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Start-ups in the logistics industry: Advancing a framework for the disruptive potential of digital freight forwarder platforms (DFFs)

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Abstract.

Digital platforms play an increasing role in the logistics industry and start-ups are challenging traditional logistics providers with new business models. It is, however, not clear whether these platforms have the potential to disrupt current industries. As a response, this paper contributes a more nuanced view on the notion of disruption and disruptive innovation and is concerned with digital freight forwarders (DFFs) in particular. To distinguish between disruptive and sustained innovations, we develop a framework from literature that allows characterizing digital platforms and their disruptive potential along the initial target market, the value contribution, the ecosystem network and the industry supervision. We apply this framework to a comparative dual-case study of two DFFs and reveal important differences. Beyond its very contribution, the paper invites researchers to expand on the given approach, in particular to advance the predictive ability of the proposed framework.

Keywords: logistics platform; digitalization; freight forwarding; platform characteristics

1. Introduction

Digitalization within the logistics service industry is of increasing strategic importance for businesses and corporations as it impacts established paradigms, business models and industry boundaries (Barrett et al., 2015; Chapman et al., 2003; Herold et al., 2021; Klötzer & Pflaum, 2017; Mikl, Herold, Ćwiklicki, et al., 2020). In particular, incumbent companies are challenged by digital logistics start-ups that offer a range of services traditionally provided by established logistics companies or providers (Bharadwaj et al., 2013; Kummer et al., 2020; Sandström et al., 2009; Sucky & Asdecker, 2019). In the last decade, investments in logistics start-ups are constantly growing with around 3.5 billion US$ in 2017 alone (Wyman, 2017). The majority of investments in logistics start-ups is related to developing and offering digital platforms that act as market intermediaries in freight transportation (Wyman, 2017). Often, such start-ups act as digital freight forwarders (DFFs) that promise to provide better and more cost-efficient, real-

time and on-demand transport arrangements, thereby posing a threat to disrupt existing business models of incumbent firms - Forto and Cargonexx are powerful examples. In particular, DFFs business models differ from incumbent firms in the following business model components: value proposition, value creation, value delivery and value capture (Mikl, Herold, Ćwiklicki, et al., 2020).

However, although DFFs and start-ups have become an increasingly prevalent topic in industry and academia, it is not clear to what extend these digital start-ups have the potential to disrupt existing industries. In particular, despite the widespread use of the term disruption by academics and managers alike, only limited research exist on nuances of disruption and what may constitute a truly disruptive digital platform. As a response, this paper evaluates to what extent DFFs in the logistics industry acting as market intermediaries have the potential to disrupt existing industries. Building on the seminal work of C. M. Christensen (1997), who distinguishes between sustained and disruptive technologies, we aspire to contribute a framework to identify the key drivers and characteristics of sustained and disruptive digital platforms. In addition, we employ two DFF case studies to examine and illustrate the potential of two emerging DFFs to shape a new industry paradigm.

The remainder of this paper is structured as follows: in the next section, we identify and define the key characteristics of digital intermediary platforms and present the associated framework. This is followed by an outline of the methodology and a description of the two DFFs that are used to scrutinize the start-ups' disruptive potential. Findings are presented and discussed in reference to our framework. We conclude by summarizing the main insights and contributions as well as outlining scientific challenges and opportunities for future research.

2. Background

Start-ups in logistics and supply chain are increasingly building capacities along the entire value chain with a digital logistics startup founded every five days (Dobrovnik et al., 2018; Wyman, 2017). These start-ups challenge existing logistics incumbents with technology-driven solutions and new digital business models (Hribernik et al., 2020; Mikl, Herold, Ćwiklicki, et al., 2020) covering logistics functions from freight forwarding, brokerage, long-distance-transportation, warehousing, contract logistics to the last-mile delivery. Often, these new business models rely on digital platforms, with some scholars even referring to a 'platform revolution' (e.g. Parker et al., 2016).

The literature distinguishes between three types of digital platforms, the *product platform*, the *platform ecosystem* and the platform acting as a *market intermediary* (Annabelle Gawer, 2014; Jacobides et al., 2018). A *product platform* comprises modular components and elements that are used efficiently to develop an array of products , while a *platform ecosystem* is characterized by an underlying platform technology and associated standards designed by the platform leader which is complemented by a set of assets offered by third parties (Annabelle Gawer & Cusumano, 2014; Jacobides et al., 2018). Start-ups in logistics and supply chain, however, mainly develop and offer platforms acting as *market intermediary* that rely on digital technology (Thomas et al., 2014). A market intermediary can be described as an "interface" that "mediates transaction" (McIntyre & Srinivasan, 2017, p. 143) of goods and services between supply- and demand-side actors, thus representing a marketplace (Thomas et al., 2014).

