

Does finance solve the supply chain financing problem?

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Abstract:

Purpose: Recently, in response to the credit crunch and the increased costs of financing, new solutions for supporting the financial management of Supply Chains, known as Supply Chain Finance (SCF), have been developed. They exploit the strengths of supply chain links to optimise working capital. The purpose of this paper is to provide a reference framework linking together the objectives leading to the adoption of SCF solutions and several moderating variables.

Design methodology / approach: This paper adopts a multiple case study methodology, analysing 14 cases of the application of SCF solutions among Italian companies.

Findings: The main findings are: (i) the identification of the different objectives leading to the adoption of SCF; (ii) the analysis of the impact of moderating variables (the level of inter- and intra-firm collaboration, the level of the trade process digitalisation, and the bargaining power and financial strength of the leading firm) on SCF adoption, and (iii) the formulation of a reference framework supporting the effective adoption of SCF solutions.

Research limitations / implications: This contribution is exploratory in nature; theory-testing contributions should be the focus of further research. Also, the sample is limited to Italian companies. Finally, the service provider point of view has been marginally taken into consideration in this study.

Originality / value: The article addresses the need for more empirical research on SCF. It provides a reference framework focused on the objectives and moderating variables leading to effective SCF adoption, providing a theory-building contribution on the general topic of SCF and on the specific topic of the adoption process of different SCF solutions.

Keywords: Financial performance, Collaboration, Supply Chain Risk Management, Case studies, Supply Chain Finance

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1 Introduction

The recent economic downturn and financial crisis caused a considerable reduction in the granting of new loans, with a significant increase in the cost of corporate borrowing (Ivashina and Scharfstein, 2010). Moreover, the collapse of the asset- and mortgage-backed markets dried up liquidity from industries (Cornett *et al.*, 2011). In such difficult times, firms (especially the ones with stronger bargaining power) were extended trade credit from suppliers in order to supplement other forms of financing, thus creating even worse problems in the upstream supply chain (Coulibaly *et al.*, 2013; Garcia-Appendini and Montoriol-Garriga, 2013). Such effects contributed considerably to the need for solutions and programmes that optimise working capital. Among these, one of the most important approaches is Supply Chain Finance (SCF). It aims to optimise financial flows at an inter-organisational level (Hofmann, 2005) through solutions implemented by financial institutions (Chen and Hu, 2011) or technological providers (Lamoureux and Evans, 2011). The benefits of the SCF approach rely on the cooperation among players within the supply chain. The SCF approach often results in the increase of trust, commitment, and profitability through the chain (Randall and Farris II, 2009). Despite the relevance of the topic for Supply Chain Management (SCM) research and practice, so far only a few contributions have been developed, claiming for further investigation in order to enrich the knowledge about the topic.

Although there is a general agreement on the relevance of the supply chain financing problem, literature (and practice) presents two different perspectives on the topic: in the first one, which we refer to as ‘supply chain oriented’ SCF embraces working capital decisions in each of its components (i.e. accounts payable, receivable and inventories) and sometimes also fixed asset financing. In general terms, the focus is on the optimisation of financial flows in supply chains, adopting multiple solutions, both financial and non-financial (Hofmann, 2005; Pfohl and Gomm, 2009). In the second one, SCF takes a purely ‘financial perspective’, focusing on financial products for companies in supply chains (Basu and Nair, 2012; More and Basu, 2013). Often, this second perspective focuses only on the so-called *reverse factoring* (a financial agreement by which a financial institution purchases accounts receivable from selected, information-transparent, high-quality buyers, with a credit risk which is lower than the one of their more risky suppliers, thus allowing them to access short-term credit at a lower cost), to the point that in many contributions, both from academia and practitioners, SCF and reverse factoring are synonymous (Wuttke *et al.*, 2013a). The financial perspective is more short-term oriented and more narrow-focused in terms of instruments, relying mainly (if not only) on reverse factoring to address the financing issues in the supply chain.

Such literature, however, does not provide adequate empirical research that can support companies in matching the different SCF solutions with its specific needs. In particular, it does not consider important factors in the decision process that can lead to the adoption of SCF. SCF, especially within the supply chain perspective, is based upon the idea that collaboration is key for a better management of financial flows, while the specific financial product (if any) implemented is of less importance. Therefore the objective of this paper is to investigate, through a series of case studies, SCF solutions adopted by companies, exploring objectives and moderating variables (the characteristics of the supply chain and its level of digitalisation) affecting the adoption, in order to contribute to the development of a more general framework to facilitate managerial decisions regarding SCF.

The paper is organised as follows: the second section presents the literature background; the third one formulates the research questions and explains the methodology used; the fourth describes the results of the data analysis, the fifth summarises and discusses the framework developed and the final section presents the conclusions drawn.

2 Literature background

2.1 *Financial flows in supply chains*

It is now common in literature to consider a supply chain as a set of inter-company product, information, and financial flows, both in theoretical contributions (Mentzer et al., 2001; Pfohl and Gomm, 2009) and among practitioners (Blackman et al., 2013). Leaning on this interpretation, considerable effort has been devoted in the last years towards aligning product and information flows (Bailey and Francis, 2008; Stavroulaki and Davis, 2010). The same cannot be argued about financial flows, whose journey towards the optimisation of and alignment to product and information flows is lagging behind with respect to the integration of product and information flows (Pfohl and Gomm, 2009; Wuttke *et al.*, 2013b). Nevertheless, it is possible to identify theoretical contributions, often based on analytical models, focused on the joint and aligned management of financial and product flows. For example, a common topic in the trade credit literature is the joint analysis of inventory policy and trade credit decisions (Seifert *et al.*, 2013), which dates back to (Goyal, 1985).

More generally, the literature addressed some related topics, including the analysis of the relationship between asset-based financing and inventory control (Buzacott and Zhang, 2004), the joint short-term financing of buyer-supplier dyads (Raghavan et al., 2011) and the coordination of the entire supply chain through financial flow management (Jaber and Osman, 2006; Lee and Rhee, 2011).

However, such contributions are still extremely theoretical in nature: Their basic assumptions are often unrealistic (Wuttke *et al.*, 2013b), including deterministic demand or infinite and instantaneous replenishments, especially when it comes to supply chain collaboration (SCC), which is often based on the absence of opportunism or availability of complete information (Seifert *et al.*, 2013). Instead, the empirical evidence on SCC shows that companies seldom cooperate in such a theoretical way, and that lack of trust and failure in identifying supply chain partners is often an insurmountable obstacle (Barratt, 2004; Soosay and Hyland, 2015).

2.2 *Risks related to supply chain financial flows*

A second relevant topic concerning financial flows in the supply chain is the management of supply chain financial risk. This has become especially relevant in recent years, as liquidity-scarce companies have tried to compensate for the contraction in bank lending through increased access to trade credit, i.e. increasing payment terms towards suppliers and / or reducing settlement terms with customers (Klapper and Randall, 2011). This behaviour led to an increase of financial risk, with a clear supply chain effect: Lost payments propagate from a company to its suppliers (Raddatz, 2010). Studies show that, on average, one fourth of a liquidity shock (e.g. a lost payment) is passed to the upstream supply chain, and it is stopped only when it faces a large, cash-rich firm (Boissay and Gropp, 2007). Propagation to suppliers is only one of the effects of liquidity shortages. Studies show that trade credit defaults also have a downstream propagation effect: Liquidity shocks likely induce a reduction in the trade credit provided to other customers, increasing default risk and payment delays (Coricelli and Masten, 2004).

