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An ICT-based start-up entering maritime logistics networks: facilitation of value cocreation patterns

Aysu Göçer
Department of Logistics Management, Izmir University of Economics, Izmir, Turkey, and
Ceren Altuntas Vural and Frida Lind
Department of Technology Management and Economics, Chalmers University of Technology, Gothenburg, Sweden

Abstract

Purpose – This study aims to explore how a start-up entering maritime logistics networks (MLNs) in the container shipping industry integrates resources underlying value cocreation patterns in these networks.

Design/methodology/approach – The paper is based on a single case study of a technological start-up, providing tracking, tracing and other information services to MLN members using internet-based software. An interorganizational theory perspective informs the case study to unveil the resource integration for value cocreation in the network.

Findings – The start-up holds multiple resource interaction roles and the start-up's involvement enables the creation of new knowledge resources, which facilitate new revenue streams and manage resource dependencies. Hence, the findings indicate that the start-up changes value cocreation patterns in the network by reconfiguring and integrating existing resources so that the service is customized for various customers, including shippers and freight forwarders.

Practical implications – The results provide insights about how technological start-ups can unlock resources within MLNs.

Originality/value – The study extends previous studies on resource roles in business networks and shows how start-ups can perform multiple roles simultaneously within these networks. In addition, the study contributes to the literature by studying information and knowledge as resources configured in different ways in a unique network setting.

Keywords Digitalization, Resource interaction, Resource integration, Resource dependence, New ventures, Shipping

Paper type Research paper

1. Introduction

Similar with other transport sectors, digitalization in maritime transportation is significantly changing organizations, interorganizational networks and the larger industry. Technological innovations, such as artificial intelligence, blockchain, the Internet of Things and automation, are providing many opportunities to optimize processes, generate new business and link effectively with global logistics and supply chains (UNCTAD, 2019). Using distributed ledger technology, market leaders are collaborating to build shared platforms that integrate information, documentation and financial flows between multiple actors related to the shipping industry (Tradelens, 2020; Morley, 2017). This improves the visibility and tracking of cargo movements in maritime logistics networks (MLNs). Besides these traditional players from within the industry, many new entrants from the information and communication technology (ICT) sectors are developing and providing digital solutions for MLNs, which indicates potential value creation opportunities from leveraging digitalization in maritime logistics (Egloff *et al.*, 2018). However, the role of these new entrants in existing MLN's value cocreation patterns remains unexplored.

MLNs comprise key actors, such as container carriers, freight forwarders and ports (Lee and Song, 2010), between which business-to-business (B2B) service transactions take place. These are connected to global supply and distribution chains via their customers, namely, shippers or consignees. This industry structure, in which resources are provided by multiple organizations that are connected in various ways, can be characterized as business network (Håkansson and Snehota, 1995). These resources are integrated within MLNs to facilitate value cocreation (Vural *et al.*, 2019). In studying maritime logistics value creation, scholars have focused on various actors,

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dyads and triads. These approaches include a service provider perspective (Lee and Song, 2010), for example, ports (Carbone and Martino, 2003), a relationship perspective between, e.g. shipping lines and logistics intermediaries (Frémont, 2009) and maritime container transporters and their customers (Fotiadis and Vassiliadis, 2017), and a perspective focusing solely on service providers (Song and Lee, 2012) or their customers (shippers) (Vural *et al.*, 2019).

Studies show the impact of digitalization on value cocreation patterns in different industrial settings (Jayashankar *et al.*, 2020; Ballantyne and Varey, 2006), nevertheless, in the expanding literature on how maritime logistics value is defined, created, cocreated and enhanced (Lee and Song, 2010; Lee *et al.*, 2012; Song and Lee, 2012; Lam and Zhang, 2014; Vural *et al.*, 2019), the impact of other actors on maritime logistics value has been understudied. New entrants to MLNs are particularly important, especially to understand the impact of digitalization on value cocreation patterns in these networks. These actors have been able to enter the market due to the valuable, new resources offered by digitalization. Research can provide significant insights into maritime logistics value creation in the age of digitalization by understanding the nature of these resources, their interrelationships and the role of these new actors in integrating these resources within MLNs.

Recently, studies relying on the industrial network approach to business markets (Håkansson and Snehota, 2017) have focused on the role of new entrants in networks (Aaboen *et al.*, 2016) and how they combine or integrate resources within networks (Landqvist and Lind, 2022; Ciabuschi *et al.*, 2012; Aaboen *et al.*, 2011). While this stream of literature investigates start-ups from a general industrial network perspective, a contextual focus is required to understand industry specifics in relation to resource dynamics, particularly because cocreated value strongly depends on the specific context where resource integration takes place (Vargo and Lusch, 2008). Furthermore, how new entrants relate to, and influence networks is an area where more research is needed (Baraldi *et al.*, 2019), especially within the scope of digitalization (Mosch *et al.*, 2022).

The purpose of this paper is to explore the role of ICT-based start-ups in MLNs in relation to resource integration underlying the value cocreation of such business networks. To operationalize this purpose, we conduct a single case study on a technological start-up that provides tracking, tracing and other information services to MLN members using internet-based software, and address the following two research questions:

RQ1. What roles do technological start-ups play in MLNs regarding resource interaction and value cocreation?

RQ2. Which dynamics shape value cocreation in MLNs to which technological start-ups enter?

The study builds on resource interaction (Håkansson and Waluszewski, 2002a, 2002b; Håkansson and Ford, 2002), value cocreation through resource integration (Vargo and Lusch, 2008) and resource-dependence (Pfeffer and Salancik, 1978) in interorganizational networks as a base. It contributes to the literature in three main ways. First, by taking MLNs as the research object, it provides insights about how the network changes when a technological start-up enters, integrates technical and social resources and performs multiple roles as a resource mediator, resource recombiner and resource renewer. Second, by studying a unique and specific network setting, it illuminates the inherent characteristics of networks. These two contributions address calls for research into specific networks and how start-ups relate to these networks (Baraldi *et al.*, 2019; Aaboen *et al.*, 2016). Third, it emphasizes how both use and exchange value are cocreated in network, which is subject to significant change facilitated by digitalization by taking a multi-actor perspective (Jayashankar *et al.*, 2020). The notion of value generation and resource interaction mechanisms behind that within an interorganizational context are considered timely (Bocconcelli *et al.*, 2020). The study focuses on knowledge and information as resources that the ICT-based start-up integrates within the MLN and examines their role in interaction and value cocreation. This answers the call of Baraldi *et al.* (2012) to recognize and investigate knowledge as a resource within business networks.

The rest of the paper is organized as follows. Section 2 reviews the theoretical underpinnings for building a synthesis on digitalization in MLNs from a resource integration and value cocreation perspective. Section 3 details the case context and methodology. Sections 4 and 5 present and discuss the findings. Section 6 concludes with implications for theory, research and practice.

