SUPPLY CHAIN INNOVATION AND SUPPLIER INNOVATIVENESS IN GLOBAL, MULTI-INDUSTRIAL COMPANIES

Insights through a case study of a “strong exemplar”

Lappeenranta–Lahti University of Technology LUT

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Examiner: Junior researcher, Iryna Maliatsina

ABSTRACT

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Keywords: supply chain innovation, supplier innovativeness, a single case study, global, multi-industrial companies

Supply chain innovation plays a paramount role, when companies aim to survive and to thrive in the competitive and challenging business environment of today, and suppliers, as key members of the supply chain, have caught the spotlight. In research, supply chain innovation has been found to positively impact supply chain operations and practices as well as risk management, with supplier innovativeness enhancing the crucial sharing of information in the supply chain and likewise improving the overall innovation performance and outcome. However, engaging suppliers in innovation efforts and reaping the benefits of it is not without its challenges and there may also be limitations in understanding how supplier innovativeness is enhanced through formal and informal methods.

Conducting a single-case study involving a company of a strong exemplar, the purpose of this thesis was to investigate how supply chain innovation and supplier innovativeness, especially, is understood, enhanced, and evaluated in multi-industrial, global companies. The findings of this study suggest that supply chain innovation and supplier innovativeness is acknowledged and aspired in such companies, which may also be in possession of several positive attributes in capturing supplier innovativeness, such as attractiveness.

Despite this supply chain innovation and supplier innovativeness remain phenomena rather difficult to enhance and evaluate. Companies may over rely on indirect methods and suppliers' voluntary actions in fostering innovation, and discovering appropriate key performance indicators persists as a challenge. The findings also allude to the great importance of culture, both internal and external, to supplier innovativeness.

TIIVISTELMÄ

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Kauppatieteet

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Toimitusketjun innovaatiot sekä toimittajan innovatiivisuus kansainvälisissä, moniteollisissa yhtiöissä – tapaustutkimus esimerkillisen yhtiön näkemyksistä

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Toimitusketjun innovaatioilla ja toimittajan innovatiivisuudella on merkittävä rooli yritysten kilpailukyvyn edistämisessä aikamme haastavassa maailmantilanteessa. Tutkimuksissa toimitusketjun innovaatioiden on todettu tehostavan toimitusketjun operaatioita ja käytäntöjä sekä riskinhallintaa, ja toimittajan innovatiivisuuden on puolestaan havaittu parantavan tiedon jakamista toimitusketjussa, edistäen myös yleisesti innovaatiotoimintaa ja -tuloksia. Toimittajan innovatiivisuuden hyödyntämiseen liittyy kuitenkin monenlaisia haasteita ja aiempien tutkimusten perusteella myös suorien ja epäsuorien menetelmien käytöstä innovatiivisuuden edistämisessä tiedetään liian vähän.

Tutkimus toteutui laadullisena yksittäisenä tapaustutkimuksena, jonka tarkoituksena oli esimerkillisen yhtiön avulla tarkastella, miten toimitusketjun innovaatiot ja toimittajan innovatiivisuus ymmärretään ja miten sitä arvioidaan ja edistetään moniteollisissa, kansainvälissä yhtiöissä. Tutkimustulosten mukaan yritykset ovat tavoitteellisia ja tietoisia toimitusketjun innovaatioiden sekä innovatiivisuuden merkityksestä, minkä lisäksi yhtiöillä voi olla monia sen edistämisessä auttavia piirteitä, kuten houkuttelevuus toimittajien silmissä.

Tästä huolimatta toimitusketjun innovaatioiden ja innovatiivisuuden arvioiminen ja edistäminen on haastavaa. Yhtiöt luottavat mahdollisesti liikaa epäsuoriin menetelmiin sekä toimittajien vapaaehtoisuuteen, eikä keskeisiä suorituskykyindikaattoreja ole helppoa määritellä. Tulokset viittaavat myös siihen, että kulttuuri – sekä sisäinen että ulkoinen - voi merkittävästi vaikuttaa innovatiivisuuteen.