The literature stream on supply risk management is quite consolidated, presenting several contributions focused on quantitative models for the minimisation of supply chain disruption risk (e.g. Berger *et al.*, 2004; Chang *et al.*, 2014; Ruiz-Torres and Mahmoodi, 2007; Yu *et al.*, 2009) or qualitative research on the approaches and organisational configuration for risk management (e.g. Blos *et al.*, 2009; Chopra and Sodhi, 2004; Christopher *et al.*, 2011; Zsidisin *et al.*, 2000). Despite the relevance that risk management has in the literature, the aspects related to financial flows are often overlooked. For example, Christopher *et al.* (2011), although recognising the necessity of a multi-disciplinary approach to global source risk, do not take financial supply risk into consideration in their framework. Zsidisin *et al.* (2000) recognise financial flows as a potential source of risk in the supply chain, but do not discuss it in their findings.

A common suggestion for solving the so-called “trade credit default chains” (Boissay and Gropp, 2007; Coricelli and Masten, 2004) is to allocate, through appropriate policies and financial products, liquidity to large cash-rich companies to allow the finance of cash constrained suppliers, typically SMEs (Boissay and Gropp, 2007). Such an approach is coherent with the concept of SCF (Seifert, 2010). The SCF approach – according to its broader definition – can represent a step towards connecting theory and practice related to the optimisation of financial flows in supply chains.

2.3 *Different perspectives on supply chain finance*

Supply Chain Finance can be defined in many ways. The analysis carried out on the different definitions and conceptual contributions highlights two major perspectives on SCF, which can be identified as “*financial oriented*” (from which a further “*buyer-driven perspective*” can be identified) and “*supply chain oriented*” (Gelsomino et al., 2016). Characteristics of these perspective are summarised in Table 1

===Please insert Table 1 here===

Table 1: SCF perspectives

The financial perspective interprets SCF as a set of (innovative) financial solutions. In the case of Camerinelli (2009) and Chen and Hu (2011), this is even explicitly mentioned in the definition. Straightforwardly, if SCF is a set of financial solutions, the financial institution (or a generic lender) becomes a compulsory actor in the SCF landscape. A second important characteristic of the financial perspective is the focus on short-term financing, and specifically, on financing solutions focused either on payables or receivables. For Lamoureux and Evans (2011), the trigger events of SCF solutions are the most important events in the trade process (e.g.: order acceptance, shipment, invoicing and payable due date), a view that is also confirmed by More and Basu (2013), for which SCF is conceptually divided into three categories: pre-shipment financing, in-transit financing, and post-shipment financing.

It is worth noticing that, within the financial perspective, it is possible to identify a subset of articles that address SCF from a stricter perspective, which could be named a “*buyer-driven perspective*”. Such articles view SCF as a buyer-driven, working capital oriented financial solution, often regarding it as a synonym of reverse factoring (Seifert, 2010; Wuttke *et al.*, 2013b). This view is quite established among practitioners (Demica, 2007).

On the other side, the supply chain perspective includes, within the SCF framework, the optimisation of the inventories along the chain (or at least between the customer and the supplier), in order to reduce the working capital, and therefore, the need for financing, or shift working capital to the player with a better availability of cash and/or a lower financing cost. As a way of example, Pfohl and Gomm (2009) state that their conceptual model has been tested in a Vendor Managed Inventory (VMI) scenario, while Randall and Farris II (2009) simply analyse the benefits of a generic shifting of inventory among two supply chain players. A second important characteristic of the supply chain perspective regards the object of financing (i.e. the collateral); Gomm (2010) and Pfohl and Gomm (2009) specifically state that SCF also applies to fixed assets financing (e.g.: through a *pay per production* solution or a joint investment decision in logistics assets). A third important difference regards the role of banks and other financial institutions, whose role in the SCF solution can still be relevant, but is no longer mandatory.

2.4 *Adopting supply chain finance solutions*

The SCF topic finds several applications through numerous solutions, programmes, and models. Some of the schemas that today are called – with general consensus – SCF solutions can be traced back long before the definition of the concept itself. For example, Brennan et al., (1988) describe early examples of vendor financing from Ford and Chrysler, in which the two companies provided subsidised short-term loans to vendors, dating back to 1942. Of course, over time, the solutions evolved. Today, as an example, the Italian

fashion stylist Renzo Rosso's company, OTB, set up an IT-based, advanced form of reverse factoring, in which the company shares its vendor rating with the financial institution, thus rewarding the best suppliers with a lower cost of financing (Zargani, 2013). The academic research has followed this evolution, with several empirical and conceptual / analytical contributions focused on reverse factoring. For example, van der Vliet *et al.* (2015) propose an analytical framework to assess the most suitable extension of payment terms in reverse factoring (thus, focusing on the buyer side of the solution), while Lekakos and Serrano (2016) focus on the supplier side, devising an analytical model that analyses the impact of reverse factoring on SMEs' suppliers. On the empirical side, Klapper (2006) provides an econometric analysis of the benefit of reverse factoring as a means of financing SMEs, Liebl *et al.* (2016) provide a clear picture of the objectives and barriers to the adoption of reverse factoring, and finally, Wuttke *et al.* (2013a) provide a case study analysis to define an adoption framework for reverse factoring. However, the SCF market is wider than reverse factoring. Specifically, two new groups of solutions, which, from an academic point of view, fall within the '*supply chain perspective*', can be identified: (i) innovative financing solutions, such as seller-based invoice auctions (GBI, 2013) and tier-two supplier financing (Pitt and Withers, 2013) and (ii) typical supply chain collaborative solutions, such as Consignment Stock (ACT, 2010) and VMI (Pfohl and Gomm, 2009). reverse factoring is a way to solve the supply chain financing problem (i.e. the problem of aligning financial and physical flows in supply chains), but it is not the only possible answer. At this time, however, the supply chain perspective on SCF lacks an empirically-based analysis taking the entire SCF solution landscape into consideration.

2.5 *Benefits for a company in adopting a supply chain finance solution*

Summarising, for the purpose of this article, we categorise the SCF solutions described in the literature within three groups: traditional financing solutions, innovative financing solutions and collaborative supply chain solutions. The first group includes traditional reverse factoring applications, which usually involve a low degree of trade process digitalisation. The second group includes innovative solutions, which usually require a high level of trade process digitalisation and a comprehensive supply chain analysis. The third group includes typical supply chain collaborative solutions, which optimise working capital, usually focusing on inventory, through SCC. The most relevant SCF solutions, programmes, and models stemming from the academic and practitioner-oriented literature are summarised in Table 2.

===Please insert Table 2 here===

Table 2: classification of SCF solutions

In general terms, the benefits sought by companies adopting an SCF solution can be categorised in three macro-typologies:

- a. Reduction of the Net Operative Working Capital (NOWC), through a reduction of accounts receivable / increase of accounts payables, as in reverse factoring or similar models (Klapper and Randall, 2011; Klapper, 2006) and / or a reduction of inventories, as in VMI or Consignment Stock (Kiesmüller and Broekmeulen, 2010; Sari, 2008);
- b. Increase of the profit, achievable through a reduction of the financial costs or through a reduction of the cost of goods sold, as in the Dynamic Discounting models (Nienhuis *et al.*, 2013; Polak *et al.*, 2012);
- c. Strategic benefits, usually related to financial risk management in the supply chain, achieved through a redistribution of NOWC and / or other activities aimed at improving access to finance for suppliers or distributors, as in advanced forms of reverse factoring and other innovative SCF solutions (Gomm, 2010; Hofmann, 2005; Wuttke *et al.*, 2013b).

The literature analysis on SCF and financial flows optimisation presents a gap between the theoretical contributions and the practical applications. Theoretical and analytical contributions, although enlightening and insightful in terms of model understanding, present unrealistic assumptions and fail to consider major obstacles for SCC. The managerial perspective on the adoption of SCF, although approached by different

authors, is still underrepresented in the literature. The existing qualitative contributions are insightful, but limited in scope to only one or a few SCF solutions (Wuttke *et al.*, 2013a), or to a few aspects of the adoption process, for example, limiting the sample to the upstream supply chain or focusing only on the barriers to adoption (More and Basu, 2013; Wuttke *et al.*, 2013b). Therefore, this article focuses on extending the theoretical body of knowledge of the qualitative research on the adoption of SCF, providing further empirical evidence on SCF applications.