2. Theoretical framework

For the purpose of this research, to explore how technological start-ups integrate resources underlying value cocreation patterns in MLNs, the theoretical framework is built on three interorganisational theories. To understand value cocreation through resource integration in MLNs, the service dominant logic (Vargo and Lusch, 2008; Vural *et al.*, 2019) serves as a departure point, while for analyzing the roles of entrants in MLNs, the industrial network approach (Håkansson and Snehota, 2017) and resource interaction in interorganizational networks (Håkansson and Waluszewski, 2002a, 2002b) is forming the base. In addition, resource-dependence theory (Pfeffer and Salancik, 1978) being a pillar in the industrial network approach, is used for recognizing and acknowledging power imbalances in these networks. Hence, the study combines theoretical approaches to address the specificities of resource integration, resource interaction and resource dependence to unveil value cocreation patterns in response to digitalization in business networks. This combination relies on the common points of the approaches pinpointing value creation as a collaborative effort among actors and as being strongly connected to resources (Bocconcelli *et al.*, 2020). Similarly, other studies have sought combinations of literature streams to capture the complexity of start-ups in context of digitalized networks (Mosch *et al.*, 2022).

2.1 Digitalization and value cocreation in networks

2.1.1 Digitalization in maritime logistics networks

Albeit more slowly than other industries, shipping is also digitally transforming itself by sourcing, adapting, developing and managing industry-specific versions of generic technologies (Lambrou *et al.*, 2019). From a narrow perspective, digitalization or maritime 4.0 can be associated with the vessels providing the shipping service (Sullivan *et al.*, 2020; Poulis *et al.*, 2020). More

broadly, digitalization offers many opportunities for both shipping companies and the MLNs they operate within. Besides reducing operational and customer service costs, it strengthens relationships with MLN members and allows new revenue-generating business models beyond traditional shipping services (Egloff *et al.*, 2018).

Among these, cargo tracking through digital platforms (Lambrou *et al.*, 2019) or blockchains (Yang, 2019) has gained wide acceptance. Shipping is inherently network-centric and requires collaboration based on information sharing across the value network (Feibert *et al.*, 2017). However, cargo tracking information today can only be obtained through a shipping service provider's internal information system and company home page (Yang, 2019). The lack of more efficient data flow between different MLN actors results in poor tracking information, unintegrated across different systems. Digitalization encourages new organizational structures, either independently or as spin-offs, as separate units or partnerships of shipping firms (Lambrou *et al.*, 2019). Supported by satellite-based vehicle monitoring systems, many digital platforms have emerged to provide cargo or container tracking services, and they are expected to grow (Morley, 2017). These service providers, mostly starting up outside the industry, are new intermediaries that enter MLNs to improve the integration of information-based resources.

2.1.2 Resource integration and value cocreation in maritime logistics networks

MLNs are composed of multiple organizations that take part in the physical flow of goods from their origin to destination. The structure of these networks can be very dynamic and change from one transaction to another, and the number of organizations that are involved vary depending on the transport service demands. A very simple illustration of the flows within these networks is illustrated in Figure 1.

Besides the physical flow of goods, maritime logistics also refers to flows of information and relationships between actors within maritime supply chains from manufacturers to end-users (Panayides and Song, 2013). The key question for these large networks of many different actors is how different actors add value (Panayides, 2006). From a traditional value chain perspective, maritime logistics value is the degree to which a maritime logistics service system meets customer demands through successful flows within the MLN (Lee and Song, 2010). These customer requirements include reliability and speed (Lam and Bai, 2016), and integrated service operations for a larger portfolio of global services (Tseng and Liao, 2015). From a service-dominant logic perspective, however, maritime logistics value is a phenomenological and experiential concept that is cocreated by suppliers and customers in MLNs through dynamic resource integration (Vural *et al.*, 2019).

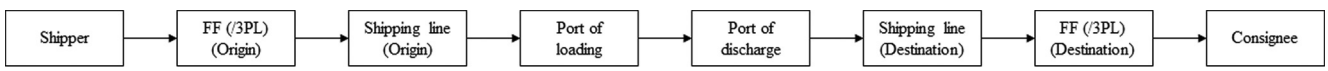
Shipping companies depend on resources provided by MLN actors. While business partners like ports or freight forwarders provide door-to-door logistics services and complement the value proposition, shippers and investors provide financial resources (Yuen and Thai, 2017). There are also operant resources (Vargo and Lusch, 2008), such as power, trust, competence or information (Vural *et al.*, 2019), that are integrated by shippers, freight forwarders and shipping companies for value cocreation in MLNs. New actors enter or existing actors stay in MLNs as long as they can combine and recombine these resources to facilitate value cocreation.

Yuen *et al.* (2019) emphasize the importance of information management as a critical resource that enables effective network integration and improved performance. Critical information shared conveniently on real-time basis by network members improves the actions and performance of other network members (Lee, 2000). Digitalization of shipping accelerates information flows within MLNs, which new actors enter to integrate resources. Digitalization also requires both physical and digital resources to be combined and recombined (Henfridsson and Bygstad, 2013). Lam and Zhang (2019) argue that ICT-based process innovations have a significant impact on achieving customer value in shipping contexts. However, it is still not known how digitalization of information flows changes resource integration and value cocreation in MLNs. From their port study, Harrison and Håkansson (2006) concluded that new actors can activate existing but unconnected or passive resources in networks. However, this idea needs to be applied to larger MLNs affected by digitalization to understand the consequences of value cocreation in these networks. To deepen the understanding of resources in networks, our focus below is on the industrial network approach.

2.2 Resource interaction in business networks

Businesses strive to collect and combine resources to provide value to users and obtain firm growth (Penrose, 1959). These resource combinations emerge within specific use contexts (Baraldi *et al.*, 2012). Organizations must collect many different resource types that are tied to multiple resource providers through relationships (Håkansson and Snehota, 1995) connected in business networks. The values of these resources are not fixed; they emerge and change as a result of the resource interaction within networks (Håkansson and Waluszewski, 2002a, 2002b). Interactions within networks produce the "double face" of resources. That is, an interaction not only enables production and access to a certain resource or resource collection but also provides valuable information about the "using" of resources, which, in turn, enables further development of the resource or resource combination (Håkansson and Snehota, 1995). Therefore, understanding resource dynamics in business networks requires investigation of resource interaction as well as resource exchange.

Figure 1 Basic MLN flows



Notes: FF: Freight forwarder 3PL: Third-party logistics service provider

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In their 4R model, Håkansson and Waluszewski (2002a, 2002b) identify four types of interacting resources: products, facilities, organizational units and interorganizational relationships. The first two are called technical resources and the latter two are called organizational or social resources. Based on of the assumption of resource heterogeneity (Penrose, 1959), a resource's value depends on which resources it is combined with, and this is considered as resource interaction (Baraldi *et al.*, 2012) (Bocconcelli *et al.*, 2020, for a detailed discussion on similarities and differences of interaction and integration). Hence, we conceptualize value to reside in unique and dynamic resource constellations. Furthermore, it's not enough to simply bring different resources together. Technical, organizational or mixed resource interfaces (Dubois and Araujo, 2006; Baraldi and Strömsten, 2006) are to be created for combining resources successfully and how these interfaces match or mismatch form value creation (Huemer and Wang, 2021).

