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## Towards a framework on the factors conditioning the role of Logistics

### Service Providers in the provision of Inventory Financing

#### Abstract

**Purpose** – This paper explores the conditions in which Logistics Service Providers (LSPs) can compete or collaborate with banks in offering Inventory Financing as a Supply Chain Finance (SCF) service.

**Design/methodology/approach** – A multiple case study research methodology was adopted. The case study involved six LSPs across Europe. Data was collected through semi-structured interviews.

**Findings** – The results highlighted that an attractive credit demand for LSPs consists in suppliers with high amounts of inventory or borrowing needs that go beyond their borrowing capacity from the perspective of a bank.

LSPs can respond to this demand when they have three specific capabilities: risk assessment, risk monitoring, and organizational capabilities. The offer of Inventory financing can be controlled by the LSP or by the bank. When the LSPs control the offer, they offer different conditions compared to the banks in terms of credit rationing, transaction costs, payment flexibility, tax rate advantage, and financial risk management. When the bank controls the offer, the LSPs influence the nature of SCF services only in terms of credit rationing and transaction costs. LSPs seem to easily develop risk assessment and risk mitigation capabilities, while the organisational capabilities appear to be the most challenging to build, and when absent they create a barrier to the provision of inventory financing.

**Originality/value** – The value of the paper is twofold. Firstly, the paper provides a comprehensive taxonomy of the factors conditioning the role of LSPs in the provision of inventory financing as a SCF service. Secondly, the paper clarifies the link between the factors and the different roles played by LSPs.

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2  
3 **Keywords** – Supply Chain Finance, Inventory Finance, Logistics service providers, Multiple

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5 Case study

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7 **Paper type** – Research paper

## 1. Introduction

Supply Chain Finance (SCF) is an emerging field of research focused on the management of financial flows across the supply chain (Gelsomino et al., 2016), with the purpose of reducing the risks and maximising the profit for the different actors involved (Caniato et al., 2016). The mechanisms for the reduction of risk and the creation of profit include the optimisation of the cash to cash cycle, the avoidance of payment delays, the management of working capital (Evans and Koch, 2007; Sadlovska, 2007; Hofmann and Kotzab, 2010), as well as higher integration between the primary and secondary actors of the supply chain (Chakuu et al., 2019). The existing studies on SCF focused mainly on the supply side of supply chains (Chakuu et al., 2019) and they described a number of SCF instruments, such as reverse factoring (Dello Iacono et al., 2015; Caniato et al., 2016; Liebl et al., 2016; Bals, 2019), dynamic discounting (Basu and Nair, 2012; Bryant and Camerinelli, 2014; de Boer et al., 2015; Caniato et al., 2016) and inventory financing (de Boer et al., 2015; Song et al., 2016; Martin and Hofmann, 2017; Xu et al., 2018; Lam et al., 2019).

Inventory financing is gaining an increasing attention within the academic and industrial community (Liu et al., 2015; Liebl et al., 2016; Xu et al., 2018; Bals, 2019; Martin and Hofmann, 2019; Moretto et al., 2019; Wang et al., 2019; Jia et al., 2020) because of the considerable amount of Inventory that characterises global supply chains.

While traditionally banks were controlling the offer of SCF instruments, the growing use of instruments like inventory financing is changing this scenario and is increasing the importance of new actors such as logistics service providers (LSPs), non-bank financial institutions (NBFIs), and platform providers (Chakuu et al., 2019).

LSPs can collaborate or compete with banks in offering inventory financing, since they can use their better visibility of the supply chain and their closer control of the inventory. However, the conditions in which LSPs can compete or collaborate with banks in offering

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3 inventory financing as a SCF service are still unclear. Previous studies identify different  
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5 factors conditioning the role of LSPs in the provision of inventory financing as an SCF  
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7 service, but a comprehensive taxonomy of these factors is still missing, and the link between  
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9 the factors and the different roles played by the LSP is unclear.  
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13 Understanding these factors is highly relevant given the number of LSPs that are  
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15 interested in the provision of SCF services. Large LSPs, such as UPS, DHL and Swiss Post,  
16  
17 are already offering various financial value-added services at operational and strategic levels  
18  
19 to enhance their service offering portfolio (Hofmann, 2009; Chen and Cai, 2011).  
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23 This paper aims at filling this gap, and it proposes an empirically validated framework  
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25 that classifies all the key the factors conditioning the role of LSPs in the provision of  
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27 inventory financing as an SCF service as well as the link between these factors and the  
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29 different roles played by the LSPs.  
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33 The paper is structured as follows. Section 2 introduces SCF and inventory financing and  
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35 reviews the previous studies on the factors conditioning the role of LSPs in the provision of  
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37 inventory financing. The section ends with a theoretical framework that is the basis for the  
38  
39 empirical work. Section 3 summarises the multi case study methodology adopted for the  
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41 validation and refinement of the framework. Section 4 presents and discusses the results of  
42  
43 the empirical work. Section 5 discusses the results and Section 6 presents some conclusions.  
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## 46 47 **2. Literature review**