3 Research questions and methodology

According to the research focuses revealed in Section 2, this study uses the multiple-case study methodology to answer two Research Questions (RQs):

RQ1. What are the main objectives driving the adoption of SCF?

RQ2. How do moderating variables (i.e. level of digitalisation, bargaining power, financial attractiveness and level of collaboration) affect the adoption of SCF solutions?

The starting point of a case research study is the research framework (Voss *et al.*, 2002). Therefore, to answer these RQs, we devised a theory building research framework upon which we based our work, as reported in Figure 1. It provides guidance for the categorisation and grounds theory in the data collected. Considering the general objective of the paper of investigating the adoption process of different SCF solutions, the successful adoption of an SCF solution has been identified as the dependent variable. This variable can assume different values, clustered in three categories (traditional financial solutions, innovative financial solutions and collaborative supply chain solutions). On the other side, the literature survey presented in Section 2 highlights different perspectives on SCF and objectives undertaken by companies in adopting SCF solutions. For this reason, in accordance with Liebl *et al.* (2016), the independent variable selected is the objective leading to the SCF adoption in terms of the aims and purposes of the leading company adopting the SCF solution. To complete the framework, this article wishes to test the possible effect of the four moderating variables on the relationship between the dependent and independent variables:

- (i) the level of trade process digitalisation between the adopter and the suppliers / distributors involved in the SCF solution, which is at the base of most of the innovative SCF financial solutions (Seifert, 2010), and more generally, of most of the supply chain collaborative solutions (Perego and Salgado, 2010);
- (ii) the importance of bargaining power towards the upstream or downstream supply chain's primary members, which plays a relevant role in reverse factoring and other SCF solutions (Klapper, 2006; Lekakos and Serrano, 2016; Liebl *et al.*, 2016);
- (iii) the importance of bearing a high financial attractiveness towards the service provider of the SCF solution, a critical variable in most quantitative and conceptual models on the general SCF topic (Klapper and Randall, 2011; Klapper, 2006; Randall and Farris II, 2009);
- (iv) the relevance of intra- or inter-firm collaboration in implementing the SCF solution, used in other empirically-based contributions on SCF (More and Basu, 2013; Wuttke *et al.*, 2013b) and more in general in the field of supply chain management (e.g. Luzzini *et al.*, 2015; Rollins *et al.*, 2011; Salema and Buvik, 2016).

===Please insert Figure 1 here===

Figure 1: the research framework

3.1 Case selection and data collection

The case study methodology is appropriate given the exploratory nature of this study, in order to investigate the variables of interest and their relationships. Analysing multiple case studies reinforces the generalisability

of the results and allows a cross-case analysis of the significant variables (Eisenhardt, 1989; Yin, 2009), as well as strengthens representativeness and external validity, and avoids biases (Leonard-Barton, 1990; Tversky and Kahneman, 1986; Yin, 2004). To measure the different variables composing the research framework, we developed a semi-structured protocol (reported in Table 3) and used a structured database, which ensures reliability (Gibbert *et al.*, 2008; Yin, 2004).

===Please insert Table 3 here===

Table 3: interview protocol

The explorative approach derives from the need to form new hypotheses regarding the adoption process in the field of SCF (Eisenhardt, 1989; Yin, 2009). The unit of analysis is the focal company of a supply chain that implements an SCF solution. For each company, at least one person identified as a “key player” in the process – e.g. CIO, CFO, CPO, Supply Chain Manager, Cash Flow Manager – was approached for an interview. In some of the cases, it was necessary to involve other “key players” (usually other department managers), who were interviewed as well. In other cases, it was appropriate to complement the data collected from the focal company with interviews with suppliers or distributors. Nevertheless, the focal company remains the main data source. To ensure construct validity, triangulation between different sources (both interviews and secondary sources provided either by the focal company or from different sources) was used. To increase the reliability of the collected data, several interviews (especially in the beginning) were carried out by multiple researchers. For each case, a transcription and a standard report summarising the main information was produced. In case of disagreements between the interviewers (which happened in the most complex cases), the interviewee was asked to review the final report.

The sample selection was based on a mix of literal and theoretical replication. All of the companies selected for interviews present the following characteristics, thus allowing an easier comparison:

- (i) large companies (i.e. revenues higher than 50 million €);
- (ii) high decision-making autonomy within the Italian branch (to avoid organisations that might be uninterested in implementing an SCF solution in Italy);
- (iii) an SCF solution completely implemented at the moment of the interview;
- (iv) reasonable satisfaction with the application outcomes.

Specifically, we selected companies that were satisfied with the SCF solution adopted. Being this article part of a larger ongoing research project, we carried out several interviews and selected, a posteriori, the fourteen that presented (explicitly or through an analysis of the entire data collected) satisfaction in the successful outcome of the SCF solution. Moreover, we introduced heterogeneity in the following variables:

- (i) the company role in the supply chain (retailer, manufacturer, ...);
- (ii) the industry;
- (iii) the SCF solution implemented.

Overall, 14 companies were contacted and analysed: 3 retailers from the consumer goods industry, 3 producers from the fashion industry, 2 manufacturers from the electrical components industry, 2 processors from the food and beverage industry, 2 manufacturers from the automotive industry, 1 telecommunication operator, and finally, 1 manufacturer from the home appliance industry, for a total of 24 interviews. The interviews lasted, on average, 2 hours each. They were carried out by phone or by physically visiting the interview headquarters, digitally recorded and transcribed by the researchers. The first interviews also served the purpose of fine-tuning the protocol (Strauss and Corbin, 1990); however, case-specific questions were asked in later interviews where necessary. Table 4 summarises the entire empirical sample.

===Please insert Table 4 here===

Table 4: empirical sample and objectives of specific SCF applications

3.2 Coding and data analysis

The coding was mainly based on the procedure developed by Strauss and Corbin (1990). After a sufficient number of interviews, we started to integrate all the data collected from the different sources, relating the findings to existing concepts from the literature on SCF, according to the variables of our research framework described above. In the second step, we performed the cross-case analysis, comparing the various cases along each variable, thus identifying groups of cases with similar values. To do so, it was especially useful to start the analysis considering the cases pair-by-pair, analysing the similarities and differences and looking for possible confirmation in other cases (Eisenhardt, 1989; Voss *et al.*, 2002). In the final step, we reviewed the most relevant and interesting causal links against the existing literature (Eisenhardt, 1989; Voss *et al.*, 2002). For example, the identified moderating effect of financial attractiveness found several confirmations in the literature (Klapper, 2006; Pfohl and Gomm, 2009), while the initial conflict of the objective leading to SCF adoption with the existing literature led us to the development of the ‘SCF adoption continuum’ presented in the next section. Table 5 presents each category identified and formalised with the aforementioned process, providing information on its operationalisation and measurement.

===Please insert Table 5 here===

Table 5: variables of the conceptual model

4 The complex picture of supply chain finance adoption

This section presents the results from the multi-case study and illustrates the resulting model and its underlying logic. Due to the limitations in space availability, they will focus on the most relevant and illustrative results. First of all, we will discuss the objectives of the SCF adoption, thus providing an answer to RQ1. Subsequently, we will focus on the moderating variables and their moderating effect on the relationship between objectives and the adoption of SCF solutions, thus answering RQ2. The main results are summarized in four research propositions.