New businesses always need to recombine resources (Schumpeter, 1934), some of which are controlled by others (Öberg and Shih, 2014). They must simultaneously add to and fit into their customers' existing resource constellations (Aaboen *et al.*, 2011), but not unilaterally. Rather, they interact and coact with other network actors to combine resources (Ciabuschi *et al.*, 2012). These actors have both resource provider and resource user roles in these networks and from their interaction innovative solutions emerge (Cantù *et al.*, 2012). By studying different university spin-offs, Aaboen *et al.* (2016) suggest three generic roles regarding resource interaction. New businesses can act as:

1 resource mediators, connecting existing resources between business relationships and organizational units;
2 resource recombiners, facilitating mutual adaptation of resources between products and facilities; and
3 resource renewers, whereby resources are replaced at the network level, and interactions are required at all four interfaces of 4R model.

While research into resource interaction in business networks emphasizes the importance of resource combining and interfaces between network actors, another important aspect is power imbalances between actors with different resources. Because no organization can hold all needed resources internally, it must interact with others to combine resources (Håkansson *et al.*, 2009). According to resource dependence theory (RDT), organizations are coalitions that adapt their behavior and structure to acquire external, scarce and valued resources (Ulrich and Barney, 1984). Their two main objectives are to control critical resources that decrease their dependence on others; to control critical resources that increase others' dependence on them. Achieving these objectives increases their power within interorganizational networks (Pfeffer, 1981).

The nature and availability of critical resources determine the degree of dependence within these networks (Ramsay, 1996). A resource's criticality depends on its commercial or operational importance and scarcity of alternative sources (Pfeffer and Salancik, 1978; Cox *et al.*, 2002). To reduce their dependence on external resources, organizations engage in various interorganizational arrangements, such as interlocks, alliances, joint ventures, mergers and acquisitions (Drees and Heugens, 2013).

Departing from the discussion on the pursuit of digitalization (Egloff *et al.*, 2018), this study builds on the complex interaction patterns of MLNs (Håkansson and Waluszewski, 2002a, 2002b), which are reshaped by the entrance of digital intermediaries (Baraldi *et al.*, 2019; Mosch *et al.*, 2022) taking different roles while integrating information-based resources (Aaboen *et al.*, 2016) and facilitating the value cocreation along the network (Vargo and Lusch, 2008). This value cocreation environment is stimulated by resource-dependences (Pfeffer and Salancik, 1978), which further reveals the emergent power dynamics in MLN networks (Pfeffer, 1981).

3. Methodology

In line with the research purpose, a qualitative research design was adopted. A network was analyzed as the research object in a maritime industry setting through a single case study methodology to explore how technological start-ups influence value cocreation in an MLN. Case study is a widely preferred method in business marketing research (Beverland and Lindgreen, 2010), particularly when focusing on start-ups in business network settings (Laage-Hellman *et al.*, 2018). It can enable understanding complex, dynamic relationships and interactions in business settings and reveal interconnected relationships and dynamic processes in business networks (Dubois and Araujo, 2004; Dubois and Gadde, 2002). Single case design provides rich opportunities to develop a theory based on grounding the meaning of theoretical concepts in empirical and contextualized observations and descriptions (Andersen *et al.*, 2018). In our study, the single case design provided deeper, contextualized understanding on the focal phenomenon in its context and identified complex interaction patterns created by the start-up's involvement in the MLN.

Case studies investigate a contemporary phenomenon in depth in a real-life context to provide rich insights to develop nuances for reality (Flyvbjerg, 2006; Yin, 2014). In the present study, the single case was selected based on the research topic before extending the unit of analysis to the larger MLN by including multiple networks actors in the study.

3.1 Case selection and data collection

The case company, SG (anonymized), is a start-up from Turkey offering a global container transport tracking platform. Founded in 2016 by one academician and two practitioners; it is both a start-up and a university spin-off. In 2010, two of the founders, who were working in shipping industry, experienced container tracking problems. They converted this into a business idea that evolved following sales success. The case company was selected from ICT-based start-ups offering new digitalization services to MLNs. In the selection criteria, importance was given to choosing from new entrants that have a developing presence in shipping industry with their acknowledged customer portfolio performing operations worldwide. In addition, the connectedness of the start-up within the MLN, and the availability of services to multiple network members such as shippers, freight forwarders and shipping lines in shipping industry was another key criterion in selecting SG.

Data was collected by semistructured interviews with experts to gain context-dependent knowledge and experience (Flyvbjerg, 2006). Qualitative researchers in case studies mostly prefer interviews as guided conversations to collect rich evidence (Yin, 2014). Data collection in this study aimed to understand SG's business model in depth, its internal operations and network connections.

We conducted the first interview with the cofounder, who shared documents and gave detailed information about the start-up's history, mission, vision, business model which provided insights about the company and its position in the MLN. This interviewee described the customer base of the start-up and explained the segmentation of their customers in the MLN. Informant selection process is carried out with direct guidance of the cofounder, who suggested interviewees from the start-up's key customer segments that were representative of the MLN, such as cargo owners, freight forwarders and software companies. Cargo owners included exporters and importers who manufacture or trade products requiring international transportation services. We used the term "cargo owner" because a single company could be both exporter and importer. Software suppliers are different sets of customers who sell software and related services to either freight forwarders or cargo owners, but they buy the tracking information from the case company to differentiate their offering.

The interviewees were familiar with both the former MLN structure and the changes in the network since SG entered. An interview guide based on the theoretical framework was prepared to capture this knowledge. The guide included sections covering how the start-up's integration affected business interactions in the MLN, the roles of start-ups in the MLN resource interface, the value cocreation outcomes of MLN partners during resource interaction and the dynamics of the start-up's integration in the MLN. Table 1 below provides the details about case informants and interviews. The interviews, which were completed over one year, continued until no further conceptual insights were generated, i.e. theoretical saturation (Corbin and Strauss, 2008). The interview data were complemented by company documents, presentations and reports. The framework was refined with the case company during data collection, while a final validation interview was conducted to confirm the findings and assure trustworthiness.

Prior to the interviews, each interviewee was assured of anonymity. With the permission of the interviewee, each session was recorded. A discovery-oriented approach (Yin, 2014) was used in the interviews to probe for details and ensure that the experience and knowledge of the professionals were fully reflected. The audio files were transcribed into text files to enable clearer and more systematic analysis. We also listened carefully to each interview to better understand its context and nuances. Notes were taken during the interviews or while relistening after the interviews were also transcribed and included in the analysis.

3.2 Data analysis

Following the purpose and research design, content analysis was used. This method follows a set of procedures to produce "replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (Krippendorff, 2004, p. 18). This method aims to reduce qualitative data by identifying core consistencies and meanings (Patton, 2002). It, thus, allowed us to explore patterns within the data and categorize them as resource roles, value types and value cocreation dynamics in the MLN, which were changed by SG, the ICT-based start-up.