In particular, DFFs are the most common market intermediaries' platforms in the area of logistics and transportation.

Due to the relatively recent emergence of the digital platforms in logistics and supply chain, there is only limited knowledge among academics and practitioners about the short-and long-term disruptive impact of these digital startup platforms. So far, research on market intermediary platforms focused mainly on platform competition (Zhu & Liu, 2018), growth (Thomas et al., 2014) or the social and environmental dimension of intermediaries (Bardhi & Eckhardt, 2010; Murillo et al., 2017). It exists, however, confusion and lack of insights whether these DFF platforms have the potential to disrupt the logistics industry.

To examine disruptive innovations, scholars frequently refer to the seminal work of C. M. Christensen (1997) who distinguishes between sustaining and disruptive technologies and innovations. Sustained innovations are characterized by improving products with incremental advances or major breakthroughs, thus enabling the incumbent's company to sell more products to their most profitable customers (C. M. Christensen et al., 2015). In other words, sustaining technologies improve already existing and established products along the dimensions that mainstream customers demand (Sandström et al., 2009). Examples include better mobile reception, a better TV resolution or the fifth blade in a razor.

Disruptive technologies, in contrast, are initially underperforming along the dimension of mainstream customer demand and are considered inferior by most of incumbents' customers (C. M. Christensen et al., 2015). The low performance and the ancillary performance attributes create a market that is characterized by uncertainty, thus established firms find it irrational to abandon their profitable customers in order to aim for a new, but small market with an inferior technology and customers are skeptical to switch to the new offering only because it is less expensive (Sandström et al., 2009). Only when the performance and the quality of the disruptive technology rises, existing incumbents' customers are willing to abandon the sustaining technology and adopt the new technology. This distinction is also salient for DFFs, yet it is unclear whether digital market intermediaries can be regarded as sustained or disruptive. As the aim of this paper is to examine if DFFs in logistics can be classified disruptive or sustained, this paper firstly builds and outlines the main digital intermediary platform characteristics that are most relevant to distinguish between sustained and disruptive technologies.

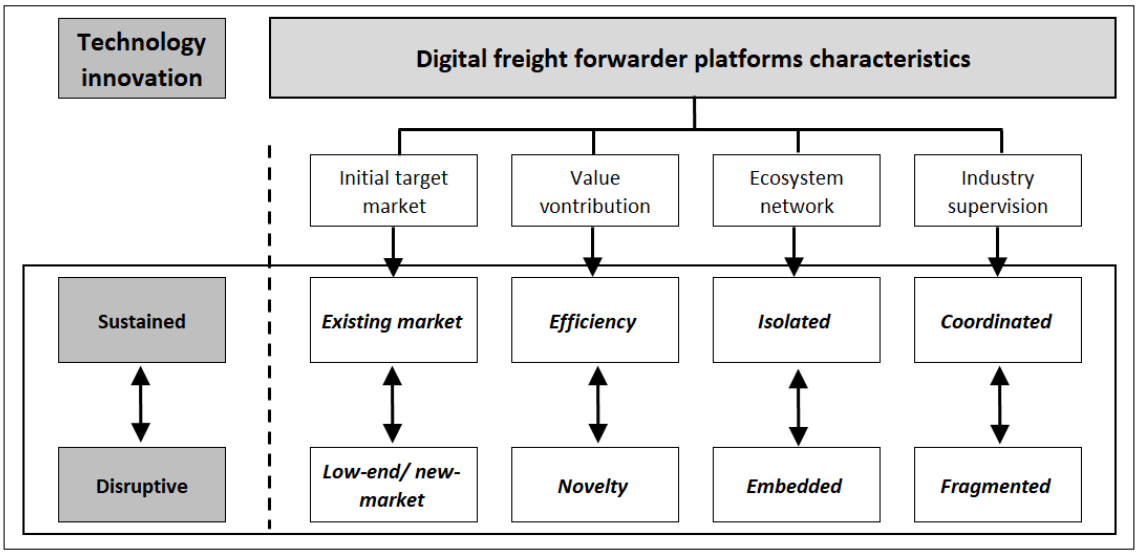
3. Sustained vs. disruptive technologies: Digital freight forwarder platform characteristics

Sustained and disruptive technologies and innovations have distinct characteristics that allow us to differentiate between digital intermediary platforms. In particular, existing management and technology literature (e.g. Barrett et al., 2015; Bharadwaj et al., 2013; C. M. Christensen et al., 2015; de Reuver et al., 2018; Markides, 2006) has identified four characteristics that are most relevant when distinguishing sustained from disruptive innovations (see Fig. 1), namely the *initial target market*, the *value contribution*, the *ecosystem network* and the *industry supervision*.