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51 SCF aims at planning, steering, and controlling the financial flows along a supply chain  
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53 and it has become pivotal among academics and practitioners, especially since the global  
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55 financial crisis of 2007-2008 (Hofmann, 2005; Pfohl and Gomm, 2009; Bryant and  
56  
57 Camerinelli, 2014; Liebl et al., 2016; Bals, 2019). Hofmann (2005) and Pfohl and Gomm  
58  
59 (2009) highlight that SCF does not focus on a single actor of the supply chain. According to  
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3 them, SCF is an approach for two or more members in a supply chain (customers, suppliers  
4 and service providers) that optimise create value through planning, steering, and controlling  
5 financial flows. These activities increase the value of all the participating supply chain  
6 members and optimise the use of their working capital. Similarly, Bryant and Camerinelli  
7 (2014) define SCF as:  
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15 *“The use of financial instruments, practices and technologies to optimise the management*  
16 *of the working capital and liquidity tied up in supply chain processes for collaborating*  
17 *business partners. SCF is largely ‘event-driven’. Each intervention (finance, risk mitigation*  
18 *or payment) in the financial supply chain is driven by an event in the physical supply chain.*  
19 *The development of advanced technologies to track and control events in the physical supply*  
20 *chain creates opportunities to automate the initiation of SCF interventions.”*  
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30 This definition takes into account supply chain, supply chain members, processes,  
31 interventions, and interrelationships. Moreover, it highlights that SCF is an event-driven  
32 phenomenon, initiated by specific interventions that take place in the supply chain.  
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37 SCF can be studied from a supply chain-oriented perspective (Hofmann, 2005; Pfohl and  
38 Gomm, 2009; Wuttke et al., 2013; Mathis and Cavinato, 2010; Liebl et al., 2016) or finance-  
39 oriented perspective (Camerinelli, 2009; More and Basu, 2013; Bryant and Camerinelli,  
40 2014). The supply chain-oriented perspective considers every possible financing mechanism  
41 within the supply chain, while the finance-oriented perspective focuses on the financing  
42 mechanisms involving a “traditional” financial institution. These two perspectives generated  
43 various schools of thoughts and approaches towards SCF.  
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53 The actors coordinating SCF instruments can be either primary or supportive (Pfohl and  
54 Gomm, 2009; Chakuu et al., 2017; Chakuu et al., 2019). The primary actors are directly  
55 involved in the material, informational and financial flows within the supply chain (e.g. focal  
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3 company/buyer and supplier), while the supportive actors provide support services to the  
4  
5 primary members (e.g. service providers and traditional banks). Chakuu et al. (2017) further  
6  
7 categorise the service providers into LSPs, NBFIs, and platform providers. The above-  
8  
9 mentioned actors can provide a range of SCF instruments including fixed-asset financing,  
10  
11 inventory financing, and accounts receivable/accounts payable financing (Chakuu et al.  
12  
13 2019).  
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16  
17 (Bryant and Camerinelli, 2014) focused on the SCF actors and developed the concept of  
18  
19 “disintermediation”, indicating that a bank or a non-bank financial institutions (NBFIs) can  
20  
21 be substituted by another member of the supply chain for the provision of SCF services.  
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23 They argued that LSPs are in a favourable position to substitute the banks/NBFIs in the  
24  
25 provision of SCF services, although only Hofmann (2009) further analysed this potential  
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27 role of LSPs. These studies tend to see LSPs as mediators that work with traditional banks to  
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29 support their financing solutions, or with parent firms that provide SCF solutions via their  
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31 financial intermediaries.  
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37 Among the different SCF solutions, this paper focuses on inventory financing, namely a  
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39 set of SCF instruments that leverage purchase orders, raw materials, and inventory as part of  
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41 the financing mechanism. Inventory financing is increasingly interesting for SCF actors such  
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43 as LSPs, non-bank financial institutions (NBFIs) and platform providers (Chakuu et al.,  
44  
45 2019). LSPs in particular are playing an increasingly important role as providers of SCF  
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47 services (Pfohl and Gomm, 2009). While traditionally a bank would provide the capital for  
48  
49 SCF solutions, a set of changes in the credit demand challenged the role of banks and  
50  
51 increased the possibility for LSPs and other new actors to offer SCF services (Bryant and  
52  
53 Camerinelli, 2014).  
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57 In a traditional scenario, banks can benefit from economies of scale and expertise in  
58  
59 managing cash flow and therefore in offering SCF solutions. However, under specific  
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3 conditions LSPs could compete with banks, or add value and collaborate with banks in the  
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5 provision of SCF instruments.  
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8 Previous studies highlight that LSPs involved in the provision of Inventory financing can  
9  
10 have two different roles: mediator or provider.  
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13 The LSP acts as a mediator when a Bank/NBFI offers a short-term loan in coordination  
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15 with an LSP. This instrument is also called an Integrated Logistics Financial Service (ILFS)  
16  
17 (Chen and Cai, 2011). The loan is based on the value of the collateral that in this context is  
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19 inventory (raw materials, work in progress, finished), in-stock or in-transit. This instrument is  
20  
21 used by both buyers and supplier for buying additional inventory or improving cash flow.  
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23 The set credit limit is also affected by the type of inventory, its condition (whether it is pre-  
24  
25 processed, work in progress, or finished) and its ability to be resold. Once the credit limit is  
26  
27 finalised, the inventory is pledged and transferred into the warehouse coordinated by an LSP.  
28  
29 The traditional bank/NBFI can then transfer the loan amount to the buyer/supplier. The LSP  
30  
31 not only coordinates the inventory, but also maintains its quality, checks for counterfeit items  
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33 and, if the need arises, liquidates the inventory on behalf of the traditional bank/NBFI.  
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39 The LSP acts as a provider when it takes the ownership of inventory from the supplier and  
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41 resells it to the buyer. Like in the previous category, the loan is based on the value of the  
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43 collateral. The key difference between the mediator and the provider role regards the  
44  
45 disintermediation of the traditional bank/NBFI by the LSP. Like other forms of  
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47 inventory/warehousing finance, this instrument focuses on providing financial support to the  
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49 suppliers. The suppliers can use the loan for buying additional inventory or improving cash  
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51 flow. The credit limit is set on the same basis as the previous instrument. Once the credit  
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53 limit is finalised, the LSP transfers the loan amount to the supplier. Consequently, the LSP  
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55 sells the inventory to the buyer. In case the LSP is not cash-rich, it may raise capital from the  
56  
57 traditional bank/NBFI.  
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3 Several SCF studies analysed the factors conditioning the role of LSPs in the provision of  
4 inventory financing. These studies identified three categories of factors: the nature of  
5 demand, the capabilities of the LSP, and the nature of the SCF offer. The remainder of this  
6 section will define and review these factors.  
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### 11 *Nature of the demand*

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15 The first category of factors conditioning the role of LSPs in the provision of inventory  
16 financing describes the nature of the supplier's demand for credit, characterised through the  
17 Exceeding capital needs (factor 1.1) and the amount of Inventory in transit (factor 1.2).  
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22 *1.1 Exceeding capital needs.* The first situation in which an LSP can compete with a bank  
23 arises when the amount of capital that the supplier needs exceeds the normal borrowing  
24 capacity from the bank's perspective. Many financial institutions are not willing to provide  
25 financial support beyond the normal borrowing capacity of a supplier (Cao and Zhang, 2012).  
26 Previous studies described several cases in which a supplier's need for capital exceeds its  
27 normal borrowing capacity, such as during growing (Asselbergh, 2002; Extra et al., 2016) or  
28 seasonal sales (Ng et al., 1999; Asselbergh, 2002). A seasonality of sales can require an  
29 injection of liquidity when the supplier needs capital to respond to the increase in demand. At  
30 the same time, the supplier may need additional capital to cover the fixed costs during the  
31 downturn (Asselbergh, 2002). The banks tend to consider the seasonality of sales as a source  
32 of additional risk, connected to a lower profit margin or greater loss (Ng et al., 1999;  
33 Asselbergh, 2002). Similarly, sales growth implies a need of increasing the suppliers'  
34 capacity to meet the demand, with the related investments and financial needs. Banks tend to  
35 consider sales growth as a short-term phenomenon that can affect the supplier's profitability  
36 and margins, and therefore they are reluctant in offering their SCF services (Asselbergh,  
37 2002).  
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3 *1.2 Inventory in transit.* The second situation in which an LSP can compete with a bank  
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5 arises when the supplier has a considerable amount of inventory in transit that leads to  
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7 pending accounts receivables. With a large proportion of pending accounts receivable and  
8  
9 reduced liquidity, suppliers generally require cash from external sources (Asselbergh, 2002;  
10  
11 Dello Iacono et al., 2015). Banks tend to perceive uncertainty and increased financial risk in  
12  
13 this situation because of the fluctuations of total receivables, and therefore they are reluctant  
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15 in offering their SCF services (Dello Iacono et al., 2015).  
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### 20 *LSP capabilities*