Coding in content analysis can be either manifest (explicit) or latent (implicit) (Kassarjian, 1977; Krippendorff, 2004; Babbie, 2010). The former focuses on the visible, countable surface content of a communication, particularly word frequencies, whereas the latter, which was used here, is more exploratory, focused on identifying implicit meanings, patterns or symbolism in the data set (Babbie, 2010).

To achieve the purpose of understanding resource interaction and value cocreation patterns within the MLN, theoretical concepts were systematically matched and combined with empirical data collected by semistructured interviews while the codes and concepts were developed iteratively (Dubois and Gadde, 2002). During latent coding, we followed an abductive

Table 1 Summary of interviews

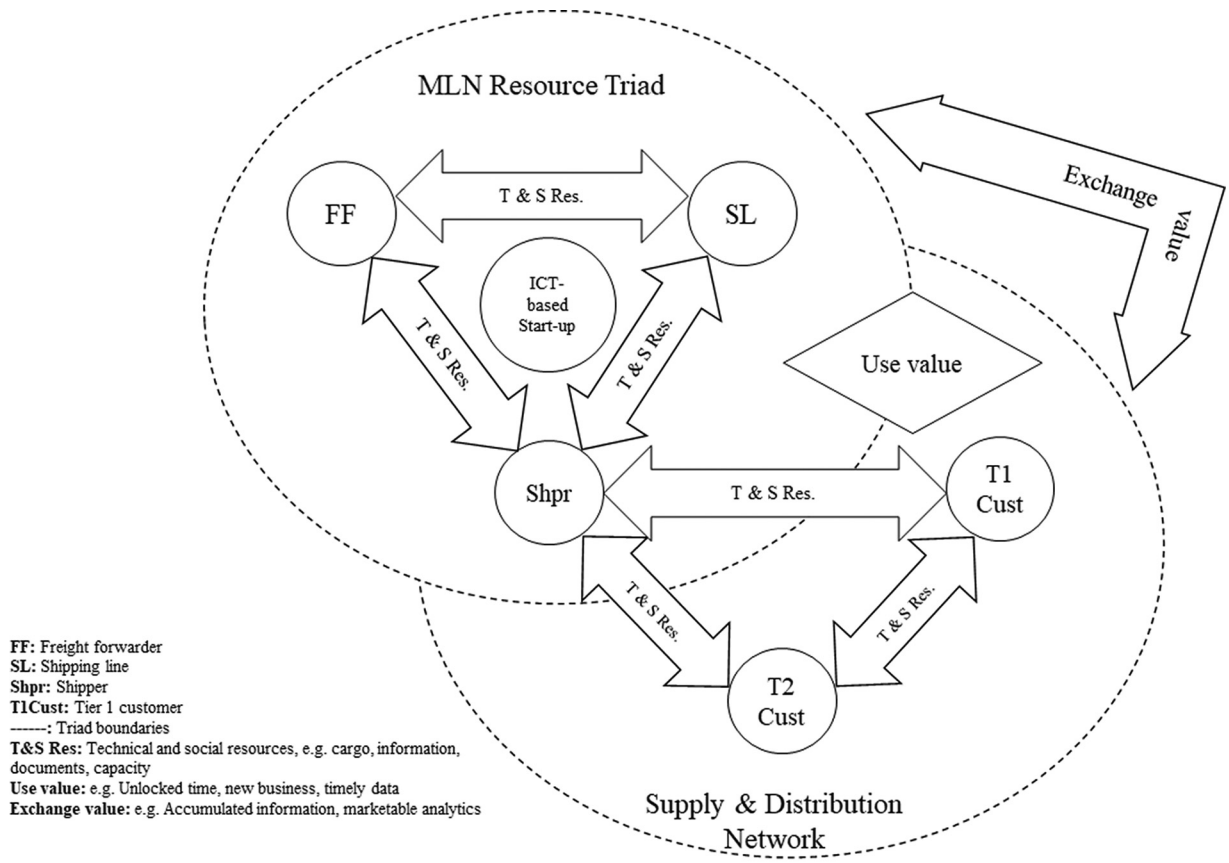
No.	Interviewee code	Interviewee's role	Category	Date	Duration
1,2,3	SG	1.SG (1 cofounder, 2 operational officers)	ICT-based start-up	20.08.2019	1:42:20
		2.SG Cofounder (1)		23.09.2019	1:12:41
		3.SG Cofounders (2)		07.09.2020	34:13
4	FF1	Operation team leader	Freight forwarder	24.02.2020	34.35
5	FF2	Systems and process manager	Freight forwarder	25.02.2020	40:04
6	FF3	Marketing and sales manager	Freight forwarder	27.02.2020	25:28
7	FF4	Chief executive officer	Freight forwarder	03.03.2020	24:58
8	FF5	Director	Freight forwarder	05.03.2020	37:51
9	FF6	Operations supervisor	Freight forwarder	10.03.2020	18:39
10	BCO1	Export operations – Logistics specialist	Cargo owner	21.02.2020	28:22
11	BCO2	Head of export operations	Cargo owner	26.02.2020	20:08
12	BCO3	Information systems manager	Cargo owner	02.03.2020	21:30
13	BCO4	Logistics specialist	Cargo owner	10.03.2020	24:19
14	BCO5	Logistics manager	Cargo owner	10.03.2020	23:09
15	SS1	Head of operations	Software supplier	21.01.2020	53:50
16	SS2	Vice president, Research and development	Software supplier	25.02.2020	28:28

logic to match theory with the empirical data simultaneously through systematic combining (Dubois and Gadde, 2002). Abduction can involve a mix of inductive, deductive and abductive subprocesses (Kovács and Spens, 2007; Järvensivu and Törnroos, 2010). However, different from induction, it accepts existing theory and different from deduction, it mostly allows for data-driven theory generation rather than theory-driven research. Having started with industrial network approach on the one hand, and the value cocreation and service dominant logic, on the other, we noted evidence of resource dependence in the data. The frame of reference served as the basis for understanding how resources are exchanged and integrated for value cocreation in business networks. Theory on resource interaction, resource integration and resource dependence in business networks informed the frame of reference, which was then used to build the initial categories that represented resource roles. We, therefore, expanded our theoretical base and revised our framework (Figure 2) several times during data collection and content analysis while systematically combining data with theory.

When creating categories, it is important to decide whether they are mutually exclusive. We followed an iterative process for building, testing and revising categories through simultaneous comparisons with data (Krippendorf, 2004; Pratt, 2009). The theoretical underpinnings were matched with the codes, while the thematic categories emerging from the interview data were continuously revised based on data comparisons complemented with other data sources, such as company documents. From this process, the MLN resource exchange framework emerged (Figure 2), which was also continuously revised. The abductive and iterative approach in the design and execution of the study provided a pillar for research quality (Flick, 2014).