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1 Introduction

Supply chain innovation (SCI) plays a vital role in companies' efforts of improving their supply chain performance and in obtaining competitive advantages (Malacina & Teplov 2022, 1; Arlbjørn et al., 2011, 3) by enhancing supply chain operations and practices as well as risk management (Afraz, et al., 2021, 1). Regarding the last mentioned and bearing in mind, how turbulent and challenging the most recent years have been globally, it should thus not come as a surprise that supply chain innovation has sparked the interest of both the academic field (etc. Afraz et al., 2021; Feng et al., 2022; Hopkins 2021; Malacina & Teplov 2022; Solaimani & van der Veen 2022; Yuan et al., 2022; Wong & Ngai 2022) and companies at large. As stated by Solaimani and van der Veen (2022, 597) to succeed in the uncertain business environment of today, innovation should happen at *"all possible internal and external sources"* induced "*not by a department but a mindset"*.

Indeed, according to Sjoerdsma & van Weele (2015, 192) companies are increasingly aware of the importance of external partners in the innovation process, and the role of the suppliers (undoubtedly one of the most important of such) in the supply chain innovation has not gone unnoticed in research (e.g., Mandal 2021; Kim & Chai 2017), either. However, reaping the benefits of supplier innovativeness is, by no means, without its challenges (Sjoerdsma & van Weele 2015, 192). Conflicting objectives, unanticipated change demands and pressure on reducing prices may hinder suppliers from sharing their innovations and creating them together with the buyer (Henke & Zhang 2010, 3). And as suggested by Sjoerdsma & van Weele (2015, 192), there may also be limitations in understanding how formal and informal approaches in supplier relationship management enhance innovation.

Based on the above, the purpose of this bachelor's thesis is to address how supply chain innovation, as a relevant and interesting phenomenon, is so far regarded and improved in focal companies, by conducting a single case study. The selected case company is a global, multi-industrial company, which has been awarded for its innovation activities and which

could also be regarded as a bellwether of its respective field. The data of the case study will consist of both primary and secondary data sources, including a semi-structured interview with the company employee and the company website. With this aim, the following research questions were formed:

> Q1: How is supply chain innovation understood in global, multi-industrial companies?
>
> Q2: How is supplier innovativeness enhanced and evaluated in global, multi-industrial companies?

The remainder of this paper will be organized as follows. After the introduction, an overview of the literature concerning supply chain innovation will be presented. Following that, the methodological approach of the thesis, the single-case study, and the results from the selected case company are introduced. Finally, the results are discussed, and the conclusions and limitations of the thesis provided, alongside with managerial implications and future research suggestions.

2 Overview of the literature

This chapter presents the key findings of the literature review starting with the definition of supply chain innovation by Arlbjørn et al. (2011, 8), which also acts as the framework for how the impact of supply chain innovation will be regarded in the review. Accordingly, the next subchapters consider supply chain innovation through the lens of supply chain network, supply chain processes and technology. The last mentioned is regarded especially through the concept of Industry 4.0 and its technologies, which have, in the recent years, sparked the interest of the academic field immensely.

2.1 Supply chain innovation

Arlbjørn et al. (2011, 8) define supply chain innovation as *"a change (incremental or radical) within the supply chain network, supply chain technology, or supply chain processes (or combinations of these) that can take place in a company function, within a company, in an industry or in a supply chain in order to enhance new value creation for the stakeholder*". The following subchapters will define and consider more closely how innovation may occur in a supply chain network, supply chain processes and through the means of the latest technology, but there are few things regarding this definition of supply chain innovation that should now be remembered. First of all, that innovativeness does not only manifest in extreme – a synonym to radical – changes that revolutionize everything, but it can also be demonstrated through "*an optimization of current practices within networks, technology, and processes"* (Arlbjørn et al. 2011, 8). Secondly, that innovation is not merely an idea, but an execution of an idea, which must also have commercial value (Arlbjørn et al. 2011, 8).

2.2 Innovation within a supply chain network

The number of components that form a supply chain network results in a complex system (Fianko et al., 2023, 388) consisting, for example, of outsourcing, partnerships, collaborations, distribution channels and logistics providers (Arlbjørn et al. 2011, 10). To complicate matters further, these members are scattered across the supply chain, forming different kinds of relationships, and sharing different kinds and amounts of "*information, product and financial flows"* (Ali et al., 2019, 716), resulting in a very different strategic importance and awareness of each other (Arlbjørn et al. 2011, 9). Regarding innovation in amidst of all this, two words from the last sentence arise as crucial: *sharing* and *information*. Referring to the previous studies (of Chapman & Corso 2005; Soorsay et al., 2008; Cao & Zhang 2011 and Cruz-González et al., 2015), Wang and Hu (2020, 2) declare the learning process - where new possibilities and new knowledge is gained through collaboration within the supply chain network – as the most important driver for how a supply chain network enhances the innovation performance of a company.