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22 The second category of factors conditioning the role of LSPs in the provision of inventory  
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24 financing describes the LSPs' capabilities. Previous studies highlight three types of  
25  
26 capabilities: the capability of risk assessment (factor 2.1), the capability of risk mitigation  
27  
28 (factor 2.2), and the organisational capabilities (factor 2.3). These capabilities are affected by  
29  
30 the conditions such as LSP size, age of firm, country of origin, and type of LSP. This study  
31  
32 will consider these factors as antecedents of the capabilities themselves, likely to affect the  
33  
34 way inventory financing is offered (Asselbergh, 2002; Buzacott and Zhang, 2004; Garcia-  
35  
36 Teruel and Martinez-Solano, 2010; Moritz et al., 2016).  
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41 *2.1 Capability of risk assessment.* The capability of risk assessment represents the  
42  
43 capability of an LSP to assess the financial risk connected to each supplier. There are two  
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45 factors that affect the nature of this capability in a specific SC configuration: the social  
46  
47 capital and trust along the supply chain and the Intra and inter-firm collaborations. Previous  
48  
49 studies highlighted that social capital and trust between an LSP and suppliers affect the credit  
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51 availability and the enforcement of financial contracts (Liu, 2015; Caniato et al., 2016; Liebl  
52  
53 et al., 2016; Moritz et al., 2016). Intra and inter-firm collaborations represent the  
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55 collaboration between LSPs and suppliers within and outside the organisations. These two  
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57 factors affect the LSP's supply chain visibility and place it in a better position to offer  
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3 financial support to the suppliers with respect to the banks (Basu and Nair, 2012; Bryant and  
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5 Camerinelli, 2014; de Boer et al., 2015; Caniato et al., 2016; Song et al., 2016; Xu et al.,  
6  
7 2018; Bals, 2019).

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10 *2.2 Capability of risk mitigation.* The capability of risk mitigation represents the LSP's  
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12 capability to mitigate the financial risks. For a specific SC configuration, this capability  
13  
14 depends on inventory monitoring and liquidation policy. Inventory monitoring indicates the  
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16 capability of monitoring the inventory of debtors (Hofmann, 2009; Chen and Cai, 2011; Li et  
17  
18 al., 2011; Liu, 2015), while the liquidation policy is the policy adopted for seizing the  
19  
20 inventory of suppliers in default and for redeploying it efficiently (Buzacott and Zhang, 2004;  
21  
22 García-Teruel and Martínez-Solano, 2010). Thanks to its position in the supply chain, an LSP  
23  
24 can easily monitor the debtors' inventory in transit or warehouses (Hofmann, 2009; Chen and  
25  
26 Cai, 2011; Li et al., 2011; Liu, 2015). In contrast, banks need the support of a third-party for  
27  
28 monitoring or seizing the inventory. At the same time, thanks to their extended relationships  
29  
30 with the suppliers and thanks to the ownership of the inventory, LSPs generally have lenient  
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32 liquidation policies compared to the banks in case of supplier default of the supplier  
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34 (Asselbergh, 2002; Buzacott and Zhang, 2004; Garcia-Teruel and Martinez-Solano, 2010;  
35  
36 Moritz et al., 2016).

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39 *2.3 Organisational capabilities.* Organisational capabilities describe the organizational  
40  
41 expertise and skills needed to offer SCF, including the knowledge of SCF,  
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43 accounting/invoicing standards, agency risks and costs, organisational policies, global  
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45 breadth, introduction timeliness, operating flexibility, as well as ICT capabilities (Chakuu et  
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47 al., 2019).

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Several studies highlighted that an adequate knowledge of SCF and its mechanisms is  
crucial for LSPs willing to offer SCF services (Mateen and More, 2013; More and Basu,  
2013; BAFT et al., 2016; Martin and Hofmann, 2017).

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3 LSPs sharing the accounting/invoicing standards with the suppliers can more easily offer  
4 them SCF (Bryant and Camerinelli, 2014; BAFT et al., 2016; GBI, 2016).  
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8 LSPs can foster the integration of the company and of the supply chain, enabling it to  
9 overcome the “silos” mentality and the agency risks that lead to effective supply chain  
10 planning, particularly essential for successful SCF (Hill et al., 2013; Moritz et al., 2016; Yan  
11 et al., 2016).  
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18 The organisational policies of the LSP affect the possibility of offering SCF conditions  
19 that are more attractive if compared to a bank (de Meijer and de Bruijn, 2013; More and  
20 Basu, 2013).  
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25 The global breadth indicates the capability of LSPs of facilitating the flows of materials,  
26 information, and cash of a supply chain on a global scale. While Banks tend to offer financial  
27 services nationally because of regulatory barriers, an LSP can easily be familiar with the  
28 management of cross national financial flows, thus gaining a key competitive advantage  
29 compared to the banks (GBI, 2016; Lorentz et al., 2016).  
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37 The introduction timeliness is the capability describes the timeliness in introducing a SCF  
38 program for a large proportion of suppliers (Wuttke et al., 2016). This factor is essential and  
39 directly related with the risk assessment capability of an LSP, since a supplier with a low risk  
40 assessment can quickly enrolled into a SCF program.  
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47 Operating flexibility represents the capability of the LSP of controlling changes in the  
48 flows of material, information, and cash (Basu and Nair, 2012; Bryant and Camerinelli, 2014;  
49 de Boer et al., 2015; Caniato et al., 2016; Song et al., 2016; Xu et al., 2018; Bals, 2019). This  
50 factor can give to LSPs a key competitive advantage with respect to the banks, since the  
51 banks rarely have the same visibility of the supply chain from an end-to-end perspective that  
52 enables to effectively react to change (Garcia-Teruel and Martinez-Solano, 2010).  
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3 Lastly, ICT capabilities describe the capabilities of information acquisition and sharing  
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5 (Lamoureux and Evans, 2011; Popa, 2013; Bryant and Camerinelli, 2014; Caniato et al.,  
6  
7 2016; Chakuu et al., 2017; Chakuu et al., 2019). Several studies highlighted that symmetric  
8  
9 information across the supply chain is pivotal for the provision of SCF services (Hill et al.,  
10  
11 2013; Moritz et al., 2016; Yan et al., 2016). LSPs acquire and share information about  
12  
13 inventory and suppliers as part of their daily work, and they generally use ICT systems for  
14  
15 warehouse management, valuation track and trace, or supply management. Therefore, this  
16  
17 factor can give to LSPS a competitive advantage compared to the banks.  
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### 22 *Nature of SCF offer*

