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SCUOLA DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE

EXECUTIVE SUMMARY OF THE THESIS

The Impact of Covid-19 on Supply Chain Finance Adoption

TESI MAGISTRALE IN MANAGEMENT ENGINEERING – INGEGNERIA GESTIONALE

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1. Introduction

The 2008 financial crisis created new challenges in the financial market, starting from the reduction of loans granted from banks (Ivashina and Scharfstein, 2010). Due to the fact that financial operators started to decrease credit lines towards riskier parties (Asmundson et al., 2011), firms began to struggle for liquidity, and thus they were obliged to extend payment terms towards suppliers in order to try to mitigate financial risks (Klapper and Randall, 2011). In this situation of liquidity shortage, the small and medium suppliers were the ones struggling more, because the liquidity shock was usually transferred to upstream supply chain actors (Boissay and Gropp, 2007). In this general condition, SCF started to be more implemented, with the overall objective of optimizing the working capital along supply chains (Gelsomino et al., 2016). In addition to these problems of liquidity, Caniato et al. (2016) highlighted also how much SCF can be beneficial for what concerns the strategic relationships among actors along the supply chain (e.g., buyer, supplier, financial and technology provider). The Covid-19 pandemic had dramatic impacts, similar to those of the financial crisis in 2008, on population health and economic activities, with considerable implications for global supply chain networks. Indeed, lockdowns interrupted both the demand and the supply for numerous goods, and obliged companies to block their production chain with a lot of financial consequences. However, because of the novelty of the event, several gaps are still present in the academic literature. Therefore, the purpose of this research project is to analyze and report which are the major impacts of Covid-19 on SCF solutions.

2. Literature review

The literature review was important in order to identify the main characteristics of SCF, the crucial impacts of the Covid-19 on SCs and to structure the research gaps. Said that, the literature review was organized in three different study fields:

1. *Supply Chain Finance*: a general understanding of the main definitions, actors, enablers and inhibitors, benefits and costs and the main solutions developed;
2. *Covid*-19: a study of both first academic papers and documents published by institutional entities and consulting firms, in order to find out the main financial and economic impacts of the pandemic;

3. *Supply Chain Finance & Covid*-19: an analysis of which are the main SCF elements challenged by the Covid-19 pandemic.

First of all, in the SCF section, are reported all the different definitions emerged from the most famous academic papers (Caniato et al., 2019; Stemmler, 2002; Hofmann, 2005; Johnson and Templar, 2011; Gelsomino et., 2016). The focus then shifted to describing the supply chain actors, and two different classifications were considered: the one of the Global Business Center (Y. Li et al., 2020), and the one proposed by Hofmann (2005), which divides the players among macro-institutional and micro-institutional.
The following subparagraph describes which are the main benefits and challenges regarding SCF. Going ahead, the main enablers and inhibitors were reported, by adopting the framework of Hofmann and Belin, (2011).
The last subparagraph of the SCF section presents the main solutions adopted by companies.
In the Covid-19 chapter, firstly the main macro-economic impacts of Covid-19 pandemic are analyzed, by following the map proposed by Suborna Barua, (2020), which divides those impacts depending on the fact that they are visible in the short run or in the long one. In the following subparagraph, the focus was shifted to financial impacts of Covid-19 pandemic on companies. Here, an introductory analysis has been performed focusing on the cash working capital, the liquidity, the level of inventory, the days payable outstanding (DPO) compared with the ones of the previous fiscal year (Cerved, 2020). Then, the focus shifted to managerial impacts of Covid-19 on companies and on different industries (Accenture, 2020). In the end, the last subparagraph presents the monetary policies adopted by central banks and the fiscal policies implemented by national governments.
The last section of the Literature review analyzes sources regarding SCF and Covid-19. Indeed, here are reported the main SCF elements challenged by the Covid-19 and also possible SCF measures to contrast the Covid-19 crisis. It has to be said that due to the fact that the Covid-19 is a recent event, there are not so many papers discussing its connection with SCF, therefore the main contributions for this section are attributed to Hofmann et al. (2021) and Moretto and Caniato (2021).