4.1 A summary of supply chain finance objectives

The first step of the analysis concerned the objectives declared by the interviewees for the adoption of SCF solutions, which have been compared throughout the sample. The needs that ultimately led to the adoption of an SCF solution differ largely among the companies interviewed. It should be noted that the different objectives do not lead necessarily to the adoption of different types of solutions; rather, they affect the way they are implemented. For example, Company I implemented reverse factoring to “extend payment terms, usually by 30 days”. Company F, instead, implemented a similar model but with different characteristics, with the explicit purpose of supporting strategic, selected suppliers. Finally, company E, pressured by a strict normative on payment terms, needed a solution to optimise its own inventories and reduce the financial risk in the upstream supply chain. Based on how much the adopter leans towards different benefits (e.g. the need to reduce the financial risk of suppliers, optimise its own NOWC, reduce inventories in the distribution network, and so on), it is possible to delineate two macro-objectives (OBJ#), representing the driving need that led the company to adopt an SCF solution:

- OBJ1. Improve the adopter’s financial performance
- OBJ2. Secure the upstream/downstream supply chain’s financial performance

These two objectives represent two extremes of a ‘SCF adoption continuum’: OBJ1 is polarised toward financial (or economic) benefits of the focal company, with no concern for the rest of the supply chain, while OBJ2 is focused on strategic benefits for the whole supply chain (e.g. reducing the overall supply chain risk by supporting financially weak but critical suppliers), even allowing a reduction in the adopter’s financial

performance. For example, M specifically stated that the Consignment Stock programme implemented was aimed at avoiding the risk of the bankruptcy of key distributors. The Consignment Stock programme generates an immediate financial cost for the company, at least partially mitigated by an expected future increase in market share (due to an aggressive push strategy towards the distributors involved). In some cases, however, the objective of the company does not coincide with one of the two alternative objectives exclusively, but it falls in the middle of this continuum (*'Intermediate'* objective). Table 6 presents the classification of cases by the typology of OBJ#, as well as the summary of the value assumed by the different moderating variables presented in the next subsections.

===Please insert Table 6 here===

Table 6: summary of results

4.2 The impact of trade process digitalisation on the adoption of supply chain finance solutions

The analysis of the moderating variables revealed the role played by several factors as barriers to or enablers of specific clusters of solutions. One of the most relevant seems to be the level of digitalisation. Several managers highlighted how the implementation of the most complex SCF solutions requires a complete digitalisation of the trade process. As the previous literature suggests, digitalisation enables collaborative (Blandine Ageron et al., 2013; Hvolby et al., 2007; Valentini and Zavanella, 2003; Vigtil, 2007) and innovative SCF solutions (Hofmann and Belin, 2011; Wuttke *et al.*, 2013b). Moreover, the data collected suggests that a high level of trade process digitalisation makes traditional SCF models appear obsolete.

Trade process digitalisation is known to provide significant cost-savings with respect to a paper-based trade process (Fairchild, 2005; Perego and Salgaro, 2010), and it allows the provision of value-added services, such as the enhanced and faster visibility of invoices, which grants to suppliers (or distributors) additional flexibility in the management of accounts receivable (or payable). Such increased flexibility is virtually cost-free, being inherited from the digitalisation process itself. Therefore, companies offering forms of Reverse or Captive Factoring implemented mainly – or only – to pursue NOWC improvement through longer payment terms (i.e. OBJ1), but based on the trade process digitalisation, might also provide, in the end, the typical flexibility features of OBJ2-driven implementation. This is the case of C, which used to implement a paper-based, traditional Captive Factoring with the main goal of improving its cash position (OBJ1). Attracted by the cost savings of trade process digitalisation, C shifted towards a digitalised solution in the form of a cloud-based factoring platform available to suppliers. This platform offers more flexibility in the decision to factor accounts receivable (i.e. decide when and which invoice to factor, or provide real-time information on invoice approval and discount costs). This flexibility, explicitly pursued in applications leaning towards OBJ2, has been implemented by C not due to a need to reduce risk in the supply chain, but because the digitalisation of the process made it easily available at a negligible cost, improving, at the same time, the competitiveness of the instrument. Quoting C's CFO's own words, "we implemented this platform to have a higher economic return from the management of our accounts payable [with respect to traditional captive factoring], but its flexibility made it more appealing for the suppliers, made it more interesting to use our service instead of a standard factor". More generally, three groups emerge from an analysis of trade process digitalisation within our sample:

- (i) OBJ2-driven and intermediate applications, usually innovative or collaborative solutions, which require a high level of trade process digitalisation. Are part of this group cases F, G, L, M and N;
- (ii) OBJ1-driven applications with a low level of trade process digitalisation, which tend to result in the adoption of traditional solutions. Are part of this group cases A (captive factoring), G and I;
- (iii) OBJ1-driven applications with a high level of trade process digitalisation, which tend to result in the adoption of innovative or collaborative solutions. Are part of this group A (VMI), C, H and K.

These clusters confirm that, in alignment with the literature findings, a high level of trade process digitalisation enables innovative and collaborative solutions. More importantly, digitalisation of the trade process negatively

affects the application of traditional solutions, making them significantly less beneficial than innovative ones. On one side, OBJ2-driven applications require innovative and collaborative solutions, because those solutions provide the desired flexibility and other strategic benefits. On the other side, when the adopter has a sufficient level of trade process digitalisation, these solutions are also adopted in the case of OBJ1-driven applications, given their cost-effectiveness. These findings are summarised in the first proposition.

Proposition 1:

- (a) *Innovative financial and collaborative SCF solutions are enabled by a high level of trade process digitalisation.*
- (b) *A high level of trade process digitalisation negatively affects the adoption of traditional financial solutions.*

4.3 The impact of bargaining power on the adoption of supply chain finance solutions

A second relevant aspect that may preclude or enable specific solutions is the balance of power between companies. Even if a solution is proven to be effective in a specific buyer-supplier relationship, it may be impossible to replicate, even in a similar context, if the prospective adopter does not have enough bargaining power. For example, the CIO from Company A, who directly manages the company's VMI programme, states: "Usually it is the supplier that suggests VMI adoption. We tried to suggest it to other suppliers, but it is difficult, there is resistance". Even when Company A is able to identify a supplier that can provide a positive business case, a lack of sufficient bargaining power usually results in on-boarding resistance.

The topic of bargaining power came up several times in interviews. Bargaining power towards other companies in the supply chain is more common when the SCF application streams from OBJ1-driven. For example, when Company B set up its traditional reverse factoring solution in 2008, it decided to refuse the acknowledgement of a credit transfer to financial institutions other than the one involved in the reverse factoring agreement (a practice known as a 'ban on assignment clause'). This was established to prevent suppliers from using alternative programmes requiring transfer approval by the buyer (which include the large majority of standard factoring agreements) and push them towards B's programme. The CPO harshly stated: "We are giving them this opportunity: If they don't like it, they are free to find a different programme, given that, if needed, we won't approve their credit transfer." It is clear that this approach requires strong bargaining power from Company B towards its suppliers, especially the ones in need of improving their cash position. In fact, Company B includes relatively small suppliers in the programme: First, because it is more likely that they might have a worse financial position than B's (i.e. making them interested in joining a reverse factoring programme), and secondly, because it would be more difficult for Company B to exercise its leverage against larger suppliers. Of course, bargaining power does not affect only financial solutions. For example, the OBJ1-driven implementation of Consignment Stock from Company H, simply stated, is a shift of inventories from H to selected suppliers. Company H capitalises its strong position in the chain to implement such programme, exploiting the fact that weaker suppliers will accept the increase in NOWC rather than risk losing such a large customer.

Overall, most of the OBJ1-driven applications deem bargaining power towards the primary supply chain members as "highly relevant". The reason is clear: OBJ1-driven applications often have negative implications for the supply chain members involved (e.g. accepting longer payment terms). Even when, as specifically stated by Companies C and H, the business case of their SCF model is very likely to be positive for the supply chain members involved, on-boarding might still be problematic, because the model still bears a negative effect on the supplier's NOWC. In conclusion, based on the analysis of the importance of bargaining power it is possible to state a second proposition.