An integral part of the supply chain network and consequently, supply chain innovation, are suppliers. So far, studies have concluded that suppliers have a diverse positive impact on innovation, whether it concerns product innovation (Tu et al. 2014; Minguela-Rata et al. 2014), process and green innovation (Wu 2013) or innovation performance (Nogueira Tomas et al. 2014) and outcome (Yeniyurt et al. 2014) in general. This overall promising influence could be credited to the great significance of the learning process mentioned above, since according to Kim & Chai (2017, 50) supplier innovativeness positively impacts information sharing in the supply chain.

To enhance supplier innovativeness and reap the benefits of it, Henke & Zhang (2010, 45) encourage companies to maximise collaboration activities and to minimize competitive activities with their suppliers. Ultimately, this means acknowledging and respecting what supplier innovativeness means from the perspective of suppliers, who, in many cases, are the underdogs of the relationship. As stated by Henke & Zhang (2010, 45) suppliers must be able to trust that innovation investments made in the name of the focal companies, will also

benefit themselves in the long run and that, as a thank you, their innovation efforts will not be handed to their competitors, either. In other words, supplier innovativeness depends on the supplier's perception of how committed the other party is (Henke & Zhang 2010, 45) and this is further verified by Li et al. (2022, 27), whose findings suggest that *"long-term relationship focus has a significant positive impact on supplier innovativeness"*.

2.3 Innovation within supply chain processes

In defining supply chain processes Arlbjørn et al. (2011, 9-10) refer to the eight key processes identified by the Global Supply Chain Forum: customer relationship management, customer service management, demand management, order fulfilment, manufacturing flow management, supplier relationship management, product development and return management. In their study, Arlbjørn et al. (2011, 12) showcase, for example, how Cisco *"made radical innovations in supply chain business processes by establishing a whole new business model for handling product returns"*.

Of the above mentioned, supplier relationship management can be regarded, if not the most important, at least one of the most important supply chain processes to encourage supplier innovativeness. The main purpose of supplier relationship management is to build such relationships with strategically important suppliers, that will (amongst other things) enhance innovation and enable both parties to develop their business accordingly (Deloitte 2015, 1). This is achieved through the careful selection of suitable suppliers and appropriate KPIs, the clear alignment of requirements and initiatives, the fostering of collaboration and information sharing, and the successful management of changes bound to come along the way (Deloitte 2015, 4).

2.4 Innovation within supply chain technologies: Industry 4.0 technologies

Finally, a literature review on supply chain innovation must also consider technological breakthroughs and improvements and therefore it cannot fail to include Industry 4.0. As a term, Industry 4.0 was first presented in 2011 by German government, referring to the country's scheme to improve its *"industrial capability through digitally controlled manufacturing"* (Simonetto et al., 2022, 1). Nowadays it is commonly used as a synonym to the Fourth Industrial Revolution, effectively describing the automation and digitization of manufacturing processes, due to improvements in information and communication technologies (Dallasega et al. 2018, 3; Lopes de Sousa Jabbor et al., 2022, 3).

Despite their groundbreaking reputation, in research and in general there appears to be a lack of consensus on how to address these key technologies with Zheng et al. (2021, 1924) exhaustively stating how there is *"no agreed list of I4.0 enabling technologies in the literature".* According to the systematic literature review by Rad et al. (2022, 269) Industry 4.0 core technologies are additive manufacturing, augmented reality, automation, big data technologies, blockchain, cloud computing, Internet of People, Internet of Things, manufacturing, robotics, simulation, and semantic technologies, whilst Kusi-Sarpong et. al (2022, 1), for example, speak of Industrial Internet of Things, Cyber-physical systems, autonomous vehicles as well as cloud and cognitive computing in their research.

By any name, in the academic field, the interest in Industry 4.0 technologies within supply chains has skyrocketed, with Rad et al. (2022, 282) claiming that between 2018-2021 thrice as many studies regarding the subject were published in comparison to previous years – thus highlighting its importance. So far, the research has concluded that Industry 4.0 technologies have a positive impact on supply chain performance (Erboz et al., 2022; Qader et al., 2022; Sharma et al., 2022; Rad et al., 2022; Fatorachian & Kazemi 2021), with their main contribution coming from the integration and optimization of supply chains (Rad et al. 2022, 281). Integration, in this context, is translated as effective sharing of information along the supply chain as well as enhanced collaboration of different supply chain actors, whilst

optimization refers *"to the improvements in supply chain processes that are manifested in, for example, superior efficiency, quality and speed"* (Rad et al. 2022, 281).