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25 The third category of factors conditioning the role of LSPs in the provision of inventory  
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27 financing describes the credit offer. The credit offer can vary in terms of credit rationing  
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29 (factor 3.1), transaction costs (factor 3.2), payment flexibility (factor 3.3), tax rate advantage  
30  
31 (factor 3.4), and financial risk management (factor 3.5).  
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34 The credit rationing describes the borrowing constraints connect to the SCF service  
35  
36 (Seifert et al., 2013; Bryant and Camerinelli, 2014; O'Toole et al., 2015; Chakuu et al., 2017;  
37  
38 Chakuu et al., 2019). Traditional banks and NBFIs can have expensive or prohibitive  
39  
40 borrowing constraints, and therefore LSPs can leverage this factor and offer better credit  
41  
42 rationing conditions to attract new customers.  
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45 Transaction costs describe the processing costs related to the loans, and they are related to  
46  
47 information exchange, monitoring costs, finance search, fee for renegotiating credit contracts,  
48  
49 and payments (Hill et al., 2013; Kortman et al., 2016; Wandfluh et al., 2016). These costs are  
50  
51 generally high when credit comes from the banks, and LSPs can often offer substantially  
52  
53 lower transaction costs to compete with banks in the provision of SCF services (Hill et al.,  
54  
55 2013).  
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LSPs can also offer to the suppliers more flexibility in the repayments (Soufani et al., 2013; Extra et al., 2016; Chakuu et al., 2017; Chakuu et al., 2019).

Tax rate advantage indicates that an LSP offering SCF can reduce the amount of taxes to pay because of the reduction of net income (Hill et al., 2013; Soufani et al., 2013; Liebl et al., 2016).

Financial risk management indicates the possibility of better balancing the financial risk between the different actors of the SC, and a better balance of risk reduces the risk of bankruptcy for all the members of the supply chain. (Seifert et al., 2013; Bryant and Camerinelli, 2014; O'Toole et al., 2015; Chakuu et al., 2017; Chakuu et al., 2019).

Based on the reviewed factors, the authors of the study developed a set of hypotheses on the behaviour of LSPs in the different situations that the factors describe. If there are the right demand conditions but the LSP doesn't have the needed capabilities to offer SCF services, the LSP will not be involved in the provision of the SCF services. When there are the right demand conditions but the LSP has only some of the needed capabilities to offer SCF services, the bank/NBFI will control the provision of the SCF service and the LSP will play a mediating role. When there are the right demand conditions and the LSP has all the needed capabilities, the LSP could collaborate with the bank in offering the service or offer the service by itself, based on the nature of the LSP capabilities and of the SCF offer. Table 1 summarises the hypotheses and shows the theoretical framework of this study.

-----*Insert 'Table 1 Theoretical framework' here*-----

### 3. Research design

A three-stage abductive research design was adopted, as illustrated in Figure 1, to provide the ability to offer new insights (Kovács and Spens, 2005). Stage 1 focused on the exploration of the applicability of SCF “theory” to the “new” context of LSPs. Stage 2 was an iterative process of “theory matching”, to the SCF literature. As the authors sought to explain the conditions in which LSPs can compete or collaborate with banks in offering Inventory Financing, they investigated six LSPs across Europe. The abductive cycle closed in Stage 3, when theoretical saturation was reached and the theoretical framework initially proposed from the review of the literature was reviewed and validated. The specific research questions (RQs) that the study sought to address can be expressed as follows:

*RQ1 What are conditions in which Logistics Service Providers (LSPs) can compete or collaborate with banks in offering Inventory Financing?*

*RQ2 How do LSPs behave in the different situations?*

-----Insert 'Figure 1 Three stage abductive research design' here-----

#### 2.1 Case Study Design

The objective of this paper is to empirically study the conditions in which LSPs can compete or collaborate with banks in offering inventory financing. The context in which SCF is offered and LSPs operate is truly complex spanning both internal and external organisational boundaries. This complexity caused by lack of theory and well-supported definitions and metrics supports a case study methodology (Eisenhardt, 1989; Harrison, 2002).

The study took the form of a multiple case study (Yin, 2009) followed by cross-case analysis. The authors of this paper used the five-stage process of case study design as

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2  
3 described by Yin (2009). Its focus was six LSPs across Europe. The cases were selected  
4  
5 based on the purposive sampling method, where the case is selected based on the conceptual  
6  
7 framework and research questions. As described by Miles and Huberman (1994), purposive  
8  
9 sampling is suitable for qualitative research which is informed *a priori* by an existing body of  
10  
11 social theory on which research questions may be based.  
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14  
15 The cases selected for this analysis are taken from a pool of LSPs, who were part of a  
16  
17 research project with regard to which authors were part of the research team. The LSPs  
18  
19 selected are either willing to offer inventory/warehousing finance or to extend their existing  
20  
21 inventory financing offers. Table 2 presents the characteristics of the selected cases.  
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27 ----- *Insert 'Table 2 Case Characteristics' here* -----  
28