Proposition 2:

The bargaining power towards supply chain players enables the adoption of OBJ1-driven SCF solutions.

4.4 The impact of financial attractiveness on the adoption of supply chain finance solutions

The financial attractiveness of the focal company, which may be interpreted as a form of bargaining power towards financial institutions, is more common in applications streaming from OBJ2-driven. This is from example the case of Company D, which implemented its reverse factoring programme with the double objective of optimising its financial performance and providing specific suppliers with a means of improving their working capital as well. To do so, D negotiated a cap on interest and commission charges (not on a supplier-per-supplier basis, which can create accounting issues, but as a single cap for the whole supply base) with the factoring company. The reason for this approach is clear, as the company CFO states: “Some [of our competitors] have let the factor ‘skin the supplier’, they use reverse factoring as an additional business line. That’s not what we are doing”. The ‘skin the supplier’ effect, which can be translated as extending as much as possible payment terms letting the factoring company decide the interest rate for suppliers, seems to be a by-product of OBJ1-driven factoring applications. To avoid this, D used its high financial attractiveness towards financial institutions (having a strong long-term financial position and a negative cash conversion cycle) to negotiate the aforementioned cap. Contextually, D did not extend payment terms (to be more specific, it negotiated a flooring option on the factoring agreement, which is the possibility of extending payment terms on an invoice-per-invoice basis, charging interest and commissions to the buyer instead of the supplier). Arguably, the factoring company accepted the conditions because the market opportunity of factoring a considerable share of the company pre-approved passive invoices could not be neglected, even considering the (relatively) lower applicable rates.

Overall, the more the SCF model aligns towards OBJ2, the higher the importance of financial attractiveness of the focal company. Cases F and N, which are the companies that, more than the others, stressed the importance of reducing the risk in the supply chain as the main driver behind the SCF application, are also the ones that placed more stress on the importance of bearing financial attractiveness. Some of the cases categorised as “Intermediate” also stated the importance of this variable, but the qualitative assessment of such importance was lower than the average for OBJ2-driven applications. However, the importance of financial attractiveness is clear and explicit only when the adopter wishes to implement a financial model. In fact, the level of importance of financial attractiveness is often measured when the interviewee describes the dynamics of its iteration with the financial institution in setting up and managing the programme. It is considerably more difficult to understand the importance of financial attractiveness in a case in which the adopter implemented a collaborative solution. For example, M implemented a Consignment Stock programme to lower NOWC constraints on strategic distributors. From the description of the strategy leading to the implementation of the model, it is possible to identify the characteristics of an OBJ2-driven application. However, the solution did not require a financial institution or a service provider. Therefore, it was considerably more difficult to assess the possible importance of financial attractiveness for M in implementing its SCF model, because the variable could not be directly observed. However, from the description of the effects of the programme, it could be indirectly observed that M has, in fact, a high financial attractiveness, given that it was able to withstand an increase in its NOWC without having to suffer major consequences from a financial performance point of view. On the contrary, OBJ1-driven applications do not usually deem as relevant the importance of financial attractiveness. The reason for this might be that this type of application usually seems to provide higher returns for the service providers with respect to OBJ2-driven applications. In conclusion, based on the analysis of the importance of financial attractiveness it is possible to state a third proposition.

Proposition 3:

The financial attractiveness of the focal company enables the adoption of OBJ2-driven SCF solutions.

4.5 *The impact of collaboration on the adoption of supply chain finance solutions*

The topic of collaboration is often mentioned in the interviews. A considerable number of cases analysed underlined the importance of intra- and inter-firm collaboration for an effective SCF implementation.

Intra-firm collaboration (usually between the finance and procurement, logistics, or supply chain departments), comprehensively, plays a key role in solutions that influence the commercial and financial policies of a company, such as Inventory Financing or reverse factoring. This is particularly evident in the case of L. The adoption of its current advanced form of reverse factoring, described as highly successful, is actually a second attempt. In fact, the company unsuccessfully tried to implement the exact same model a couple of years earlier. The Cash Flow Manager attributed the previous failure to the lack of interaction between finance and procurement, which slowed down the process and made the solution unappealing to suppliers. The current implementation is based on high, sometimes informal, levels of collaboration between the two departments (e.g. the Cash Flow Manager stated that they had explicitly fostered frequent and informal contacts between the operative resources of the different departments exactly for this purpose). Such collaboration serves two main purposes: aligning the reverse factoring proposals with other negotiations with suppliers (i.e. avoiding proposals to unappealing suppliers from a strategic or commercial point of view), and sharing knowledge with the procurement office, whose expertise on financial matters can sometimes be limited. The importance of intra-firm collaboration is even clearer in the case of F and N, which provide different elaborations of procurement and supply chain management data on their suppliers to the financial institution. By definition, this integration requires a great deal of collaboration between departments, with the interviewees from both companies referring to ‘frequent cross-functional meetings’ specifically for the purpose of discussing the SCF solution. The same reasoning is applied to the aforementioned Consignment Stock programme implemented by Company M. Their solution is based on the selection of strategic distributors in financial distress to be included in the programme, an operation that, as stated by the Supply Chain Manager, requires a high degree of collaboration between the finance and supply chain departments.

Interestingly, intra-firm collaboration seems to bear significant importance only when the adopter wants to achieve, at least to a certain degree, a reduction in the supply chain financial risk (OBJ2-driven or intermediate applications). On the other side, when discussing OBJ1-driven applications, intra-firm collaboration is seldom mentioned. These applications seem to be characterised by a more ‘natural alignment’ between departmental objectives, without requiring additional collaboration efforts. From the analysis of OBJ1 applications, a sort of central-ownership model emerged, in which a department is clearly in charge of the programme and the other departments involved provide information in a passive way. For example, the Supply Chain Manager of Company C, one of the most emblematic cases in this sense, provided only a brief overview of the reverse factoring programme during the interview and referred us to the CFO for a proper description, although its department provides the data to run the programme. On the other side, OBJ2-driven applications seem to be based on a collaborative-ownership model, in which the interviewees struggle to clearly define a department ‘in charge’ and often identify (as in the case of B and M) more than one C-level as key figures in managing the SCF solution.

Therefore, for OBJ2-driven applications, the relevance of intra-firm, rather than inter-firm, collaboration emerges more clearly. This may be due to the fact that when a very large company such as F or N wants to implement an SCF solution to allow small and micro suppliers a better access to liquidity, inter-firm collaboration is not really an issue. The adopter sets it up, chooses the suppliers that might or might not enter the programme (or the criteria to automate this process) and the need for liquidity, combined with the possibility of accessing it at the favourable rate, and automatically drives the suppliers towards the solution. It is more a matter of communication than of collaboration. On the other side, when a company such as I or H implements reverse factoring for the purpose of extending the payment terms, it needs to collaborate with the suppliers. As the CPO from Company H explained, when questioned about intra-firm collaboration: “Yes, sure, there’s collaboration between us and finance, but I believe the important form of collaboration is with

the suppliers. [...] it is so important that arguments on the reverse factoring programme are not held by my people, but directly by me with the supplier's CEO or CFO". The analysis of the interviews seems to indicate a mitigation effect of bargaining power on inter-firm collaboration in OBJ1 applications: Some of the managers interviewed seem to foster collaboration to partially relieve the imposition of bargaining power. The different role of intra- or inter-firm collaboration emerges clearly when we analyse the different use of collaboration or simple communication. OBJ1-driven applications (e.g. the aforementioned case H) stress the importance of meeting with suppliers, for example, to present the programme or to settle arguments, while the collaboration between departments is more a matter of communication (e.g. procurement communicates the required data to finance once a week). Instead, OBJ2-driven applications stress the importance of collaboration among functions, while the relationship with suppliers is more a matter of communication.

