). However, port digitalisation involves multiple co-creators, resulting in a complex value co-creation process (Haraldson et al., 2021). Advancing port digitalisation requires examining inter-organisational relationships, deepening meso-level understandings and considering further value co-creators in addition to shipping companies. Other

actors, such as the municipality, road transportation companies, and digital solution providers, are also critical for port development. Hence, SDL provides a suitable theoretical lens, as it decentralises inter-organisational service-for-service exchange, where value emerges through multiple-actor interaction (Vargo et al., 2024).

Port digitalisation research explored large container ports, and smaller ports with different traffic profiles may uncover deeper insights into value co-creation mechanisms (Chen et al., 2024). These ports may also reveal unique value co-creation dynamics due to their distinctive organisational setups and localised challenges. Shifting beyond the dyadic firm-customer relationship in value co-creation could enable further digitalisation in ports. Meso-level value co-creation in transport is also becoming recognised as essential for sustainable development (Wieczerzycki et al., 2024). Therefore, we argue that a meso-level approach to value co-creation is necessary to understand critical activities for efficient digitalisation.

An exploratory case study on a RoPax port digitalisation project was designed to address the research question. RoPax ports handle roll-on and roll-off vessels that carry both vehicles and passengers. Our analysis focuses on shifting from microlevel to meso-level value co-creation through participating companies in the focal project, analysing their value co-creation processes and challenges. In total, we identified six meso-level hindrances affected by four micro-level hindrances.

The next section reviews the literature on value co-creation and its relationship with digitalisation. Section 3 details the research design. Section 4 presents the findings and discussion. Research limitations and future research suggestions are discussed in the conclusion.

2 Literature Review

2.1 Contexts for Value

Value is a subjective, relational, and contextual concept (Chandler & Vargo, 2011), formed by perceivers and their relationship with other actors (Eggert et al., 2019). In service-dominant logic (SDL), consumers are also relevant value co-creators (Vargo & Lusch, 2008). This study focuses on the value-in-use due to the nature of the research question, as we aim to understand the phenomenon from a meso-level

and multi-actor perspective. Value-in-use stands for the outcomes of an activity that either facilitates or hinders achieving a goal (Kleinaltenkamp et al., 2022; Macdonald et al., 2016). Context understanding is essential for value-in-use, which consists of "*a set of unique actors with unique reciprocal links among them*" (Chandler & Vargo, 2011, p. 40). Kleinaltenkamp et al. (2022) remarked that value-in-use could serve an individual company or organisation (micro-level) or a collective of them (meso-level).

SDL emphasises that value is co-created by multiple actors rather than a single actor. Value co-creation has its own narrative and process, value co-creators may also be unaware of each other when multiple co-creators are involved (Vargo & Lusch, 2016). Non-participative co-creators may emerge due to unclear expectations, scarce information, or lack of trust (Järvi et al., 2018). Hence, actor engagement is critical for value co-creation, which starts with awareness of co-creators and resource integration (Storbacka et al., 2012). Value co-creation occurs at various aggregation levels (Vargo et al., 2020), defined by the number of involved actors (dyadic or triadic) or the nature of relations, direct or indirect (Burton et al., 2024; Chandler & Vargo, 2011). Understanding the role of other actors in multi-actor configuration is another SDL application (Vargo et al., 2020). Storbacka et al. (2012) proposed a three-phase process for meso-level value co-creation: origination, mobilisation and stabilisation. They also strived that a focal actor should consider micro- and meso-level configurations for purposeful value co-creation.

SDL scholars defined the "micro-level" of value co-creation differently. Chandler & Vargo (2011) referred to the actors involved in exchange activities, where they could control the context and resources for a specific activity. In contrast, Burton et al. (2024) framed their definition within digital service innovation. They conceptualised micro-level within an organisation's departments or business units, where a focal firm has full control over activities and resources. Despite the micro-level within an organisation, we consider the customer or digital solution user to be another value co-creator on this level, and only the provider-customer relationship is focused on this level. Based on the research question, which is related to digitalisation hindrances across micro- and meso-levels. The current study follows Burton et al (2024)'s definition for a clear distinction.