Regarding the environmental sustainability of supply chains, the real-time data provided by the technologies can allow the effective use of materials, products, energy, and water (de Sousa et. al, 2018, 20), whilst also reducing CO2 emissions, fuel consumption and waste (Naseem & Yang 2021, 21). For example, 3D printing enables the fast creation of prototypes, with almost zero waste streams and (many times) with recyclable materials (Sanders et al., 2019, 231). According to a systematic literature review by Birkel & Müller (2021, 8) the technologies could, for instance, also optimize transport routes (Table 1).

Lastly, Industry 4.0 could also have a positive social impact on supply chains by providing safer working environment, more satisfying workload, and job enrichment (Braccini & Margherita 2018, 1) and a great example of this is provided by drones. The remotely controlled aircrafts are currently, for instance, used in agriculture, not only enhancing the accuracy and intelligence of irrigation and chemical spreading, but also effectively relieving humans from having to fly over the fields in potentially dangerous conditions. This positively impacts on the work safety, which in turn could add to well-being of the employees by reducing stress and anxiety. Another important aspect - increased employee satisfaction - can also be achieved by using Industry 4.0 technologies *"to perform repetitive, mundane manual tasks and allowing employees to take on more strategic and mentally stimulating work"*. (Fitzgerald & Quasney 2017, 6, 10.)

Table 1

Industry 4.0 potential contributions to the economic, environmental, and social sustainability of supply chain management according to Birkel & Müller (2021, 6, 8, 10)

Economic	Environmental	Social
Enhancing productivity Improving supply chain resilience Accelerating time to market and delivery time Enhancing maintenance and repair Improving decision-making Reducing storage and idle time Reducing order inaccuracy Reducing cost of recycling Allowing customer-specific planning and processes	Optimizing transport routes Enhancing product lifecycles Reducing energy and material consumption and the creation of waste Enhancing traceability and transparency of information regarding recycling Enhancing the use of capacities Enhancing the prediction of demand (reducing bullwhip effect) Optimizing processes to reach environmental targets Enhancing the adherence of ecological certificates	Enhancing safer work environments Reducing stress Reducing extreme and repetitive tasks Enhancing learning and training Increasing flexibility of work life Creating new jobs Supporting and assisting employees Enhancing the adherence of social standards and requirements

Concluding this literature review, some of the key success factors and challenges in reaping the benefits of Industry 4.0 to supply chain performance are presented, referring to the findings of the study by Rad et al. (2022). To succeed, the support and the commitment of the top management was recognized as crucial, alongside with the similar *"business goals, technological vision, strategies, and activities"* of the supply chain enterprises, whilst the most common challenges were seen relating to human resources and cost. Adopting the said

technologies means that current employees need to change their work routines and acquire a new set of skills, which may not come easily, and finding 4.0 competent employees is no less difficult. Industry 4.0 technologies also demand large investments up-front and the necessary infrastructure. Other problems include privacy and data security concerns as well as legal issues. (Rad et al. 2022, 281-282.)

3 Research Methodology

Following the literature review on supply chain innovation, the empirical part of the thesis will now be presented. Firstly, this chapter justifies the use of qualitative research as a research method and a single-case study as a research strategy in this thesis. After that, the selected case company is introduced, followed by the description of the data collection method and the data analysis process. Finally, the reliability and validity of the thesis is considered.

3.1 Qualitative research and a single-case study

A simple way of describing the difference of quantitative and qualitative research is provided by Braun & Clarke (2013, 3-4), who state that whilst quantitative research design collects and analyses numbers as data, qualitative research employs words. As such, the purpose of the qualitative research is not to predict, but to understand (Merriam & Tisdell 2015, 5-6) - in the case of this thesis - how supply chain innovation is regarded and enhanced from the point of a view of the selected company. Followed by this, a case study was therefore seen as a natural choice for a research strategy, as it is, stated by Yin (2009, 23) and Halinen & Törnroos (2005, 1286) a method examining a contemporary phenomenon, which is hard to distinguish from its context, but rather it is necessary *"to understand the dynamics involved in"* and *"in which multiple sources of evidence are used"*.

