Developing logistics value propositions: Drawing insights from a distributed manufacturing solution

Abstract

With a focus on supply chains as ecosystems of service exchange, our paper aims to explore how value propositions are developed and evolve via combinations of service innovation. A single longitudinal case study is presented. The units of analysis are different projects along a logistics service provider (LSP)'s innovation journey. The study explores how the case company identified innovation in logistics as a gap and developed a distributed manufacturing strategy with a unique business model involving a reallocation of production functions across a global supply network. Our contribution is two-fold. In terms of theory, we adopt a service-dominant logic perspective to investigate how companies' value propositions evolve over time. In terms of managerial contributions, our paper provides insights into how service providers can strategically integrate their resources with service ecosystem partners to provide competitive business propositions.

Keywords: Innovation; service-dominant logic; value proposition; service ecosystem; logistics innovation

1. Introduction

The immensely challenging conditions which organisations are confronted with nowadays emphasise the need for companies to adapt to the dynamic markets they operate in to sustain long-term competitive advantage. Firms, therefore need to manage value propositions to suit their customers' changing requirements (Green et al., 2017; Lusch & Nambisan, 2015). Recent research envisages value propositions emerging from co-creation processes which require the active involvement of customers, as service beneficiaries, alongside the required supply chain resources and management practices (Breidbach & Maglio, 2016). Hence, service innovation should be seen as a dynamic process involving multiple organisations, across complex supply chains, which need to collaborate in order to create new value propositions and / or to evolve existing ones (Skålén et al., 2014).

Accordingly, there is a need for reconsidering value creation processes, since mutually beneficial value can only be achieved by the acceptance of multiple actors along the supply chain. This is a departure from previous research that focused on value-adding or value-delivery activities to customers, independent of the customer context (Lusch & Nambisan, 2015). Value, it is argued, is created only when the value proposition is accepted by its beneficiaries (e.g. customers) (Baumann et al., 2017). Service innovation should hence be viewed as a set of collaborative efforts aiming to create and develop value propositions (Ballantyne et al., 2011). Adopting this view, four different approaches to service innovation have been previously identified: Adaptation; Resource-based innovation; Practice-based innovation and Combinative innovation (Skålén et al., 2014). Despite the fact that some research has been conducted on service innovation and its impact on firm performance, particularly in a manufacturing context (Cheng & Krumwiede, 2017; Visnjic Kastalli & Van Looy, 2013), few studies have explored how value propositions develop and evolve over time via combinations of different types of service innovation (Frow et al., 2014). Using a service-dominant logic (S-D logic) and a service ecosystem perspective (Pohlmann & Kaartemo, 2017; Vargo et al., 2015; Vargo & Lusch, 2004), our study aims to fill this gap. It explores how service providers' value propositions develop and evolve based on interactions within their given service ecosystem via combinations of different types of service innovation.

Therefore, the main research question guiding this paper is:

How do companies' value propositions evolve over time via different types of service innovation?

To investigate the research question, we use a longitudinal case study of a global logistics service provider (LSP), LogCom. The logistics sector has been argued to suffer through a lack of innovation, and insights into how logistics companies sustain their competitive advantage through introducing innovation are particularly valuable (da Mota Pedrosa et al., 2015; Wagner, 2008). As argued by Tokman and Beitelspacher (2011) the mainstream focus of LSPs is on value adding activities that enhance the transactional value of products being sold. This view is rooted in a good-dominant logic (G-D logic) that value is attached to economic exchange (Vargo et al., 2015). Confronting the traditional approach to innovation that LSPs had been characterised as adopting before (Chapman et al., 2003; Flint et al., 2005; Grawe, 2009), the S-D logic could lead to a shift toward proactively managing the innovation process in different service ecosystem settings (Yazdanparast et al., 2010).

Our study contributes to theory in two ways. First, it extends existing theory on how value propositions can evolve in a service ecosystem via combinations of different types of service innovation. It highlights that a successful radical service innovation strategy needs to be supported by substantially changed resources and practices. It also emphasises that radical innovation can require a re-allocation of the roles performed by partners within a supply chain. Second, by adopting a service ecosystem perspective on innovation, our study highlights the importance of considering interactions both within and between two levels: Micro-level (service encounters) and meso- level (organisations) and calls for a more balanced view on the role of focal actors within a service ecosystem. The paper is structured as follows: Section 2 summarises the theoretical underpinning of our study, and provides a brief introduction to the logistics sector and the need for it to accelerate the adoption of service innovation; Section 3 highlights the research methods employed; Section 4 summarises our main findings, while

Section 5 highlights our study's main conclusions, contributions to theory and managerial implications.

2. Theoretical background

2.1. A service-dominant logic perspective on innovation

The era of the service economy has prompted both practitioners and academia to identify the elements of service innovation that are essential to a firm's competitive advantage (Spohrer, 2017). However, research on service innovation is in its infancy (Chester Goduscheit & Faullant, 2018). To understand the basic assumptions of service innovation, three different perspectives have been identified by Coombs and Miles (2000): (1) an assimilation approach, which argues service innovation is similar to product innovation; (2) a demarcation approach, which treats service innovation fundamentally different from product innovation regarding its nature and character; (3) a synthesis perspective, which criticises both perspectives and calls an integrative approach to connect product and service innovation. Theories of service innovation from a synthesis perspective reflect a shift from a G-D logic to a S-D logic (Maglio & Spohrer, 2008). In other words, the synthesis perspective starts to more clearly emphasise the value perspective. According to S-D logic, a firm's ability to develop and create service innovation depends upon its operant resources (e.g. potential useful knowledge or skills), and value is always co-created by multiple actors. The fundamental work of Vargo and Lusch (2004) led to the development of eleven foundational premises (FPs) for S-D logic (see Table 1 below), which were further updated and consolidated into a set of five axioms (highlighted in bold in Table 1) (Vargo & Lusch, 2016).

Foundational Premise	Vargo and Lusch (2016)	Axiom Status
FP1	**Service is the fundamental basis of exchange**	1
FP2	Indirect exchange masks the fundamental basis of exchange	
FP3	Goods are distribution mechanisms for service provision	
FP4	Operant resources are the fundamental source of strategic benefit	
FP5	All economies are service economies	
FP6	**Value is co-created by multiple actors, always including the beneficiary**	2
FP7	Actors cannot deliver value but can participate in the creation and offering of value propositions	
FP8	A service-centered view is inherently beneficiary oriented and relational	
FP9	**All social and economic actors are resource integrators**	3
FP10	**Value is always uniquely and phenomenologically determined by the beneficiary**	4
FP11	**Value co-creation is coordinated through actor-generated institutions and institutional arrangements**	5

Table 1. Service-dominant logic foundational premises and axiom statuses (based on Vargo & Lusch, 2016).

