

# Supply Chain Management: Financial Approach

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**Abstract:** Financial supply chain management (FSCM) is the practice of looking at all your financial processes at the holistic level, rather than viewing them as individual processes. It's the end-to-end process that involves the procure-to-pay cycle, working capital management, and the order-to-cash cycle business processes. This field is a relatively new one. Despite the crisis-enhanced research interest and the growing importance of FSCM, academic contributions and discourse on the subject remain fragmented and vague. Mainly conceptual approach dominates; research methods employed are mostly empirical surveys and case studies, with the main focus given on the manufacturing industry while the bank "dimension" in the FSCM equation is neglected. At the same time, scarce research efforts have been identified towards the systematic documentation of the core concepts and formative elements of FSCM in the direction of building a "general theory of FSCM". The paper provides a literature review of the FSCM discipline, identifies gaps and challenges in the field while providing insights on a future research agenda, thus preparing the ground for FSCM standardization and hopefully initiating a fruitful academic dialogue on the subject. A review and analysis of selected, up to date theoretical and empirical literature is provided in order to prove the significance of this discipline in modern management theory and provide useful conclusions. Moreover, an emphasis is given on the contemporary aspects of FSCM in terms of collaboration among companies, suppliers and financing institutions.

**Keywords:** Supply Chain Management (SCM), heated competition, Financial Supply Chain Management (FSCM), modern Information Technology, logistics, crisis, financial performance, Literature Survey and financial processes.

## I. INTRODUCTION

In spite of the fact that supply chains have existed ever since companies have been organized to bring products and services to customers, the notion of their financing and consequently financial supply chain management (FSCM) is a relatively recent thinking in management literature. Although research interests and the importance of FSCM are constantly growing, scholarly materials remain scattered and unclear while no research has been directed towards a systematic identification of the core initiatives and constructs involved in FSCM. Major Interest in FSCM has steadily increased since the past decades and especially during the recent global financial crisis, when firms saw the benefits of collaborative relationships within and beyond their own organization (e.g. Klapper, L.F. and Randall, D., 2011; Wuttke et al., 2013). Companies worldwide discover that they can no longer compete effectively in the current complex business environment apart from their suppliers or other entities within the supply chain process. The comparative advantage of a linkage among firms' supply chain strategies and their overall business plans is also considered a top priority so as to achieve a successful FSCM practice. This paper aims to redefine the concept of FSCM and review both theoretical and empirical research, while underlying the existing research gaps thus, laying the ground for a fruitful dialogue among the various stakeholders. The main goal of this paper is twofold: to provide a literature review of FSCM, both theoretical and empirical, while underlying the existing research gaps thus, laying the ground for future research. At first, the main elements that constitute the term FSCM are defined so as to analyze and decode its inner meaning. Moreover, an emphasis is given on the contemporary aspects of FSCM in terms of collaboration among companies, suppliers and financing institutions. Afterwards, a systematic review of both theoretical and empirical literature is provided in order to prove the significance of this discipline in modern management theory and provide useful conclusions. This is achieved by analyzing, except from the theoretical research contributions, several empirical studies that justify the theoretical background. Finally, certain suggestions are proposed for all the involved parties to get the best out of FSCM, hopefully initiating a fruitful academic dialogue on this critical issue.

## II. SCM

Under the drastic competitive mechanism of market, the traditional enterprise management pattern of Vertical Integration, which refers to the pattern to control the whole process of raw and processed materials, manufacture, distribution and sales transaction, has been replaced by Horizontal Integration. Making full use of external resources, enterprises put their main emphasis on their key business and the cultivation of their core competitive power while they give their non-core business to their partners. Horizontal Integration establishes a chain that links all the enterprises from suppliers, manufacturers and distributors. Since the relationships of adjacent node enterprises are demand-and supply, all the adjacent enterprises are connected together to form a supply chain. Supply chain, with the core