Due to the complex actor relationships in ports, hindrances to value co-creation are diverse. Actor engagement is challenging when interdependent operations require collaboration among multiple, sometimes competing actors (Raza et al., 2023). Hindrances can reinforce each other, creating compounding effects that continuously slow port digitalisation. Thus, identifying and analysing individual hindrances to digitalisation is insufficient for our research question. Instead, hindrances must be contextualised within the co-creation processes.

2.2 Digitalisation and Its Impacts

Digitalisation is the application of digital technologies to society or work (Vial, 2019), which serves as a basis for enabling new ways of working and collaboration (Gong & Ribiere, 2021). The ultimate driver for digitalisation is business performance enhancement and value co-creation. Hence, digitalisation should evolve alongside business development (Porter & Heppelmann, 2014).

Value (co-)creation through digitalisation in an organisation or among two organisations was previously studied (Martinez, 2019; Wieczerzycki et al., 2024). Nevertheless, research on the multilevel impacts of digitalisation-enabled value co-creation is scarce(Zhang et al., 2024). Organisations introduce digital technologies at different paces (Martinez, 2019). By scaling digitalisation across multiple organisations, inter-organisational coordination becomes critical. Empirical studies on digitalisation's impacts on value co-creation are available across diverse fields, including manufacturing (Martinez, 2019), logistics (Michel et al., 2023), and highly traditional food production (Hauke-Lopes et al., 2023).

RoPax shipping gained limited attention compared to other ports, such as container ports (Du et al., 2023). Digitalisation hindrances and drivers were studied in ports (Brunila et al., 2021; Inkinen et al., 2019, 2021) and maritime transport (Sanchez-Gonzalez et al., 2019; Tijan et al., 2021). Common hindrances are: 1) organisational resistance to change (Gerlitz & Meyer, 2021); 2) security concerns (de Langen, 2021; Tijan et al., 2021); 3) outdated management perspectives (Tsvetkova et al., 2021); 4) technical limitations; and 5) resource scarcity. Each port is a unique self-organising system (Watson et al., 2021). Nevertheless, value co-creation through port digitalisation remains unclear, which is the goal of this study.

2.3 Theoretical Framework

This paper positions on the micro-to-meso-level value co-creation, focusing on two aspects: 1) hindrances on both levels, and 2) their interdependences. Drawing from the literature, we categorise hindrances based on the three-phase process of meso-level value co-creation: origination, mobilisation and stabilisation (Storbacka et al., 2012). The definitions of these phases are presented in the following table.

Origination	Mobilisation	Stabilisation	
	Change management process,		
Invention or introduction of a	where value co-creators would	Establishment and acceptance	
new value co-creation process,	communicate, prove and	of pow operation practices	
which would alter the meso-	understand potential barriers	would become the dominant	
level value co-creation	to change, and resources	logia on a mass loval	
structure.	would be mobilised for the	logic on a meso-level.	
	target value co-creation.		

 Table 1: Three-phase Meso-level Value Co-creation Process

 Adopeted from Storbacka et al. (2012)

Figure 1 illustrates the research focus on interdependent hindrances. In the figure, actors A and D are active and engaged co-creators with resource contributions. Actors B and C are identified as co-creators but non-participative due to specific hindrances. These hindrances may be interdependent and reinforcing, further preventing these actors from participating in value co-creation.



Figure 1: Reinforced and interdependent hindrances Source: Own

3 Methodology

This study investigates hindrances and their interdependencies for port digitalisation from a value co-creation lens. Given the limited theoretical and empirical foundations, an exploratory case study was designed. Previous studies on port business changes due to technological drivers also applied this research design (Henríquez et al., 2022). An exploratory study provides first-hand insights into emerging empirical phenomena (Swedberg, 2020). Furthermore, we adopted an abductive approach, iterating between theoretical frameworks and empirical observations to refine our understanding (Dubois & Gadde, 2014). An ongoing, dynamic interaction between theory and fieldwork characterises this research.