Recent service innovation studies adopting the S-D logic as the guiding theoretical framework aimed to enhance the understanding of firms' value propositions (Skålén et al., 2014). This led to calls for a change in perspective, from a focus on innovative *output* (e.g. products, solutions), to a focus on the innovation *process* involved in bringing suppliers, customers and other organisations together in order to provide more efficient and effective innovative service offerings (Lusch, 2011). Skålén et al. (2014) thus defined service innovation as a formulised set of activities aimed at integrating resources into value propositions. Therefore, *service innovation* should be viewed as "…*creating new or developing existing value propositions by creating new or developing existing practices and/or resources, or by integrating existing practices and resources in new ways*" (Skålén et al., 2014, p. 154). Four types of service innovation are suggested by Skålén et al. (2014) as a result (Table 2).

1. Adaptation: A firm's existing or slightly developed operant and operand resources are integrated in new ways into existing or slightly developed practices. The scope of innovation is thus modest, as is the modification of the value propositions.
2. Resource-based innovation: New resources are integrated into existing or slightly changed practices. A new value proposition is thus created, or an existing one developed, through the implementation of new operant and/or operand resources.
3. Practice-based innovation: Existing or slightly changed resources are integrated in new practices;
4. Combinative service innovation: New operant and/or operand resources are integrated into new practices, something which radically develops an existing value proposition or creates a new one.

	Resources	
Practices	**Existing (slightly modified)**	**New (substantial changed)**
Existing (slightly modified)	1. Adaptation	2. Resource-based innovation
New (substantial changed)	3. Practice-based innovation	4. Combinative innovation

Table 2. Four types of service innovation (Skålén et al., 2014)

However, despite the fact that new theory is emerging in order to better understand and categorise service innovation (see for example Chakkol et al., 2014; Skålén et al., 2014), the literature addressing the innovation process itself, particularly in terms of how a firm's value propositions develop and evolve over time via combinations of different types of service innovation is limited and lacks empirical insights. Our study aims to contribute to filling these

gaps. The logistics industry is used as context for our study, for the reasons outlined in the following sections.

2.2. Innovation in the logistics service industry

Logistics activities, often performed by specialist providers, lie at the centre of the modern physical economy. Fundamentally, LSPs facilitate warehousing and distribution connections between suppliers and customers, performing value-adding activities across material and information flows (Chapman et al., 2003). Logistics provision has been required to evolve significantly, from a predominantly cost reduction role to a more sophisticated service, delivering a broader set of values through which companies gain competitive advantage (Busse & Wallenburg, 2014; da Mota Pedrosa et al., 2015). New market and technological forces have accelerated the shift from a 'supply chain' perspective, with a focus on efficient material flows, to a 'demand network' perspective which puts customer value creation at the core of all transformative activities performed across complex value systems. This approach has led to calls for better understanding the role of LSPs and their approaches to innovation in the value creation process (Busse & Wallenburg, 2011; Christopher & Ryals, 2014; Lusch, 2011). It allows researchers to focus on the performance of a service system as a whole (Breidbach & Maglio, 2016), and to move from viewing logistics innovations as an output, to considering innovation as a dynamic process to achieve sustainable competitiveness.

The consequent implications for logistics provision have been considerable. LSPs have needed to adapt to the dynamic markets they operate in if they want to continuously meet customer needs and better serve themselves and societies they operate within. Any organisation with a

static strategy for their supply chain logistics will quickly fall behind in this fast-changing environment. Hence, it is essential for LSPs to identify any problems and barriers to innovation and to provide on-going, novel solutions (Busse & Wallenburg, 2011) despite the invariably outsourced nature of LSP work, with a characterising emphasis on winning and executing contracts. This high, relatively short-term, customer dependency resulted in several barriers for LSPs being innovative, including price pressure, the preference for reactive innovation in responding to customer's immediate needs and the narrowed innovation opportunities in finding new customers (Busse & Wallenburg, 2014; Flint et al., 2005; Oke, 2008). Meyer-Larsen et al. (2015) citing Wagner (2008) noted that, "…research shows that other industries spend from 4.8% to 17.8% of their turnover on research and innovation, compared to only 1.1% for the transport industry". Combined with the decentralised structure of logistics organisations and a lack of a clear definition of logistics innovation, the whole logistics provision sector was arguably suffering from a consequential lack of innovation (Busse & Wallenburg, 2011).

However, LSPs are ostensibly well-positioned in the supply chain for effective innovation to occur. For instance, as LSPs play a critical role in coordinating material and information flows they have insights into complex networks and are well positioned to identify opportunities for enhancing customer value(Flint et al., 2008; Wagner, 2008). In this quest, logistics companies also benefit from their role of serving consumers directly. Customer loyalty and competitive advantage can thus be achieved by these "customer-oriented" and "proactive improvement" measures (Grawe et al., 2009; Rajahonka & Bask, 2016; Wallenburg, 2009). More specifically, LSPs have deeply integrated systems with their customers, and the resulting strong

partnerships and high levels of trust have been identified as the most important resources for joint innovation to occur (Flint et al., 2005; Wagner & Sutter, 2012).

2.3. Examining logistics innovations through S-D logic and service ecosystem lenses

Overall, the above studies outline that research attention shifts from a focus on the value adding activities of logistics innovations to the *process* of proactively managing the innovation in a supply chain (Lusch, 2011). This reflects a systems approach, where resources are heterogeneously distributed between firms across the supply chain (Eisenhardt & Martin, 2000) and no single entity can thus hold all the resources required to manage value creation activities (Lusch, 2011; Zhang et al., 2016). Following the S-D logic, Lusch (2011) proposed a value network perspective referred to as a service ecosystem. The service ecosystem concept builds upon S-D logic, which emphasises the shared institutional arrangements of value co-creation and service exchange activities (Axiom 5) (Vargo & Lusch, 2016). It consists of multiple levels – micro (e.g. service encounters), meso (e.g. organisations) and macro (e.g. societal) (Akaka & Vargo, 2014; Vargo et al., 2015), where actors in a service collaboratively participate in: (1) co-production of service offerings, (2) service exchange, (3) value co-creation (Flint et al., 2014; Tokman & Beitelspacher, 2011).