Initial target market: To distinguish between sustained and disruptive technologies, it is important to which extent the needs of actors in an incumbent's target market are addressed. *Sustained technologies* focus on an existing target market, i.e. sustained innovation drive sales

within the incumbent's mainstream and profitable customers segment (Sandström et al., 2009). In contrast, disruptive technologies start in markets that incumbents initially overlook. The literature divides disruptive target markets in *low-end footholds* and *new-market footholds*. The former refers to a disruption that occurs because incumbents pay less attention to less-demanding customers as they target the most demanding and thus most profitable customers, thereby missing to provide low-end customer with a 'good enough' product (C. M. Christensen et al., 2015). The latter, *new-market footholds*, refers to a disruption that turns non-consumers into consumers, thereby creating a new market in a niche. Thus, the main distinction between the target markets for sustained and disruptive technologies is that 'sustained' platforms focus on existing customers, while 'disruptive' platforms enlarge the economic pie either by attracting new customers into existing or new markets.

Figure 1: Digital freight forwarder platform characteristics



Value Contribution: Whether a digital technology can be seen as sustained or disruptive innovation depends on the value that it provides to its customer base. Amit and Zott (2001) distinguish contributions in the technology sector, for which three are valid for digital intermediary platforms, namely *efficiency*, *lock-in* and *novelty*. *Efficiency* refers to the ability to reduce information asymmetries between buyers and sellers, thereby enhancing transactional efficiencies through a reduction in search, distribution and inventory costs. *Lock-in* refers to the ability of a digital business model to prompt users to engage in repeat transactions either through the 'ease of use' or building barriers that makes it inconvenient to switch providers. *Novelty* refers to new services and new methods of distribution and structuring transactions e.g. by eliminating inefficiencies or connecting previously unconnected parties. However, while efficiency indicates a rather sustained innovation approach, novelty may be an indicator for disruptive technology.

Ecosystem network: In digital platforms, multiple actors in the ecosystem have different roles that enable, constrain and coordinate numerous' actor's actions and interactions in ecosystems or industries (Hinings et al., 2018; Mikl, Herold, Pilch, et al., 2020). In order to be

disruptive, digital logistics start-ups need to place considerable importance on the ecosystems' network as critical linkages exist with various actors both up and down the supply chain or even outside the supply chain (Chapman et al., 2003). Moreover, alliances and partnerships within the ecosystem may not only help to improve the service through e.g. shared digital assets, but also provides an opportunity to scale the business as more supply-side partners augment the service, thereby using the network effect to increase the customer base (Bharadwaj et al., 2013). Thus, the higher the digital platform is integrated or embedded in the ecosystem, the higher is the chance to eventually scale the business and become disruptive.

Industry supervision: Whether a platform can be considered disruptive even when it defined as sustained, seems also to be related to the industry regulations the digital platform is operating in. For example, although Uber is by definition rather a sustained innovation, C. M. Christensen et al. (2015) see Uber as an "outlier" (p. 51) that was able to disrupt the taxi business due its regulated nature where market entry and prices are closely controlled by various jurisdictions. As a consequence, it is argued that the extent how an industry is regulated represents a crucial factor when assessing sustained and disruptive platforms. Thus, whether digital platform can be considered disruptive depends on the fragmentation and coordination within the industry the platform is operating in.

4. Research Design

To address the research aim of determining whether digital platforms represent sustained or disruptive technologies, a qualitative approach using a dual case study from DFFs start-ups is used to examine the four identified characteristics a) the initial target market, b) the value contribution, c) the ecosystem network and d) the industry supervision. In particular, we chose two DFF start-ups, namely Forto and Cargonexx, that are currently challenging TFFs and logistics service providers (LSPs), who often still typically rely on legacy IT systems and cumbersome and manual processes For and Cargonexx, however, make extensive use of advanced algorithms to calculate and predict rates, capacities and means of optimization along the value chain, thereby representing a service that traditional providers can currently not offer (Mikl, Herold, Ćwiklicki, et al., 2020). A qualitative case study approach allows us to analyze the similarities and differences between the cases to find out whether these start-ups have a disruptive potential. We used academic and non-academic sources, websites, press releases, newspaper articles, industry reports and process descriptions about Forto and Cargonexx to gather information about the four identified characteristics and adopted a content analysis approach to gain in-depth understanding of the characteristics to enable a discussion to distinguish between sustained and disruptive technologies. A detailed description of Forto and Cargonexx is presented next.