Moreover, an analysis of the secondary sources and practitioner-oriented publications shows that the unilateral optimisation of working capital, which disregards the other primary members of the supply chain (e.g. the unilateral extension of payment terms with concurrent reverse factoring programmes), are often frowned upon by public opinion (Construction News, 2013; Plimmer, 2013). The companies interviewed might be aware of this and seek inter-firm collaboration to reduce the risk of being perceived as unethical. Thus, the impact of inter- and intra-firm collaboration can be summarised in a fourth proposition.

Proposition 4:

- (a) *Intra-firm collaboration is positively linked to a successful application of OBJ2-driven SCF solutions.*
- (b) *Inter-firm collaboration is positively linked to successful applications of OBJ1-driven SCF solutions.*

4.6 Supply chain finance: a reference framework

In the previous section, we presented 14 cases of the adoption of different SCF solutions, from which four propositions have been developed. Such propositions can be linked together in a reference framework that can guide managers towards the identification of the most suitable SCF solutions, given their most prominent need.

The first result has been the identification of two main alternative objectives leading to the adoption of SCF solutions: OBJ1-driven (i.e. improving the financial performance of the focal company, with a more short-term and unilateral perspective) and OBJ2-driven (i.e. reducing the financial risk of the supply chain as a whole, with a more strategic and comprehensive perspective).

Our analyses first suggest that the level of digitalisation enables or disables different SCF solutions. Companies that possess a higher level of trade process digitalisation tend to adopt more innovative or collaborative solutions, attracted by the superior cost-savings. This, in turn, naturally provides specific benefits to the entire supply chain (e.g., flexibility and visibility), allowing for an improvement of the entire supply chain's financial performance, even if the initial objective was OBJ1-driven. Companies implementing innovative or collaborative solutions with OBJ1-driven state that the enhanced benefits for the supply chain contribute to making the solution more competitive against similar solutions offered by competitors.

Although OBJ2-driven can be pursued with a low level of trade process digitalisation, the application of traditional solutions seems to be inherently more costly than the innovative or collaborative ones, the former involving time-consuming activities (e.g. periodic meetings with representatives from the financial institutions) that could be replaced, in the latter, by an automated workflow.

A second variable that enables or disables SCF solutions is bargaining power. OBJ1-driven seems to be enabled by a high level of bargaining power towards the primary supply chain actors (suppliers and distributors). OBJ2-driven, instead, seems to be enabled by a third variable: the financial attractiveness of the focal company, which implies attractiveness towards service providers. As regards the moderating variables affecting SCF

solutions, collaboration – both inter- and intra-firm – plays a critical role in affecting, respectively, OBJ1-driven and OBJ2-driven applications.

The conclusions drawn from the analysis of the data represent a concatenated framework from the objective underneath the decision to apply SCF to the implementation itself. The two instances of the research framework, streaming from OBJ1-driven and OBJ2-driven, are reported in Figure 2.

===Please insert Figure 2 here===

Figure 2: the two instances of the conceptual model

5 Discussion and implications

The aim of this study was to understand the objectives pursued by companies when adopting SCF models and how this adoption is affected and / or enabled by moderating variables. The contribution of this research to the SCF field can be effectively summarised in the following three points:

(i) *A plurality of objectives shapes the adoption of SCF*

The literature seldom acknowledges the plurality of objectives that may lead to the adoption of SCF. Within the supply chain perspective on SCF, the identified objective is often general, e.g. the inter-company optimisation of financing flows, as in Hofmann (2005) and Pfohl and Gomm (2009). Also, within more focused contributions, e.g. on reverse factoring, the objective taken into consideration is often partial, like the extension of payment terms, with the reduction of supply risk mentioned as a sort of secondary source of benefits (Klapper, 2006; Wuttke *et al.*, 2013b). However, our sample shows that this hardly fits with the real-world applications. The cases analysed in this article present a more complex picture, in which the reduction in supply risk is sometimes the most relevant driver leading the adoption of a specific SCF solution. This is coherent with the study of Liebl *et al.* (2016), which, however, focuses on reverse factoring only. Our analysis shows that the objective of a company implementing an SCF solution lies between two extremes: on one side, the mere reduction of the adopter's NOWC, and on the other, the reduction in the risk within the supply chain (e.g. improving access to finance to suppliers or distributors). Our framework, based on 14 successful SCF applications, shows that these two opposing approaches are affected by different moderating variables. This has two main implications: Academic contributions should take this plurality of objectives into account while addressing SCF – even from a conceptual point of view. Managers seeking to adopt an SCF model, on the other side, should focus their effort on different key variables based on the objective they wish to pursue.

(ii) *Digital innovation has a central role*

The level of digitalisation is the only moderating variable affecting all types of applications. Several cases highlight the importance of a digital trade process as an enabler of the most complex applications. In fact, our sample shows how a high level of digitalisation in the trade process negatively affects the adoption of a traditional solution, fostering the adoption of more innovative SCF solutions, which are inherently more flexible and beneficial for all the parties involved. This is hardly recognised in the literature. For example, Wuttke *et al.* (2013b) states that the most complex solutions require a high level of digitalisation in the trade process, but this variable does not find space in the final framework, while Liebl *et al.* (2016) do not recognise this variable among the barriers identified. However, it plays a relevant role: Companies might be set back towards traditional, costly and (especially when the objective is OBJ2-driven) inefficient solutions by a lack of proper digitalisation in the trade process. In fact, as in the case of B, pursuing a financial risk reduction in the supply chain through a traditional solution appears to be costly. A high level of digitalisation in the trade process might be the key to closing the gap between OBJ1-driven- and OBJ2-driven SCF applications.

(iii) *Does finance solve the supply chain financing problem?*

Aligning physical and financial flow in a supply chain is a multi-disciplinary problem (Hofmann, 2005; Pfohl and Gomm, 2009). This is also reflected in the sample analysed: Cases A, C and H used typical supply chain collaborative solutions to explicitly achieve an improvement in their financial performance. The opposite holds as well: Cases B, F and N used reverse factoring with the main purpose of reducing bankruptcy risk in the upstream supply chain. These results provide a major implication for academia and a managerial insight. The theoretical implication is that finance is not the only way to solve the supply chain financing problem: Authors who position themselves in the supply chain perspective of SCF should take the whole spectrum of SCF solutions into consideration. The major gaps identified within this perspective are the definition of best practices (Pfohl and Gomm, 2009) and the development of methods to select the most suitable solution for a supply chain financing problem (Hofmann and Kotzab, 2010; Wuttke *et al.*, 2013b). It is clear, from the cases presented in this paper, that both of these gaps cannot be tackled only by taking financial products into consideration, but rather, by considering a wider spectrum of solutions. A finance-only approach might be short-sighted. For example, the contribution of Lekkakos and Serrano (2016) is of value for the investigation of the implications of reverse factoring, but (as correctly stated by the authors themselves) these studies should be extended to different SCF solutions in order to have a more complete picture of the different effects of SCF on a supply chain. More accurate and insightful conclusions need an integrated financial-supply chain perspective. As per the managerial insight, our study highlights how managers should adopt a general perspective when addressing their supply chain financing problem, taking several solutions into consideration. If anything, extending their point of view is likely to provide additional opportunities to achieve the desired outcome. To do so, it is paramount to take into consideration the appropriate moderating variables, i.e. fostering inter-company collaboration and ensuring the appropriate bargaining power when leaning towards OBJ1-driven, and fostering intra-company collaboration and ensuring a high financial attractiveness when leaning towards OBJ2-driven.