3. Research Objectives and Research Questions

From the analysis of the extant literature, some gaps were identified. In particular, the gaps discovered and then investigated are the following.
First, despite several papers discuss the objectives and the enablers/inhibitors of SCF adoption (Gelsomino et al. (2016), Caniato et al. (2016), Hofmann and Belin (2011), Wuttke et al. (2013)), the literature has still not described how these past objectives and enablers/inhibitors are impacted by the current situation, if and how they are changing. Moreover, in the extant literature, a lot of SCF solutions are analyzed. However, due to the fact that the Covid-19 is a new-born event, there is a lack of analysis regarding the main impacts of the pandemic on SCF solutions adoption. Thus, it was interesting trying to understand how the Covid-19 shaped the current SCF instruments, specifically whether the ones already adopted before the pandemic changed or some new solutions emerged now, in order to meet new requests coming from suppliers, who are facing the highest financial and economic issues in this pandemic period.
On the basis of the identified research gaps, two Research Questions were developed.

RQ1) Why, according to different possible contingent factors coming from the pandemic, should a company decide to rely on SCF solutions?

This Research Question wants to understand which are the main impacts and the following consequences caused by the current pandemic on SCF adoption. In particular, it has the double objective of both studying the new adoption objectives and the evolution of enabler and inhibitor factors, during the Covid-19 pandemic. The Research Question was then split into two sub research questions:

RQ1a) According to different possible contingent factors coming from the pandemic, how are the main objectives of adoption of SCF solutions changing?

The purpose of the following question is to understand and analyze if, and in case how, the previous objectives of SCF adoption, which companies wanted to achieve, are changed now with the pandemic, or if instead they were completely not impacted.