3.2 Case selection

The case company is a large, global company operating both as a developer and a supplier in multiple industrial sectors, and as requested, it will remain anonymous throughout this thesis. It was selected as a case company based on (the author's evaluation of) its appropriateness and the accessibility of the relevant data. Innovation is strongly present in

the company's strategy and operations, and as a multi-industrial global company, it can be regarded as a single case of *strong exemplar* (Hultman et al. 2012, 14).

3.3 Data collection

The primary data of this thesis was collected through a semi-structured interview, which is a typical source of evidence in case studies (Yin 2018, 118). The interview was gained through a project founded by the Foundation for Economic Education. It was done in English in March 2021, and recorded, lasting approximately 40 minutes. At the time of the interview, the interviewee held the position as the Head of Supply Chain with multiple years of experience in the company and was therefore regarded as having relevant and expert insights into the thesis research question. The findings of the data (analysis) are presented anonymously and therefore no direct citations from the interviewee are provided. In addition to this, as stated earlier, to truly exemplify a case study, the use of multiple sources of evidence is recommended (Yin 2018, 127). Respectively, this thesis also employed secondary data, which was gained from freely accessed web content, such as the company website and its articles and reports.

3.4 Data analysis

The data was analyzed through a qualitative content analysis, in which the (relevant) elements of the research material are recognized and named (Vuori 2023). A qualitative content analysis typically begins, as stated by Erlingsson and Brysiewicz (2017, 94), with the transcription of the (recorded) interview, followed by multiple re-reads of the text. They then carry on, stating that after an initial understanding of what is being said, the text should be condensed, with the core meaning remaining intact. These shortened meaning units are then summarized with a couple of words, which is the process of labelling, or in other words, coding. Finally, the codes that are seen relating to each other are grouped together as categories. (Erlingsson & Brysiewicz 2017, 94)

3.5 Validity and reliability

In any research, the quality of it can be honoured and evaluated through validity and reliability. Validity expresses how well and how correctly the chosen operational measures of a study are able to describe what they intend to describe (Tilastokeskus 2023). Reliability, on the other hand, refers to whether the same results and conclusions of the same research can be drawn again (and again) or by others. Thus, it requires that the actions taken by the researcher are explained in detail. (Yin 2018, 42, 46)

Finally, regarding the sources of evidence of this case study, the interview, and the online data, both have weaknesses that may affect their quality and legitimacy. Mediocre interview questions or an interviewee's desire to please an interviewer can lead to response bias, and *"inaccuracies due to poor recall"* are also possible. With online sources, the accessibility, retrievability and selectivity of the data may present issues and the bias of the original authors should also be considered. (Yin 2018, 114) These issues will be reviewed once more in the final chapter of this thesis, where its limitations are recognised.

4 Findings

This chapter presents the findings of the study, based on the content analysis of the data. In the third chapter, which introduced the research methodology, it was explained that the final part of the content analysis is to form categories of the codes with similar meaning or context (Erlingsson & Brysiewicz 2017, 94). As a result, a total of five main categories applicable to the topic of the thesis were identified and named as follows: the (company's) relationship with suppliers, criteria for the suppliers, enhancing supplier innovativeness, characteristics of innovative suppliers and evaluating supplier innovativeness. The final category and consequently, the subchapter, regarding the impact of COVID-19 pandemic on collaborative innovation was concluded due to its undeniable and tremendous effect on any supply chain, and as such a topic, it was regarded to provide interesting insights on supply chain innovation in the time of dramatic change.

4.1 The procurement of the company and the relationship with the suppliers

The procurement of the case company is extremely decentralized, with almost half a thousand employees scattered across the world, located in tens of different cities and countries. The reason for decentralization, when inquired, originates from the traditional convenience of nearby locations and the number of ERP systems currently in place, although the latter is due to change in the future. Suppliers, in similar, are plenty, with the case company claiming tens of thousands of active suppliers, with many hundreds of them acting as key or main suppliers. The company's SRM, according to their website, emphasizes the development of reciprocal partnerships with the key and main suppliers, whilst naming innovation as one its main goals. When required, the interviewee considered the relationship with the suppliers mutually based on trust. Regarding the duration of the partnership with the suppliers, the interviewee explained that they have generally lasted for years or even decades, with startups less regular, if existing, and not especially sought after.

