

Costs and benefits of Supply Chain Finance solutions: is it always worth it?

The Supply Chain Finance Essential Knowledge Series

Agostino Bonzani, Federico Caniato, Antonella Moretto,
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Supply Chain Finance Community

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Volume 3

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Acronyms

B2B	Business-to-Business
CC	Credit Card
CCC	Cash Conversion Cycle
DD	Dynamic Discounting
DIH	Days Inventory Holding
DPO	Days Payable Outstanding
DSO	Days Sales Outstanding
EBIT	Earnings Before Interest and Taxes
ERP	Enterprise Resource Planning
IDis	Invoice Discounting
InvAuc	Invoice Auction
IF	Inventory Finance
LSP	Logistic Service Provider
POF	Purchase Order Finance
SCF	Supply Chain Finance
SCM	Supply Chain Management
RF	Reverse Factoring
ROCE	Return on Capital Employed

Acknowledgments

This volume is part of a research project called "De logistiek dienstverlener als financieel ketenregisseur", financed by the Nederlandse Organisatie voor Wetenschappelijk Onderzoek.

Foreword

In 2012, when the SCF Community started, few companies were aware of 'Supply Chain Finance', and the vast majority of them identified it with Reverse Factoring. In six years, we can say the SCF world has completely changed. We see this very clearly, with the most disparate case studies being presented in our events: dynamic discounting, inventory financing, financing of second-tier suppliers, and so on. It is a sign that SCF moved from being identified with a scheme to extend payment terms to being identified with an approach. An approach that expresses the willingness of actors in the supply chain to collaborate in adopting new and innovative schemes to optimise financial flows, exploiting the strengths of their supply chain relationships.

However, this shift in understanding led to a proliferation of different schemes, making more difficult for companies to find their way in the SCF landscape. Which scheme provides the specific economic and financial benefits you are looking for? And what are their costs? Is the implementation cost of dynamic discounting higher than reverse factoring? Why should I decide to use an invoice auction platform? These are significant questions that need proper answers.

It's for this reason that we are pleased to present the third volume of the Supply Chain Finance Community Essential Knowledge Series, titled "Costs and benefits of Supply Chain Finance solutions: is it always worth it?". In this volume Agostino Bonzani, Federico Caniato and Antonella Moretto from Politecnico di Milano (Italy), explore costs and benefits of an extensive number of SCF schemes, in order to provide practitioners with valuable information on SCF schemes that might be relevant for their own supply chain. It is a cornerstone volume in the series, which casts a long-awaited light of practical knowledge on an otherwise nebulous landscape of complex schemes.

This volume is one of the results of a large European research project carried out in collaboration between Windesheim University of Applied Sciences (in the Netherlands), the Fraunhofer Institute (in Germany), Politecnico di Milano (in Italy) and the University of St. Gallen (in Switzerland), funded by the Nederlandse Organisatie voor Wetenschappelijk Onderzoek.

Enjoy the read!

Luca Gelsomino (luca@scfcommunity.org)
Academic director, SCF Community

A handwritten signature in black ink that reads "Luca Mattia Gelsomino". The signature is written in a cursive, slightly slanted style.

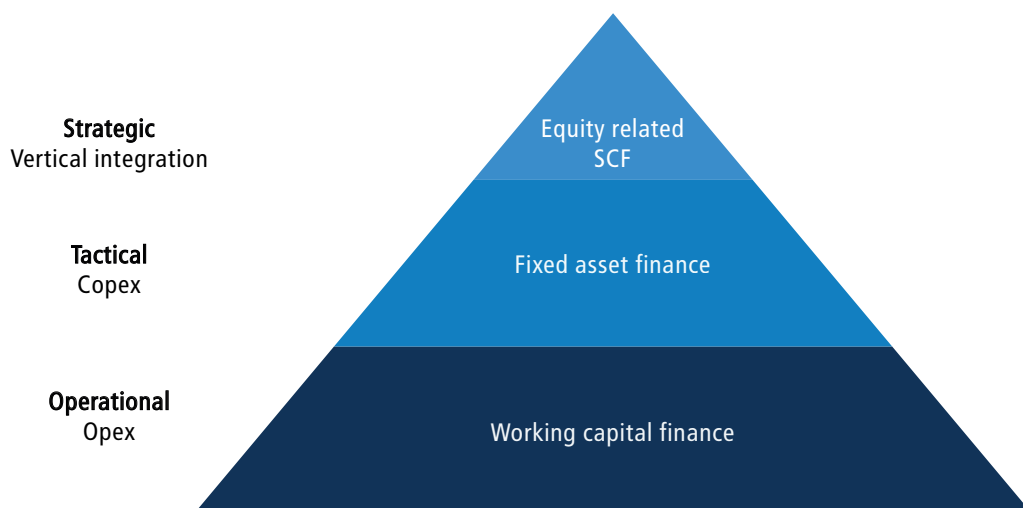
1 Introduction

The rise of supply chain finance (SCF) is mainly due to the increasing complexity, in the world of supply chain management, of integrating the three distinct flows that characterize supply chains: the physical, information, and financial flows (Hoffman & Belin, 2011). Many problems in the supply and distribution network are ultimately caused by low coordination between the three flows, resulting in performances that are overall lower than expected due to lacking efficiency and effectiveness (Bardy, 2006). Extending this view to a supply chain perspective, the need for a specific set of solutions that is able to tackle these inefficiencies becomes clear. In this economic and social context, supply chain finance can play an important role, since it can raise companies' awareness about issues that they were previously not completely aware of and provide a set of solutions to solve them.

It is difficult to draw a precise definition of SCF from the literature (Gelsomino et al., 2016), especially because different schools of thought can be identified around this term. In the previous volume, De Boer et al. (2015) provide a definition of the concept: "the optimization of the flows and allocation of financial resources in a supply chain with the aim to increase value, requiring the collaboration of at least two primary supply chain members, possibly facilitated by external service providers. As such, SCF's purpose is to improve supply chain efficiency (financial performance), effectiveness (delivery performance) and sustainability (social performance)."

However, what does it mean to allocate financial resources in a supply chain? One of the frameworks that aim to answer this question is the SCF pyramid (de Boer et al., 2015). On the vertical axis (see Figure 1), the solutions are divided according to the object of the financing. The classification divides them into: 1) operational expenditures, including all the solutions that aim to finance the net operating working capital; 2) tactical capital expenditures, including all those solutions that support the financing of fixed assets from a tactical perspective, such as vendor finance or leasing arrangements; and 3) strategic SCF instruments, which can facilitate vertical integration, minority interests, and M&As of companies at an upstream or downstream level of a focal company supply chain.

Figure 1: SCF Pyramid (De Boer et al., 2015)



By starting to investigate the operational layer, which is the one on which most of the literature has focused, it emerges that it lacks a framework that evaluates the benefits and the costs for the different stakeholders from the adoption of SCF. This aspect is important to accompany the definition of De Boer et al., the final target of SCF being the joint achievement of financial, delivery, and social performance; these need to be measured and compared in an objective way. This can be achieved by providing a standardized framework to evaluate the benefits of the adoption of SCF for both buyers and suppliers, moving beyond the simple improvement of the C2C cycle but also investigating some soft aspects. At the same time, decision makers may need to use this tool to gain a complete overview of the costs that are embedded in the SCF solution.

Consequently, to facilitate stakeholders' understanding of the impacts of the different SCF solutions, this volume aims to provide a framework to compare the main costs and benefits of each solution as well as comparing different solutions. The framework is structured to evaluate the costs and benefits of reverse factoring, and then it is applied to other solutions. Data were collected from different companies operating in Italy and running an SCF programme and were compared with secondary sources. [1]

1) The methodology session at the end of this volume provides more details about the data sources and method used in this volume.

2 Costs and Benefits of SCF

Nowadays companies are widely aware of SCF solutions; nevertheless, the level of adoption of these solutions remains limited, far from its potential reach. Companies are somehow familiar with implementing the most traditional solutions available on the market or those solutions that their existing financial providers propose to them from knowing their financial needs already. Despite the increasing technological developments of innovative solutions, the great majority of the SCF market is still related to more traditional solutions, for which the costs and benefits are quite well known. Additional insights into the costs and benefits of the most innovative solutions may finally help to trigger their diffusion in supply chains. On the one hand, the costs are explicitly indicated in the contract, but very often managers are concerned that sunk costs or hidden costs might exist as well. On the other hand, the benefits are not often so easy to quantify and are difficult to assess in a monetary way. Moreover, the benefits are sometimes visible only in the medium term and thus are more challenging to quantify. The combination of these two issues increases companies' resistance and thereby reduces the actual adoption of the SCF solution.

For all these reasons, the identification of the costs and benefits of each SCF solution is a fundamental step in helping companies in their decision-making process, allowing them to compare the different solutions and choose the one that best fit their needs.

To this extent, the SCF Observatory of the Politecnico di Milano has developed a framework that aims to address in a structured way both the costs and the benefits of the most adopted SCF solution, reverse factoring, identifying the value generated for each actor of the supply chain.