Furthermore, we sought confirmability, credibility, dependability and transferability (Halldórsson and Aastrup, 2003) to ensure the trustworthiness of this qualitative study (Lincoln and Guba, 1985). We achieved confirmability by triangulating data (Denzin, 2017) from three different network member categories and interviews with different members of the case company. Credibility was enhanced through rich theory, iterative data matching and validation interviews. The transferability of our findings to other MLN contexts was assured by providing thick descriptions of data from multiple respondents, detailed information about context, case company and underlying resource interactions and resource integration, forming the ground for analytical generalization from single case research (Andersen *et al.*, 2018). Finally, the theory-based interview guide, interview recordings and transcriptions and systematic coding process provided dependability.

Figure 2 MLN resource exchange



Notes: FF: Freight forwarder; SL: Shipping line; Shpr: Shipper; T1Cust: Tier 1 customer; -----: Triad boundaries

4. Findings

The different parts of the theoretical framework helped to investigate the empirical evidence in a more structured way. We began with looking into the list of resources that different actors integrate to facilitate the value cocreation that emerges from the entrance of the ICT-based start-up into the network. Then we built on the resource roles literature while examining the different roles that the start-up takes on while integrating the different resources. Finally, the basic premises of RDT guided the analysis related to underlying power relationships that emerged from the empirical evidence.

The analysis provided five key findings regarding resource integration underlying the value cocreation patterns in MLNs:

1 how SG as an ICT-based start-up enters MLNs by providing simple service offerings targeting niche but important business problems;
2 ICT-based start-ups affect multiple triads within MLNs by integrating technical and social resources through direct or indirect interactions among network actors;
3 they perform the roles of resource mediators, resource recombiners and resource renewers simultaneously within MLNs;
4 they facilitate value cocreation resulting in exchange and use value that all actors utilize; and
5 they decrease actor dependencies on other MLN partners but increase dependencies on data sources and start-up services.

These key findings are elaborated on further below.

4.1 Case description

The start-up company SG mainly provides live container tracking, shipment statistics and performance analysis. To enable customers to track containers live via its web page, SG either buys raw data from providers that integrate satellite data on vessel positions or captures readily available data from shipping line systems using customized algorithms. SG also sells subscription services to customers requiring information on shipping line performance, market intelligence regarding available services and information system integration. The company can be classified as a software-as-a-service provider, an online marketplace or e-platform. The target markets are shippers, logistics service providers and shipping lines operating in MLNs, although currently, there are no customers from the shipping line segment. The MLN in this research is structured around the case company SG and its customers in the MLN. These customers belong to different market segments.

4.2 Entry to maritime logistics networks

SG's main value proposition relates to an information disconnection in particular operational areas of the MLN regarding container tracking. A digital service platform that connects unconnected resources, improves integration between resources or replaces resources along the network is provided as a solution:

> We work with multiple shipping lines, so we get tracking information by searching through each of their web sites separately and integrate them. SG made that information available to all the network in a single online platform (BCO4).

Thus, rather than offering a new service or providing previously unknown data to network actors, SG creates value by processing existing data within the system and providing a *simple user interface* that presents continuous, timely updates in tracking information. While shipping lines have container data ready in their systems, these are used for vessel operations rather than offering tracking as a primary service. Thus, container tracking data continuity may be lost within certain MLN processes:

> We recognized that the biggest problem is in the transhipment process: operational tracking of a transhipment is challenging as information is broken once there is a delay or change in route (SG).

SG entered the network to mitigate information distortion and inconsistency by providing centralized, timely and updated tracking information. They replaced *ad hoc*, complicated and confusing information in the network by processing and transforming big data into a *simple and easy to understand tracking information* for all partners to use, thereby creating value. They make contribute by targeting "simplicity to create value" (SG) in data tracking offerings. Thus, SG *advances the processes of MLN actors* to a level that they can compete with larger rivals. Their aim is to create a business model that offers, through data integration, "one platform to all" (SG). Hence, ICT-based start-ups enter MLNs through their *contribution to niche business areas*, where they provide novel solutions to critical issues.

4.3 Impact on maritime logistics networks

As part of a maritime transportation network, an MLN is basically a triad between cargo owners (shippers), shipping lines and freight forwarders. The value cocreated in this triad is then used by the actors in the second triad – the supply/distribution network. The supply/distribution network is composed of actors that are supply chain members. They are the sellers and buyers of manufactured goods that are then moved and stored by MLN actors from point of pick up until point of delivery. Considering the cross-border structure of MLNs, these sellers and buyers are exporters and importers of goods, but they are operating in complex supply/distribution networks which are composed of wholesalers, distributors, traders, resellers and retailers. Although MLN members interact with only exporters or importers from these second triads, the value created at MLN level impacts the larger supply/distribution network as well.

When a start-up enters the first triad to integrate knowledge and information resources, it facilitates value cocreation, which extends to the second triad:

> When I provide information to my customers, they provide the same information to their own customers. The information is going from the shipper to the final consignee. My customers are not using this information to keep only in their file, but they use it to inform their customers as well (FF5).

Thus, the start-up mediates, recombines or renews technical and social resources within the MLN. The cocreated value resonates as exchange and use value for MLN actors depending on their utilization.

An ICT-based start-up also changes the roles of MLN actors by enabling them to generate new value offerings to their markets. The value provided by the start-up unlocks previously tied-up internal resources. These unlocked resources can

provide customized services and create new value cocreation patterns in their customer networks.

For example, time and manual workload is replaced by *outsourced tracking operations*. Cargo owners and freight forwarders use that time and effort to focus on their customers' operational processes and extend their organizational role as *solution partners*. "In that resource interaction model of the network, freight forwarders will provide digitalized service solutions for operational excellence" (BCO4). In some cases, they become *integration partners* rather than just solution partners to provide connection points and bridges between MLN partners at various nodes. Their focus shifts to *relationship building* among partners. "With increased digitalization, we'll utilize our employees' time more effectively to build better relations with our customers" (FF2).

4.4 Resource interaction roles

ICT-based start-ups do not play a single role within MLNs but can be a resource mediator, a resource recombiner or a resource renewer, depending on where in the network, between whom and for which purpose they engage in resource interaction.

4.4.1 Start-ups as resource mediators in maritime logistics networks

Start-ups act as *resource mediators* when they connect unconnected resources within the MLN. *Ad hoc* data and information are replaced by a centralized source of *integrated data* for partners in the larger network:

> Tracking information was provided by different parties, sometimes shipping line or forwarder. Then, I deliver that information to my customer. There are many partners in the MLN. This means many people in between to share information. However, with SG, information is centrally shared by all partners. I don't provide any additional information (BCO1).

By connecting data created from various sources, SG creates *aggregated data* that network actors can use to generate accessible information, especially for customers:

> SG collects data from several platforms of shipping companies, and aggregates that in one place. You can't get this information from any single source, but SG provides this. This is very convenient (SS2).

These connections form *data warehouses*: "Historical data is stored in SG's system with easy accessibility. We can track container movements retrospectively" (BCO1). The centralization of various data sources and management of integrated information by an outsourced mediator, the technological start-up, also facilitates the production of *on-time and updated data* at a single point in time, thereby avoiding data disruption from different time zones and actors:

> For example, the customer in United States will plan a new shipment in morning time and needs to learn the status of the load. The time is 11:30 pm in Turkey's zone. Since the customer doesn't want to disturb us at that time, he/she enters SG's system and learns the status of his/her load. He/she does not wait for the start of Turkey's working hours, and then again for America's working hours. At that time of the night, he/she can learn the status and make his decision (FF3).