6 Conclusions

In this paper, we have analysed, through a multiple-case study methodology, 14 cases of the application of SCF solutions in order to answer the Research Questions stated in section 3. This paper contributes to advancing knowledge in the field of SCF in several ways. First, this article provides empirical evidence on SCF, which is deemed to be necessary to advance the research in this field (Hofmann, 2005; Pfohl and Gomm, 2009). It also complements and completes the early empirical research on SCF (Wuttke *et al.*, 2013a, 2013b). Second, the article provides a further step towards the development of a general SCF theory, building on the existing research on both the general concepts of SCF (Gomm, 2010; Hofmann, 2005; Pfohl and Gomm, 2009) and the usage of different SCF models (Klapper and Randall, 2011; Klapper, 2006; Randall and Farris II, 2009). We show that a successful application of an SCF model does not rely on financial variables only (e.g. the cost of debt), but on the characteristics of the supply chain relationships, such as the level of trade process digitalisation or intra- and inter-firm collaboration. **This opens to several new research lines; for example, in-depth case studies focused on the adoption of IT-enabled SCF platforms, a topic mostly neglected so far.** Third, our sample is extended, with respect to the previous empirical research (Wuttke *et al.*, 2013a, 2013b), to a broader set of cases, including non-manufacturing companies and downstream applications of SCF solutions.

From a managerial perspective, this study provides useful contributions, allowing managers to gain a better understanding of the existing solutions, their potential and their requirements and drawbacks, thus allowing a better knowledge and supporting decision making. The clear identification of the main potential objectives leading to the adoption of SCF solutions, as well as the different mediating role that moderating variables play according to the objective, is of great value for a manager willing to explore the possible use of SCF solutions.

This article bears potential limitations: The sample collected is limited to Italian companies or Italian branches of global companies. Although the cases suggested that the propositions are geographically generalisable, no

supported claim can be made at this time. Moreover, the cases collected focused on successful applications of SCF. Future research should focus on the comparison between successful and unsuccessful adoption of SCF solutions. Furthermore, this contribution is explorative in nature, given its theory-building purpose. Theory-testing contributions should be the focus of further research. Finally, the service provider point of view has been only marginally taken into consideration in this study. Further research should also include this perspective. This exploratory contribution within the SCF field moves in the direction of improving the understanding of the causal links among the contingent factors, solutions and benefits/costs. To further develop the research in this direction, however, it is crucial to develop further quantitative contributions focused on better defining measures for the benefits and costs of the different SCF models, not only at the company level, but at the supply chain level as well. In addition, collecting the relevant data from the field is also a great challenge that partially still must be overcome. Overall, further development in all of these streams would truly support companies (and supply chains) in a holistic optimisation of financial flows at the inter-organisational level.

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Tables

Perspective	Mandatory involvement of a lender	SCF as (advanced) reverse factoring only	Inventory optimisation/shifting	Fixed Assets financing	References
Financial oriented	Yes	No	No	No	Camerinelli (2009); Chen and Hu (2011); Lamoureux and Evans (2011); More and Basu (2013)
Buyer-driven oriented	Yes	Yes	No	No	Wuttke <i>et al.</i> (2013a); (2013b) ⁽ⁱ⁾
Supply Chain oriented	No	No	Yes	Sometimes	Gomm (2010); Grosse-Ruyken <i>et al.</i> (2011); Hofmann (2005, 2007); Pfohl and Gomm (2009); Wuttke <i>et al.</i> (2013b) ⁽ⁱⁱ⁾

⁽ⁱ⁾: when defining ‘SCF practice’

⁽ⁱⁱ⁾: when defining the ‘Financial Supply Chain Management’ approach

Table 1: SCF perspectives

Solution		Description	Reference[s]	Frequency in sample
Traditional financing	Captive factoring	A typology of factoring in which the factor is owned by one large buyer and operates as its subsidiary, systematically purchasing all the invoices of the large buyer’s suppliers, similarly to reverse factoring. The close relationship between the captive factor and the buyer allows for an extreme credit risk reduction.	Mian and Smith (1992)	2
	Reverse factoring	A typology of factoring in which the financial institution purchases the accounts receivables approved by specific, informationally-transparent, high-quality buyers. The financial institution needs to calculate the credit risk of the selected buyers only, which is equal to the default risk of a high-quality customer, and not the risky suppliers (often SMEs). This arrangement provides low-risk financing to high-risk suppliers.	Klapper (2006)	6
Innovative financing	Advanced forms of reverse factoring	Technologically improved form of reverse factoring that allows the provision of capital to a higher number of suppliers at a lower rate, an increase in the quality and amount of information exchanged among partners and the involvement of new actors in the process, increasing the overall flexibility of the solution.	Shang <i>et al.</i> (2009); Wuttke <i>et al.</i> (2013b)	4
	Inventory financing	Traditional: short-term loan from a financial institution to finance inventories. Innovative: a logistics service provider buys goods from a manufacturer and obtains an interim legal ownership before selling them to the manufacturers’ customers after a certain time.	Hofmann (2005, 2009)	1
	Dynamic discounting	ICT-based evolution of common trade credit policies; it allows the dynamic settlement of invoices in a buyer-supplier relation: for every day of payment in advance with respect to a pre-defined baseline, the supplier grants to the buyer a discount on the invoice’s nominal value.	Nienhuis <i>et al.</i> , (2013)	0
	Seller-based invoice auction	Online marketplace where (usually) SMEs can auction their invoices to a group of investors, which compete in purchasing them.	GBI, (2013)	0
SCC	VMI	A supplier makes the inventory replenishment decisions for its buyer, monitoring its inventory levels and making periodic resupply decisions regarding order quantities, shipping, and timing.	Waller <i>et al.</i> , (1999)	3
	Consignment stock	A supplier ships goods to its buyer’s warehouses, maintaining property in them, until such goods are retrieved for selling. The supplier monitors the buyer’s inventory levels, even on a daily basis.	Valentini and Zavanella (2003)	2

Table 2: classification of SCF solutions

Section	Questions	Variables measured
1 The company and the interviewee		
a)	Please describe the structure of your organisation	Collaboration
b)	Please describe the supply chain of your organisation	Bargaining power, collaboration
c)	Please describe your role within the organisation	Collaboration
d)	What is the position/policy of your organisation in relation to working capital management?	Objective
2 SCF applications – general information (Chauffour and Farole, 2009; Liebl et al., 2016; Wuttke et al., 2013b)		
a)	What are the SCF projects/models/solutions actually implemented in your organisation?	Adoption of SCF solution
b)	When did the implementation of these projects start/finish?	Adoption of SCF solution
c)	Why did your organisation implement this project? What was your objective?	Objective
d)	What technological instrument did you use?	Level of digitalisation
e)	What benefits did you achieve? How did these benefits compare against expectations?	Adoption of SCF solution, Objective
f)	What were the main barriers during the implementation?	Collaboration, Bargaining power, Level of digitalisation, Financial attractiveness
3 SCF applications – details (Barratt, 2004; Dass and Massa, 2011; Klapper and Randall, 2011; Klapper, 2006; Stank et al., 2001)		
a)	What was the role of the different organisational functions?	Collaboration
b)	Who held responsibility for the project?	Collaboration, Bargaining power
c)	Did the project/model/solution affect your internal process related to NOWC management?	Collaboration, Bargaining power, Level of digitalisation
d)	How did you manage your relationship with the service provider?	Financial attractiveness
e)	Did intra- and inter-organisational conflicts related to the SCF application arise? How did you solve them?	Collaboration, Bargaining power
f)	What are the expected developments of this project for the upcoming future?	Collaboration, Bargaining power
4 Other questions		
a)	What is your view on SCF?	Objective
b)	What project/model/solutions do you find more promising?	Objective