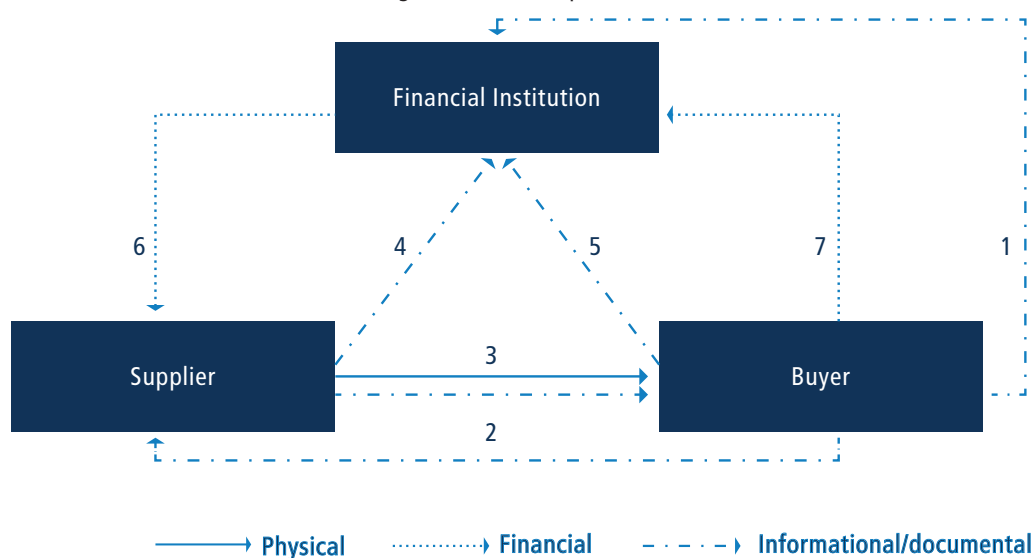
Subsequently, the structure of the model will be applied to the other innovative SCF solutions to understand the main differences and the evidence that can emerge from the application of this framework.

2.1 The Reverse Factoring Costs and Benefits Model

Implementing reverse factoring entails a high level of collaboration of all the stakeholders with the buyer, which plays a more proactive role in the financial support of its supply base, creating a potential win-win solution for all the actors involved (Seifert & Seifert, 2011).

In fact, the buyer himself, usually the largest player in the supply chain, initiates the programme to provide financial support to its suppliers, helping them to have their invoices financed quickly and at a lower interest rate, thanks to its improved creditworthiness, which acts as a guarantee for the financial institution that discounts the invoices.

Figure 2: Standard process of RF



1. The Buyer signs RF agreement with a financial institution to finance the invoices of some of its suppliers
2. The buyer issues the order to a supplier
3. The supplier issues the invoice and delivers the goods to the buyer
4. The supplier uploads the invoice to the platform of the financial institutions
5. The buyer approves the early payment of the invoice
6. The financial institution advances to the supplier a percentage of the value of the invoice
7. The buyer pays the financial institution on the due date or in accordance with the new terms agreed

A substantial difference from traditional factoring is the fact that in reverse factoring suppliers usually receive 100% of the value of invoices, while in factoring the advance ratio is smaller (typically between 80% and 90%).

2.2 Costs of Reverse Factoring

Since SCF solutions usually take significant time and effort to be implemented, once the SCF has been launched, in terms of the time to manage the solution, it is important to understand the different cost items that all the companies involved may face throughout the different stages of the SCF programme. A powerful approach that can be utilized for this purpose is the total cost of ownership (TCO) concept. Introduced by Gartner in 1987, the TCO approach can be used by decision makers to make more reliable estimations of the costs related to the whole life cycle of an investment. These involve all the costs related to the acquisition and the operating costs as well the costs related to replacement or upgrades at the end of the life cycle (Gartner, 1987).

The model developed by the SCF Observatory is inspired by the Gartner model, since it considers the costs related to the three main phases of the SCF solutions life cycle, planning, implementation, and use[2], as depicted in Figure 3.

2) There might be other costs occurring within Reverse Factoring, related to decommissioning part or the entire programme, costs of inefficient use, or any other extra cost related to unsuccessful applications. However, they are outside the scope of this study, which focus on successful RF adoption on a long time scale.

Figure 3: Costs of RF during its life cycle



2.2.1 Planning Costs

The planning phase includes all the potential costs linked to the selection of the players involved in the implementation of the solution (e.g., banks, factors, IT providers, and SCF providers). Two main types of planning costs can be identified: (1) scouting costs and (2) consultancy costs.

Due to the strategic role of reverse factoring, Seifert and Seifert (2011) highlighted the importance of the selection process of the provider. Financial institutions are always more pervasively offering RF to corporations, pushing them to take some time, turning into scouting costs, to choose the right financial, and in some cases also the right technological, partner. Hence, the costs of scouting are mentioned at around €1,000, although several companies have addressed a value equal to 0, automatically relying on their existing bank.

Another important aspect is the consultancy costs that the supplier may face at this stage. In fact, very often companies do not have the required competences internally to introduce SCF solutions; therefore, they are usually dependent on external competences to decide whether SCF might be the answer to their problems and who the best provider of that solution is. This can be null in the case of adopting the solution provided by the bank but may be more significant, ranging from €10k to €100k, in other cases.

In this phase, the buyer has to take a decision that may have important implications for the following steps: the choice of the platform. When planning the solution, the buyer can choose among three main options, which may affect significantly the costs and benefits for itself and for the supplier.

(1) The first option involves asking an IT provider to develop an in-house platform, which can be accessed exclusively by the bank to discount the invoices of its suppliers. (2) The second option sees the buyer adopting a cloud solution provided by an SCF provider for its RF programme. (3) The third option entails the buyer choosing for its RF programme the platform owned by the bank, through which the latter finances the invoices of different suppliers.

2.2.2 Implementation Costs

The implementation phase includes all those costs that arise from the initial setting up of the system until its launch. Three main implementation costs are identified: (i) acquisition and set-up costs, (ii) change management costs, and (iii) legal and compliance costs.

Starting with the acquisition costs of the platform, they are faced entirely by the buyer and may differ according to the degree of customization of the platform.

- If the buyer opts for an in-house solution, the costs may be significant, ranging from €100k for a standard version to around €1 million for a highly customized one. This is mainly the case for large corporations that face this investment to promote the digitalization of their order-to-cash and procure-to-pay processes.
- If the buyer adopts a cloud-based platform of an SCF provider for its RF programme, or the one of the bank, the costs can be significantly lower and usually consist of a one-time fee of a few thousand euros.

Regarding the change management costs, these are substantially different for the buyer and the supplier. The main items belonging to this category are: (1) the costs for supplier on-boarding, (2) the costs for training the employees involved, (3) and the costs resulting from changes in internal processes.

- De Boer et al. (2015) identified the costs of the on-boarding process of the suppliers as one of the main drawbacks of RF, since it actually takes the time and resources of the buyer to visit the suppliers physically and explain the solution to them. The data collected show that the cost estimated for the buyer is around €150–200 per supplier, since the time required for the communication, the engagement, and the physical meeting is quite relevant. At the same time, the time spent talking with the buyer about the solution has a cost for the supplier, although it can be slightly lower.
- Once the agreement has been signed, some costs related to the training of the resources may arise. For the buyer, considering around 2 days for 5 FTEs of the procurement department, these costs can be estimated at around €20k, while the costs for the suppliers can be lower. Nevertheless, these values depend on the size of the company and the number of suppliers in scope. Furthermore, it would be necessary to involve other departments in the training, such as credit and finance.
- Finally, the supplier may need to make some investments to adapt its systems and procedures to the solution, which may vary according to the implementation option selected by the buyer. If the RF platform is highly customized, it may take some time and money to connect the existing ERP system with the RF platform. If the platform is cloud based, it usually guarantees the interoperability of the existing systems through some interfaces, such as APIs, XML, and EDI, requiring just the investment needed to test it. If the platform is provided by the bank, it usually allows the supplier to upload the invoices via PDF directly without any costs.

Referring to the legal and compliance costs, these often emerge in the adoption of an RF solution. Since the introduction of reverse factoring often implies the revision of contractual conditions, there may be a need on the buyer's side to create homogeneity among all the contracts signed with the suppliers to be included in the solution; this can be a prerequisite of the bank due to the buyer's willingness to standardize to save on costs. It may result in additional costs for the buyer, which can be estimated at around €10k.

2.2.3 Use Costs

The use phase represents the routine usage of the RF solution and deals mainly with two cost items: (i) the financial costs related to the contractual conditions of the solution and (ii) the internal costs of management and control linked to the internal resources employed to manage the solution.

Once the RF programme is running, the main financial costs are borne by the supplier and consist mainly of the discount rate, which is provided to the bank, ranging in the analysed cases from 0.5% to 3% (SCF Observatory, 2016). This value has the advantage of being substantially lower than that in traditional factoring, since it leverages the creditworthiness of the buyer, as widely discussed by De Boer et al. (2015). Furthermore, there may be some costs for the suppliers, such as the commission to provide to the SCF provider, when involved, or the costs related to the opening of a tailored bank account, when the solution is fully managed by the bank.

On the other hand, the management and control costs are connected to the effective functioning of the solution, both on the human side, since the programmes almost always need some employees who are fully dedicated to the management of the solution, and on the technology side, since proper maintenance of the IT system is a fundamental prerequisite to avoid problems.

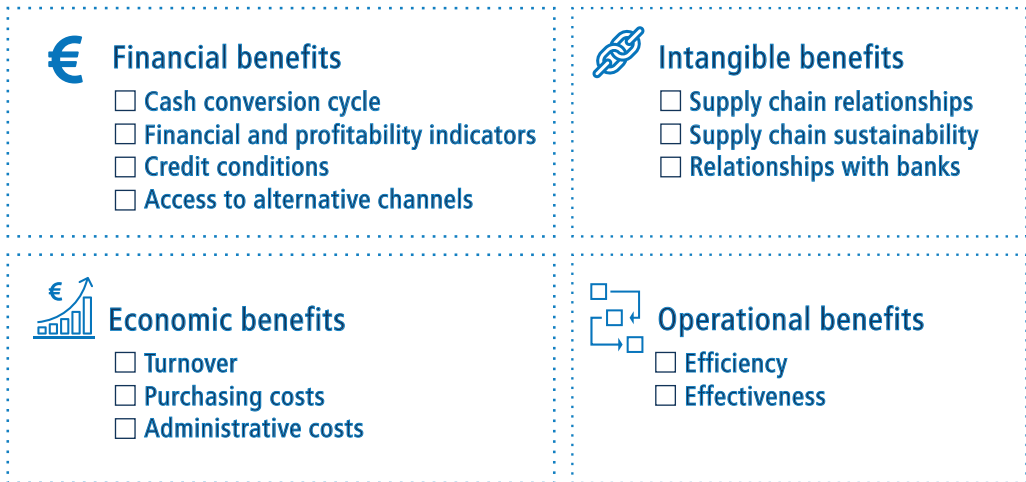
In addition, the supplier costs can be estimated at around €1k, with an employee dedicated to the management of the solution for 2% of his or her time. On the buyer's side, these costs are estimated to be around €10k, with the percentage of time dedicated to the solution being around 20%. Finally, the buyer may face some extra costs due to the maintenance of the platform in the case that it decided to implement an in-house platform.