This integration also enables value-added services by sharing timely notifications and updates on changing data, which reduces operational workloads throughout the network.

Another connection is built among the multiple processes of different actors. Because SG's service is integrated with the systems of both freight forwarders and customers, they can deal with each other directly rather than with the start-up as the data provider. Thus, maritime network processes are mediated by SG through *process integration* across all MLN actors. Our respondents predicted that more start-ups would emerge as resource mediators who integrate and aggregate data in MLNs.

4.4.2 Start-ups as resource recombiners in maritime logistics networks

Start-ups may become *resource recombiners* that integrate resources by mutual adaptation of network players. The most common type is *mutual adaptation of data*, whereby integrated and combined data generate information through the mutual contribution of MLN partners:

> To get the full value of information, you must combine your data with other data sources. For example, time of arrival or delays gives some idea, but you combine it with other data for better understanding and planning (FF4).

MLN actors may integrate tracking information with their enterprise resource planning (ERP) systems. MLN actors create integrated solutions for network partners. These *integrated partnerships* are fostered by start-up information that creates an environment where each partner contributes to system activities and searches for joint solutions.

These partnerships are also formed through *collaborative risk management* practices that offer transparent information sharing and a proactive approach to fixing problems or managing operations:

> When there is a problem, we detect it earlier and warn the customer. Or maybe, if the foreign agency has not yet informed the customer, so the customer does not know that the container has arrived, then we can detect it by SG system. We inform the customer, make suggestions and help them to take precautions accordingly (BCO1).

4.4.3 Start-ups as resource renewers in maritime logistics networks

By replacing resources, start-ups cause fundamental changes within the network. For example, SG replaced manual tracking with *digital tracking*, which not only digitalizes information flow but also dramatically improves customer satisfaction by freeing up some in-house resources. "Operational efficiency is improved as the manual, mail-follow-up system is replaced by online, on-time controlling system" (BCO4). This change involves the *replacement of people with digital solutions:* "A number of employees were tracking containers manually before SG provided us to track through automation" (FF2). In addition, there is *transfer of decision-making routines to management information systems*.

As digitalization extends through various levels of logistics operations and to the wider MLN, there is fully digitalized process integration. Not only the network's main actors but wider supply chain partners become digitalized, which pushes the entire industry toward digitalization: "Digitalization of the MLN will force customs agencies to go digital; even customs declarations are being issued on digital platforms" (FF3). The interviewees frequently emphasized that *digitalized business models* will replace traditional business models. For example, cloud-based business models are making the global system less dependent on people: "Everything is moving to the cloud and everything will be connected anyway" (FF4). Especially the aggregation of digital start-up data will generate big data for the use of artificial intelligence algorithms: "Big data, opening the way for artificial intelligence, will potentially evolve to new service offerings" (SG).

4.5 Start-ups facilitates value cocreation among maritime logistics networks actors

The main value of the ICT-based start-up for the MLN is a consistent flow of timely and accurate information. This facilitates value cocreation in various forms and at different points within the network. As shown in Figure 2, mediated, recombined or renewed resources are integrated by both maritime transportation and supply/distribution network members. The notion and content of value changes according to where this value is cocreated within the network.

4.5.1 Use value

Use value is created when any actor uses the resources integrated by the start-up for its own benefit. For example, SG's direct customers use *direct access to timely data* to improve their operations at several ends of the MLN: "We provide centralized, timely and updated data. This helps partners to identify problems earlier and report sudden changes in transportation process on time" (SG). Online, updated and accurate tracking information, made available to customers by start-up integration, eliminates information inconsistencies and time and place barriers. This creates the value of *improved problem-solving capabilities and decision-making*. "Tracking information delivered through timely notifications helps to detect problems and provides full control over delays or other variations in expected dates" (FF4). "We also use it for choosing routes" (FF2).

Another value generated for MLN actors is *performance tracking*. Customers can use digital storage to access aggregated historical data to track process performances and plan for further shipments. The regular provision of such performance data facilitates competition by motivating service providers, such as carriers or freight forwarders, to improve their operations. "SG data support decision making by providing analytics related to the performance of shipping lines" (BCO4).

This improved information flow creates a competitive advantage over other market players, which enables *service differentiation* to attract or retain customers. Time can then be better used for business improvement and quicker customer response rather than searching for updated information:

> When I visit a major customer, one of argument I use to offer our services and [emphasized] that it's better than others, is that we have this SG track and trace service. So, it's like a weapon we use to convince our customers to work with us. Once they try, they love it. Through this, we gain some advantage over our competitors in the market (FF5).

The start-up solution also creates a *cost advantage* through operational efficiency and improved responsiveness, especially in problematic cases. "Additional costs, like demurrage, are avoided by improved information flow and tracking" (FF4).

Resource integration through start-ups generates value opportunity by enhancing *customer satisfaction*. The time gained from start-up integration is used to support customer operations more effectively and focus on building better customer relationships. For example, "Continuous tracking is perceived as a means of business trust by customers" (BCO1). Business and operational crises are avoided by offering correct actions for customers through responsive, timely and accurate information sharing, and proactive actions through early problem detection.

Use value is also extended to customer networks through *effective order management and planning*. Regular tracking information enables second- or third-tier customers to learn about potential delays, schedule their incoming deliveries and integrate tracking information into their internal planning systems: "We improve their [our customers'] planning, scheduling and production plans by managing unexpected changes and taking a more proactive approach" (BCO4).

By integrating resources, the tracking service is digitalized, which enables *effective utilization of labor*. By reducing tracking and mail or telephone traffic, employees can use their time for relationship building activities and operational tasks. In addition, the unlocked time can be used for improving employee know-how: "Since the SG integration, employee efficiency has improved, which is reflected in all phases of operational processes" (FF5).

4.5.2 Exchange value

The value cocreated by the continuous flow of tracking data into SG's system can be exchanged further with MLN members as a new resource. Individual actors can create aggregated information or leave traces about their preferences and decisions. When supported by *big data analytics*, these become valuable resources as inputs to new value propositions. Here, the start-up company combines resources that are generated by customers' tracking activities and produces aggregated data. SG processes this tracking data to provide market intelligence and decision-making indicators for MLN partners. "New business areas for digital analysis of company data or for digital solutions emerged from big data analytics" (FF2). Information that summarizes which actors in the MLN search for which routes, which provider offers services to certain destinations, and the ability to rate service providers according to their performance are examples to such potential offerings produced from big data. This process is evolving into digital business models shaped by application programming interface (API) solutions and generating an environment of information analytics provided by SG's system. "API will orient MLNs partners to review the performance of MLN partners (shipping lines, ports, etc.) and alter decision-making dimensions" (BCO4). This will become a new offering that is sellable to existing and new network members.