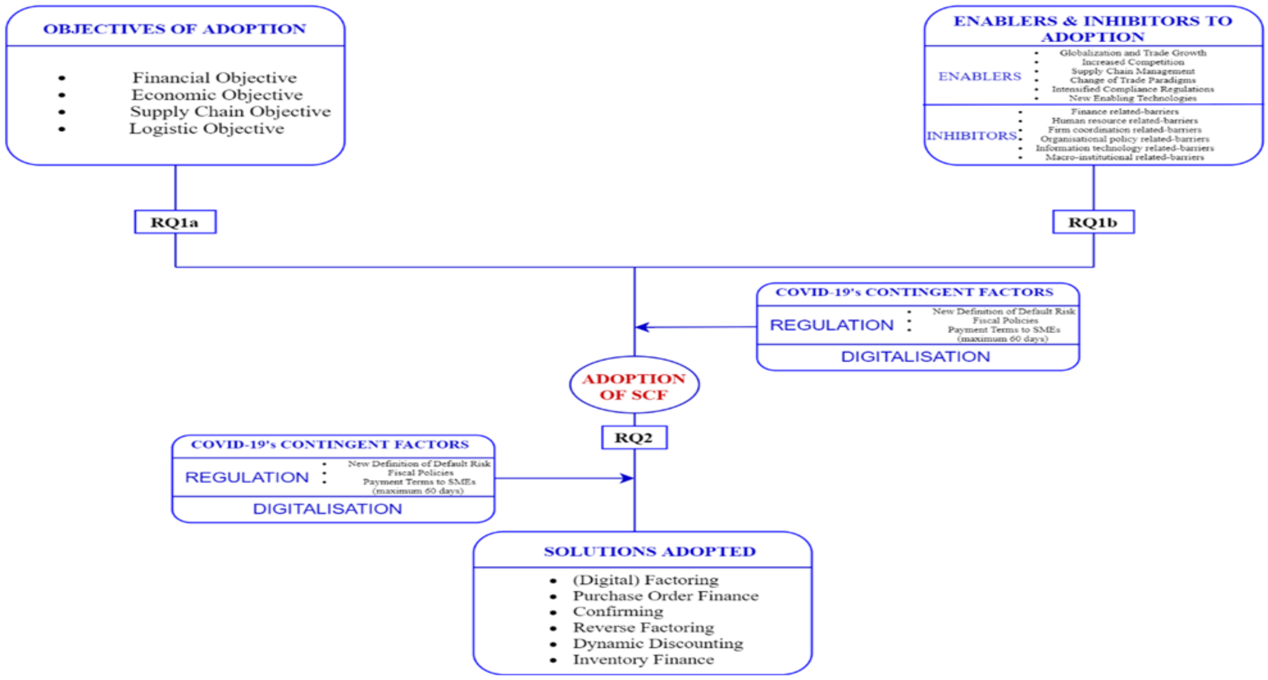

Figure 1: Preliminary Research Framework

RQ1b) According to different possible contingent factors coming from the pandemic, how are the main enablers and inhibitors in relation to SCF solutions adoption changing?

The aim of this question is to understand and analyze if, and in case how, the previous enabler and inhibitor factors of SCF adoption, which support/inhibit companies in achieving the objectives set, are changed now during the Covid-19, or if instead they were completely not impacted.

RQ2) According to different possible contingent factors coming from the pandemic, which are the main SCF solutions changes faced by companies?

The purpose of the second Research Question is trying to comprehend how SCF solutions adopted by companies of different sectors, with different characteristics and size, are impacted by the current pandemic, requiring some adjustments, the adoption of new instruments, or instead if they were totally not impacted.

4. Preliminary Research Framework

To answer the Research Questions, a Preliminary Research Framework (Figure 1) was built by including the most relevant variables emerged in the literature. In particular, the Framework is organized in the following way:

- A block with the objectives of SCF that companies want to achieve;
- A block with the enabler and inhibitor factors which enable or inhibit firms from adopting SCF solutions;
- A block with the main SCF solutions adopted by companies;
- A block with the Covid-19's contingent factors.

5. Methodology

The steps followed along the thesis work can be divided into two phases: the Literature review and the Case studies methodology.

Starting from the Literature review, for what regards the SCF stream of research, a search in the Scopus database has been implemented. Here, the process of selecting useful documents was performed starting from 487 papers, which were detected from Scopus, by formulating some basic queries containing keywords such as "*Supply Chain Finance*", "*Supply Chain Finance & Covid-19*". Then, a screening process was followed: first by title, then by abstract and finally the 98 documents left were read analyzing the full text, and other 16 articles were eliminated. Overall, 82 papers have been included in the review.

Concerning now the Covid-19 topic, there was only a limited literature published yet, and so it was chosen to integrate the academic papers with reports published by institutional entities and

Company Code	Industry	Revenues	N° of employee	Interviewee
A	Mechanical	900 mln€	3k	Purchasing Manager
B	Chemical	2 B€	2,8k	Financial Director
C	Steel	450 mln€	1,5k	Credit Manager
D	Electronics	210 B€	100k	Order to Cash Director
E	Mechanical	28 B€	63k	Finance Manager
F	Chemical	20 B€	53k	Processes and operation Manager
G	Food	450 mln€	1,6k	Financial Director
H	Telecommunications	230 mln€	1,5k	Purchasing Manager - Finance Manager
I	Steel	1,5 B€	2k	Finance Manager
J	Fashion	1,53 B€	6,5k	CFO - Finance Manager

Table 1: Case studies analyzed

consulting firm. The literature review helped to identify some research gaps, which lead to the formulation of the Research Questions. Then, a Preliminary Research Framework was created leveraging the relevant variables and construct identified from the literature review and explaining the logical connection among them and the RQs.

The second step of methodology is about the Case studies. Multiple exploratory Case studies have been developed, where data were collected through interviews with experts by using a semi-structured protocol. Once the interview protocol was prepared, both the Osservatorio Supply Chain Finance and the authors started to contact potential interviewee. Overall, 10 Case studies have been developed (Table 1), by performing firstly the Within-case analysis, where each Case study was examined independently, and then the Cross-case analysis, with the aim of comparing all Case studies' contributions to find out similarities and differences.

6. Results and Discussion

RQ1a) According to different possible contingent factors coming from the pandemic, how are the main objectives of adoption of SCF solutions changing?