A RoPax port upgrading project in the Baltic Region was selected for the case study. The port is situated near the urban area, where RoPax ships are the primary means for the locality to connect with international markets. Low traffic intermodality and high operational sensitivity result in a slow digitalisation pace. The project aimed to improve operational efficiency, reducing environmental and social impacts through digitalisation. Project participants included both incumbent port operations actors in the focal port, such as the port authority, the company that manages the port area, and new entrants (digital solution providers from other industries). Adopting the research question, the units of analysis are value co-creation targets that involve more than two actors, and each actor is at least active in one dyadic value co-creation relationship.

Data collection and analysis were continuously refined and developed in conjunction with fieldwork and theoretical framework development. The process spanned from April 2021 to April 2023, involving semi-structured interviews with project participants and field visits as primary data. Secondary data was sourced from project documentation (project proposals, reports, and presentations). Secondary data provided insight into project participants' businesses and interview structure formulation.

Interview questions included digitalisation opportunities and challenges, and at least two managerial-level representatives from each project participating company were interviewed. Interviewees were selected based on the relevance of their expertise and their involvement within their organisation in the port upgrading project. 13 interviews were conducted, reaching out to 20 individual interviewees. Table 2 presents detailed interviewees' roles. The interviews lasted 60 to 90 minutes and were recorded, transcribed, and documented. Three field visits to the terminals, led by shipping companies, resulted in observation documents.

First, we identified value co-creation targets, such as digitalisation benefits for port operations and individual firms. Next, we pinpointed hindrances that participants faced in advancing digitalisation, which were classified based on the theoretical framework, by answering: 1) to what level does this hindrance belong? , and 2) to what phase of meso-level value (Table 1) does it correspond? Finally, we examined interdependencies between hindrances. To ensure data validity, all project researchers reviewed and cross-checked interview transcriptions. Interviewees also reviewed synthesised memos to prevent misinterpretation. Findings, particularly on port digitalisation hindrances, were compiled into project reports, which participants reviewed, serving as a validation instrument to ensure an unbiased analysis.

Company type	Company type Interviewees' role		N2**
Dout outhoutry	Technical Director, COO, and IT Manager		1
Fort authority	Sales and deputy managing director		1
	IT Manager A (Interview and site visit)		1
	IT Manager A, Captain, and Cargo planner	3	
Shipping	(Interview and site visit)	÷	-
companies	Teminal manager	1	1
	Sales manager	1	1
	Operation manager (Interview and site visit)	1	1
	Resarch leaders	2	1
	CEO and project manager	2	1
Digital solution	CEO	1	1
providers	CEO and Research leader	2	1
	Director and Research leader	2	1
	Research leader	1	1
Total of different interviewees		20	13

Table 2: Interview Data

N1*: Interviewee number per session; N2**: Interview session number.

4 Findings and Discussion

Following the theoretical framework and based on the research data, we identified six meso-level hindrances that are related to four micro-level hindrances for value co-creation in port digitalisation. A description of each meso-level digitalisation hindrance can be found in Table 3.

During the interview, micro-level hindrances were often mentioned together with meso-level hindrances: some are interdependent, while others remain on a microlevel. Hence, to avoid misleading, we present micro-level hindrances relevant for meso-level value co-creation in the current section. These are:

- Lack of digitalisation leads: digitalisation often being treated as short-term projects without dedicated personnel overseeing long-term development. This was mentioned by incumbent port operation-related actors, such as port and shipping companies.
- 2. Limited operational data: some port operations remain analogue, and critical environment data for port digitalisation has never been collected.
- 3. Outdated digital infrastructure: each organisation has their own digitalisation pace. Some are reluctant or do not perceive sufficient value in further digital infrastructure investment.
- 4. Digital security concerns: fears of cybersecurity threats or risks introduced by digitalisation or new digital solutions.

The cross-analysis of interviews provided the tensions between the micro-level and meso-level hindrances. For instance, a new entrant digital solution provider remarked:

"We do not have a clear picture of this business yet and have joined this project to understand better what we can offer and to whom in particular. [...] New data sources are needed as some data is not available (e.g. parking situation at the port area)."

In this case, the meso-level hindrances are limited data accessibility (H3) and low inter-organisational resource compatibility (H4) because they understand the technical part of the solutions but lack knowledge of the meso-level setup. The

micro-level hindrances would be a lack of operational data (at the port), which was confirmed by analysing the port authority's interview.