2.3 Benefits of Reverse Factoring

In the first volume of the SCF Essential Knowledge Series, De Boer et al. (2015) highlighted the need for a framework that is able to assess the benefits of the SCF solutions beyond the operational level, also tackling the tactical and strategic echelons of the De Boer et al. (2015) pyramid.

The framework developed by the SCF Observatory heads in this direction, trying to show decision makers that the adoption of RF can lead to benefits that are not simply related to the reduction of the working capital. In particular, four main categories of benefits were identified, namely financial benefits, economic benefits, intangible benefits, and operational benefits, as shown in Figure 4.

Figure 4: Benefits of RF solutions



2.3.1 Financial Benefits

Financial benefits are often the main reason to implement an RF solution. Although the benefits might be several and different, four main macro-categories can be identified.

The first category of financial benefits is related to the reduction of the cash conversion cycle (CCC), that is, the time scale that expresses the average length of time, in days, between when a business pays its suppliers for goods received and when it is paid by its customers following the sale of the goods (SCF Observatory, 2016). The CCC consists of three components, namely days sales outstanding (DSO), days inventory holding (DIH), and days payables outstanding (DPO). The CCC is calculated according to the following formula: $CCC = DSO + DIH - DPO$. Through the adoption of RF, companies can decrease their CCC by reducing their DSO or by increasing their DPO (details about the three parameters are reported in the following Table 1).

	Definition	Calculation
Days sales outstanding	The average period that a company takes to collect revenue after a sale is realized	$DSO = \frac{\text{(total accounts receivable)}}{\text{net sales}} \cdot 365$
Days inventory holding	The average amount of time for which a company will hold inventory (raw materials, work in progress, and finished products) before the corresponding sale is realized	$DIH = \frac{\text{inventory}}{\text{COGS}} \cdot 365$
Days payables outstanding	The average payment period of a company, indicating how long it takes a company to pay its suppliers	$DSO = \frac{\text{total accounts payable}}{\text{purchasing costs}} \cdot 365$

Table 1: Components of the CCC cycle (adapted from De Boer et al., 2015)

In particular, by participating in the scheme, a supplier can decrease its DSO significantly. In some of the cases analysed, it was estimated that, with standard payment terms of 60 days, the supplier could decrease its DSO by up to 50 days. At the same time, under standard payment terms of 60 days, the buyer could stretch its payment terms for a period that ranges from 30 to 120 days to increase its DPO and consequently improve its CCC.

The second category is related to the improvement of financial and profitability indicators, in particular net debt and return on capital employed (ROCE). Net debt is an indicator that provides a snapshot of the debt level of a company by taking its liquid assets and subtracting its financial debts. Through the adoption of RF, the supplier improves its net debt significantly, thanks to the greater availability of cash, without increasing its financial debt, due to the non-recourse nature of the solution. This also has a very positive effect on the net debt of the buyer, because liquidity stays in the company's cash for a longer period.

The ROCE is the ratio between the operating income (EBIT) and the invested capital. For the supplier, the ROCE increases because the invested capital, in the component of the net working capital, decreases, while the discount given to the bank is accounted for as financial interest, so it does not affect the EBIT negatively. The effect on the buyer is the same and is as large as it manages to stretch the payment terms with the financial provider. Furthermore, in a significant amount of cases, with the introduction of RF, the buyer negotiates a discount with the suppliers.

The third category of financial benefits is related to the reduction of the cost of financing. Thanks to the higher financial rating of the buyer, suppliers can lower their cost of financing significantly, with a reduction that is 30% on average. At the same time, the buyer can leverage the fact of having brought new clients to the bank to increase its bargaining power and reduce, even though slightly, its own cost of financing.

The fourth and final category represents the benefits that a supplier receives from obtaining cash from alternative channels that differ from the traditional banking credit lines. Since the supplier might have saturated its existing credit lines, being included in an RF programme can help it to obtain cash through its invoices.

2.3.2 Economic Benefits

Better financial management of the supply chain can have also important economic impacts. Since RF enforces the strategic component of the buyer–supplier relationship, this may cause a relevant, even though not always easily quantifiable, improvement in terms of turnover and cost reduction.

Starting with the turnover, it can improve substantially due to the tighter relationship between the two parties (buyer and supplier). For the supplier, this can be estimated as an increase in turnover of up to 10–15% resulting from the potential increase in the volume of goods transacted with that specific buyer. As regards the cost reduction, there are two main categories of cost items that can be tackled by SCF solutions: purchasing costs and administrative costs.

In RF, a buyer could leverage its own bargaining power by demanding a price discount from the suppliers included in the programme. According to the cases analysed, the reduction registered can reach 10% of the price agreed before the launch of the RF programme.

Nevertheless, the latter can obtain similar cost savings with its own suppliers by leveraging its improved financial rating and its steady payment behaviour to ask for a discount, also identified in this case as being around 10–12%. As a buyer in our network mentioned: “Thanks to the inclusion in a programme of SCF, I was perceived as a more reliable customer for some of my suppliers. In this vein, I was able to get in contact with more efficient suppliers as well as to receive very convenient proposals from already existing suppliers.”

The second category of economic benefits includes all those cost savings that can be achieved by an increase in the efficiency of the internal processes due to the adoption of RF. As for the costs, the degree of digitalization of the platform entails different impacts on the cost reduction, since greater automation of the procure-to-pay and order-to-cash processes decreases the overall time required and consequently the resources needed to manage them, while, in the case of a less integrated platform, this cost reduction is only partial.

2.3.3 Intangible Benefits

Under the intangible benefits label, we want to include all those improvements that can be achieved thanks to RF that extend beyond the single supplier–buyer relationship. In particular, three main typologies of benefits were identified: better relationships at the supply chain level, improved supply chain sustainability, and better relationships with financial institutions.

The first benefit is related to one of the main paradigms of RF: collaboration. Since one of the objectives of SCF is to reduce the default risk of strategic partners, this allows the creation of long-term relationships based on transparency, trust, and collaboration. By doing so, the buyer is able to consolidate its supplier base, being sure that it does not have to stop the activities due to a cash shortage, while the supplier can strengthen both the upstream and the downstream level of its own supply chain. This shows how the simple operating relationship between the supplier and the buyer through RF may turn into a more effective collaboration on different levels of the supply chain, also fostering the exchange of information.

The second benefit is strongly connected to the definition of SCF provided by De Boer et al. (2015), since it tackles the concept of sustainability. In fact, RF can be useful to increase the overall sustainability performance of the supply chain from a twofold perspective. On the one hand, a focal company may decide to increase its social sustainability by including in an RF programme smaller suppliers with specific competencies that would otherwise disappear from the market. On the other hand, the focal company may grant access to the SCF programme only to suppliers that satisfy particular requirements, which may be related both to operating performances, such as vendor rating, and to environmental performances. The outcome of this strategy gives the chance for the company leading the SCF programme to promote more sustainable and responsible management of its supply chain, enforced by technology in the decrease in inefficiencies and in paper-based processes.

Finally, some companies mentioned a reduction in the use of paper in their processes thanks to the process digitalization induced by SCF, with a potential marginal impact in terms of environmental sustainability.

The third benefit extends the collaboration concept introduced in the previous paragraphs to a third party that may be involved in the solution. When the subject involved is a financial institution, the presence of new potential customers can become a bargaining power component for the buyer in the relationship with its financial institution. On the other hand, suppliers can increase their relationship with the financial institution by showing their improved ability to manage their financial performances with RF.

2.3.4 Operational Benefits

The last category of benefits identified deals with the improvements that a company can achieve in its everyday activities once it has implemented an RF solution. This set of advantages can be divided into two categories, depending on whether they lead to improved company efficiency or effectiveness, and is strictly connected to the degree of digitalization of the RF solution.

As for the efficiency side, digitalization can represent the main driver to obtain significant improvements. Most of the time, suppliers are guided towards digital transformation by the buyer when included in an RF programme, with a consequential increase in the efficiency of the internal processes, decreasing the times and costs needed to perform the most traditional activities (e.g. the diffusion of e-invoicing).

The extent of digitalization can also influence the effectiveness side, since more punctual and precise exchange of information among the different actors involved in an RF solution can help the development of more accurate strategies at the supply chain level, with a consequent improvement of performance metrics such as service level and innovation.

3 SCF Solutions: A Classification Focused on the Level of Digitalization

In the landscape of the different classifications of the SCF, the one provided by the SCF Observatory of the Politecnico di Milano, shown in Figure 5, aims to shed some light on two factors that can help stakeholders in their decision-making process. This classification considers all those solutions and practices that have the objective of freeing up liquidity along the supply chain by reducing the working capital of the companies, hence tackling the operational level of the SCF pyramid introduced by De Boer et al. (2015).