When asked about the power dynamics between the company and their suppliers, the interviewee accounted the type and the market position of the company favouring them and adding to their appeal (in the eyes of the suppliers), reflecting that the company was not truly dependent on its suppliers – even of those with a noticeable share of the market or a great position themselves. This was stated even with the acknowledgement (followed by later) that some of their suppliers also act as the suppliers of their customers.

4.2 Criteria for the suppliers

When discussing about the company criteria for the suppliers, the interviewee stated that multiple criteria existed for evaluating and approving new suppliers. Whilst some of the criteria was said to differ depending on the product or service provided by the supplier, the interviewee recalled that the criteria mainly consisted of general matters such as sustainability policies and quality certificates. As of innovation, the interviewee was unsure if any such criteria were included, reflecting that innovativeness had more weight with the existing suppliers. This was repeated once more at one point of the interview, where the interviewee regarded that innovativeness was a necessary feature expected at least in some of their suppliers if the company was to continue growing accordingly. In the company's Code of Conduct, innovation is mentioned a couple of times, mainly as a quality the company seeks in its employees and external stakeholders and not defined more in detail.

4.3 Promoting innovation amongst the suppliers

With their key and main suppliers, the company aims to have a constant, open dialogue and regular meetings to enhance innovation and to share ideas, whilst with the rest, less significant suppliers, they mainly discuss transactions. As of their other actions to promote innovation amongst suppliers, the company also enables the sharing of ideas through their website, where they can be given at any time through a link. From the company website, it was also learned that since the interview, the company has launched a project that aims –

besides other objectives - to enhance supply chain innovation through a shared learning process with the field professionals and which involves, for example, case study work.

Considering the suppliers' willingness to share their ideas with the company, the interviewee deemed their motivation varying from such as the simple desire of increasing their own business to those contemplating more of the long-term benefits. Patents also play a crucial role, with good ideas thus secured before they are shared. Here, however, the interviewee also wished to point out the importance of co-operation in the management of the supply network nowadays, regarding working alone ineffectual (and possibly alluding that this was the opinion of the suppliers as well).

4.4 Characteristics of innovative or non-innovative suppliers

According to the interviewee, innovative suppliers can be recognized not only by the way they grow, but how they discuss and present their innovations and offer suggestions. Regarding the differences between the companies and the impact it may have on innovation, the interviewee felt that smaller suppliers may be aided (in their innovativeness) by their desire to grow, whilst with larger suppliers the bureaucracy and internal policies may limit their ability to share ideas. Besides the level of openness or respectively, reserve, financial difficulties may also have an impact on innovation capabilities. One example, provided more in detail, also demonstrated how new laws, directives and regulations may enhance supplier innovation.

The interviewee also deemed geographical and cultural differences affecting innovativeness, with rapidly growing Chinese and Eastern European companies being more innovative than their many Western European counterparts, including Finland. As of company-related cultural issues, the interviewee highlighted the importance of creative thinkers and the difficulty of changing a well-established company culture in both cases - where innovativeness had, or had not, been there from the start. The positive impact of the research and development department (of the supplier) on innovativeness he considered more

practical and less straightforward of nature, with them (the department) possibly minding and eventually executing modest changes more so than radical ones.

4.5 Evaluating supply-driven innovations and supply innovativeness

In terms of choosing the best supplier ideas worth investing in, the interviewee admitted it was difficult and, until more recently, had not been very systematically done in the company. This, according to the interviewee was due to the challenge posed by the vast number of items and processes in the company, any of which the idea could concern. The ease or difficulty of implementing the idea was also considered as a possible explanation.

Currently, the company is in the phase of discovering and setting appropriate key performance indicators (KPIs) for the supplier ideas, based on not only their quantity, but also their value. This is a change compared to the past, as the procurement, according to the interviewee, has not been regarded innovative in nature before. Consequently, the company's procurement KPIs have traditionally focused on savings.

4.6 The impact of COVID crisis on innovation

Finally, given how the interview took place approximately a year after the COVID crisis had begun, its impact on supplier innovativeness could not be left undiscussed. According to the interview, during the most critical phase of the pandemic, securing the basic operations and transactions became the main focus of the company, with cross-company innovations reducing and the company's suppliers similarly occupied in securing their own deliveries. However, despite the fact that the overall impact of the pandemic was undoubtedly negative, the interviewee did feel that the pandemic had aided innovativeness, for example, in remote services. This positive affect was echoed on the website, which also separately mentioned the further development of digitalization and Industry 4.0 solutions in enabling remote work.