Forto (former FreightHub): The start-up Forto operates in the sea-, air-, and rail freight sector offering shipments between Europe, Asia and North America via their online based platform (FreightHub, 2019). Forto provides dependable, efficient services and processes in order to combine shipments via data intelligence and artificial intelligence (AI), including immediate automatically created price quotes, real time booking and tracking functions, a broad range of options for the transport duration, departure and arrival date and different ports and prices (O'Brien, 2018). With their optimized algorithm customers can choose from different routes and offers like fastest or cheapest shipment while easily comparing all modes of

transport. Since their founding in 2016 the start-up is currently working with 1.000 partners (O'Hear, 2019).

Cargonexx: Unlike, Forto, the aim of Cargonexx is to improve the utilization of trucks by avoiding empty runs (Cargonexx, 2019). In particular, the platform claims to determine prices of cargo transports by using AI and combining shipments by data intelligence, e.g. while freight forwarders place their orders on the platform, carriers can accept them after the former had confirmed the price calculated automatically by Cargonexx (Hausel, 2018). The platform itself works as an intermediary between customers and carriers and allows faster contracts and transactions, more desirable prices and as a side effect less CO_2 emissions compared to conventional exchange models. Currently the platform compromises 50 shippers with a turnover from customers around 1billion Euro and 8.000 registered carriers with over 100.000 trucks (Eckl-Dorna, 2017).

5. Findings and discussion

In order to classify digital platforms, we identified the four key characteristics a) initial target market, b) the value contribution, c) the ecosystem network and d) the industry supervision and used a dual case study of two DFFs, namely Cargonexx and Forto, to examine whether these start-ups can be considered as a sustained or disruptive technology. In the next sections, we present our findings (see Fig. 2) and discuss their implications with regard to sustained or disruptive potential.

5.1 Initial target market

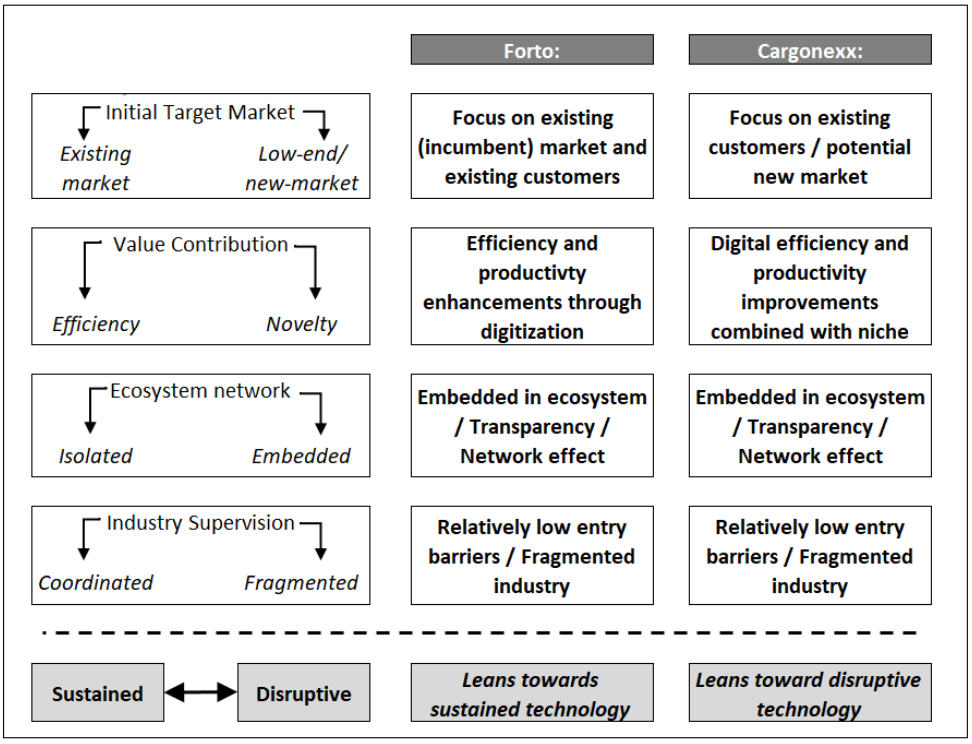
A classification of the initial target market can be used as an indicator whether a start-up has the potential to disrupt existing industries or consists of sustained innovation. Sustained technologies focus on existing customers, while disruptive technologies aim at customers that incumbents initially overlook, i.e. disruptive focus on new customers in existing or new markets (C. Christensen et al., 2011). For digital platforms that focus on freight exchange, existing customers mainly consist of shippers, i.e. freight forwarders or other LSPs, while new customers may consist of industry and trading companies who may book directly without involving a middleman (Hausel, 2018).