Using a S-D logic and service ecosystem view, the logistics firms should be viewed as resource integrators across complex value delivering networks (Cui & Hertz, 2011), who are well positioned to identify new opportunities for enhancing the performance of a service ecosystem (Vargo et al., 2015). Value propositions should thus be (re)generated in a service ecosystem with the development of resources (e.g. technology) (Rayna et al., 2015) and the way customers perceive and interpret value (Reypens et al., 2016) using different network

configurations (Tokman & Beitelspacher, 2011). As such, logistics service providers can be the partners in creating mutual value proposition in order to provide opportunities for value co-creation (Beirão et al., 2017; Yazdanparast et al., 2010). According to Lusch et al. (2016), the relevant service ecosystem and its boundaries have to be determined since there is no fixed boundary of a service ecosystem. In our study, we identify the dyadic relationship between the focal firm and its customers as the *micro level*, organisations (such as research institutes, technology providers, and other partners) as the *meso level*, while societal actors (such as final consumers) as the *macro level*. The focus of our article is on the micro and meso levels of a service ecosystem, as captured in the conceptual framework presented in Figure 1, which is used to guide our case study.

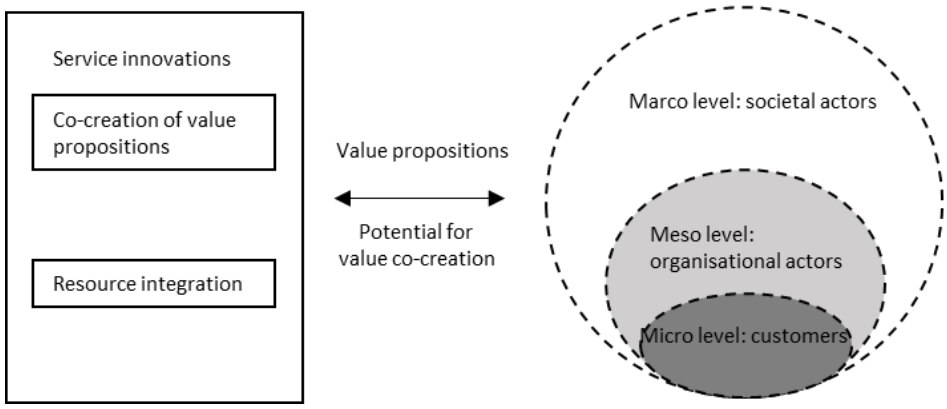

Figure 1. A conceptual framework for data collection

3. Research design

A single primary longitudinal case study approach is adopted to achieve the research aim. The use of a single case study in this context is consistent with previous literature, which has relied on single cases for maximising learning about similarly complex phenomena where prior

knowledge was limited (Beer & Micheli, 2017; Naor et al., 2015; Pellinen et al., 2016). The study was conducted between 2011 - 2017 with a leading global LSP. It sought to explore what challenges to being innovative did the LSP initially perceive, and to examine how the firm has confronted these challenges, incorporating an innovation strategy into their overall business proposition. The chosen LSP differentiated itself in having innovation at the heart of its long-term strategy.

An abductive research process was followed (Purvis et al., 2014), as suggested by Kovács and Spens (2005). Taylor et al. (2002) highlight that the abductive approach stems from the insight that most great advances in science neither followed the pattern of pure deduction nor of pure induction. Abductive reasoning emphasizes the search for suitable theories to an empirical observation, which Dubois and Gadde (2002) call "theory matching" or "systematic combining". This search starts with an attempt to find a new matching framework or to extend the theory used prior to this observation. The aim of this process is to understand the new phenomenon (Alvesson & Sköldberg, 2000) and to suggest new theory.

As shown in Figure 2, the initial interest is to examine how the case company overcame the potential barriers to become more proactive in developing innovation strategies, and how this compares to the established logistics innovation literature (Stage 1). However, during the research process it became clear that previous logistics innovation research had not adequately covered the broader actors and the evolvement of innovation strategies within this service ecosystem. Based on these earlier findings, a S-D logic was adopted in order to better understand the innovation journey of the focal company, which was the second stage of our empirical investigation. This enabled us to suggest new theory in Stage 3 of the research.

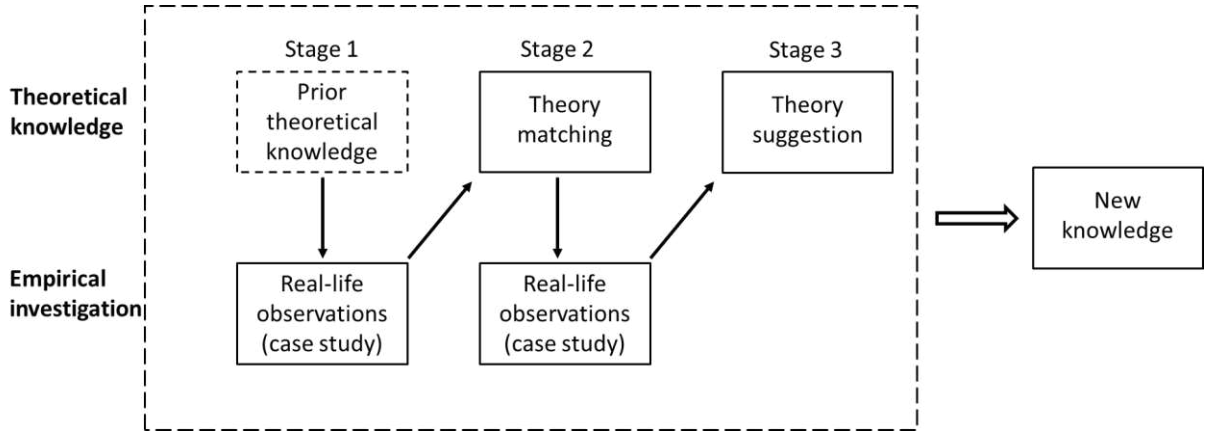

Figure 2. The abductive research process (adapted from Kovács and Spens, 2005)