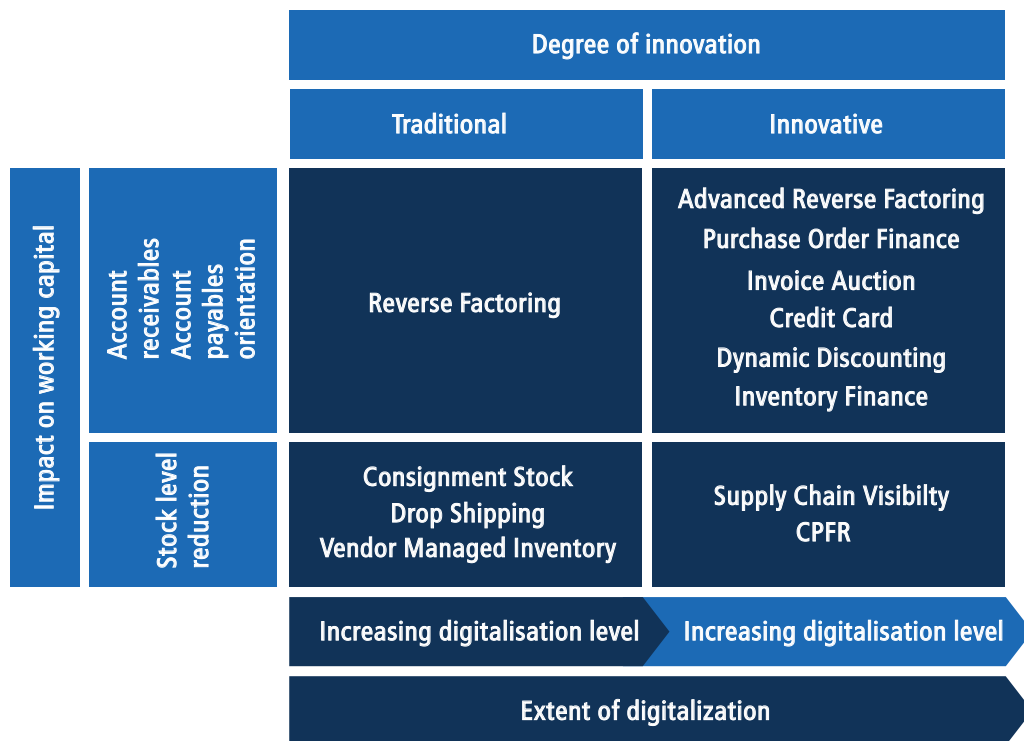
In particular, companies need liquidity for two very different reasons. On the one hand, a company may need cash because of an unbalanced situation regarding the payment terms with its suppliers and customers. For example, if a company has agreed payment terms of 60 days with its customers but has to pay its suppliers within 30 days, the company needs to find a way to finance itself for at least 30 days. On the other hand, liquidity is trapped in inventory: in raw materials stocked in the warehouse, in work in progress, and in finished products that have not been sold yet. For this reason, a company may be very interested in implementing some solutions that help to reduce the physical level of the stock or just the impact of the inventories on the balance sheet.

According to these considerations, the vertical axis of the matrix of solutions is split into two categories. The first is the “account receivables-account payables orientation”, which groups all those solutions that allow companies to reduce the problems related to payment terms. The second is “stock level reduction”, which contains all the solutions that are more supply chain management oriented and have the objective of lowering the impact of stock by fostering collaboration between the members of the supply chain. Once a company identifies the main component of the working capital that it wants to tackle through the adoption of SCF, it is able to address a more restricted set of solutions.

A second variable to consider pertains to the level of digitalization embedded in the solution, which can affect different processes of the solution itself, such as the exchange of documents between the actors involved, which can be digitalized and made paper free, or the evaluation of creditworthiness, which can be made faster and more precise with the adoption of more developed algorithms.

A distinction based on the level of digitalization allows the identification of “traditional” and “innovative” solutions. The former includes those solutions that have been available on the market for several years and feature a limited level of digitalization or even solutions that do not include any supporting ICT structure and still entail manual processing of hard-copy documents. The latter accounts for all the recent solutions that definitively entail digitalization as a driver to create value for the stakeholders.

Figure 5: Classification of SCF solutions provided by the SCF Observatory



A brief description of the solutions reported in Figure 5 is summarized in Box 1.

Box 1: Definition of SCF solutions

Invoice discounting: a form of financing whereby a financial operator lends money to a company against one or more invoices issued that are still unpaid.

Factoring: a solution whereby a business sells its accounts receivable (invoices) to a third party (factor) at a discount.

Reverse factoring: a factoring method in which a highly creditworthy customer acts in partnership with a factor, allowing suppliers to sell its receivables at a lower cost than direct factoring.

Advanced reverse factoring: a form of reverse factoring implemented in the presence of wider operational information against lower risk and, consequently, lower financing costs.

Inventory finance: a form of financing that implies the transfer of the inventory to a third party that takes ownership of the goods or a simple line of credit or short-term loan to finance a company's inventory.

> Box 1 continues on page 20

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Purchase order finance: a form of financing whereby a financier provides a loan to a supplier based on the buyer's commitment to buy the goods ordered from the supplier.

Invoice auction: a technological platform or "marketplace" for invoice financing in which third-party investors meet to invest in invoices that companies have issued and that are auctioned among the various potential buyers.

Virtual credit card/B2B purchasing card: a solution that implies the use of a "virtual" credit card to simplify the process of payments made between a buyer and a supplier and to optimize their working capital.

Dynamic discounting: a solution used by buyers to pay their suppliers early in exchange for a lower price or discount on invoices awaiting payment. The dynamic component refers to the discount being proportional to the number of days earlier the invoice is settled than the standard payment terms.

Vendor-managed inventory (VMI): a practice whereby the buyer's stock is managed directly by the supplier and the latter sets the replenishment phases independently.

Consignment stock: a technique similar to vendor-managed inventory (VMI), except that stock held in the customer's warehouse is still owned by the supplier until it actually is used for production, the moment when the sale and transfer of ownership take place.

Drop shipping: a technique whereby the buyer acts as a showcase for the supplier, since the former does not keep the goods that it sells in stock but instead has the goods that it sells shipped directly to the end customer.

Supply chain visibility: information sharing between supply chain partners, including data on sales, stock levels, advertising campaigns and available production capacity.

Collaborative planning, forecasting, and replenishment (CPFR): a full working relationship between customer and supplier, without decisions being delegated to one of the two parties. The concept involves joint practices for sales forecasts and replenishment plans and generally includes sharing plans for production on the supplier's side.

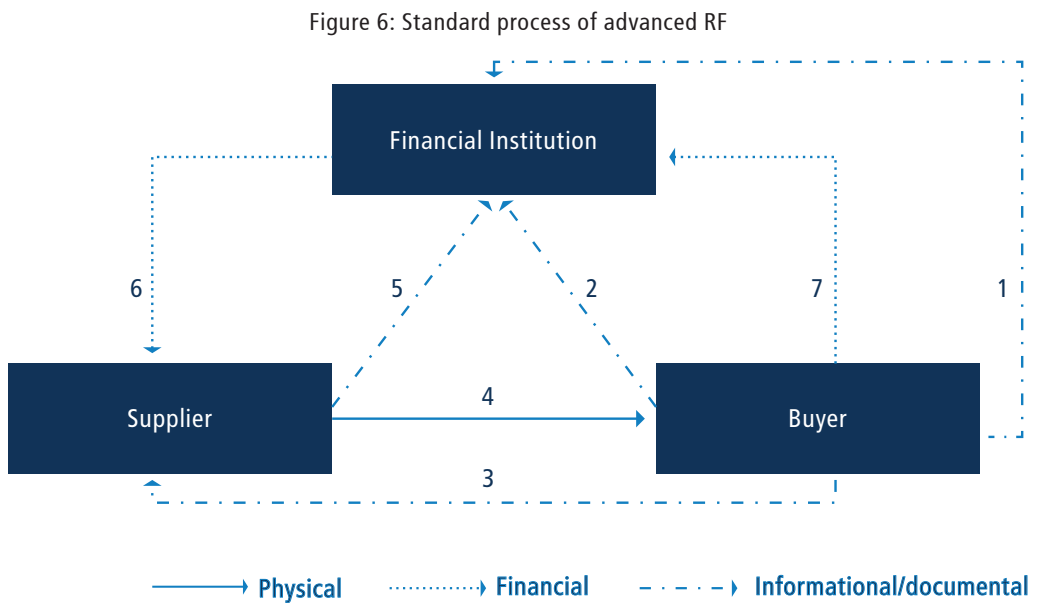
Source: SCF Observatory (2016)

4 SCF Solutions: Costs, Benefits, and Applicability

In this section, we intend to use the same model for reverse factoring to perform a cost and benefit assessment of the SCF solutions identified in the matrix reported in Figure 5. To perform the cost and benefit analysis, several case studies on the more innovative solutions of the “account receivables–account payables” category were deployed. Since the focus of this paper is more SCF than SCM oriented, the cost and benefit analysis will not deal with the solutions falling into the “stock level reduction” category.

4.1 Advanced Reverse Factoring

Advanced reverse factoring (see Figure 6) is an innovative version of “traditional” reverse factoring, in which the financing of a supplier’s invoices occurs in the presence of more operational information and therefore potentially entails lower risk. To apply it, especially on a large scale, it is necessary to leverage a technology platform that supports the processes involved and the relationship between the buyer and the supplier and guarantees the involvement of a financial institution.



1. The Buyer signs RF agreement with a financial institution to finance the invoices of some of its suppliers
2. The buyer shares with the financial institution some additional information about the suppliers
3. The buyer issues the order to a supplier
4. The supplier issues the invoice and delivers the goods to the buyer
5. The supplier uploads the invoice to the platform of the financial institution
6. The financial institution advances to the supplier a percentage of the value of the invoice
7. The buyer pays the financial institution on the due date or in accordance with the new terms

The role of digitalization is aimed at managing the larger amount of information exchanged between the buyer and the financial institution. In fact, the former performs pre-screening of the suppliers to be included in the programme according to some criteria agreed with the latter. The information shared with the financial institution can be of different natures, such as the documentation that governs business transactions or the buyer's vendor rating. This solution perfectly fits, for example, the case of a large customer with many small and medium-sized suppliers. In this context, the sharing of information included in the vendor rating of the buyer (quality, accuracy, etc.) offers the buyer a dynamic picture of the supplier base rather than the static one that can be gathered only by looking at financial indicators, as happens in the *Staff International* case (see Box 2). Furthermore, the criteria to access the RF programme can extend beyond the traditional vendor rating scheme, opening up the programme to suppliers that satisfy some other requirements, as undertaken by Puma in fostering environmental sustainability in its supply chain.