5 Conclusions and discussion

The aim of this thesis was to gain a better understanding of how supply chain innovation and supplier innovativeness, especially, is regarded, enhanced, and evaluated in multi-industrial, global companies by conducting a single-case study of a strong exemplar. This chapter will discuss the findings and present the conclusions of the study, whilst also considering theoretical and managerial implications. The limitations of the study are likewise recognized, and future research questions suggested.

5.1 Discussion and theoretical contributions

In conclusion, it can be stated that multi-industrial, global companies may possess several positive attributes that aid supply chain innovation and supplier innovativeness. In the case of the selected company, for example, its long-lasting relationships with the key and main suppliers and the company's understanding of the importance of mutual beneficially and trust, are all integral in fostering supplier innovativeness, as concluded by studies of Henke and Zhang (2010) and Li et al. (2022). Likewise, the attractiveness of the company (implied both by the company interviewee and the favourable market position) is considered pivotal in winning over the suppliers' innovation efforts (Ellegaard 2012; Hald et al. 2009; Tanskanen & Aminoff 2015), and large companies, in general, could easily claim such a feat.

However, the findings of this study also suggest that whilst the importance of supply chain innovation, alongside with supplier innovativeness, is acknowledged and aspired in multi-industrial, global companies, it remains a phenomenon rather difficult to enhance and evaluate. Based on the interview, one of the most concrete forms of methods in encouraging supplier innovativeness in the case company is to invite suppliers to come spontaneously forward to the focal company with their ideas. This is in line with the findings of the study by Pihlajamaa et al. (2019 11), stating that majority of ways to improve supplier

innovativeness appear to favour indirect methods resulting in the fact that *"the innovation outcomes are highly dependent on suppliers' voluntary actions"*. The evaluation of supplier innovativeness could likewise be a challenging prospect for companies, as directly confirmed by the interviewee. Overcoming this roadblock and finding the appropriate KPIs is paramount in successfully managing supplier relationships (Deloitte 2015, 4), and consequently, in enhancing supplier innovativeness.

From the interviewee, it was also to be understood that innovation and supplier innovativeness may not have much significance in the beginning of the relationship when suppliers are first chosen based on the more traditional supplier criteria. This implication, when connected with the later statement regarding the difficulty of changing the existing company culture, strongly suggests that supplier innovativeness ought to be a key performance indicator from the start, as concluded by Kim and Chai (2017, 50). In their study, Kim and Chai (2017, 50) refer to the findings by Fawcett et al. (2011, 53) when they consider the great advantage of suppliers who are indigenously committed to innovation. Their conclusions are supported by Jean et al. (2017, 144) and Tellis et al. (2009), who name organizational culture as the most effective driver of innovation.

The importance of culture was also highlighted by the rather interesting cultural and geographical difference implied by the interviewee, in stating how Asian and Eastern European suppliers could be regarded more innovative than those of Western Europe. As one might initially assume and as contemplated by Jean et al. (2014, 98) a great cultural and geographical distance can put a strain on the fundamental trust in the relationship and how, for example, *"China's legals institutions including intellectual property rights (IPRs) and contracts, provide little governance or protection for firms' innovation outputs"*. Many Asian cultures are besides hierarchical, which according to Hsu et al. (2014, 5470) is a well-known barrier to innovation in organizations since it requires that the authority (of the leaders and owners) is relinquished to some degree.

One possible explanation then to this somewhat surprising statement could be find from the earlier definition by Arlbjørn et al. (2011, 8) and the consideration to what contributes as a

supply chain innovation. For example, according to Chung et al. (2017, 86) many Chinese companies focus on incremental innovations instead of radical ones, with their innovations characterized by the use of existing products that can be easily adjusted for the demands of the local market, and which are improved through the effective collection of customer feedback rather than the slower science. Another contributing factor could be *guanxi*, an omnipresent part of Confucian cultural structures and interactions that includes elements such as face-saving and emotional commitment (Yang & Wang 2011, 492, 494), and which according to previous studies enhances attachment, social obligations (e.g., Cai et al., 2010; Yang et al., 2018) and trust in the supply chain (Wang et al. 2023). A slightly less direct insight to this spark of innovation is offered by Azadegan and Dooley (2010, 500), whose findings indicate that different learning styles could, in fact, facilitate manufacturers to reap the benefits of supplier innovativeness - such a gap between styles might easily be at least partly explained by differences in educational backgrounds and cultural upbringing.