The design of this research is a single longitudinal case with embedded units, and each research unit represents an innovation project, which allows us to analyse data within each unit and across the units, while achieving depth and detail in the investigation. It also allowed us to capture in detail the context surrounding the phenomenon (Barratt et al., 2011). Moreover, Roehrich et al. (2017) highlight that single cases are appropriate when an 'extreme' case is observed, where the phenomenon of interest (service innovation) has a high degree of visibility (through the company's competitive strategy) and which offers ample opportunities to gain complex insights into real life situations (Eisenhardt, 1989) and learn (Binder & Edwards, 2010; Stake, 2010). Second, the longitudinal design provided us with an opportunity to investigate each innovation project in its shared context within a given time range. It also helps to examine how the case company has developed its value propositions within its service ecosystem (Chakkol et al., 2014), capturing the dynamics and complexities of the involved interactions and developments over time (Hald & Mouritsen, 2018; Smith et al., 1995). In addition, due to the purpose of this research, the investigation is not about making

comparisons between these research units. Rather, we capture these innovation projects under a co-evolutionary view of the company's overall innovation strategy (Dubois & Gadde, 2002). We examine both the micro- and meso-levels of the service ecosystem, which required us to include service encounters (between the focal company and its customers) and external organisations (in our case, a research partner of the LSP and a technology provider). Thus, the major rationale for selecting the case study was to gain insights into the company's journey of service innovation from its very early stages.

Conducting a theory-building case study requires the same rigour as any scientific research. According to Meredith (1998), controlled observation, controlled logic of reasoning and replicability is required from a case study. Data collection methods employed in the current study involved unstructured interviews and verbal narratives, presentations, documentation and archival records in order to capture the company's journey towards developing an innovative logistics solution over the period 2011 - 2017. Eleven respondents were selected from the company (see Table 3), in order to obtain a broader view of the phenomenon under investigation. The criteria for selection were their area of responsibility, as well as their knowledge of the projects and expertise in the area. Each discussion lasted from 30 minutes to 4 hours. The interviews were unstructured, in accordance with the highly exploratory nature of the study (Eisenhardt, 1989; Meredith et al., 1989), and were aimed at understanding how new solutions were developed and implemented, as well as any perceived benefits and limitations. In some instances, follow-up interviews were also conducted to get a deeper insight into certain aspects and to resolve any ambiguities. Primary data collected through interviews was supplemented with secondary data, such as company reports and various internal and external communications, to enable triangulation of the findings and

enhance the credibility of the study (Patton, 2002; Yin, 2003). To establish internal validity, over 40 interviews were conducted in total over the 6 years period, as well as collecting internal documents and numerous public documents (website, annual reports, brochures) as supportive materials to the claims and actions of the stakeholders (Eisenhardt & Graebner, 2007).

Number	Position	Date of interview / Interview duration (hrs)
1	Business and Market Coordinator	2015 (2), 2016 (1.5)
2	Chairman of the Board of Directors	2017 (1)
3	Research Leader, Chair of University Research Centre	2014 (1), 2015 (2), 2016 (1), 2017 (1.5)
4	Corporate Optimization and Analytics Manager	2014 (0.5), 2015 (1), 2016 (0.5), 2017 (2)
5	Global Head of Logistics and Manufacturing	2011(1), 2012 (1), 2014 (1.5), 2015 (4), 2016 (3)
6	Global Head of Logistics Solutions	2014 (1)
7	Global Head of Strategy and Innovation	Twice Annually, 2012-2017 (0.5)
8	Global Head of Supply Chain Solutions	2014 (2)
9	Global Key Account Manager	2012 (1), 2014 (1), 2015 (3), 2017 (1)
10	Logistics Manufacturing Services Analyst (A)	2014 (1), 2015 (1), 2016 (1), 2017 (1)
11	Logistics Manufacturing Services Analyst (B)	2016 (1), 2017 (1)
Secondary data sources		**Number**
Press articles		11
Annual reports and press releases		26
Company presentations		18
Internal documents		41

Table 3. Interview participants and secondary data sources

The use of multiple sources of evidence allowed us to apply triangulation in order to reduce bias, enhance construct validity and improve convergent validity (Denzin, 1978; Eisenhardt, 1989; Yin, 2003). Data analysis employed open, axial and selective coding analysis, in accordance with Miles & Hubermen (1994) and Strauss & Corbin (1998). To ensure further reliability of the data, drafts were presented to the interviewees and fed back to the company,

as well as industry experts, through a series of presentations. Näslund et al. (2010) argue that project reviews of this type are important in order to substantiate the findings. Such joint reflections of the individuals in the system studied by the researchers are likely to enhance understanding and take the learning forward – for both the research and the organization. The views of multiple investigators were compared to validate empirical evidence and findings from our case study. When different interpretations between researchers were met, additional rounds of analysis were ran in order to analyse the material and discuss the findings until all researchers shared the same understanding. For reliability and traceability of findings, the first researcher kept a daily journal in which notes were actively taken throughout the data collection process (Voss et al., 2002). A case database was also constructed at the beginning of the research process, where all documents, notes and interview transcripts were stored and labelled (Beer & Micheli, 2017). The longitudinal nature of the study further improved the credibility of the data collected by providing within-case replication. For example, case findings were written after each stage of data collection and presented to members of the management team and their feedback informed subsequent data collection and analysis.

Open coding was first employed to organize the vast amount of data collected into higher-level concepts (these were captured under the codes *Service Offering; Value Proposition; Resource Integration; Potential for Co-creation – see Table 5*). A repeated comparison process helped integrate new interview data with previous observations and interactions. The second step involved identification of trends and themes in the collected data. This step is often referred to as pattern coding (Miles & Hubermen, 1994) or axial coding (Ellram, 1996), which enabled the authors to identify "common threads" in the interviews. Considering the longitudinal nature of the case, data analysis took place in parallel to data collection and, as

common threads began to emerge, they were compared with the rest of the already transcribed interviews (Kembro & Selviaridis, 2015). As a result, insights from the conducted interviews were brought up in the remaining interviews to receive additional comments in order to confirm or contest a common thread. This was an iterative process, where the analysis began simultaneously with the gathering of the data, and continued throughout the data collection process and beyond (Ellram, 1996). Table 4 presents a sample of the coding process followed. Other final codes that were selected include (alongside *Value Proposition) Service Offering*, *Resource Integration*, *Potential for Co-creation*, *Operant Resources*, *Operand Resources*.

Raw data	**Preliminary codes**	**Final code**
"We experience increasing demand for personalized products and a movement away from globalization to localization, shorter lead-times and an increasing number of smaller shipments; so our own ability to innovate and bring new products and services to market is key to our long-term value creation".	Customised manufacturing process Geographical closeness to customer	Combinative innovation
"we receive the components from the supplier, and store the components by [Logcom]'s facilities; we assemble the	From logistics service to manufacturing activities Adding value activities in the services portfolio	Resource integration

components into the final product and send to the customer, but also in some cases we wanted to do installation as well".		