Box 2: An emblematic case of advanced reverse factoring *Staff International*

Staff International is an Italian company of the OTB Group that develops, produces, and distributes pret-à-porter brands through exclusive worldwide licensing agreements. Its turnover in 2016 was around 330 million euros. The company cooperates with many of the key players in the textile and apparel supply chain, such as suppliers of raw materials and accessories, dyes, laundry, and ironing, just to name a few. Distribution takes place through three main channels: retail, wholesale, and e-commerce.

Despite the high reliability rating that Staff International obtained for many years from the traditional banking system, in many cases this was not enough for its suppliers to gain significant credit lines under good financial conditions.

In July 2014, Staff International launched the C.A.S.H. (Credito Agevolato - Suppliers Help) project to support Made in Italy. The programme implies the creation of a credit line of 50 million euros based on the principle of reverse factoring to help its smaller Italian suppliers. The deal introduced by the company expects its "virtuous" suppliers to be able to cease all credits due to Staff International quickly under particularly favourable conditions.

The possibility to access the programme is open to all the actors in the supply chain with a certain qualitative rating assigned by the company. The ratings are updated every semester and rely on concrete parameters, such as the delivery reliability performance and technical reliability, the quality, and the partnership capabilities.

4.1.1 Costs of Advanced Reverse Factoring

The backbone of the cost structure of an advanced RF solution is mostly similar to that of traditional RF, although some differences could be identified. First, in the implementation phase, the exchange of additional information causes higher set-up costs due to the additional flows of information in the setting-up stage. This also increases the change management costs, because the suppliers' on-boarding could be more time consuming in the preliminary phase, although a lower number of suppliers is involved and thus less time is devoted to meeting suppliers and to training. On the other hand, in the running phase, the buyer could reduce its management and control costs slightly thanks to its increased focus on the suppliers. This positive effect is partially reduced by the need to update the data to share with the bank on a yearly basis, thereby also revising the set of suppliers involved in the programme. However, the major advantage pertains to the fact that the supplier could benefit from lower financing costs, since the financial institution can perform a better outline of the supplier thanks to the greater availability of punctual information provided by the buyer.

4.1.2 Benefits of Advanced Reverse Factoring

Like the costs, almost all the benefits of advanced RF belong to the same categories as the traditional version. What can be improved through the integration of a larger amount of information is mainly the credit conditions of the supplier, which are now evaluated by the financial institution according to a wider set of indicators. If some of the data exchanged concern sustainability parameters, the sustainability of the whole supply chain can benefit; on the other hand, if the data exchanged are of a more operational nature, the buyer may increase its effectiveness due to deeper knowledge of its supplier base. Finally, the buyer could benefit from an improved relationship with its financial institution, because it provides the latter with access to its already-profiled customer base.

4.2 Purchase Order Finance

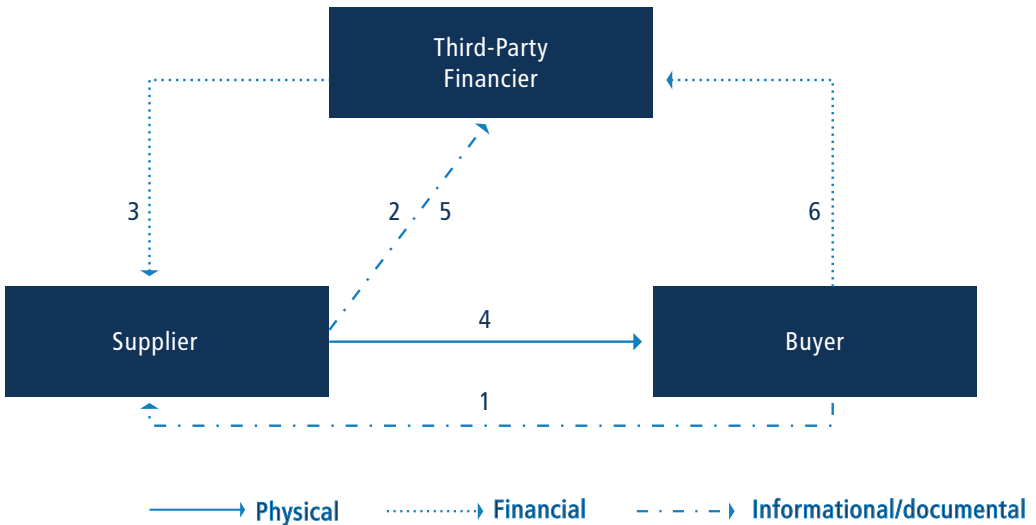
De Boer et al. (2015) identified purchase order finance (POF) (see Figure 7) as one of the most interesting pre-shipment financing solutions that can help suppliers to cope with financial constraints. In fact, it may happen that suppliers receive an order that they cannot accept due to a shortage of the liquidity necessary to perform the required operations.

In this context, a financial institution can intervene, providing the financing that the supplier needs to make all the adjustments to its operations, such as opening up a new production line or making specific investments, or more simply helping it to issue orders to its own suppliers. In any case, the amount financed can reach a maximum of 50% of the order value. Once the order has been accepted by the supplier, performed, and invoiced, it will repay the financial institution progressively. In several cases, this repayment process is performed through a factoring agreement with an actor that can also be different from the POF lender.

In this context, digitalization plays a particular key role, since the subject in charge of the financing needs to mitigate the risk, which can, in some cases, be unbearable. Through punctual sharing of information by the supplier about not only the order but also the contract and other documents, such as sales forecasts

and the payment terms agreed with the buyer, the financial institution (or other asset management funds that have provided the financing) can work out a more accurate offer for the supplier, as shown in the Fonderie Officine Meccaniche Tacconi case (see Box 3).

Figure 7: Classification of SCF solutions provided by the SCF Observatory



1. The buyer issues the order to a supplier
2. The supplier presents the order to the third-party financier
3. The third-party financier advances to the supplier a percentage of the value of the order
4. The supplier issues over time the invoices and delivers the goods to the buyer
5. The supplier sells over time the invoices to the third-party financier
6. The buyer pays the third-party financier on the due date

Box 3: An innovative case of POF *Fonderie Officine Meccaniche Tacconi*

Fonderie Officine Meccaniche (FOM) Tacconi is a medium-sized Italian company founded in 1962 that manufactures components for the automotive sector. Over the years, FOM Tacconi has experienced considerable growth, increasing its turnover from 3.7 million euros in 1989 to 35.5 million euros in 2002 to the current (2015) 75 million euros.

In this very specific context, in 2015, FOM Tacconi signed a contract to the value of around 40 million euros for 4 years with a large automotive company. To fulfil the contract, FOM Tacconi needed to open some new, fully dedicated product lines. Since the first revenues from the contract would have been generated only once the new components had been delivered, FOM Tacconi needed to find a way to finance the construction of the new production lines.

To overcome this issue, the management of FOM Tacconi decided to adopt a purchase order financing programme offered by a financial provider through a dedicated vehicle (Special Purpose Vehicle). The agreement had two main implications. On the one hand, the vehicle advanced around 10-15% of the contract value with an 18-month loan, while on the other hand it agreed to buy all the invoices as they would be issued by FOM Tacconi to a total of 24 million euros of sales to tie the debt repayment times to the business performance.

To allow this solution to work, the vehicle started a collaboration with an IT provider to develop a platform to manage the huge number of invoices effectively (around 960 invoices per year), related to the contract issued with FOM Tacconi. The adopted technology consisted of an advanced digital computing platform that could both gather documents from different sources and be integrated into companies' ERPs, managing the entire process of financing trade credits, transparently and without incurring long authorization processes or complex procedures.

4.2.1 Costs of Purchase Order Finance

Purchase order finance is a solution that is structurally complicated for the traditional SCF providers but more attractive for alternative funding companies, which are somehow more agile in offering these solutions. Being quite a new emerging solution, mainly offered by international providers, a supplier that wants to access POF may need some time to find the right partner. Consequently, some scouting and consultancy costs may arise for the supplier in the early stages of the programme.

To access the solution, the supplier may be required to make some technological improvements to ensure punctual and precise information exchange with the other actors involved. This does not happen when the solution implemented is more traditional and still paper based, and in this case does not affect the acquisition costs. Considering the interviews performed, in most cases the solution is still adopted following a paper-based approach.

The impact on change management costs can instead be more relevant, since many operating processes are affected by this solution, especially when they require massive digitalization. Finally, a supplier that intends to access POF needs to retrieve and harmonize a wide set of documents, such as contracts, orders, letters of credit, and so on, involving high exposure to legal and compliance costs.

The use costs of POF, as for the other SCF solutions, are the most relevant cost item and may vary according to the type of POF that is put in place. First, being a particularly innovative and costly solution, the embodied financial costs are very high, also due to the presence of a coupled factoring solution in the post-shipment phase. Second, there are relevant costs of management and control of the solution, which can be lower when the process is digitalized or higher when it is still paper based, as is frequently the case.

4.2.2 Benefits of Purchase Order Finance

Similar to costs, the financial benefits that can be achieved by a supplier that requests POF may vary according to the way in which the solution is set up. Starting with the cash conversion cycle, the benefits for the supplier are evident, since it can obtain part of the payment related to the accepted order up front, hence increasing its cash availability and its net debt. Furthermore, the increase in the turnover of the supplier due to the acceptance of the order can increase its EBIT and consequently its ROCE. Thus, as shown in the *FOM Tacconi* case, the supplier can benefit from a new channel to access financing by pledging the order itself, which then may result in pledging the invoices resulting from the contract with the buyer.