29  
30 As illustrated in Table 2, six LSPs are located across various regions of Europe.  
31  
32 Interestingly, Delta and Theta are 4PLs while the other LSPs are 3PLs. This is clear from the  
33  
34 range of services each LSP is offering.  
35  
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37  
38 The rigour of the research design is ensured by following the four basic tests commonly  
39  
40 used in empirical research (Yin, 2009). These tests are summarised in Table 3.  
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43 ----- *Insert 'Table 3 Case study tactics for four design tests' here* -----  
44  
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46  
47 The tactics illustrated in Table 3 were used as a checklist to ensure that, where appropriate,  
48  
49 the proposed tactics have been utilised as a way of maintaining the quality of the studies for  
50  
51 this paper. Specifically, the external validity of the studies was improved by using six cases  
52  
53 and cross-case analysis. The cross-case analysis in this context takes in to account contextual  
54  
55 factors as a way to establish the domain in which the findings can be generalized. This  
56  
57 enabled the use of replication logic and pattern matching to explore the LSPs capabilities and  
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3 associated behaviours to offer SCF services across the six cases. In terms of data collection,  
4  
5 the author has endeavoured to use all three of the suggested techniques to improve construct  
6  
7 validity. These include the use of multiple sources of data, establishing a clear chain of  
8  
9 evidence and having informants review key case study reports. Furthermore, the reliability of  
10  
11 the data collection phase was improved through the use of a case study protocol and  
12  
13 development of a case study database. Finally, during the analysis stage, internal validity is  
14  
15 increased through the use of techniques such as template analysis.  
16  
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## 20 **2.2 Prior theory applied in a new context**

21  
22 In order to ensure the rigour of the case study design, a research protocol was developed  
23  
24 (Easterby-Smith et al., 2012). This was a living document that provided the research team  
25  
26 and case study partners with an overview of the rationale for the study, unit of analysis, RQs  
27  
28 and interview schedules for the different stages.  
29  
30  
31

32  
33 The first step was a scoping study. As illustrated in Table 4, this involved eleven semi-  
34  
35 structured interviews with the senior management. The output was a report that provided a  
36  
37 summary of the context and a recommendation for the scope of the main study (second  
38  
39 step). It was reviewed by members of the research team for accuracy.  
40  
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44 ----- *Insert 'Table 4 Scoping and main study interviews' here* -----  
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49  
50 The main study focused on the multi-dimensional nature of the factors for the offering of  
51  
52 inventory financing by LSPs. The aim of this stage was predominantly to understand the  
53  
54 current factors for the inventory financing adoption and the related mechanisms. It took the  
55  
56 form of a further 25 semi-structured interviews (see Table 4). The interviews were conducted  
57  
58 at two different levels of analysis: the senior management team (SMT) and the operational  
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3 level. Each interview lasted about one hour, took place in the company premises, and was  
4  
5 recorded. The interview schedule logged the interviewee, date, time, duration and any  
6  
7 supporting documentation. Contact notes were written within 24 hours of the interview in line  
8  
9 with (Miles and Huberman, 1994). They were analysed by the authors, and the identified  
10  
11 themes were integrated in the results of the study.  
12  
13

14  
15 Two of the authors conducted an independent analysis of the interviews, identifying the  
16  
17 quotes relevant to the two themes. Following an iterative process, each quote was related to a  
18  
19 specific factor affecting the SCF offering, and the definitions of practices and factors from  
20  
21 the literature were integrated or tailored when needed. The results of the analysis were  
22  
23 compared and consensus between the authors was reached.  
24  
25

26  
27 The findings of the study were validated with members of the company in early September  
28  
29 2018 and early 2020.  
30  
31

### 32 **2.3 Theory matching**

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34 The theory matching process is emergent and iterative. It became apparent that whilst  
35  
36 there was genuine overlap between the factors suggested in the literature and the factors  
37  
38 emerging during the interviews, there were a number of enabling mechanisms turning factors  
39  
40 into enablers. The researchers then reflected on these findings and conducted a focus group to  
41  
42 further refine their understanding. This process was repeated twice until theoretical saturation  
43  
44 was reached. From the initial workshop, the theory matching process took weeks to complete.  
45  
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### 49 **2.4 Theory suggestions**

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51 The researchers recognised theoretical saturation at the point where the continuation of  
52  
53 data collection provided no new conceptual insights. Following this, consensus was reached  
54  
55 for the resultant theoretical framework. The authors sought to provide insight on the way in  
56  
57 which different factors can enable inventory financing offering by LSPs.  
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#### 4. Results

Alpha detected a demand for financial services by suppliers with a considerable amount of inventory in transit. The management highlighted how they were granting to these suppliers a higher borrowing capacity compared to the banks, stating that *“financial support to our clients is not based on same parameters as that of banks. We see if clients we deal with balances the trade through the year. This gives us a good indication whether or not to lend any financial support”*. A key difference between Alpha and the banks is a less formal process to grant the financial support. Due to the existing relationship with its suppliers, Alfa doesn't take into account 'know your client' regulations and credit rating in offering.

In response to this demand, Alpha developed set of specific capabilities. Risk assessment and risk mitigation are facilitated by the relationship with the suppliers, and the management highlighted that *“we have systems with which we can monitor the invoices, value, goods in warehouse as well as during transportation. So, we can use this information for our benefit in monitoring and liquidating if need arises”*. The management also highlighted that the operating flexibility and dedicated organisational policies supporting SCF facilitate the provision of inventory financing.

To fulfil the demand, Alpha is offering inventory financing with control of the instrument. According to Alpha, *“borrowing constraints from the banks and other financial institutions is a good thing if we want to offer SCF, as you have got demand and you additional earn interest rate as well as you hold their inventory”*. Even after charging interest rate, Alfa in collaboration with banks or third-party provides a competitive rate to the clients due to the reduction in the transaction costs and associated formalities.

Beta detected a demand from the fresh food transportation firms with capital needs exceeding their normal borrowing capacity. The firm has the capability of assessing the risk and the interviewee highlighted that *“we have strong relationships with our suppliers”*.