Table 4. Sample coding

4. Findings

LogCom's history is built on its expertise in international freight forwarding services, particularly air, but also ocean freight services. The company employs around 16,000 people worldwide, operates a global network with over 500 offices in more than 80 countries and works with partner companies in a further 80 countries. In 2011, the company decided to add logistics services to this. However, they recognised that simply introducing a new logistics offering into an already crowded and competitive market would not guarantee success. Subsequently, before launching the new service, LogCom decided to invest time to identify and develop innovative approaches, looking for ways the company could differentiate itself from existing players in the logistics service provision market and identify niches that offered the opportunity to target higher margin business opportunities. To identify different phases of innovation development, we adopted Toivonen and Tuominen (2009, p.893)'s definition of service innovation: "a new service or such a renewal of an existing service which is put into practice and which provides benefit to the organisation that has developed it." In this manner, we define newness as new to the firm - as a traditional freight forwarder, the creation of new logistics services is often relevant to how existing resources (e.g. warehouses, transport

network, skills and knowledge) are deployed and developed, and how new resources and capabilities can be integrated (Chester Goduscheit & Faullant, 2018; Witell et al., 2016). Our preliminary analysis thus identified two key development phases (2011-2014 and 2015-2017) of the newly proposed logistics solutions, and one transition phase (2013-2015). These three solutions played integral parts in the company's new distributed manufacturing service, and they provide an empirical lens on the evolving nature of value propositions, resource integration activities, and value network reconfigurations through the innovation journey of LogCom.

4.1. The distributed manufacturing solution (2011-2014)

The first period of this innovative solution development was initiated by several questions raised by the company at the time: Is it possible to integrate into customers' manufacturing processes?; How can inventory velocity be improved?; and How can production be moved closer to customers?

> *"Logistics or 'Contract Logistics' is now a commodity and basic logistics functions which were once seen as specialised are also commoditizing... The opportunity we identified was to move our services further along the value chain" (Global Head of Logistics and Manufacturing, LogCom).*

LogCom developed a series of approaches to help address these questions, and these activities have been implemented with one of its customers in the telecommunications industry. The distributed manufacturing service allowed its customer to relocate and postpone part of their manufacturing processes originally conducted in China until the order fulfilment process took

place in various other countries, such as Brazil and UAE (Dubai), significantly reducing lead times and allowing last-minute software customisation, immediately prior to customer delivery. In this distributed manufacturing solution, the value proposition of a reduction in lead-time was achieved by postponing the final aspects of the manufacturing process, with LogCom conducting final assembly processes closer to the final customers, using its own pre-existing logistics facilities. However, at the very beginning, the company could not articulate exactly what the logistics strategy would be, or what resources and practices it would need to adopt. In doing so, LogCom featured a number of actions to support this different approach and created a fresh knowledge bank and attitude for the new logistics business, which included 1) the recruitment of a senior executive to lead the new logistics business, 2) the recruitment of manufacturing specialists, 3) the creation of a new mind set with a fresh focus on the role a logistics provider could play in the electronics supply chain:

> *"A company recruit […] had manufacturing background; he entered the company in order to improve the logistics operations… so what he tried to do is to improve the assets velocity… in our case, the warehouse. What we are going to do is instead of having our warehouse full of products for a long period of time, we need to increase the turnover… this could help us to improve the profitability" (Logistics Manufacturing Services Analyst A, LogCom).*

The company followed the strategy of integrating upstream in the supply chain by developing manufacturing capabilities in response to the existing customer's demand and also, in order to differentiate from the traditional logistics operation, which focused on the pick, pack and send of products to customers. These actions reflected that both LogCom and its customer

were both resource integrators and benefited from the service exchange (Edvardsson et al., 2011). From LogCom's view, participating in customer's manufacturing process meant that the company had to have the knowledge and ability to reconfigure the orders from the customer. According to one of their research analysts:

> *"… Now the lead time is reduced to 8 weeks or so (it used to be 24 weeks previously), so it is a massive reduction in lead time… That reduction in lead time is the major factor in the success of this new service (Logistics Manufacturing Services Analyst B, LogCom)".*

In conclusion, by developing this new value proposition as a *Combinative Innova*tion type (Skålén et al., 2014), which required new practices as well as new resources to be embedded in the new manufacturing strategy adopted, the customer further benefited from the integration of LogCom's manufacturing resources through better cash flow and an ability to introduce a wider range of products with smaller inventory to satisfy the demand from end consumers faster in local markets. Specifically, customer loyalty had also increased since the service was launched in 2014:

> *"… the customer became more dependent on LogCom… they cannot easily change the service provider, because we have people now into their operations and know the way they and their supply chain work" (Logistics Manufacturing Services Analyst A, LogCom).*

4.2. The On-Demand Forecasting solution (2013-2015)

The second period was identified as a transition phase, as it triggered more research thoughts and ideas that led to a further evolution in LogCom's service offerings. The forecasting project conducted by LogCom during this period was in collaboration with an external academic partner, thus, the identified value proposition was co-created without direct customer involvement; instead, it was initiated from a research project and accepted by LogCom as a potential solution, which further developed its existing value proposition for its customers:

> *"…the way it works is that the collaboration is supposed to be beneficial in both ways… we started a knowledge exchange [programme] from the university to LogCom… [LogCom] helped us to identify the relevant research questions that we tried to address." (Research Leader, Chair of University Research Centre)*

This new solution featured a 'demand-based forecasting and inventory planning' approach, which proactively helped LogCom's customers to reduce their inventory holding costs and balance their inventory levels throughout the supply chain. This *Practice-based Innovation* type required existing resources to be embedded with new practices in order to develop a new value proposition. The goal was to be able to understand customers' actions and to be 'truly customer centric', as the forecasting approach was largely dependent on how far customer data could be accessed and the quality of the data. More importantly, this innovation project was crucial for value proposition development in the next stage, because the research partner had been considered as a strategic resource for further service provision (Vargo, 2009). As indicated by a research analyst:

"… LogCom had a [research project] previously… and it was a forecasting and inventory management solution, which was developed by [Research Analyst's name], and during this there was a question raised by [Researcher's name, University Partner], she mentioned: have you considered additive manufacturing? Also, a customer was pushing LogCom for customised glasses. LogCom couldn't do that at that moment [and] that was how the project started" (Logistics Manufacturing Services Analyst B, LogCom).