Turning to the economic benefits, we meet the main benefit of POF: the increase in the turnover of the supplier. Since POF is a solution that has the objective of supporting suppliers in keeping up with the production requested in the downstream part of the supply chain, it gives them the chance to increase their turnover mainly through accepting orders that otherwise would have been impossible to pursue. Moreover, the supplier can decrease its own purchasing costs by leveraging its improved reputation as a reliable payer, and eventually its administrative costs, whether it digitalizes the related process.

The main benefits arising from the intangible category are linked, on the one hand, to the better relationships within the supply chain, since this solution may affect more tiers than a traditional SCF solution, while, on the other hand, if the solution is adopted with a financial institution, this can become a flywheel for the latter to offer traditional financial services.

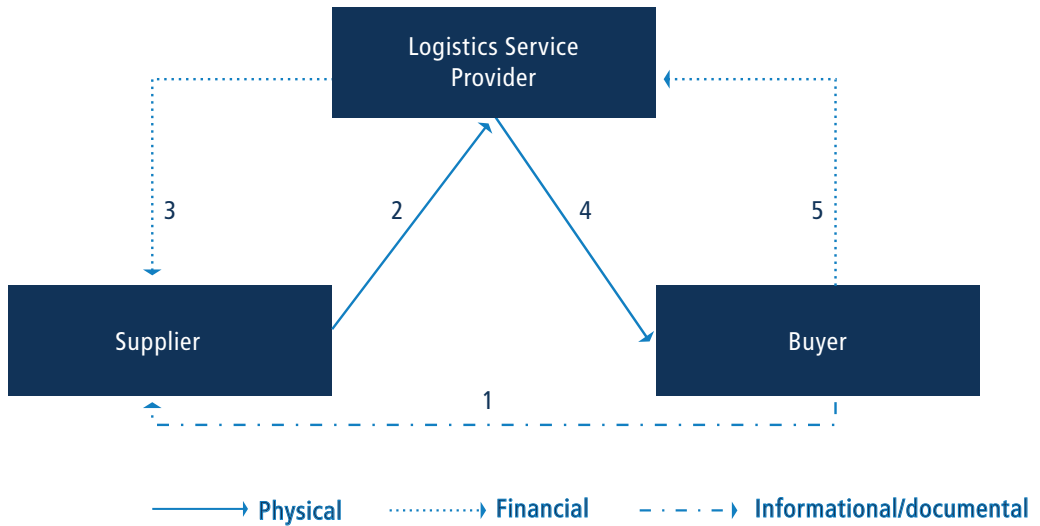
Finally, some very relevant operational benefits can emerge in terms of effectiveness, since, by accepting the order, the supplier increases significantly the service level offered to the client and, in the case of orders featuring a high degree of innovation, its overall reputation, as shown in the *Tacconi* case. In terms of efficiency, significant improvements can be registered only in the case of a digitalized solution.

4.3 Inventory Finance

The broad concept of inventory financing refers to a short-term loan provided by a financial institution or a third party to a supplier with the collateralization of part of its stocks. One interesting aspect of inventory financing is the increasing involvement of other external actors, such as logistics service providers, which might be proactive in providing these services as they own information related to the status and the position of the inventories, the payment times of the customers, and so on. This information asset can be empowered by the diffusion of technologies like the Internet of Things, big data, and blockchain, which are diffusing widely throughout the logistics sector.

However, as there are many different types of inventory financing, this does not always apply. In other cases, if the structure of the LSPs allows it, they can buy the stocks directly, taking them away from the supplier's balance sheet and decreasing its working capital significantly, and then resell them directly to the buyer when needed, acting as a sort of distributor.

Figure 8: Standard process of IF with an LSP distributor



1. The buyer issues the order to a supplier
2. The supplier delivers the goods to the LSP
3. The LSP pays the supplier a percentage of the value of the goods
4. The LSP resells the goods to the buyer who needs them
5. The buyer pays the LSP the full value of the goods

4.3.1 Costs of Inventory Finance

Even though banks and logistics service providers are viewing this market with increasing interest, this solution is not particularly diffused, especially due to the high-risk exposure deriving from issuing loans against inventory. For this reason, suppliers may take time and resources to identify the players that are offering the same product but with many different peculiarities, thus incurring some quite relevant scouting and consultancy costs.

To offer IF, the lender needs to have continuous visibility of the financed inventories, and this can lead to investments in an ICT structure that supports the continuous monitoring of the goods as well as investments in a physical infrastructure, depending on whether the lender wants to store the goods in its own warehouses. These aspects are consequently charged to the supplier, which can hence face important costs in the acquisition phase.

Change management costs are also significant for the supplier, since IF can modify substantially the physical flows of the goods and consequently the way in which processes are managed. In this context, the use of technology can help in mitigating these costs by reducing the related non-value-added activities.

In addition, a key point that may arise for the supplier is the compliance costs due to the accounting complications related to the exchange of property of the goods, often identified as the main barrier to the adoption of IF.

Finally, the use costs of IF are mainly related to the interest rate that is charged by the LSP or the bank, which is in general very high, since it embodies a very high risk for the lender. Nevertheless, the interest rate can be mitigated by a set of factors, such as the high possibility for the bank to remarket the product in the case of default of the supplier, thanks to the access to some alternative distributive channels at the downstream level of the supply chain (Hoffman et al., 2016).

4.3.2 Benefits of Inventory Finance

The choice of the IF solution to implement can affect the financial benefits of the supplier in two very different manners. In fact, the supplier can expect to improve its CCC only when the LSP or the bank actually buys the in-transit inventory to resell it to the buyer, the supplier being able to take away the goods from its balance sheet, thus decreasing its DIH. The same applies to the net debt, which decreases only when the stocks are deconsolidated. On the contrary, profitability indicators are affected differently, since, if the supplier can take away the goods from its balance sheet, the impact on the ROCE is more significant, as the working capital is drastically reduced.

Another benefit for the supplier, as is the case for POF, is the possibility to access liquidity through alternative financing channels, since traditional actors are unlikely to offer these services on a regular basis. The presence of economic benefits is related to a potential increase in turnover enforced by the greater cash availability, as for almost all the other solutions.

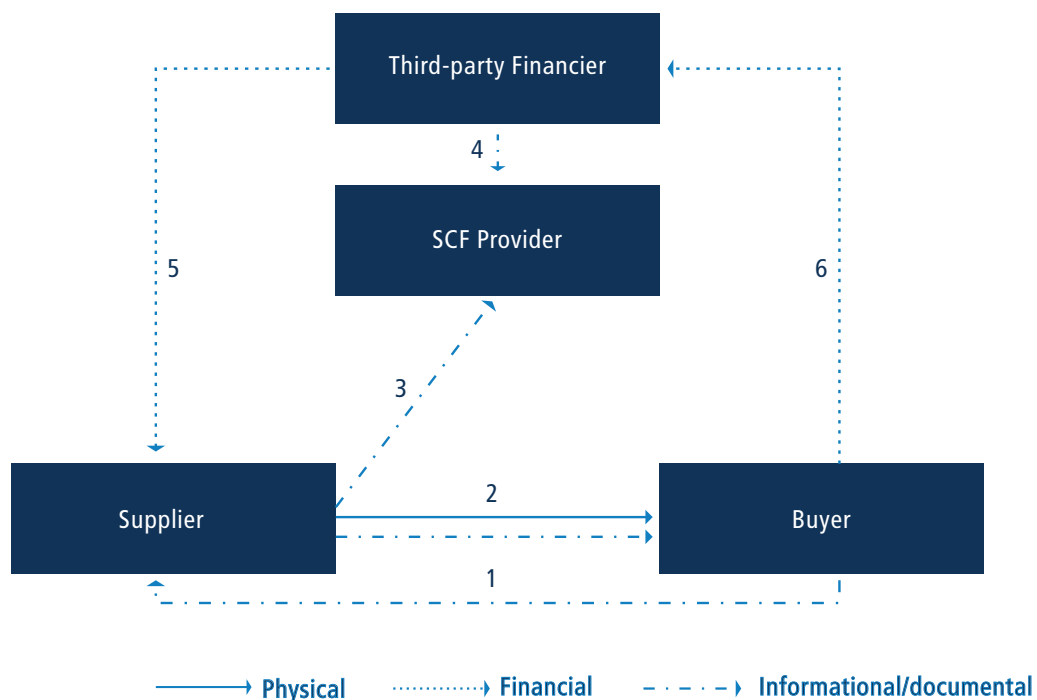
As regards the strategic standpoint, the main benefit for the supplier is an improved relationship with the banks, since they may perceive the threat of new actors offering these particular services and consequently try to tighten the relationship with the suppliers. In terms of efficiency, the punctual and precise exchange of information may require the supplier to adapt its technological infrastructure to that of the financial institution or the LSP, thus accelerating the innovation process inside the company. In terms of effectiveness, since the solution implemented by the supplier also embodies continuous monitoring of the status of the inventory, the buyer itself perceives this as a valuable aspect, because the latter may have complete visibility of its goods before they are delivered.

4.4 Invoice Auction

“Traditional” invoice discounting can be upgraded to an invoice auction, according to an alternative and innovative model, emerging from the bank company scheme (see Figure 9). This tool allows third parties (corporate investors, banks, and asset managers but also private citizens) with capital availability to invest in a kind of “new financial product”, which is characterized by medium risk and a short-term return: suppliers’ invoices.

In the application of this model, invoices are uploaded to a cloud platform (actually a “marketplace” for commercial invoices) on which a real auction mechanism is triggered between different potential investors. The actor that manages the platform–marketplace does not provide capital but acts as a “guarantor” by evaluating and enabling companies that issue their invoices and funders wanting to access auctions. The overall process takes around 3 to 7 days, thus making cash available very quickly to small suppliers. For these reasons, the solution can be especially relevant to small and medium enterprises, usually suppliers dealing with buyers with very long payment terms.