Forto is offering digitized processes from booking, communication, data exchange and document management, however, their initial target market consist of existing customer segments and uses mainstream shippers for the transport (FreightHub, 2019; Mikl, Herold, Ćwiklicki, et al., 2020; O'Brien, 2018). In other words, Forto targeted a market that has initially not been overlooked, instead attempting to make customers switch to their product by offering more transparency, reliability as well as time and cost advantages (O'Hear, 2019), thereby focusing on existing profitable customers and not expanding the economic pie. In contrast, Cargonexx focused on customers that are overlooked by incumbents by providing a niche product. More specifically, Cargonexx attracts existing freight forwarders or LSPs by offering a new market: based on AI, their platform connects shippers with trucks with empty runs (Cargonexx, 2019; Eckl-Dorna, 2017). Moreover, Cargonexx is increasingly receiving bookings directly from industry and trading companies and uses own trucks and drivers

(Hausel, 2018), thereby posing a threat to existing freight forwarders and LSPs as incumbent customers switch and seem to adopt the new technology.

In summary, significant differences between the initial target market of the two DFFs can be observed. Forto initially focused on existing customers in existing market, i.e. the start-up targeted profitable companies and used mainstream freight forwarders or LSPs for transportation. Cargonexx, however, offered a new product for existing customers, thereby creating a new-market foothold. While Forto initial target market indicates a sustained innovation, Cargonexxx tendency leans more towards a disruptive potential, in particular as industry and trading companies increasingly using Cargonexx's technology to avoid the middleman.

Figure 2: Forto and Cargonexx platform characteristics



5.2 Value proposition

The value proposition is another indicator to classify whether a start-up has the potential to disrupt current industries. Often, start-ups focus on exploiting existing competencies for short-term success while at the same time exploring new competencies for long-term benefits (Wang & Rafiq, 2014). According to Amit and Zott (2001), the former represents a focus on efficiency,

i.e. it is related to an increase in productivity of running and managing the nexus of the transactions in which it is embedded. The latter represents a novel innovation of products, services, production and distribution methods and management of transactions. While a focus on efficiency indicates a sustained technology, novel innovations may have the potential to disrupt industries.

Forto's value proposition lies in the digital collaboration between customers, partners and suppliers, i.e. their system reduces the information asymmetry between the parties; presenting it itself a 'market aggregator' and providing customers with full tracking and reporting (FreightHub, 2019). In other words, Forto focused on operational and transactional efficiencies that incumbent forwards are not (yet) able to offer, mainly due to their legacy information technology (Tirschwell, 2018), thus, Forto's value proposition is built around efficiency and higher productivity. Cargonexx focused also on the efficiency aspect by offering 'One-Click-Trucking' and use of algorithms for handle transportation orders. For example, incumbent dispatchers need around 25 minutes to organize a transportation order, while Cargonexx needs under one minute (Eckl-Dorna, 2017) and uses freight, traffic and weather data among others to calculate and offer potential future routes to forwarders (Hausel, 2018). Their initial focus, however, on the previously unused room from empty truck runs, could be regarded as a novel contribution where Cargonexx is not only increasing the efficiency, but also connecting previously unconnected parties (Amit & Zott, 2001).

Although both DFFs value propositions focused initially on efficiencies, minor differences can be observed. Forto's value proposition is built around higher productivity by enhancing transactional efficiencies trough a reduction in search, distribution and inventory costs. While Cargonexx also focused on the efficiency by offering 'One-Click-Trucking', the start-up build new competencies through the use of AI and was able to attract previously unconnected parties. As a consequence, Forto's value proposition indicates a sustained innovation, while Cargonexx has a greater tendency to a novel innovation, thereby leaning more towards a disruptive technology.