4.3. The additive manufacturing solution (2015-now)

In the third period, after identifying additive manufacturing as an opportunity to integrate further into its customers' supply chains and better manage inventory levels, as well as an important complement to LogCom's manufacturing strategy, the company purchased its first 3D printer in 2015. However, the company had no prior knowledge of the technology before they started the project, and it was considered as the biggest challenge to LogCom due to the difficulties of changing mindsets of people who worked in logistics industry:

"… we have got to get the outside view out of companies of our industry, logistics is a very introvert industry… so really working with [Research University] and [Technology Provider], they see the world completely different to our world " (Global Head of Strategy and Innovation, LogCom).

The initial idea of an additive manufacturing service was to install 3D printers in LogCom's warehouses, which would help their customers meet consumer demand by printing products closer to final markets. In 2016, LogCom established a strategic relationship with a world-

leading additive manufacturing provider (3dCom), and continued the research partnership with the partner university. This collaboration provided the company with a great opportunity to identify the potential products that could be produced using additive manufacturing, and to learn how to customise the products at the latest possible stage of the supply chain. The partnership allowed LogCom to access 3dCom's network, which helped them better understand the additive manufacturing market. More specifically, the partnership helped LogCom learn the operational aspects of additive manufacturing process, for example: the installation and maintenance of 3D printers, how to control the inventory for raw materials, and the whole printing and finishing process. The main benefit of the collaborative project was that an ability has been developed by LogCom to implement, operate and maintain the machine, and the company became a certified provider of additive manufacturing services. The partnership between LogCom, 3dCom and the academic partner allowed the utilisation of knowledge and skills among the actors in the service ecosystem to co-create a service offering (Tokman & Beitelspacher, 2011). As noted by the interviewee:

> *"…LogCom collaborates with [Research University] to acquire some experience with additive manufacturing and to develop analytical tools which we need, in order to start to sell additive manufacturing services to customers" (Logistics Manufacturing Services Analyst A, LogCom).*

Overall, developing this new value proposition as a Combinative Innovation type, required new practices as well as new resources to be embedded in the new manufacturing strategy adopted. In addition, several factors that resulted in modifying the customer value proposition during the project implementation were identified throughout the study. These factors could

be considered as both barriers for the service offering development, and opportunities for creating new practices to fit into the whole manufacturing strategy. For instance, the main barriers for the adoption of additive manufacturing technology identified by LogCom were: 1) Legal copyright issues ("[we] *did not realise until we started to do it… it makes it very difficult to navigate the legal arena*" (Global Head of Strategy and Innovation, LogCom). 2) The initial cost of additive manufacturing investment (because the technology was changing rapidly, "… *every month there are new 3D printers come into the market; with one technology you cannot print everything"* (Logistics Manufacturing Services Analyst A, LogCom). In consequence, LogCom decided to outsource additive manufacturing to maintain its asset-light nature alongside this newly developed value stream. More specifically, this decision helped the company to manage certain legal issues. For example, the manufacturing process was moved to well-established partners with much more knowledge of the technology. This outsourcing approach also helped the company to better understand and manage the interface between its suppliers and customers, which is now perceived as one of its major competitive advantages.

In sum, the innovation journey of LogCom showed that the company continuously developed its value proposition through resource integration activities with different actors in the service ecosystem, with various outcomes. Subsequent innovation projects resulted from an initial collaboration with the telecom company that targeted the development of a new value proposition. By 2017, the company was reporting a rise in profit across its global operations by 9.89% and an increase in net forwarding revenue by 6.48%, the highest improvement on its financial figures for the past decade. The changes highlighted above emphasise that, in the newly distributed manufacturing strategy, LogCom was perceived as better positioned to

manage decentralised, final assembly activities in the local consumer markets than the original equipment manufacturer itself. This implies a shift away from the customer managing an in-house globally centralised manufacturing activity to a more locally distributed manufacturing model. The new model enabled LogCom to develop their services into more lucrative, longer lasting business relations with their customer, as they begun to carry out some additional value creation activities. The details of the value proposition development, including resource integration and potential value co-creation activities are summarised in Table 5, based on Skålén et al. (2014). These will be further discussed in the following section.

Service offering	**Value proposition**	**Resource integration**	**Potential for co-creation**
Distributed manufacturing service	Combinative innovation: a customised manufacturing process closer to the final customer	-Warehouse and transport network. -Recruitment of new staff with electronic manufacturing background. -Participation in product design and manufacturing stage.	-Customer provides the specific products that allow LogCom to take a part of manufacturing role to meet the demand of final consumers. -Repair, restocking, and recycling of the products.
On-demand forecasting service	Practice-based innovation: Inventory management from a customer-centric view	-Strategic partnership with a university to facilitate a fundamental forecasting study. -Working closely with	-Customer provides the supply chain data. -A better understanding of its customer's needs and balancing its inventory

		customers and available supply chain data.	levels through the supply chain.
Additive manufacturing service	Combinative innovation: on-demand production process at the latest possible stage	-Strategic partnership with a technology provider. -University research projects. -3D printer investment.	-Customer's demand can be analysed by the logistics service provider in order to identify opportunities for customisation at the latest stage. -Reduce inventory levels. -On-demand and low-volume production.

Table 5. Innovation project value proposition development

5. Discussion and conclusions

5.1. Value proposition development

By adopting a S-D logic and a service ecosystems view, our study aimed to investigate how companies' value propositions are developed and evolved via combinations of different types of innovation strategies over time (Skålén et al., 2014). Through a longitudinal case study, we examined how a logistics service provider evolved its value proposition in a service ecosystem, and the innovation efforts made to achieve better integration with its customers' manufacturing activities. We found that the case company accumulated knowledge and competencies to enhance the functionality of their service provision, which is consistent with S-D logic which highlights the importance of the operant resources (skills and knowledge) and

multiple actors participating in the offering of value propositions (Vargo & Lusch, 2016). Without embedding manufacturing knowledge, the case company perceived they would have had to follow a static strategy as a traditional logistics service provider who aimed to compete mainly through a cost reduction strategy, which was deemed undesirable. In particular, as the company's value proposition evolved, it became increasingly difficult for other competitors to follow because customers were closely embedded into value creation processes, in another word, the density of resources had increased in LogCom's service ecosystem (Lusch & Nambisan, 2015).