Figure 9: Standard process of an invoice auction



1. The buyer issues over time a set of orders to a supplier
2. The supplier issues the invoice and delivers the goods to the buyer
3. The supplier uploads the invoice to the platform of the SCF provider
4. The third-party financier participates in the auction and wins it
5. The third-party financier advances to the supplier a percentage of the value of the invoice
6. The buyer pays the third-party financier on the due date

Box 4: The Altaquota case

Altaquota is a small Italian company established in 2014, which provides highly customized packaging services. Due to its complete orientation towards the client, the company involves its clients in all the phases of the development of the packaging features, furthermore allowing them 120 days to pay. Since Altaquota needs to pay its suppliers in 60 days and the production of the requested specifics takes around 20 days, the company needs to reduce the impact of the working capital in such a way that it does not affect the chance of obtaining new orders.

To solve this problem, Altaquota decided to turn to a start-up that provides a trading invoice platform to sell its invoices on the marketplace at a convenient discounted rate, receiving cash within 48 hours.

4.4.1 Costs of Invoice Auctions

Invoice auctions are a solution that has attracted interest only recently, once the technological push had set the basis for providing a product that empowers the features of traditional invoice discounting. For this reason, the number of players that offer this solution is still limited, thus pushing companies to evaluate properly which is the best solution for their needs, involving some scouting costs, while the consultancy is usually provided directly by the platform.

In the implementation phase, the supplier sees as a unique acquisition cost the entry fee that is sometimes required to access the service, since the invoices are uploaded on the platform simply in PDF format, without facing investments in infrastructure. Change management costs are indeed a component, since the supplier may outline a strategy to understand when to access the platform and which invoices he wishes to discount. Legal and compliance aspects are also a problem for the buyer, since, by accepting the ceasing of the credit, it will need to send each payment to a different bank account, which belongs to the winner of the auction.

As is the case for invoice discounting, the main costs for the suppliers lie in the use phase, in particular the interest rate charged by the third party that provides the financing to the supplier, which is on average quite high (around 7%–9%). Besides, as a consequence of the change management costs identified above, both supplier and buyer will face some management and control costs.

4.4.2 Benefits of Invoice Auctions

The main reason that pushes suppliers to pledge invoices in invoice auctions is undoubtedly the need to improve the cash-to-cash cycle through a fast and flexible solution, which allows them to be financed just when they need it, obtaining up to 90% of the value of the invoice. In addition, since the invoice auction platforms connect not only financial institutions but also investment funds, factors, and so on, this provides access to capital markets that otherwise would have been impossible for the supplier to reach. A company once interviewed said: “As a matter of fact, an invoice auction has a pretty high interest rate, but for us it is the only possible way to have access to credit. I am a start up and no bank is willing to provide credit to us, without important personal collateral. Thereby, this cost is still much lower or at least much more manageable than not having cash at all.” The solution is valuable for this reason but also because it can turn into a bargaining lever with the banks, which may decide to lower their standard traditional interest rates to be competitive again.

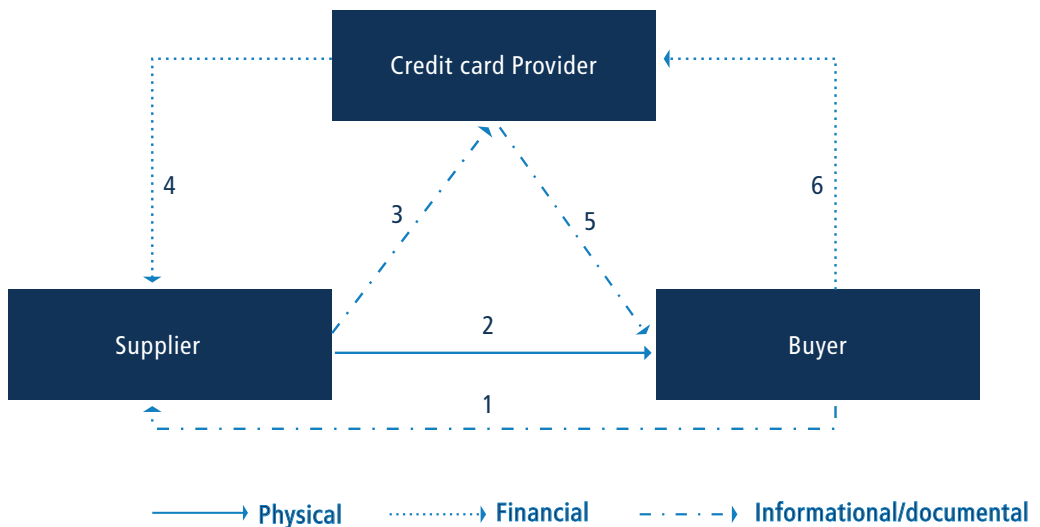
A strategic approach to an invoice auction could help the supplier to boost its growth and consequently increase its turnover slightly, while the essential digitalization required by the solution has certain positive impacts on the efficiency and on the administrative costs.

4.5 Virtual Credit Card - Purchasing Card

A virtual credit card (also known as a B2B or purchasing card) is an SCF solution that entails the use of a “virtual” credit card to streamline payments between buyer and supplier. The solution can be implemented both by the supplier (supplier-centric), when it wants to streamline its cash flows related to its customer base, in a solution that is quite similar to factoring, and by the buyer (buyer-centric), when it wants to steady its wide supplier base, implementing a solution that is conceptually similar to reverse factoring. The latter solution mentioned is the one that is more diffused and for which the cost and benefit assessment was performed (see Figure 10).

Compared with RF, the credit card is adequate for managing small invoices as well as small suppliers, since it can be used for a maximum of 30% of the turnover.

Figure 10: Standard process of a buyer-centric B2B credit card



1. The buyer issues the order to a supplier
2. The supplier delivers the goods to the buyer
3. The supplier sends the invoice to the credit card provider
4. The credit card provider advances to the supplier a percentage of the value of the invoice
5. The credit card provider notifies periodically the expenses to the buyer
6. The buyer pays the credit card provider in accordance with the agreed terms

4.5.1 Costs of a Virtual Credit Card

Since the number of providers of B2B credit cards is very low, a buyer that is interested in the solution needs to face very limited scouting costs, while the provider itself usually provides the related consultancy. The cost of scouting might be higher if it is perceived as an alternative to RF, so buyers need to compare the costs and benefits of the credit card solution with those of RF.

As regards the implementation costs, the fee paid by the buyer to the provider includes the cost of the technology platform, without the need for further relevant investments, because the process is totally virtual and based on a virtual platform. Concerning the change management costs, both buyer and supplier need to train their personnel in this new solution; for the buyer, this involves further time to visit the suppliers to explain the solution, as happens with RF.

The main use costs involved in credit cards are primarily related to the interest rate applied by the provider to the transaction volumes through the credit card, which is quite high due to the innovativeness of the solution and is estimated at around 1–1.5% per month on average. A less relevant cost item, but still present, is the costs of the management and control of the solution for both the buyer and the supplier.

4.5.2 Benefits of a Virtual Credit Card

The main objectives of the B2B credit card range from the optimization of net working capital to the shrinkage of the DSO for the supplier and the enlargement of the DPO for the buyer, as is the case for RF. The main peculiarity of this method is its flexibility, since it is possible to choose the right combination of DSO and DPO according to the requirements of the suppliers. For example, if the payment term is 60 days, the buyer could decide to switch the DPO to 23 days and thus the supplier could improve the DSO from 30 to 53 days. This also affects the financial and profitability indicators of both actors, since the use of the credit card as a working capital tool does not turn it into financial debts on the balance sheet and hence does not have an impact on the company's financial performances registered in the risk centre.

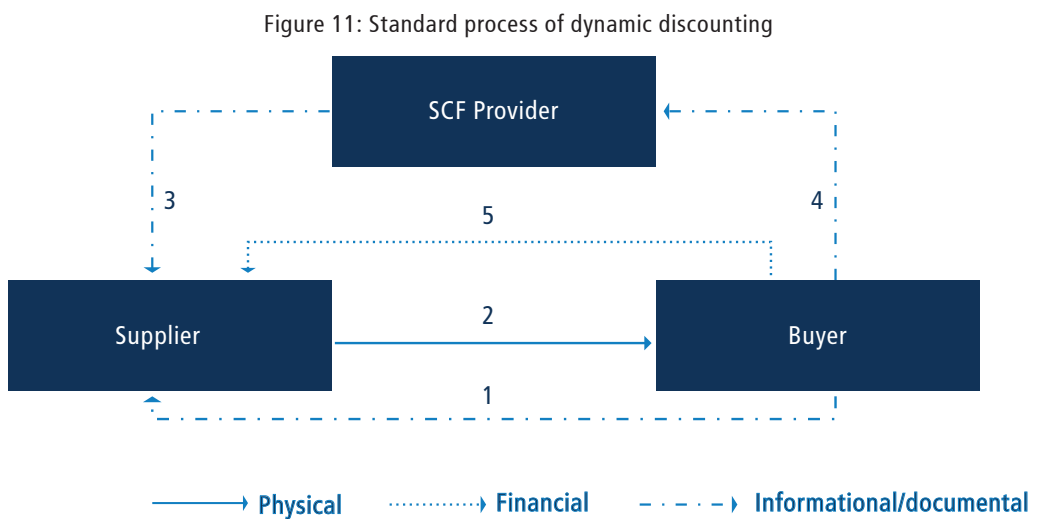
All this is combined with the significant intangible benefits, such as the flexibility of the solution, which is both independent of traditional banks and of a customizable nature, allowing the buyer and supplier sides to reach an optimal agreement during the negotiation and collaboration phases, increasing the solidity of the supply chain. In terms of sustainability, it is registered only for the buyer, because acting only on 30% of its turnover causes a limited impact on the upstream level of the supply chain.

Regarding the operational benefits, the credit card requires substantial digitalization of the processes and thus entails a further process efficiency benefit if they are not already digitized; this is also impactful for the supplier.