5.3 Ecosystem Networks

To understand whether a digital platform has disruptive potential, the degree to which the start-up is embedded in the ecosystem network is an indicator. Existing literature emphasizes that not only entrepreneurial ideas and products define the success and scalability of a start-up, but rather the creation of relationships to relevant counterparts can be crucial, such as incubators, financiers, suppliers and other collaborators (Baraldi, Havenvid, Linné, & Öberg, 2018). A digital "platform, in the end, is the technology behind relationship building" (Shaughnessy, 2018, p. 1). For example, the more a start-up is embedded in the ecosystem network, the more interdependencies exist that enable business development among parties in the ecosystem. These parties have often not a direct contractual relationship and prosper by creating ecosystem elements that become integral to how the ecosystem functions, thereby naturally expanding the business (Landqvist & Lind, 2017).

Forto and Cargonexx aim to collaborate and share data within the ecosystem network and along the supply chain, i.e Forto and Cargonexx see embedding not only about developing organizational resources such as relationships, but also about fitting into established technical resource structures and combing in new ways(Landqvist & Lind, 2017). In contrast to the two

DFFs, TFFs or LSPs generally only manage particular steps of the transportation journey and don't tend to share information with those manning the other parts of the system. In other words, while TFFs or LSPs may be able to gather data about a specific shipment from A to B, they are left in the dark about the legs preceding and following their involvement, thereby lacking a data-driven process based around transparency or the 'single version of the truth' (Transmetrics, 2019).

Forto as well as Cargonexx seem to be related to the relevant parties within their network to develop their business (e.g. Eckl-Dorna, 2017; Hausel, 2018; O'Brien, 2018; O'Hear, 2019). However, more importantly, both DFFs aim to provide full transparency along the supply chain and within their ecosystem networks as it is part of their business model. While the degree of embeddedness of the two DFFs cannot be quantified due to the lack of available information, a positive feedback look from network effects can be observed (Baraldi et al., 2018; Dickel et al., 2018). Forto and Cargonexx are characterized by high interconnectivity, speed of information processing and numerous parties that can be considered 'network generators' that increase the customer and collaborators' base, thereby increasing the opportunity for more embeddedness of the two DFFs in the ecosystem network (Amit & Zott, 2001).

5.4 Industry Supervision

Another crucial factor when assessing whether DFF platforms are sustained or disruptive technologies is the degree of regulation of the industry the platform is operating. Sustained technologies take place in coordinated markets while disruptive ones aim fragmented industries (C. Christensen et al., 2011). For example, fragmented industries in this case can be identified by low entry barriers, e.g. small enterprises can join the industry any time and large companies lacking control of the industry (Brown, 2011). This is particularly true for the transportation and logistics industry, where a large number of service providers with comparable strength exist.

Cargonexx, for example, focused on road freight, where entry barriers are considerably low and competitive pressure is high, which leads to truck utilization of 60 per cent with 20 per cent of trucks running empty (Baron et al., 2017). Furthermore, business complexity in road freight is low with point-to-point movements that can be carried out by one carrier, which adds to the fragmentation in the road freight transportation industry. As a consequence, entering the road freight market is relatively easy, particularly when Cargonexx provides instant binding land-transport rate based on historic analysis and forecasting.

Forto in contrast, is operating in the sea-, air and rail freight sector, where fragmentation is comparably low as the transport chains are more complex. However, the technological progress makes the complexity less relevant as digitization makes it easier to integrate various actors along a complex supply chain. As such, Forto tries to mimic TFFs or LSPs by spanning a virtual network around the globe with an offering of support to regular freight flows and combine it with other modes of transport.

In summary, both the road freight and the sea-, air and rail freight sector have relatively low entry barriers, thus Forto and Cargonexx are both operating in fragmented industries. The consequences of these observation are twofold. First, a coordinated response from an overarching organization or association that may regulate or challenge global DFFs is rather

unlikely, thus, second, the fragmentation in the transportation markets may represent a pre-requisite or an indicator that both DFFs have disruptive potential.

6. Conclusion

This paper contributes a more nuanced view on the notion of disruption and disruptive innovation and is concerned with DFF platforms in particular. To distinguish between disruptive and sustained innovations, we developed a framework from literature that allows to characterize digital platforms along the initial target market, the value contribution, the ecosystem network and the industry supervision. The findings from our comparative case study provide insights into whether the two DFFs Forto and Cargonexx have the potential to disrupt existing industries or whether these digital platforms are rather sustained innovations. Although our examination of the four characteristics shows similarities, at the same time it reveals important differences between the start-ups regarding their disruptive potential.