Table 3: interview protocol

Sector	Role in the supply chain	Origin	Interviewee (number of interviews)	Typology of service provider	SCF solution adopted	
A	Consumer goods	Retailer	France	CIO (2)	Internal development Captive factor	VMI Captive Factoring
B	Electrical equipment	Manufacturer	Switzerland	CPO (1)	Financial institution	Reverse Factoring
C	Consumer goods	Retailer	France	SCM (2), CFO (1)	Internal development Captive factor	VMI Captive Factoring
D	Consumer goods	Retailer	Italy	CFO (2)	Financial institution	Reverse Factoring
E	Food and beverages	Processor	Italy	CFO (2)	Financial institution	Inventory Financing
F	Fashion	Manufacturer	Italy	SCM (1)	Financial institution	Advanced Reverse Factoring
G	Fashion	Manufacturer	Italy	CPO (1)	Financial institution	Reverse Factoring
H	Automotive	Manufacturer	Italy	CPO (1), CFO (1)	IT provider Financial institution	Consignment Stock Reverse Factoring
I	Electrical equipment	Manufacturer	Italy	CPO (2)	Financial institution	Reverse Factoring
J	Automotive	Wholesale distributor	Austria	SCM (3)	Internal development	VMI
K	TelCo	Service company	UK	CPO (1)	Financial institution	Reverse Factoring
L	Home appliances	Manufacturer	USA	Cash flow manager (1), SCM (1)	SCF solution provider	Advanced Reverse Factoring
M	Food and Beverages	Processor	Italy	SCM (1)	Financial institution Internal development	Advanced Reverse Factoring Consignment Stock
N	Fashion	Manufacturer	Italy	CFO (1)	Financial institution	Advanced Reverse Factoring

Table 4: empirical sample and objectives of specific SCF applications

Variable	Description and operationalisation
<i>Dependent variable</i>	
SCF solution adopted	Can assume different values, clustered in three categories: <ul style="list-style-type: none"> a. Traditional financial solutions (Reverse Factoring; Captive Factoring) b. Innovative financial solutions (Advanced forms of reverse factoring; Inventory Financing; Dynamic Discounting; Seller-based Invoice Auction) c. Collaborative supply chain solutions (VMI, Consignment Stock)
<i>Independent variable</i>	
Objective leading to the SCF adoption	Can assume three values: <ul style="list-style-type: none"> a. Improve adopter financial performance (OBJ1): The adopter wants to improve its own financial performance, with neutrality towards the supply chain's financial performance, but exploiting the supply chain's links and dynamics b. Improve adopter financial performance and secure the supply chain (Intermediate objective): The adopter employs a balanced approach characterised by an improvement of its own performance (typically reduced with respect to OBJ1) implemented together with measures to secure the upstream and / or downstream supply chain c. Secure the supply chain (OBJ2): The adopter is focused on reducing risk in the supply chain, improving the overall financial performance, even accepting a decrease in its own financial performance
<i>Moderating variables</i>	
Level of digitalisation	Referred to the adopter's trade process. The highest level is a fully digitalised order cycle with shared visibility with the financial institution (Perego and Salgaro, 2010)
Bargaining power	Contractual power of the adopter company towards the upstream (or downstream) supply chain. Measured as the importance of having and / or exercising such form of power towards the primary members of the supply chain (when applicable)
Financial attractiveness	Attractiveness of the adopter as a potential market opportunity for a service provider. Measured as the level of importance of financial attractiveness for the effective adoption of the SCF solution (when applicable)
Intra-firm collaboration	Degree of collaboration among different departments of the adopting company, measured as the level of importance of formal or informal collaboration and / or the degree of shared ownership and control over the SCF model (e.g. shared decision between finance and procurement on the new entrance of suppliers in a reverse factoring programme vs. finance dept. decision only)
Inter-firm collaboration	Level of collaboration between the adopter and other primary members of the supply chain, for example: necessity of setting up one-to-one meetings with other companies to discuss the SCF solution or to settle minor disputes (high level of collaboration) vs. one-way standardised communication of SCF details (low level of collaboration)

Table 5: variables of the conceptual model

Case	Dependent variable	Independent variable	Moderating variables				
	SCF solution adopted	Objective	Digitalisation of trade process	Bargaining power towards primary member	Financial attractiveness	Intra-company collaboration	Inter-company collaboration
A	VMI	OBJ1	High	Medium	Low	High	Low
	Captive Factoring	OBJ1	High	High	Low	Medium	Low
B	Reverse Factoring	OBJ2	Low	High	High	High	High
C	VMI	OBJ1	High	Medium	Low	High	Low
	Captive Factoring	OBJ1	High	High	Low	Medium	Low
D	Reverse Factoring	Intermediate	Low	High	High	High	Low
E	Inventory Financing	Intermediate	Medium	Medium	Medium	Medium	Low
F	Advanced Reverse Factoring	OBJ2	High	High	High	Low	Low
G	Reverse Factoring	Intermediate	Low	High	Medium	High	Low
H	Consignment Stock	OBJ1	Medium	High	Low	Low	High
	Reverse Factoring	OBJ1	Low	High	Medium	High	High
I	Reverse Factoring	OBJ1	Low	High	Medium	Low	High
J	VMI	Intermediate	High	Medium	Low	High	Low
K	Reverse Factoring	OBJ1	Low	High	Low	High	Low
L	Advanced Reverse Factoring	Intermediate	Low	High	High	High	Low
M	Advanced Reverse Factoring	Intermediate	Low	High	Medium	High	Low
	Consignment Stock	OBJ2	Medium	High	Low	Low	Low
N	Advanced Reverse Factoring	OBJ2	High	High	High	High	Low

Table 6: summary of results

Figures

Figure 1

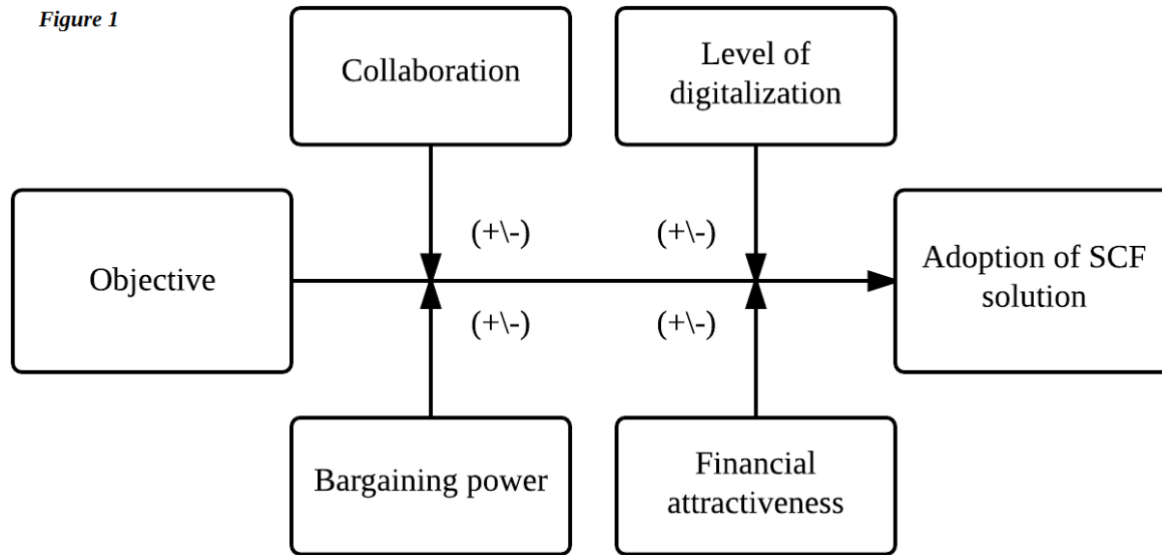


Figure 2