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3 Regarding risk mitigation, Beta can monitor inventory in-transit but doesn't possess any  
4 liquidation capability. Beta also lacks the organisational capabilities to tailor SCF offering to  
5  
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8 serve the financial needs of its suppliers. As a result, Beta is not offering any SCF service.  
9

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11 *Delta* detected a demand triggered by suppliers with capital needs exceeding their normal  
12 borrowing capacity and with a considerable amount of inventory in transit.  
13

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15  
16 Delta has all the capabilities needed to offer SCF. It has a strong relationship with its  
17 suppliers. The interviewee stated that "*we have enormous social and capital trust and it helps*  
18 *in SCF, especially if the SCF-market is not developed.*" Delta uses SCF offerings to enhance  
19 the inter- and intra-firm collaboration by providing supportive functions to the entities  
20 involved. It is also able to mitigate the risk by monitoring the inventory in-transit, inventory  
21 at its warehouses, taking the ownership of the inventory and liquidate it if necessary.  
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23 Furthermore, organisational capabilities of Delta adequately support its SCF service  
24 offerings.  
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35 To fulfil the financing demand, Delta is offering multiple type of SCF offering without  
36 collaborating with banks. Delta has inhouse and less formal process of providing the financial  
37 support to the suppliers. According to Delta, "*we understand suppliers' seasonality, growth*  
38 *in sales and liquidity requirements, so we tailor our solutions to best match their needs*".  
39  
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44 According to Delta, "*credit rationing increases it demand for alternative source of*  
45 *financing.*" More credit rationed the supplier are more financial services they can offer.  
46  
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49 Payment flexibility is a significant advantage for Delta. As stated by Delta, "*the payment*  
50 *flexibility provided by us makes suppliers highly likely to adopt our SCF services.*"  
51

52  
53 Furthermore, Delta's offerings reduce transaction costs substantially, therefore providing  
54 better offer to the suppliers. Tax rate advantage also makes it attractive to offer SCF as Delta  
55 saves on the net income. Lastly, financial risk management using SCF services makes Delta  
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60 to distribute financial risk along the supply chain.

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3 *Gamma* detected a demand of Inventory financing from transportation firms in the FMCG  
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5 sector with capital needs exceeding their normal borrowing capacity.  
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8 The only capability of *Gamma* consists in assessing the credit risk of the suppliers, thanks  
9  
10 to a strong trust and with suppliers. Because of this lack of capabilities, *Gamma* is currently  
11  
12 unable to offer SCF to its suppliers.  
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15 *Theta* detected a demand of Inventory financing from suppliers with capital needs  
16  
17 exceeding their normal borrowing capacity and a considerable amount of inventory in transit.  
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21 *Theta* developed a set of specific capabilities to respond to this demand. *Theta* can easily  
22  
23 assess the risk thanks to strong intra- and inter-firm collaboration. It can mitigate the risk by  
24  
25 monitoring the inventory in-transit and in its warehouses as well as by easily liquidating the  
26  
27 inventory in case the supplier default on the financing solution. The company also developed  
28  
29 Key organisation capabilities consisting in a good operating flexibility and in organisational  
30  
31 policies supporting SCF. The interviewees highlighted that these capabilities created a  
32  
33 structured and easier process to provide SCF.  
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36  
37 *Theta* is offering inventory financing in collaboration with the bank, leveraging better  
38  
39 credit rationing conditions. According to *Theta*, *“borrowing constraints from the banks and*  
40  
41 *other financial institutions make a strong case for us to help our suppliers”*.  
42  
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45 *Zeta* is monitoring a credit demand arising from small transportation firms with capital  
46  
47 needs exceeding their normal borrowing capacity.  
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50 The interviews highlighted that the company has a good capability of assessing and  
51  
52 monitoring the credit risk of its suppliers. The interviewee highlighted how these capabilities  
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54 were fostered by *“a high transparency in monitoring the goods and assets.”*. Moreover, the  
55  
56 company developed a good liquidation capability in case default of a supplier.  
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3 However, the company did not develop any organizational capability connected to the  
4 provision of SCF services. Therefore, Zeta is currently not responding to the credit demand  
5 and it is not offering inventory financing. Table 5 summarises the results of the empirical  
6 work.  
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15 ----- *Insert 'Table 5 Case results summary' here* -----  
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## 19 **5. Discussion**

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22 The previous section summarised the results of six case studies, analysed to validate and  
23 refine the theoretical framework developed from the literature. The results validated the key  
24 elements of the theoretical framework on the behaviour of LSPs in different contextual  
25 situations.  
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31 The LSPs Beta, Gamma and Zeta detect a potential demand but they do not have the  
32 needed capabilities to offer SCF services. None of the companies have the full set of  
33 capabilities needed for the provision of SCF services. In particular, the three LSPs have the  
34 capability of risk assessment, only Zeta has risk mitigation capabilities and none of them has  
35 organisational capabilities. Due to lacking capabilities, Beta, Gamma and Zeta are not able to  
36 respond to the demand and provide a SCF offer that is attractive for their suppliers. The  
37 results suggest that risk mitigation and organisational capabilities are critical to develop  
38 actual SCF offer and more difficult to gain.  
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51 The LSPs Alpha and Theta detect a potential demand, and both target suppliers unable to  
52 get financial support from banks. They have the full set of capabilities to offer SCF services,  
53 and they offer SCF in collaboration with the banks. The interviews highlight that offering  
54 SCF in collaboration with banks requires the full range of capabilities highlighted in the  
55 framework. Both LSPs have a specific set of capabilities that allow the assessment and  
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3 mitigation of risk. In addition, Alpha and Theta developed organisational policies that support  
4 offering SCF to its suppliers. In terms of nature of credit offer, both leverage credit rationing  
5 and Alpha uses reduced transaction costs to increase the attractiveness of its offer. In line  
6 with the theoretical framework, this indicates that nature of demand and LSP's capabilities  
7 are pre-requisite for LSPs to offer SCF in collaboration with the banks.  
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15 Delta is the only LSP offering SCF offerings without the mediation of a bank. Delta has all  
16 the capabilities needed to respond to the demand and it uses various leverages to differentiate  
17 its offer from the banks. The nature of Delta's credit offer is based on the credit rationing,  
18 lower transaction costs, flexibility in payments, less tax and distribution of risk to avoid  
19 bankruptcy. In line with the theoretical framework, the LSP offering SCF as a provider has  
20 the full set of capabilities and a complex SCF offer.  
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30 The value of the empirically validated theoretical framework shown in Figure 2 is twofold.  
31 Firstly, the framework proposes a classification of the capabilities that LSPs need to offer  
32 Inventory Financing. The empirical results suggest different degree of difficulty in gaining  
33 these capabilities, and a sequential process that sees risk assessment capabilities developed as  
34 first, followed by risk mitigation and organizational capabilities. The mentioned capabilities,  
35 when absent, also highlight the barriers that LSPs face in offering Inventory Financing.  
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44 Secondly, the framework highlights three stages of maturity in the provision of SCF  
45 services: demand detection, capabilities development, and service provision. The LSP plays a  
46 different role in each of these stages and should follow different managerial guidelines. While  
47 detecting a demand, the LSP should consider the opportunity of offering inventory financing  
48 and therefore assess the capabilities needed for its development. While developing  
49 capabilities, the LSP can initially decide to collaborate with a bank for the provision of  
50 Inventory financing.  
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3 The role of the LSP will depend on a trade-off between the costs needed to develop the  
4 three key capabilities and the benefit for the LSP from the provision of the SCF service.  
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6 Having developed all the three key capabilities, an LSP is able to offer SCF as a provider.  
7  
8 The LSP can use multiple levers to compete with the bank, and its role will depend on the  
9 nature of the credit offer provided. Therefore, a practitioner can use the framework as a guide  
10 to assess its current maturity and design a roadmap for the provision of inventory financing.  
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20 -----Insert 'Figure 2 Updated theoretical framework here'-----  
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24 From a theoretical perspective, the framework provides a contribution to the knowledge of  
25 the conditions in which LSPs can compete or collaborate with banks in offering Inventory  
26 Financing as a SCF service. The contribution consists in classifying the factor, in exploring  
27 their hierarchical importance, and in exploring the relationship between the different factors  
28 and the different roles of the LSP. Moreover, while previous papers in this domain studied  
29 the adoption of SCF for a generic instrument, this paper explores the situation for the specific  
30 instrument of inventory financing and by LSPs as specific actors.  
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## 40 **6. Conclusion**