Finally, the findings of this study also suggest that a company's size and financial status as well as internal bureaucracy and policies could have an impact on supplier innovativeness, alongside with legislation. Regarding suppliers' motivation to participate in innovation activities, long-term benefits and business growth opportunities were contributed to possible reasons, with the acknowledgment that patents might also be employed to secure one's innovations and interests. The negative impact of COVID pandemic on innovation was also affirmed, except for remote work services.

5.2 Managerial contributions

Based on the findings of the study, there are several implications for supply chain managers. The importance of trust and mutual beneficially in enhancing supplier innovativeness requires that managers are aware of the informal and formal ways of how they are strengthened. In addition, managers should aim to establish long-term relationships with their key and main suppliers and work on amplifying their company's attractiveness in the eyes of suppliers. The importance of culture – both internal and external – to supplier

innovativeness highlights how managers should establish indigenous innovativeness and innovative organizational culture as their main requirements for suppliers from the very beginning of the relationship. In addition, the possible positive impact of different learning styles to supplier innovativeness should be noted when selecting suppliers. Discovering and setting appropriate KPIs to evaluate innovative efforts is likewise paramount. Managers should also be aware of the possible effect of a company size, financial status and inner policies as well as external laws, regulations and directives to supplier innovativeness.

5.3 Limitations and future research

Like all research, this study has some limitations. First, it employed a single case study to explore supply chain innovation in multi-industrial, global companies, and whilst (as such) it was considered a suitable research strategy for that purpose, it will not allow the generalization of the findings. Future research on the subject is thus required to reaffirm the conclusions withdrawn in this study. Secondly, the study focused only on the perspective of a focal company (in the role of the manufacturer) in the supply chain, leaving, for example, the supplier outlook on the supply chain innovation undiscovered. Thirdly, the data used for this study was cross-sectional by nature, and in the future research on supply chain innovation could instead employ longitudinal data to gain understanding of how view on supply chain innovation in focal companies may have changed over a long period of time.

Finally, regarding the reliability and validity of the data collection and the data analysis process, the novelty of the author (of this thesis) should also be remarked. Whilst the primary data was gained from a project involving a more experienced interviewer (which can be seen positively influencing the quality of it), response bias and inaccuracies are still possible. The selectivity of the secondary data and its possible bias should likewise be noted, given that it was obtained from the company website and thus bound to give a favourable account. And although, the reliability of this thesis is enhanced by the systematic analysis process that would enable other researchers to repeat it, their superior knowledge and experience might allow different insights or a more comprehensive synthesis of the case company and the

supply chain innovation phenomenon as a whole – in which case, the validity of the thesis would be threatened.

5.4 Conclusions

Supply chain innovation plays a paramount role, when companies aim to survive and to thrive in the competitive and challenging business environment of today, and suppliers, as key members of the supply chain, have caught the spotlight. In research, supply chain innovation has been found to positively impact supply chain operations and practices as well as risk management, with supplier innovativeness enhancing the crucial sharing of information in the supply chain and likewise improving the overall innovation performance and outcome. However, engaging suppliers in innovation efforts and reaping the benefits of it is not without its challenges and there may also be limitations in understanding how supplier innovativeness is enhanced through formal and informal methods.

Conducting a single-case study involving a company of a strong exemplar, the purpose of this thesis was to investigate how supply chain innovation and supplier innovativeness, especially, is understood, enhanced and evaluated in multi-industrial, global companies. The primary data was collected through a semi-structured interview with an employee of the case company and secondary data employed online sources, such as company website. The findings of this study suggest that supply chain innovation and supplier innovativeness is acknowledged and aspired in global, multi-industrial companies, which could also possess several positive attributes in capturing supplier innovativeness, such as attractiveness and an understanding of the importance of mutually beneficial relationships and trust.

However, the results also indicate that supply chain innovation, alongside with supplier innovativeness, remains a phenomenon rather difficult to enhance and evaluate. Companies may over rely on indirect methods and suppliers' voluntary actions in fostering innovation, and discovering appropriate key performance indicators remains a challenge. The findings also allude to the great importance of culture, both internal and external, and the benefit of

different learning styles between the parties. Other factors to consider are a company's size, financial status, internal bureaucracy, policies, and legislation. Future studies are required to confirm the findings of this study.

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