With regard to the initial target market, Forto initially focused on existing customers in an existing market, while Cargonexx focused on a niche product that may represent a new market. Similarly, the value contribution of both DFFs is mainly related to efficiency and productivity improvements through digitalization of and along the supply chain. However, Cargonexx focus on empty runs may enable to connect previously unconnected parties, which suggests that incumbent customers increasingly adopt the new technology, making the disruptive force of Cargonexx ever more likely to unfold. Forto as well as Cargonexx aim to be embedded in their ecosystem not only to create a positive feedback-loop from a network effect, but also to increase transparency among relevant parties. Moreover, both DFFs operate in relatively fragmented industries with low entry barriers, thereby providing a foundation that may result in disruptive potential.

However, although our formal inquiry found characteristics with disruptive potential, it could be debated whether these platform technologies only represent first mover advantages rather than disruption. As our findings point out, Forto and Cargonexx focus on enhancing productivity and efficiency which leads to the question how long can these DFFs sustain their competitive edge over the long term and keep TFF from replicating the digital platform advantages. In addition, DFFs still face some functional gaps and technical limitations to fully digitize the supply chain, e.g. for real-time global decision-making an Internet of Things (IoT) environment connecting all transport assets would be needed, which requires access to the relevant parties. Thus, although DFFs are technology vanguards and provide a better value-chain perspective, they need to expand or enter strategic alliances in order to advance.

Although we are confident to have identified a framework of four distinct characteristics to examine whether digital platforms can be seen as disruptive or sustained, other factors and a more fine-grained view may be required. Hence, we invite researchers to expand on our approach, which is of particular importance for enabling the predictive ability of the proposed framework. We are not yet convinced that we have the ability to identify, ex ante, those very characteristics leading to industry-disruptive innovation. It is left to further studies to clarify how the emergence of DFFs affects existing business models in logistics and transportation, especially how it affects TFFs or LSPs. However, despite its infancy stage the influence of

digital platforms on sectors and industries has rightly drawn increasing scientific and managerial attention already.

References

Amit, R., & Zott, C. (2001). Value creation in e- business. *Strategic management journal*, *22*(6- 7), 493-520.

Bardhi, F., & Eckhardt, G. (2010). Market-mediated collaborative consumption in the context of car sharing. *ACR North American Advances*.

Baron, R., Zintel, M., Zieris, M., & Mikulla, D. (2017). *Digital platforms in freight transportation* (https://www.adlittle.com/en/insights/viewpoints/digital-platforms-freight-transportation

Barrett, M., Davidson, E., Prabhu, J., & Vargo, S. L. (2015). Service innovation in the digital age: key contributions and future directions. *MIS Quarterly*, *39*(1), 135-154.

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly*, *37*(2), 471-482.

Cargonexx. (2019). *The future of trucking* https://www.cargonexx.com/en/

Chapman, R. L., Soosay, C., & Kandampully, J. (2003). Innovation in logistic services and the new business model: a conceptual framework. *International Journal of Physical Distribution & Logistics Management*, *33*(7), 630-650.

Christensen, C., Raynor, M., & McDonald, R. (2011). Disruptive innovation. Perseus Book LLC (Ingram).

Christensen, C. M. (1997). *The Innovator's Dilemma*. Harvard Business School.

Christensen, C. M., Raynor, M. E., & McDonald, R. (2015). What is disruptive innovation. *Harvard Business Review*, *93*(12), 44-53.

de Reuver, M., Sørensen, C., & Basole, R. C. (2018). The digital platform: A research agenda. *Journal of Information Technology*, *33*(2), 124-135.

Dobrovnik, M., Herold, D., Fürst, E., & Kummer, S. (2018). Blockchain for and in Logistics: What to Adopt and Where to Start. *Logistics*, *2*(3), 18. https://doi.org/10.3390/logistics2030018

Eckl-Dorna, W. (2017, 27 July). Startup Cargonexx will Lkw-Frachten effizienter organisieren *Manager Magazin*. https://www.manager-magazin.de/unternehmen/autoindustrie/startup-wie-cargonexx-lkw-transporte-effizienter-organisieren-will-a-1157000-2.html

FreightHub. (2019). *The Digital Freight Forwarder*. FreightHub https://freighthub.com/en/

Gawer, A. (2014). Bridging differing perspectives on technological platforms: Toward an integrative framework. *Research policy*, *43*(7), 1239-1249.

Gawer, A., & Cusumano, M. A. (2014). Industry platforms and ecosystem innovation. *Journal of Product Innovation Management*, *31*(3), 417-433.

Hausel, C. (2018). Cargonexx verhindert leere LKW auf unseren Straßen. https://www.basicthinking.de/blog/2018/10/24/cargonexx-start-up-check/

Herold, D. M., Ćwiklicki, M., Pilch, K., & Mikl, J. (2021). The emergence and adoption of digitalization in the logistics and supply chain industry: An institutional perspective. *Journal of Enterprise Information Management*.

Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Digital innovation and transformation: An institutional perspective. *Information and Organization*, *28*(1), 52-61.

Hribernik, M., Zero, K., Kummer, S., & Herold, D. M. (2020). City logistics: Towards a blockchain decision framework for collaborative parcel deliveries in micro-hubs. *Transportation Research Interdisciplinary Perspectives*, *8*, 100274.

Jacobides, M. G., Cennamo, C., & Gawer, A. (2018). Towards a theory of ecosystems. *Strategic management journal*, *39*(8), 2255-2276.

Klötzer, C., & Pflaum, A. (2017). Toward the development of a maturity model for digitalization within the manufacturing industry's supply chain.

Kummer, S., Herold, D. M., Dobrovnik, M., Mikl, J., & Schäfer, N. (2020). A Systematic Review of Blockchain Literature in Logistics and Supply Chain Management: Identifying Research Questions and Future Directions. *Future Internet*, *12*(3), 60.

Landqvist, M., & Lind, F. (2017). A start-up embedding in three business network settings–a matter of resource combining. *Industrial Marketing Management*.

Markides, C. (2006). Disruptive innovation: In need of better theory. *Journal of Product Innovation Management*, *23*(1), 19-25.

McIntyre, D. P., & Srinivasan, A. (2017). Networks, platforms, and strategy: Emerging views and next steps. *Strategic management journal*, *38*(1), 141-160.

Mikl, J., Herold, D. M., Ćwiklicki, M., & Kummer, S. (2020). The impact of digital logistics start-ups on incumbent firms: a business model perspective. *The International Journal of Logistics Management*. DOI:10.1108/IJLM-04-2020-0155

Mikl, J., Herold, D. M., Pilch, K., Ćwiklicki, M., & Kummer, S. (2020). Understanding disruptive technology transitions in the global logistics industry: the role of ecosystems. *Review of International Business and Strategy*. DOI:10.1108/RIBS-07-2020-0078

Murillo, D., Buckland, H., & Val, E. (2017). When the sharing economy becomes neoliberalism on steroids: Unravelling the controversies. *Technological Forecasting and Social Change*, *125*, 66-76.

O'Brien, C. (2018). Startup Of The Week: FreightHub. https://innovator.news/startup-of-the-week-freighthub-3933bca180aa

O'Hear, S. (2019). FreightHub, the European digital freight forwarder, collects $30M Series B. https://techcrunch.com/2019/05/02/freighthub-b/

Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). *Platform revolution: How networked markets are transforming the economyand how to make them work for you*. WW Norton & Company.

Sandström, C., Magnusson, M., & Jörnmark, J. (2009). Exploring factors influencing incumbents' response to disruptive innovation. *Creativity and Innovation Management*, *18*(1), 8-15.

Shaughnessy, H. (2018). Why Disruption Is All About Ecosystem Thinking. https://disruptionhub.com/ecosystem-platfrom-business-haydn-shaughnessy-disruption/

Sucky, E., & Asdecker, B. (2019). Digitale Transformation der Logistik–Wie verändern neue Geschäftsmodelle die Branche? (*Geschäftsmodelle in der digitalen Welt* (pp. 191-212). Springer.

Thomas, L. D., Autio, E., & Gann, D. M. (2014). Architectural leverage: putting platforms in context. *Academy of management perspectives*, *28*(2), 198-219.

Tirschwell, P. (2018). Traditional forwarders challenged not disrupted. https://www.joc.com/international-logistics/so-far-forwarding-sector-proving-be-harder-disrupt-taxis_20180409.html

Transmetrics. (2019). Standing up to Amazon: Why Data Is the Key to Save the Logistics Industry? https://transmetrics.eu/blog/standing-up-to-amazon-why-data-is-the-key-to-save-the-logistics-industry/

Wang, C. L., & Rafiq, M. (2014). Ambidextrous organizational culture, Contextual ambidexterity and new product innovation: a comparative study of UK and C hinese high- tech Firms. *British Journal of Management*, *25*(1), 58-76.

Wyman, O. (2017). Digital Logistics Startups Are Both Challenge And Opportunity For Industry Incumbents. *Forbes*. https://www.forbes.com/sites/oliverwyman/2017/07/28/digital-logistics-startups-are-both-challenge-and-opportunity-for-industry-incumbents/#66d1000e1589

Zhu, F., & Liu, Q. (2018). Competing with complementors: An empirical look at Amazon. com. *Strategic management journal*, *39*(10), 2618-2642.