4.6 Dynamic Discounting

Dynamic discounting allows suppliers to obtain advance payments in exchange for a discount on the nominal value of the invoice through an agreement with the buyer; this solution could be implemented by using the cash of the buyer and thus without the involvement of any financial provider (as shown in Figure 11) or through the support of a financial intermediary that is financing the buyer.

This solution arose just recently, even though the early payment discount usage was already existent and widely diffused (Xign 2006). What could definitely boost this solution is the development of cloud platforms and e-invoicing systems, which allow the dynamic settlement of invoices in a buyer–supplier relation (Gelsomino, 2015).



1. The buyer issues the order to a supplier
2. The supplier issues the invoice and delivers the goods to a buyer
3. The supplier uploads the invoice on the platform and the range of discounts offered
4. The SCF provider notifies the buyer of the early payment request
5. The buyer accepts the request for a discount and pays the supplier

4.6.1 Costs of Dynamic Discounting

The existence and widespread usage of early payment, as shown by Xign (2006), highlights the business opportunity arising from the automation of this process. Since that moment, an increasing number of start-up have begun to offer dynamic discounting platforms, some of which could grow and become international players.

For this reason, in the planning phase, the buyer needs to understand which providers are operating in its geographical area and/or in its specific market, in some cases requiring some external consultancy, especially for the on-boarding process of its suppliers. Since the platforms are almost always cloud-based, the buyer does not have to face important investments to start offering DD to its suppliers but may be required to pay an entrance fee to access the platform.

Furthermore, change management costs may arise for both players to understand the dynamics related to DD and to draw up a proper strategy to optimize the financial flow, while the buyer, as is the case for the buyer-centric solutions analysed, needs to spend time and resources on explaining the solution to its suppliers. Legal and compliance costs are not affected by this solution, since every transaction is already embedded in the existing contracts.

Unlikely all the other SCF solutions, DD may not require the presence of a third-party financier. From an accounting perspective, the discounts provided by the supplier fall into financial charges; hence, they represent financial costs. Finally, both players need to be involved constantly in the invoicing process, resulting in management and control costs.

4.6.2 Benefits of Dynamic Discounting

Assessing the financial benefits of DD, the most immediate effect is the improvement in the supplier's CCC, due to the reduced payment terms agreed in exchange for a discount, an impact that depends on how quickly it wants to discount the invoice. On the contrary, the buyer will see this anticipated payment as a reduction in its DPO. Moving to the indicators, due to its particular accounting treatment, the supplier will improve its net debt with the larger amount of cash available, while the buyer will benefit from a potential increase in the ROCE, since it will be able to increase its operating margin thanks to the higher financial income (the discount provided by the provider).

The credit conditions of the supplier are not affected, since it is a non-financial player; the buyer or its funding company provides this financing, which is not considered as a real debt and hence does not affect its overall financial debt, which is monitored by the national bank.

Turning to the economic benefits, suppliers will be able to use the liquidity to grow and increase their turnover, since, from an accounting perspective, DD affects neither the sales of the buyer nor its purchasing cost. The benefits are spread quite equally between the buyer and the supplier in the intangible category, since the use of this solution is not intended to have a lock-in effect but can be extended by the buyer to other members of the supply chain, in some cases awarding only the most sustainable suppliers. On the other hand, buyers can increase their bargaining power towards the banks, since they actually provide a

5 Conclusions

The use of an approach based on TCO allowed us to frame all the costs of the different solutions in Table 2.

		Innovative Solutions													
		RF		Adv RF		POF		IF		InvAuc		CC		DD	
		S	B	S	B	S	B	S	B	S	B	S	B	S	B
Planning	Scouting		◐		◐	◑		◑		◐			◐		◐
	Consulting		◐		◐	◑		◑							◐
Implementation	Acquisition and Setting-up		◑		◑	◐		◑		◐			◐		◐
	Change Management	◐	◑	◐	◑	◑		◑		◐		◐	◑	◑	◑
	Legal and Compliance		◐		◐	◑		◑		◐	◐		◐		
Use	Financial	◐		◐		◑		◑		◑		◑		◑	
	Management and Control	◐		◐	◐	◑		◑		◐	◐	◐	◐	◐	◐

Table 2: Overview of the costs of SCF solutions

Innovative solutions are in general costlier in their life cycle for two main reasons: the very limited presence of traditional players that offer this precise subset of solutions and the need embedded in these solutions to involve a very wide set of actors in the process.

Besides, innovative solutions are more linked to meeting specific requirements of the supplier, which can be related to the acceptance of a critical order, the need to mitigate the impact of the inventories on the balance sheet, or the possibility to manage the cash flows better in a specific period of the year by providing discounts. In addition, innovative solutions differ from the traditional solution because they are able to provide different solutions to different actors, whether they are small and medium-sized enterprises or large buyers.

Nevertheless, the costs shown in the table partially justify the low degree of adoption of such innovative solutions. To overcome this barrier, we expect that the adoption of technologies in the internal processes of the companies will be able to reduce the planning and implementation costs drastically, with a subsequent impact on the related use costs.

The benefits of different SCF solutions that emerged are summarized in Table 3.

Innovative Solutions

		Innovative Solutions															
		RF		Adv RF		POF		IF		InvAuc		CC		DD			
		S	B	S	B	S	B	S	B	S	B	S	B	S	B		
Financial	Cash conversion Cycle																
	Financial and profitability indicators																
	Credit conditions																
	Change Management																
Economic	Turnover																
	Purchasing costs																
	Administrative costs																
Intangible	Supply chain relationship																
	Supply chain sustainability																
	Relationship with banks																
Operational	Effectiveness																
	Efficiency																

Table 3: Overview of the benefits of SCF solutions

Considering the comprehensive panorama of the benefits of the solutions, the value embedded in digitalization clearly emerges, in most of the cases leading to impacts on different levels of the supply chain.

Innovative solutions, in fact, have the chance to lead to a win-win situation for the actors involved in different levels, with the focus on the benefits that extend beyond the short-term orientation, like most of the financial benefits, but contrarily are more long-term oriented, like economic and intangible benefits.

With punctual and extended use of these solutions, the benefits that may emerge could strongly overcome the costs described above. In this case, technology can act not only as an enabling tool to access the solution but also as a fundamental driver of the adoption.

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Methodology note

This volume benefitted from a critical analysis of international literature covering the topic of Supply Chain Finance. Analysing scientific literature and secondary sources meant that we were able to:

- (i) study the international debate on Supply Chain Finance, looking in particular at the accepted understanding of the term in each country and by each interlocutor;
- (ii) identify particularly exciting international cases and innovative business cases;
- (iii) detect the main players and international trends;

Moreover, the empirical research included 22 in-depth case studies from the “demand-side”, to establish the most pressing Supply Chain Finance needs, solutions, schemes and models that they have implemented to address these needs, together with the benefits they gained and the obstacles they had to deal with.

The Observatory also conducted over 69 interviews with Supply Chain Finance solution providers. These interviews helped us to analyse the products and services on offer together with the market and technological trends. We were also able to identify the main products and services that will be most dominant in Supply Chain Finance in the near future.

Lastly, we closely examined many secondary source reports on international case studies, the providers’ websites, descriptions of the various solutions, sector reports and methodological reports on the procedures used by rating agencies to determine financial ratings.

Our research was helped by the Observatory’s Advisory Board, this year a group of 76 C-level managers responsible for the following departments:

- 36 from Credit, Administration, Finance and Control.
- 29 from Purchasing, Supply Chain and Logistics.
- 11 from other management functions.

The Observatory organised three workshops to complement the methodology adopted (plus an introductory kick-off session) maintaining an open dialogue on Supply Chain Finance topics with our Advisory Board. At the meetings, the Advisory Board was joined by other companies from across Italy. We also prepared four closed-door work tables to work actively with the community on themes of particular interest for the Observatory’s research.

About the SCF Essential Knowledge Series

The Supply Chain Finance Essential Knowledge Series is a collection of papers providing valuable and applicable insight in the current world of SCF to both practitioner and researcher. This series covers all major aspects that contemporary managers face when attempting to optimize the financial flows in the supply chains their organisation is part of. In doing so, this series brings relevant up-to-date knowledge from both academic and business world in a way that is practical and understandable to readers active in various functions and with different backgrounds. True to the nature of SCF, this series does not take a narrow, single disciplinary focus, but looks at all its relevant facets, including finance, supply chain management, legal, accounting, risk management and IT. Its practical and accessible style makes this series an indispensable item at the bookshelf of every CFO and supply chain leader.

The Supply Chain Finance Community

The Supply Chain Finance Community is a not-for-profit association of all those involved in supply chains: manufacturers and technology vendors in 31 countries around the world. Its founder members are 23 business schools across Europe supported by corporations, banks, consultancies and technology vendors. The SCF Community supports and enables transfer of knowledge as well as research in the innovation and adoption of SCF solutions. As such, the community provides a place to discuss and drive relevant SCF and working-capital initiatives that play an important role in the international corporate and financial industry. As a country-neutral association it is well positioned to support practitioners in building a common glossary for SCF and to study the SCF market and its opportunities.

About Politecnico di Milano and the Observatory on Supply Chain Finance

Politecnico di Milano is the first technical university in Italy and among the leaders in Europe in the fields of Engineering, Architecture and Design. The School of Management delivers an end-to-end portfolio of services in research, education and high-level consultancy within the field of management, economics, and industrial engineering. The Supply Chain Finance Observatory of the School of Management of Politecnico di Milano was established in 2013 to address the increasing interest of companies and public authorities in the possibilities offered by supply chain finance solutions to optimise their working capital and access to credit. The aim of the Observatory is to generate and share knowledge about supply chain finance, and so contribute towards these solutions across the Italian market, to the benefit of all players, and stimulate debate and dialogue by creating a community of C-level executives.

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