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43 This study explored the conditions in which Logistics Service Providers (LSPs) can  
44 compete or collaborate with banks in offering Inventory Financing as a Supply Chain Finance  
45 (SCF) service. The authors developed an empirically validated conceptual framework  
46 describing the different roles played by LSPs willing to provide inventory financing.  
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53 The study has several limitations. Firstly, the level of detail of the factors has been  
54 conditioned by the level of detail of the previous studies focused on a generic SCF  
55 instrument. Further studies can build on this initial conceptualization and propose a more  
56 detailed maturity model, able to provide more detailed managerial guidelines for the demand  
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3 detection, the development of the capabilities, and the nature of the service provision. At the  
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5 same time, further research can study the role of the LSPs by analysing the different forms of  
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7 inventory financing that can be provided in the different situations. From a broader  
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9 perspective,  
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13 Secondly, the study focused on the dyad LSPs/suppliers, but the authors are aware of the  
14  
15 key role played by other actors, such as the platform providers. The same research approach  
16  
17 adopted in this paper could be used to study different actors and instruments. Since the  
18  
19 authors focused on the service provision from the LSP perspective, it is not possible to  
20  
21 generalise the findings to other actors without more research.  
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25 A third limitation regards the restriction of the sample to European. While it is possible to  
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27 assume that the factors and the maturity levels can be apply in different contexts, this  
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29 generalisation requires further empirical research.  
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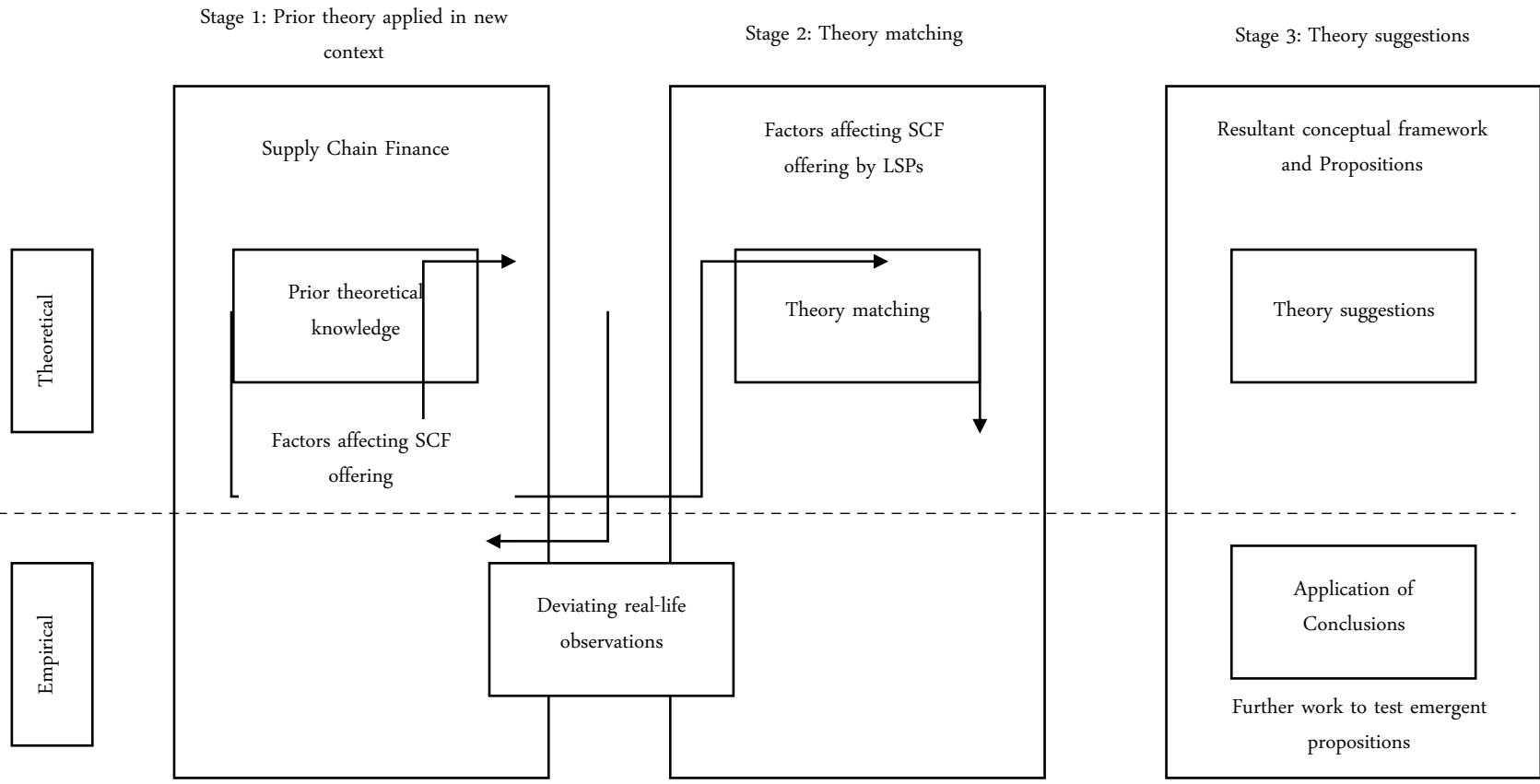
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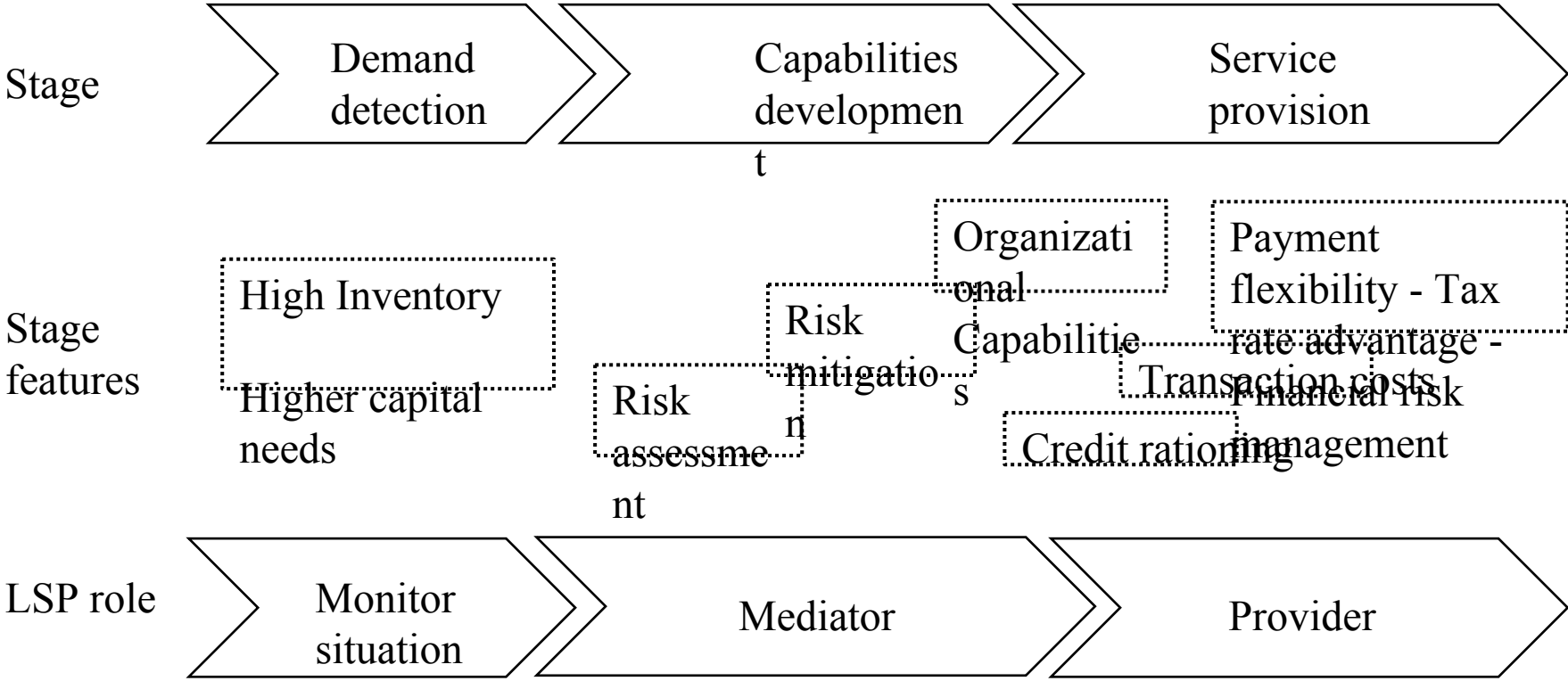
1 **Figure 1 Three Stage Abductive research design**