4.6 Dependency dynamics critical to value cocreation in maritime logistics networks

The interviews showed that resource interaction is not enough to maintain the resource interface. Instead, sustaining effective interaction of resources depends on key factors related to data flow and start-up services – most critically, the *data source*. MLN members, such as freight forwarders or cargo owners, buy tracking information from SG and disseminate it across their customer networks via technical or social resource interfaces or use it for their internal operations. The ICT-based start-up triggers technical resource interaction throughout the MLN, using data and information-related resources, such as tracking data, analytics and API. This indicates a critical dependency on data sources, such as shipping line websites or other data suppliers aggregating data from satellites. "If a shipping line's website is not updated, then SG's information won't be accurate either" (FF5). Therefore, *sustaining accuracy and flow of data* is key to resource interaction among the partners to avoid incomplete tracking data or inaccurate information caused by the dependence on original data sources. Furthermore, *MLN partners' operational performances* depend on each other as partners at different ends of the MLN use

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the centralized information flow for operational or decision-making purposes. "We received incorrect information because the data did not flow to SG's system due to a problem in a shipping line's system" (BCO1).

Technical resource interaction is simultaneously elevated by social resource interaction using relationship-based resources, such as feedback mechanisms, collaboration or interorganizational relationships. *Continuous improvement of start-up services*, fostered by the feedback mechanisms provided by *MLN partners* to develop recommendations, is also critical to value cocreation in MLNs. "Continuous improvement of start-up systems is important to avoid mistakes and sustain performance" (FF6). Examples for the different roles, use value and exchange value are provided in Table 2.

Because the start-up system depends on original data sources, any problem supplying correct or timely data disturbs the entire network. Therefore, all MLN partners must contribute mutually as feedback mechanisms to detect information flow or content problems and to improve start-up service performance and their own processes:

> We had a long meeting, and I provided a long list of things that we would like to have and could be used to improve SG's service. SG also thought that these points were important (SS2).

Thus, a critical element to overcome dependency is *MLN actors' collaboration* to contribute to mutual value cocreation to improve start-up services.

5. Discussion

The purpose of this paper was to explore the roles of ICT-based start-ups in MLNs and answer the three research questions in relation to their roles, how these roles facilitate value cocreation in MLNs and the dynamics that shape value cocreation. Regarding our first research question, the findings point out that ICT-based start-ups play the roles of resource mediators, resource recombiners and resource renewers simultaneously in MLNs. These roles vary according to the purpose of resource interaction and where in the network it takes place. We agree with Aaboen *et al.* (2016) that the value of resources depends on how they are integrated within the network. We further argue that these roles change depending on the ability of a given resource interaction to unlock other resources.

5.1 Start-up performing multiple roles facilitating value cocreation

In this specific case, the start-up's main value proposition is its *resource mediator* role of connecting unconnected informational resources, similar to what Harrison and Håkansson (2006) argue regarding new entrants in business networks. However, they do not do this straightforwardly. Rather, they aggregate, format and make data readily available on demand, and confirm it from multiple data sources to provide meaningful information as a resource. Furthermore, to enhance value cocreation, they combine this resource with others, such as recent news or the ICT infrastructure. In this case, the start-up and customers need to adopt a mutual resource interface so that the final output has the desired form. Finally, some resource interfaces depend on resource renewal at the network level, whereby a new technological infrastructure, such as APIs, replaces manual routines and changes value cocreation for both the immediate customer and other tiers of the customer network.

Based on *resource combining* within networks (Baraldi *et al.*, 2012; Landqvist and Lind, 2019), our findings show that the multiple opportunities to combine and integrate resources mean that the start-up company simultaneously performs multiple roles within the network. These different combinations of resources change the inherent value (Penrose, 1959) of the tracking information and enhance value cocreation within the network. Building on what Lee (2000) suggests, playing all three roles, the start-up facilitates the sharing of critical information conveniently

Table 2 Examples of different roles and value offerings

	Explanation	Examples
Start-up roles in MLNs		
Resource Mediator	*Ad hoc* tracking data integrated along the macro network and centralized in a single source	Tracking data at one shipping line's website is combined with tracking data at another shipping line's website and shared with MLN through start-up platform
Resource Recombiner	Individual data processing and problem-solving approach transformed into mutual effort and collaboration to improve information sharing along processes	A shipping line's delay information, reported by start-up tracking system, is adopted to shipper's ERP system to revise their internal operations based on new tracking data
Resource Renewer	Manual data tracking and traditional business models were replaced by digital data tracking and digitalized business models	Tracking data, which was manually sorted from each shipping line's website by employees, are digitally collected from all related websites and shared in start-up's platform
Changing Role	Freight forwarders as solution and integration partners rather than operational partners	Freight forwarders recognize a delay in tracking data on time and take proactive actions by informing and working with the shipper to avoid potential problems at shipper's side
Value offerings cocreated in the MLN		
Use Value	MLN partners use timely, online, accurate, centralized data sharing to create value along processes	Accurate and timely tracking data is used for planning customs clearance priorities, which in return, helps to avoid demurrage or other procedural penalties
Exchange Value	Tracking data aggregates into big data used for innovation	Long-term tracking data provides information analytics to shippers, which are used for choosing shipping lines based on their long-term performances for particular routes

and on-time, which leads to improved performance of larger network members. This evidence of a start-up taking on all three roles in business networks is an addition to Aaboen *et al.* (2016) since, in their study, each role is derived from the individual case analysis. In addition, this study adds understanding of the complexity involved in changing roles for start-ups.

Regarding the types of resources (Håkansson and Waluszewski, 2002a, 2002b), we do not find any evidence regarding the combination of specific resource types for performing certain roles. Technical resources, such as the data, information, information sharing infrastructure and algorithms, sometimes combine with each other and sometimes with social resources, such as the relationships between start-up and customer organizations or their organizational units. Hence, we argue that technical, social or mixed resource interfaces (Dubois and Araujo, 2006; Baraldi and Strömsten, 2006) are created with simultaneous roles within the MLN. Importantly, our findings show, as a *resource renewer*, a start-up also changes the role and resource interfaces of other network actors. In our case, for example, freight forwarders were previously heavily focused on technical resource interfaces with their customers through data tracking and standardized information updates. However, after automating their technical resource interface by using the start-up's services, they became solution or integration partners focused on social resource interfaces. The resources of the MLN were thereby unlocked.

While performing these multiple roles, an ICT-based start-up can cocreate value in an MLN by solving significant niche problems. The value cocreation patterns within the MLN take two main directions. First, use value is created by using consistent, timely and accurate tracking information for decision-making, operations, risk management and service differentiation with SG's first-tier customers, such as freight forwarders and cargo owners. Second, the creation of use value is extended to further customer tiers through organizational interfaces. An interesting finding is that this resource interaction becomes a resource itself. When the customers use SG's tracking services to create use value for themselves and their networks, they leave traces of their search trends and the historical performance of their containers. These inputs create a form of market intelligence that becomes a valuable resource itself. Value cocreation thus creates a new resource with exchange value for the start-up. The processed and packaged search data becomes a new service offering for the MLN based on this exchange value.