The results of this Research Question showed how the main objectives of SCF solutions are changed as a consequence of the Covid-19 pandemic. Indeed, firms during the Covid-19 pandemic tended to switch their focus from financial and economic objectives to supply chain one. As a matter of fact, before the pandemic all companies tried to achieve a higher DPO by extending the payment terms, especially with strategic suppliers with relevant volumes, to optimize the cash working capital and the credit management KPI. This means that SCF was seen by companies as a huge opportunity for achieving their financial and economic targets, without considering the supply chain objective with the same priority.

With the pandemic, the results obtained were completely different from the previous ones. This because the Covid-19 generated so much new and unprecedented challenges for the entire supply chain, that the supply chain objective became the common thread for all firms, which started to take care of their suppliers struggling for liquidity. Moreover, the current pandemic highlighted the importance of creating a stable and solid supply chain ecosystem based on strong and long-lasting collaborations among buyers, suppliers, and financial providers because it was the only way to assure the business continuity. This means that, with the pandemic, assuring the continuity and sustainability of the business has become the new priority, instead of the financial objectives of increasing DPO and optimizing liquidity.

RQ1b) According to different possible contingent factors coming from the pandemic, how are the main enablers and inhibitors in relation to SCF solutions adoption changing?

Starting from the enabling factors, the results of the Case studies highlighted that the majority of companies interviewed are enabled towards the adoption of SCF solutions by an increase of digitalization. This enabler was already cited by authors in the extant literature, such as Hofmann and Belin, (2011) and Nowicka, (2018). In particular, concerning the Covid-19 pandemic and the digitalization contingent factor, there was a strong development of more innovative digital platforms that had triggered a greater use of SCF instruments. Indeed, two Case studies reported that, during the current pandemic, they implemented a new customer digital portal, with the objective of speeding up the supply chain processes and supporting better their clients. Another enabler reported by four Case studies, which was already described in the literature by Hofmann and Belin, (2011) and Mentzer et al., (2001), is supply chain management. Indeed, these companies interviewed stated that they decided to propose SCF solutions to suppliers, in order to form stronger collaborative partnerships, with the goal of making supply chain processes more efficient, and thus bettering the overall management of the entire supply chain. This enabling factor was even more enhanced during the Covid-19 pandemic, which conveyed a higher sense of cohesiveness among the supply chain actors and the feeling that only with a stable and manageable supply chain is possible to assure the business sustainability.

Other two enablers stated in the literature and confirmed by the Case studies are globalization and increased competition. Indeed, three companies reported that in a more globalized financial system, they are able to implement their solutions more easily towards also foreign suppliers, and, at the same time, a higher competition between financial providers allows them to provide SCF instruments at better financial conditions for suppliers.

Moving to the inhibitors, the results of the Case studies highlighted that the majority of companies interviewed are inhibited toward the adoption of SCF instruments by two main barriers: the human resource and the macro institutional ones.

The first one, described in the academic literature by several authors, such as More and Basu, (2013), Barton, (1993), Jongejans et al., (2014), Cristopher and Ryals, (1999), is negatively impacting the SCF adoption due to a lack of expertise regarding the SCF topic, cultural limits and a poor common vision among partners involved in the supply chain. However, by analyzing two Case studies, it emerged how the Covid-19 pandemic has positively impacted the human resource inhibitor. Indeed, on one hand suppliers are now struggling more from a financial point of view, and so they started to study these solutions because they have a higher need of funding while, on the other hand, buyer firms chose a different approach to propose these instruments, shared by an expert of finance, an expert of purchasing and the factor involved, in order to better clarify how these SCF solutions work and which are the main benefits they can convey.

The second main barrier regards the obstacles encountered by companies interviewed in applying their solutions, due to non-uniform norms and legislation between different countries. In fact, it was impossible to standardize the same SCF solutions for all countries, due to different factoring rules from nation to nation, and financial providers found difficulties in managing foreign clients and suppliers. This barrier acquired even more importance now with the Covid-19, because companies started pursuing the supply chain objective, by enlarging the pool of clients and suppliers towards which dedicating their solutions, but a lot of times they were blocked by SCF different regulation.