Phases	Hindrances and description	Description	
Origination	– Unaware co-creators [H1]	Co-creators are unaware of value co-creation opportunities. This may be caused due a lack of digital knowledge in an organisation.	
	 Lack of collective leadership for digitalisation [H2] 	Multi-actor collaboration requires collective leadership from several actors, but they are often reluctant and unmotivated.	
Mobilisation	 Limited data accessibility [H3] 	Data may exist but not be sharable or usable due to security concerns or incompatible inter- organisational systems.	
	 Low inter-organisational resource compatibility [H4] 	Digitalisation requires new resources, such as knowledge, business intelligence or enabling technology. The resource combination between different co-creators may not be compatible or result in an efficient resource combination.	
	 Misaligned or misunderstood value co- creation targets [H5] 	Co-creators do not have aligned value targets or are unable to communicate efficiently.	
Stabilisation	- Resistant to change [H6]	The co-created value could be implemented, but larger-scaled co-creators resist change. Thi could be that they demand further social value co-creation or more aligned interests.	

Table 3: Meso-level Value Co-creation Hindrances

To understand micro-to-meso level hindrance relationships, we further mapped the tension in Table 4. The first column presents meso-level hindrances, and the first row includes the micro-level hindrances. The findings revealed two micro-level hindrances that impact almost all the meso-level aspects: lack of digitalisation leads and security concerns.

As RoPax port digitalisation is still emerging, many co-creators focus on short-term digitalisation projects, working without a strategic digitalisation plan. This was common at the port and shipping companies. Some started to create new positions to adapt to the technological changes – a digitalisation manager – who strategically oversees all the digitalisation-related collaborations. Digital security concerns were also commonly mentioned in the literature (Tijan et al., 2021). Because RoPax ports involve both passenger and vehicle traffic, concerns regarding privacy regulations such as GDPR and image protection of the passengers were mentioned. A balanced

consideration of customer privacy, safety, and efficiency should be carefully designed.

		Micro-level hindrances			
		Lack of	Limited	Outdated	Digital
		digitalisation	operational	digitalisation	security
Meso-level hindrances		leads	data	infrastructure	concerns
	Unaware co-creators [H1]	Х			
	Lack of collective leadership for digitalisation [H2]	Х		Х	Х
	Low data accessibility [H3]		Х		Х
	Low inter-organisational resource compatibility [H4]		Х	Х	Х
	Misaligned or misunderstood value co- creation targets [H5]	Х		Х	Х
	Resistant to change [H6]	Х			Х

Table 4: Micro-to-meso Level Hindrance Relationships

The most independent micro-level hindrance would be limited operational data. Since many may already have established data collection systems, the more challenging aspect is how to exploit value through the collected data and enable data treatment for business intelligence. Nevertheless, if the digital infrastructure is outdated, the actor may have to upgrade first, then start co-creating with other actors. This observation seconds with Storbacka et al. (2012), that the focal actor should consider hindrances from both levels for co-creating value.

Micro-level hindrances, such as lack of digitalisation leads, outdated digital infrastructure and security concerns, were broadly mentioned in the literature (see Section 2.2). These are closely linked to institutional setups, where actors should collaborate and jointly overcome problems like institutional inertia and insufficient leadership support (Tijan et al., 2021).

5 Conclusion

This study explores the interplay among hindrances in value co-creation through digitalisation and their implications for theory and management. Theoretically, the tensions between various port digitalisation hindrances were revealed (Brunila et al., 2021; Inkinen et al., 2019, 2021). By adopting an SDL perspective (Vargo & Lusch,

2016) and phases of meso-level value co-creation (Storbacka et al., 2012), we could understand these hindrances contextually and decentralisedly. Our findings indicate the need for continued research on effective strategies to foster digitalisation in traditionally slow-to-digitalise industries. Managerial implications include addressing these hindrances contextually, for example, by encouraging digital leadership coalitions across the port development community, engaging governments and other relevant stakeholders to incentivise data sharing. Promoting shared platforms and standardised protocols can also aid in this effort. Overall, clear communication and coordinated efforts are essential for overcoming obstacles and facilitating accelerated digitalisation.