Therefore, a critical success factor for developing the new distributed manufacturing value proposition was the identification of the right partner, with potential for value co-creation. Three different types of contributions were sought by LogCom when initiating the cooperation with its main partner: Knowledge; Capital; Testing opportunities (Wagner & Sutter, 2012):

- Knowledge – The ability to provide know-how, information and management experience to the logistics innovation process. Interactions between firms participating in the innovation process are key for its success, and the willingness to exchange knowledge were deemed as a key antecedent for value co-creation.

- Capital – The innovation project was mainly financed through contributions from LogCom, but the size of investment was dependent on the capability gap (resources and practices) identified between itself and the potential partner. The smaller the gap, and the more willing the partner was to share the associated risks, the more attractive it became as an option.

- Testing opportunities – The new partner needed to be able to support the innovation project by providing opportunities for testing the new services and processes. For LogCom the customer temporarily placed a whole team of engineers in the newly developed distributed manufacturing facility for testing the new assembly process and supporting necessary quality assurance mechanisms.

Furthermore, among the three innovation projects, a proactive manufacturing strategy could be identified as an "umbrella" under which the company's overall innovation activities were guided (Figure 3). The empirical findings indicate that the roles of different organisations, customers, and actors can be varied when co-producing service offerings (Flint et al., 2014; Frow et al., 2016). With regard to the case company: a logistics service provider can be strategically viewed as a network coordinator in developing necessary business propositions over time in order to insert into customers' manufacturing activities (Cui & Hertz, 2011; Tokman & Beitelspacher, 2011). This balanced view of the case company in co-producing service offerings is consistent with S-D logic's FP7 and FP8, especially as LogCom initially acted as a potential beneficiary to receive the service offering, and then to co-create a value proposition from the on-demand forecasting service.

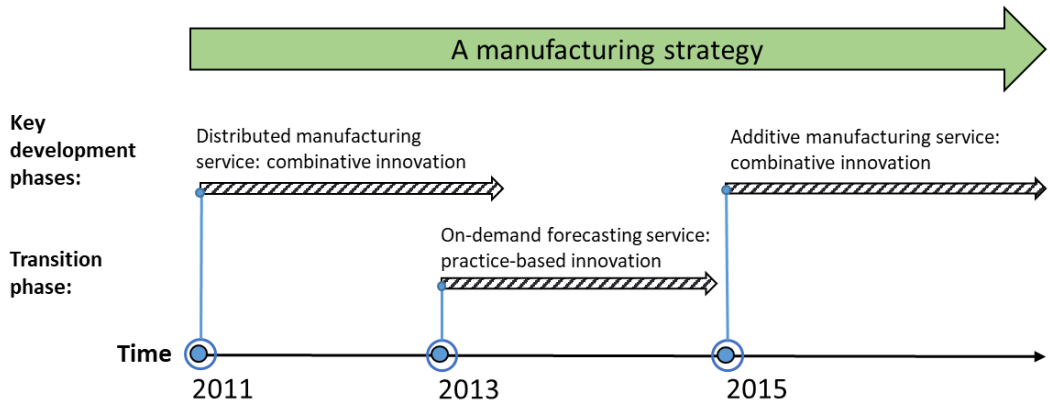

Figure 3. Key innovation projects related to the overall value proposition development

We also add to the literature on service innovation studies by highlighting the importance for organisations to consider not just the interactions between operand and operant resources when developing new value propositions, but also the opportunities that can emerge from the service ecosystem within which they operate (Figure 4). The longitudinal nature of our study also enabled us to follow the focal company's innovation journey and examine the development of new value propositions over time through collaborative activities within and between different levels of their service eco-system (e.g. LogCom and its customer on micro-level; collaborations with other organisations on meso-level) (Tokman & Beitelspacher, 2011). This approach enabled us to highlight the fact that these dynamic interactions can lead to a high level of integration of resources between the collaborating partners of the service system, as well as new network configurations (where the adoption of new resources, new practices and a re-allocation of roles across the network can emerge). Here, existing resources and practices (e.g. the service provider's initial transportation network, warehouse infrastructure and logistics provision activities) can be considered as a "vehicle" for the development of new value propositions and new service offerings, while newly embedded manufacturing knowledge and resources play an important role. More specifically, the intangible

manufacturing knowledge can also change the functionality of the current (or future) tangible resources (Vargo & Lusch, 2016).

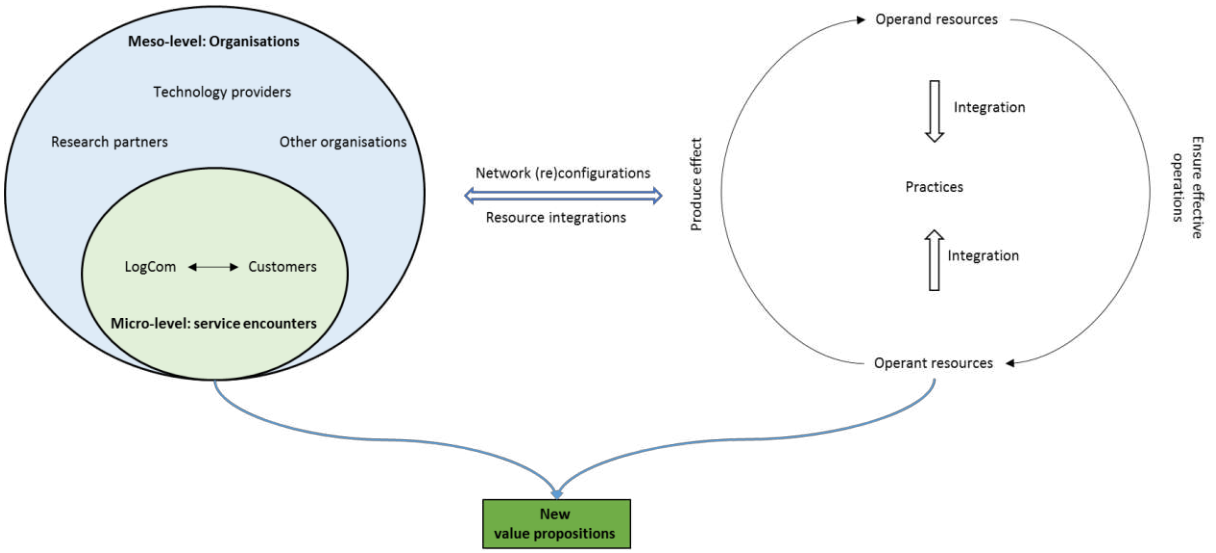

Figure 4. Value proposition development in a service ecosystems view

5.2. Implications for theory

While we provide evidence from a particular case, general implications for theory can be deducted. By adopting a service-dominant logic and a service ecosystems perspective, our study highlights that innovation activities in value proposition development can emerge as combinations of different types of service innovation. Our research has identified three innovation projects, two which were classified as combinative innovation types and one practice-based innovation type. The resultant value proposition is sometimes initially developed by the focal firm internally (for instance the distributed manufacturing service) - here, a new opportunity (value proposition) was identified and developed with the integration of the firm's own operant resources (competences and knowledge of newly recruited staff)