RQ2) According to different possible contingent factors coming from the pandemic, which are the main SCF solutions changes faced by companies?

Regarding this Research Question, it was decided to consider as unit of analysis the SCF solution and not the Case study, meaning that the same company can be reported in more than one sample, if that Case study adopts more than one SCF solution. Said that, the results obtained from the Case studies were quite heterogeneous. Indeed, a sample of four companies reported that they were not strongly impacted by the new difficulties brought by the Covid-19, and therefore also the adopted SCF solutions did not require to apply some changes. This because they are all stable and solid firms, which could continue their business and support their suppliers in the supply chain, by maintaining the already used solutions. Moreover, one of the companies interviewed attributed this choice of not making changes to both a lack of expertise regarding the SCF topic and a lack of strategic vision towards these instruments. On the other hand, two Case studies stated that neither they had the necessity to find other sources of financing, nor their suppliers did, and so there was no need to diversify the supply chain strategy. Another sample of six Case studies reported that, after the Covid-19 began, they decided to further improve and enlarge their solutions already implemented. All of them in fact, chose to strengthen the reverse factoring solution by extending the pool of suppliers to the smallest ones facing strong financial issues. In particular, the three biggest companies interviewed, stated that they wanted to enlarge their solutions even to foreign clients and suppliers, with a double aim of supporting and building more collaborative and cohesive supply chains in all countries in which they operate.

Overall, all the six Case studies attributed to the digitalization contingent factor a fundamental role regarding their SCF expansion strategy. Indeed, by exploiting this phenomenon, they could develop new platforms, such as a new customer portal, for facilitating their suppliers to access SCF instruments and making the supply chain processes faster and more efficient. The last sample regards those Case studies that, during the Covid-19, not only decided to improve the already adopted SCF instruments, but they also started implementing new solutions, in order to satisfy as much as possible the requests coming from their suppliers. Said that, it is important to highlight how much the digitalization and the market trends contingent factors pushed a lot of companies in this direction. Indeed, while the digitalisation was beneficial to speed up the SCF platforms, the market trends, and in particular the shortage of all raw materials, which caused a dramatic increase of purchasing prices, leaded to even stronger financial issues. It is not a case in fact that the majority of these Case studies said that the new SCF instrument they applied was the dynamic discounting, due to these two covid-19's contingency factors. Indeed, as confirmed also by the Osservatorio Supply Chain Finance (2020), the dynamic discounting is a "*digital native*" solution, because it is really innovative and, through a digital platform, it is able to support and enforce the supply chain, without necessarily needing a financial and credit institution as an intermediary.

7. Conclusions

In this last section, the theoretical and managerial implications, together with limitations and future developments, are reported.

Starting from the theoretical implications, in the extant literature there are several academic papers describing both the SCF objectives of adoption (Wuttke et al., 2013, Wandfluh et al., 2015, Hofmann and Kotzab, 2010) and the enabler and inhibitor factors (Hofmann and Belin, 2011, Nowicka, 2018, Wuttke et al., 2013, Yang and Li, 2010), but there are few papers discussing the SCF topic related to the Covid-19. So, this research thesis is useful to understand more which are the emerging objectives, how the enablers and inhibitors were impacted, and how the adoption of SCF solutions changed, during the Covid-19. Going on with the managerial implications, this dissertation can be useful for those firms which are already adopting SCF solutions, and for those that are considering entering in this world. Indeed, by looking to the results obtained, companies can understand how the objectives and the enabler and inhibitor factors are changing with the pandemic, so that they can consider different variables in their decision-making process and in their final decision to start adopting or not these instruments. Concerning the limitations and future developments, the first one regards the sample of Case studies, which can be enlarged in order to identify additional relevant insights, which can further validate the results obtained. The geographical location of Case studies presented is another limitation. Indeed, the fact that the majority of companies interviewed came from Italy, restricted the scope of the research thesis. The last limitation is about the fact that, most of the contributions reported in this thesis work, came from buyers' perspective, so it could be extremely interesting try to also investigate the supplier point of view.

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