5.2 Resource dependence dynamics in maritime logistics networks

In relation to the second research question, our findings reveal power dynamics in MLNs as important game-changers for value creation. Although ICT-based start-ups significantly enhance value cocreation in MLNs through resource integration, the traditional structure of these networks involves significant power imbalances between actors. Shipping lines are very powerful actors that provide the transportation capacity and the infrastructure together with related information resources. Cargo owners and freight forwarders vary in size and shipment volume, so some are powerful, whereas others are relatively weak. Although SG's service offering heavily depends on the publicly available container data supplied by shipping line systems, it has no formal relationships with these organizations. Containers belong to shipping lines as well, which makes the information a critical resource (Ramsay, 1996), essential for SG's operations and with no alternatives (Pfeffer and Salancik, 1978). Thus, the MLN experienced significant disruptions when shipping lines had temporary ICT infrastructure problems or even hacker attacks, which have become a regular threat for the industry. SG is following two paths to tackle this challenge: controlling other critical resources to decrease its dependence and increasing others' dependence on itself (Pfeffer, 1981).

First, SG is trying to find alternative resources that can reduce its dependence on shipping lines' information channels. It is forming contracts with other information service providers that extract data from satellites and sell this data to diverse markets. Second, SG is upcycling historical search data in the system to create a new service. It combines individual searches in the system to form a critical resource providing information about the reliability and accuracy of shipping line services. Given that this may impact shipper preferences, it is critical for shipping lines. By developing this important resource, SG intends to increase shipping lines' dependence on it and thereby ensure the viability of its offering. This might even result in a new customer category for SG that is composed of shipping lines searching for shipper preferences.

6. Conclusion

This study explored how an ICT-based start-up integrated resources within an MLN and influenced value cocreation patterns within this network. The single case was analyzed in the surrounding MLN and in relation to the roles performed during resource integration. The results show that ICT-based start-ups can take on all three roles of resource mediators, resource recombiners and resource renewers in business networks and thus adds understanding to the complexity involved in changing roles (Aaboen *et al.*, 2016).

The roles depend on how they interact and integrate resources, and, in turn, this integration affects value cocreation within the network. The start-up roles can even change the roles of other network members. During resource integration, mixed resource interfaces are developed by combining technical and social resources. Resource integration facilitates the creation of both use and exchange value in the network. This then helps to decrease structural resource dependence on powerful actors by using customer resources to develop new service offerings that propose new value to network actors.

6.1 Theoretical contributions

The paper contributes to the literature on business networks that ICT-based start-ups enter and challenge in three areas. First, the particular characteristics of the maritime transportation network and its connection to supply networks show how resource integration and the resulting value cocreation by connecting triads is executed in this specific network setting. In this way, the study contributes with details of how the network changes when a technological start-up enters, integrates resources and performs multiple roles through resource interaction (Bocconcelli *et al.*, 2020). Second, by performing different roles, ICT-based start-ups strengthen their position within MLNs, enable other network members to change their roles, and facilitate both use and exchange value cocreation. This profiling of start-up roles within business networks extends

what Aaboen *et al.* (2016) suggest, and this paper concludes that these organizations can perform multiple resource interaction roles simultaneously within networks. Performing multiple resource interaction roles simultaneously offers a significant source of network dynamics.

The study also shows that it is important to understand how resource integration triggers other network members' abilities to integrate resources and thus their value cocreation. Hence, building on previous studies on start-up resource integration within networks (Landqvist and Lind, 2019; Ciabuschi *et al.*, 2012), this study extends the analysis to the network level to provide insights about network dynamics regarding resource dependence and value cocreation. Related, this study contributes to the resource dependence stream of literature (Drees and Heugens, 2013) through revealing how the role(s) of the start-up is changing resource dependence in the network.

Finally, addressing calls to study knowledge as a resource within business networks (Baraldi *et al.*, 2012), the findings show that the main resource that the ICT-based start-up developed is knowledge as a combination of other technical, social resources and intricate interfaces. The consistent flow of knowledge unlocks other resources for network members while also regenerating itself as a resource for its initial provider. The knowledge generated by the start-up's customers becomes new resources enabling service differentiation and facilitating new value cocreation within the network.

6.2 Managerial implications

Container shipping is considered a conservative industry regarding the digitalization of operational processes that require significant manual work and documentation. Hence, many external players want to enter container shipping networks to offer ICT-based services. This study provides insights about such start-ups by showing how their value proposition can unlock resources within MLNs and how different combinations of resources can strengthen their positions within these networks. These start-ups should understand how they can establish technical and social resource interfaces with other network members to facilitate the cocreation of value, not only for their immediate customers but also for further customer tiers in their supply/distribution networks.

There is a structural power imbalance in these networks as shipping lines are quite powerful members who prefer vertical integration and in-house ICT-based solutions. Yet, ICT-based start-ups depend on them. Nevertheless, by demonstrating how integrating knowledge-based resources can create new knowledge that benefits all network members, these start-ups can incentivize shipping lines to form coalitions with them. This can then reduce the inherent resource dependence in such MLNs.

6.3 Notes on future research

The present study has regarded ICT-based start-ups in MLNs. However, the resource interaction underlying the performance of multiple roles in business network may be the basis for other more established companies as well as roles in other business network settings. Since digitalization is an important enabler across industries, the abilities to take on such network roles and reconfiguring resources with technological development are neither bound to start-ups nor tied to this specific setting. The findings and theoretical contributions above are thus grounded in an empirical study of a start-up in its specific network context. Importantly, the underlying value cocreation patterns, resource interaction and changing resource integrations are developed to be of value in researching business networks of other industrial settings based on analytical generalization in single case research (Andersen *et al.*, 2018).

Hence, more research on a variety of business network settings is required since there is room for learning across industrial settings to understand how different contexts affect value cocreation in networks and identify which network characteristics that are critical in cocreation. For example, the case of MLN is a service network, whereas business networks that focus on product exchanges or product development may have different dynamics. This, in turn, may require different theoretical approaches to resource integration and value cocreation. The industrial network approach and resource-dependence theory could provide new explanations of start-up entry and integration in business networks. Resource dependence dynamics vary across networks and over time with value cocreation that can be studied with the service dominant logics as a base. As a resource, knowledge can change dependencies within networks. Therefore, future research being at the intersection of these theories to explain how start-ups enter and even disrupt business networks could make interesting contributions to the field.

To end, the topics of digitalization, start-ups, power and network dynamics require frameworks of different streams of literature (Mosch *et al.*, 2022), which will require discussion of challenges and boundaries with given theoretical approaches or even combinations. An open view to similarities and differences among theoretical approaches (Bocconcelli *et al.*, 2020) could help us to learn more about own assumptions and to stretch theoretical boundaries to embrace contemporary and future phenomenon in business networks.

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Further reading

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Corresponding author

Ceren Altuntas Vural can be contacted at: ceren.altuntasvural@chalmers.se

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