This study has several limitations. First, the ongoing nature of the port upgrade in this case means that the value co-creation outcomes are unknown. Further research considering the realised value of co-creation outcomes would be valuable. Second, difficulties in engaging organisations outside the project limit the completeness of the case study analysis, suggesting a need for further investigation into nonparticipative co-creators. Last, we question the generalisability of the study due to the uniqueness of each port. We encourage future research to consider these aspects and further study the research topic within the context of port operation.

References

- Brunila, O. P., Kunnaala-Hyrkki, V., & Inkinen, T. (2021). Hindrances in port digitalization? Identifying problems in adoption and implementation. *European Transport Research Review*, 13(1).
- Burton, J., Story, V. M., Zolkiewski, J., & Nisha, N. (2024). Digital service innovation challenges faced during servitization: a multi-level perspective. In *Journal of Service Management* (Vol. 35, Issue 2, pp. 202–226). Emerald Publishing.
- Chandler, J. D., & Vargo, S. L. (2011). Contextualization and value-in-context: How context frames exchange. *Marketing Theory*, 11(1), 35–49.
- Chen, Y., Tsvetkova, A., Edelman, K., Wahlström, I., Heikkila, M., & Hellström, M. (2024). How does Digitalisation Transform Business Models in Ropax Ports? A Multi-Site Study of Port Authorities. *Journal of International Technology and Information Management*, 32(1), 162–189.
- de Langen, P. W. (2021). Seaports as Clusters of Economic Activities. In International Encyclopedia of Transportation (pp. 310–315). Elsevier.
- Du, Y., Li, C., Wang, T., & Xu, Y. (2023). Special issue on "Smart port and shipping operations" in Maritime Policy & Management. In *Maritime Policy and Management* (Vol. 50, Issue 4, pp. 413– 414). Routledge.
- Dubois, A., & Gadde, L. E. (2014). "Systematic combining"-A decade later. Journal of Business Research, 67(6), 1277–1284.
- Eggert, A., Kleinaltenkamp, M., & Kashyap, V. (2019). Mapping value in business markets: An integrative framework. *Industrial Marketing Management*, 79, 13–20.