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1 **Figure 2 Updated theoretical framework**

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*Table 1 Theoretical framework*

Demand	X	X	X
LSP Capabilities		X	X
SCF Offer			X
LSP role	None	Mediator	Provider

Table 2 Case Characteristics

	Alpha	Beta	Delta	Gamma	Theta	Zeta
<b>LSP categorisation</b>	3 PL	3 PL	4 PL	3 PL	4PL	3 PL
<b>Country</b>	UK	Italy	Switzerland	Netherlands	France	Germany
<b>Turnover</b>	GBP 7.5 million	EUR 115 million	CHF 8.2 billion	EUR 150 million	EUR 4.2 billion	EUR 3.4 billion
<b>Services offered</b>	Transportation, warehousing, distribution, returns management, WMS hosting, leasing freight forwarding.	Transportation, warehousing, distribution, integrated Logistics	Traditional logistics services, digital, financial and mobility solutions, consultancy, advanced supply chain services	Warehousing and transportation	Transport solutions, warehousing, consultancy, industrial services, advanced supply chain services	Transport Solutions, industry specific solutions, information logistics, warehousing
<b>SCF Instruments (offered)</b>	Inventory financing	None	Factoring, Reverse Factoring, Inventory/Warehousing finance, Dynamic Discounting	None	Inventory financing	None



Table 3 Case study tactics for four design tests

Test	Case study tactic	Employed in this study	Phase of research
Construct validity	Theory triangulation	Yes	Research design
	Use of multiple sources of evidence (data triangulation)	Yes	Data collection
	Have key informant review the case study report	Yes	Data analysis
Internal validity	Do pattern matching	Yes	Data analysis
	Explanatory building		Data analysis
External validity	Use theory in multiple embedded case units (units of analysis)	Yes	Research design Data analysis
Reliability	Use case study protocol	Yes	Research design
	Develop case study database		Data collection
	Maintain chain of evidence		Data collection

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Table 4 Scoping and main study interviews

LSP	Number of interviews	
	Scoping Study	Main Study
Alpha	2	5
Beta	2	3
Delta	1	3
Gamma	2	3
Theta	3	8
Zeta	1	3
Total	11	25

Table 5 Case results summary

Categories	Factors	Alpha	Beta	Delta	Gamma	Theta	Zeta
<b>Nature of the demand</b>	Exceeding capital needs	X	X	X	X	X	X
	Inventory in transit	X		X	X	X	
<b>LSP capabilities</b>	Capability of risk assessment	X	X	X	X	X	X
	Capability of risk mitigation	X		X		X	X
	Organisational capabilities	X		X		X	
<b>Nature of SCF offer</b>	Credit rationing	X		X		X	
	Transaction costs	X		X			
	Payment flexibility			X			
	Tax rate advantage			X			
	Financial risk management			X			
<b>Bank relations</b>		Collaboration	None	LSP	None	Collaboration	None