and operand resources (existing own logistics network and customer's products, as well as new manufacturing resources). However, the case company also relies on the collaboration between different actors in the service ecosystem (e.g. on-demand forecasting solution and additive manufacturing service) to develop value propositions with multiple strategic partners.

Therefore, the theoretical contributions are two-fold. First, our study extends existing theory on how value propositions can evolve in a service ecosystem via combinations of different types of service innovation. We highlight that innovation capability can be increased through effective service exchange within multiple actors' service ecosystems (Lusch & Nambisan, 2015). However, alongside substantially changed practices (Skålén et al., 2014), substantially changed operand resource are also crucial for radical innovation to take place (in our case, a service company implementing a manufacturing strategy with embedded practices as well as resources). Thus, our research findings are different from previous research on service innovation or "servitization" (Smith et al., 2014), which highlighted that knowledge of service is important for manufacturers to enter service provision (Chakkol et al., 2014; Zhang et al., 2016), as opposed to service providers developing manufacturing provision capabilities. Our study indicates that while extant resources (transport networks, warehouse infrastructure) do support a radical innovation strategy, as well as strengthen power positions during the negotiation of the service offering (Storbacka & Nenonen, 2011) (limited new additional investment required). However, substantially reconfigured resources, as well as new practices, also need to be embedded.

Second, by adopting a service ecosystems perspective on innovation, with a focus on two levels: micro (service encounters) and meso (organisations), our study calls for a multi-faceted

view on the role of focal actors within a service ecosystem. The focal firm in this paper sometimes acts as a co-creator of a new value proposition (at the micro-level), while also being one of the beneficiaries of interactions at the meso-level, acting as a coordinator between customers, research institutes, and technology providers from which it draws much needed knowledge to support its innovative processes (Tokman & Beitelspacher, 2011). Furthermore, a service ecosystems perspective on innovation enabled us to capture some of the changes to the institutional arrangements that can occur – for example, the legal copyright issues associated with product design when the case company developed its additive manufacturing service. Hence, the disruption of the institutional status quo could run the risk of experiencing negative consequences from the innovation development (Chandler et al., 2019). While taking a service ecosystem view on innovation (Lusch, 2011), capturing the interactions within as well as between different levels is critical for theory development.

5.3. Implications for practice

The research has explored a logistics service provider's innovation journey, which evolved from a traditional warehousing and transportation provision to a more involved participation in its customers' value creation activities. Thus, in line with the S-D logic, our study emphasises that if an innovative solution aims to be truly "customer centric", logistics service providers should not only develop value propositions, but try to influence their own customers' value creation processes proactively (Bettencourt et al., 2014; Grönroos & Voima, 2013).

Firstly, following a S-D logic, we highlight that in order to radically innovate firms should focus on opportunities to adopt combinative innovation solutions (new resources and new practices) by reconsidering the resources they have (or have not) previously obtained and integrate

them with newly developed practices in order to gain competitive advantage. In line with Chakkol et al. (2014), we argue that logistics managers can therefore build more communication channels between different actors in/outside the current service ecosystem in order to identify opportunities for developing new value propositions, and position the LSP not just as a participant in delivering value to consumers but as the main beneficiary. Moreover, the study has also highlighted the dilemma between the investment in tangible new resources and intangible new knowledge to a company. Managers should evaluate the risk of finding themselves in a "lock-in" situation due to heavy investment in new resources and skills specific to a limited number of customers. Our case highlights that while the case company's distributed manufacturing strategy was successful, with final assembly closer to consumers' markets being now conducted on behalf of its electronics customer, the strategy of investing in tangible resources associated with internalising additive manufacturing facilities was initially less successful. However, the newly acquired knowledge related to managing additive manufacturing activities meant that the company can now successfully manage an outsourced provision of this service on behalf of its direct customers.

A second practical implication is related to the innovation strategy that service providers can adopt, as different value propositions can be embedded in an overall service provision (Smith et al., 2014). Our case study highlights that service providers should explore opportunities to integrate upstream and / or downstream in the supply chain, even if this might mean participating in new value streams associated with manufacturing processes. This could become crucial in developing future viable value propositions that can be incorporated into the overall innovation strategy of an organisation.

5.4. Limitations and suggestions for further research

The exploratory case study presented has limitations. First, it should be noted that, while adopting a longitudinal case study design with multiple observations and respondents, the value proposition developments reported are of the focal company alone. Future studies could consider a triad of suppliers - focal company – customers in order to further explore opportunities for developing value propositions along the supply chain. Further studies could also consider both a company's and its customers' service ecosystems, which could provide an even more comprehensive understanding of the interactions emerging in service ecosystems. Second, the nature of the company is an international freight forwarder who added logistics services to their organisational structure, so further studies could consider different types of logistics service providers to give a more comprehensive view on logistics service innovations. Moreover, as each of these logistics innovations has the potential to contribute to the e-commerce (Ma et al., 2019) and the sustainable development areas (Abbasi & Nilsson, 2016) of the logistics sector, further research should contribute to and extend existing work on these two topics.

Furthermore, the limited generalisability of single case studies has to be noted. The aim of case study research, however, is not to generalise findings but to build new theory or refine a less theorised area of knowledge based on empirical observations (Eisenhardt, 1989; Keating, 1995; Ketokivi & Choi, 2014; J. Meredith, 1998; Walker et al., 2015). In order to apply sample-to-population generalisations, further research should consider testing the findings of our case study using large samples using statistical techniques. Finally, due to a need to restrict the research scope, we only considered the micro- and meso-level of the service ecosystem. Future studies should, therefore, consider the interactions at the macro-level (e.g. final

consumers and socio-economic aspects) of the service ecosystem when studying how value propositions are developed.

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