- Gerlitz, L., & Meyer, C. (2021). Small and Medium-Sized Ports in the TEN-T Network and Nexus of Europe's Twin Transition: The Way towards Sustainable and Digital Port Service Ecosystems. *Sustainability (Switzerland)*, 13(8), 4386.
- Gong, C., & Ribiere, V. (2021). Developing a unified definition of digital transformation. *Technovation*, *102*.
- Haraldson, S., Lind, M., Breitenbach, S., Croston, J. C., Karlsson, M., & Hirt, G. (2021). The Port as a Set of Socio-technical Systems: A Multi-organisational View. In *Maritime Informatics* (pp. 47– 63).
- Hauke-Lopes, A., Ratajczak-Mrozek, M., & Wieczerzycki, M. (2023). Value co-creation and codestruction in the digital transformation of highly traditional companies. *Journal of Business and Industrial Marketing*, 38(6), 1316–1331.
- Henríquez, R., Martínez de Osés, F. X., & Martínez Marín, J. E. (2022). Technological drivers of seaports' business model innovation: An exploratory case study on the port of Barcelona. *Research in Transportation Business & Management*, 43, 100803.
- Inkinen, T., Helminen, R., & Saarikoski, J. (2019). Port digitalization with open data: Challenges, opportunities, and integrations. *Journal of Open Innovation: Technology, Market, and Complexity*, 5(2).
- Inkinen, T., Helminen, R., & Saarikoski, J. (2021). Technological trajectories and scenarios in seaport digitalization. Research in Transportation Business and Management, 41, 2210–5395.
- Järvi, H., Kähkönen, A. K., & Torvinen, H. (2018). When value co-creation fails: Reasons that lead to value co-destruction. Scandinavian Journal of Management, 34(1), 63–77.
- Kleinaltenkamp, M., Eggert, A., Kashyap, V., & Ulaga, W. (2022). Rethinking customer-perceived value in business markets from an organizational perspective. *Journal of Inter-Organizational Relationships*, 28(1–2), 1–18.
- Macdonald, E. K., Kleinaltenkamp, M., & Wilson, H. N. (2016). How business customers judge solutions: Solution quality and value in use. *Journal of Marketing*, 80(3), 96–120.
- Martinez, F. (2019). Process excellence the key for digitalisation. Business Process Management Journal, 25(7), 1716–1733.
- Michel, S., Bootz, J. P., & Bessouat, J. (2023). Possible futures of crowd logistics for manufacturers: results of a strategic foresight study. *Journal of Business and Industrial Marketing*, 38(10), 2019– 2029.
- Porter, M. E., & Heppelmann, J. E. (2014). How Smart, Connected Products Are Transforming Competition. *Harvard Business Review*, 92(11), 64.
- Raza, Z., Woxenius, J., Vural, C. A., & Lind, M. (2023). Digital transformation of maritime logistics: Exploring trends in the liner shipping segment. *Computers in Industry*, 145.
- Rodrigue, J.-P. (2024). *The Geography of Transport Systems* (6th ed.). Routledge. http://people.hofstra.edu/geotrans.
- Sanchez-Gonzalez, P. L., Díaz-Gutiérrez, D., Leo, T. J., & Núñez-Rivas, L. R. (2019). Toward digitalization of maritime transport? *Sensors*, 19(4).
- Sjödin, D., Parida, V., Kohtamäki, M., & Wincent, J. (2020). An agile co-creation process for digital servitization: A micro-service innovation approach. *Journal of Business Research*, 112, 478–491.
- Storbacka, K., Frow, P., Nenonen, S., & Payne, A. (2012). Designing business models for value cocreation. Review of Marketing Research, 9, 51–78.
- Swedberg, R. (2020). Exploratory research. The Production of Knowledge: Enhancing Progress in Social Science, 2(1), 17–41.
- Tijan, E., Jović, M., Aksentijević, S., & Pucihar, A. (2021). Digital transformation in the maritime transport sector, Technological Forecasting and Social Change, 170, 120879.
- Tsvetkova, A., Gustafsson, M., & Wikström, K. (2021). Digitalizing maritime transport: digital innovation as a catalyzer of sustainable transformation. A Modern Guide to the Digitalization of Infrastructure, 123–148.

- Tuunanen, T., Lumivalo, J., Vartiainen, T., Zhang, Y., & Myers, M. M. (2023). Micro-Level Mechanisms to Support Value Co-Creation for Design of Digital Services. *Journal of Service Research*.
- Vargo, S. L., Fehrer, J. A., Wieland, H., & Nariswari, A. (2024). The nature and fundamental elements of digital service innovation. *Journal of Service Management*, 35(2), 227–252.
- Vargo, S. L., Koskela-Huotari, K., & Vink, J. (2020). Service-Dominant Logic: Foundations and Applications. In E. Bridges & K. Fowler (Eds.), *The Routledge Handbook of Service Research Insights and Ideas* (pp. 3–23). Routledge.
- Vargo, S. L., & Lusch, R. F. (2008). Service-dominant logic: Continuing the evolution. Journal of the Academy of Marketing Science, 36(1), 1–10.
- Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: an extension and update of servicedominant logic. *Journal of the Academy of Marketing Science*, 44(1), 5–23.
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. In *Journal of Strategic Information Systems* (Vol. 28, Issue 2, pp. 118–144). Elsevier B.V.
- Watson, R. T., Lind, M., Liesa, F., & Delmeire, N. (2021). Shipping: A Self-Organising Ecosystem. In Maritime Informatics (Issue 2020, pp. 13–32).
- Wieczerzycki, M., Ratajczak-Mrozek, M., Hauke-Lopes, A., & Colurcio, M. (2024). Value-in-context: co-creation across different context levels in the service ecosystem. *Journal of Business & Industrial Marketing*.
- Zhang, H., Yuan, S., Zhang, F., Wang, B., & Luo, X. (Robert). (2024). A Systematic Literature Review on IT-enabled value Co-creation: Toward an integrative framework. *Computers in Human Behavior*, 152.
- Zis, T. P. V., Psaraftis, H. N., Tillig, F., & Ringsberg, J. W. (2020). Decarbonizing maritime transport: A Ro-Pax case study. *Research in Transportation Business & Management*, 37, 100565.