enterprises as the center and through the control of information flow, logistics (service flow) and cash flow, starts from purchasing raw and processed materials, producing semi-finished products and final products and ends by delivering the products to consumers through marketing networks. It is an overall function network chain structure pattern, which connects together suppliers, manufacturers, distributors, retailers and the final customers. It is an integrated enterprise network characterized by the external use of resources. The structure model of supply chain is demonstrated in Figure 1. Supply chain management is to plan, cooperate, control and optimize the logistics, information flow and cash flow of the whole supply chain system in order to deliver the Right Product of Right Quantity, Quality and Status in the Right Time to Right Place, which minimizes the overall cost. Therefore, the competition of enterprises is that of the whole supply chain instead of that of a single enterprise. The enterprises' major concern is not the maximization of their own interests, but the maximization of the interests of all the supply chain members. In the supply chain management, the members of the supply chain widely utilize modern information technology in order to strengthen the weakness of supply chain, improve operating efficiency, reduce operating costs and establish Quick Response strategies. Therefore, they can handle better in the heated competition and ever-changing market and take the upper hand of the competition. The information technology concerned in the supply chain management is also included in Figure 1. [1] [2]

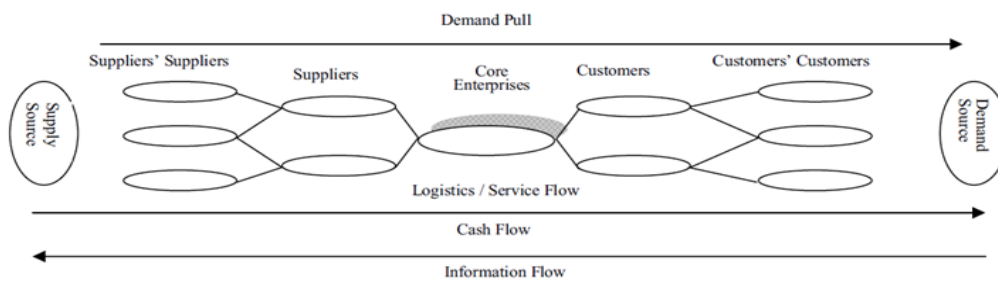


Figure 1 shows the diagram of cash flow against information flow in SCM.



Figure 2 shows the pyramid of FSCM

### III. FINANCIAL SUPPLY CHAIN MANAGEMENT (FSCM)

Supply Chain Management (SCM) is nowadays well established within large organizations as a major tool which offers competitive advantage in terms of cutting down the cost of goods and simultaneously improving customer service. Traditionally SCM was referred to the functions of logistics, transportation, purchasing and supplies. However, the evolution of SCM has moved to focus on integration (e.g. Frohlich and Westbrook, 2001), risk management (e.g. Ellis et al., 2011), sustainability (e.g. Wieland et al., 2016) and optimizing working capital (e.g., Preve and Sarria-Allende, 2010). A required condition for the application of a successful SCM strategy is the efficient cooperation among various, previously independent functions such as sales division, marketing and logistics. The financial factor has not been heavily integrated in these aforementioned procedures, but in the modern globalized economy, which is characterized by high levels of competition and harsh financial conditions, firms are engaged in an endless fight for cost cutting while struggling to gain access to the required funds in order to achieve their goals. The birth of the term FSCM comes from the necessity to identify supply chain management as a single entity and the primary objective of maximizing profit across the whole range of its activities. And the main task of FSCM is to save the capital cost by means of integrated relationships of partners and advanced financing activities in supply chains. Financial Supply Chain Management is generally defined as a set of business and financial processes that link the various parties involved in a supply chain – i.e. the buyer, the seller and the financing institution - with a view to reducing financing costs and ultimately achieve improved efficiency. Figure 2 introduces the FSCM “pyramid” in order to offer a brief, simplified view of its main components and to serve as a future research reference:[3][4]

The concept of FSCM stems from the introduction of supply chain financing programs from the financing institution with new forms of payable processes and payment terms among business partners. The financial services provided by

large participants and external financial providers help on increasing supply chain efficiency, as a whole, while remaining competitive. It essentially minimizes the complexity of payable processes via open accounts and in the meanwhile allows small participants to benefit from large participants' optimal credit ratings to reduce their costs of capital. Overall it improves short-term liquidity in the value chain and consolidates long-term supplier-buyer relationships. In Figure 3, the "circuit" of FSCM is presented via the lens of the operation of the most common FSCM instrument i.e. Reverse Factoring (RF) <sup>2</sup>, so as to provide a simplified illustration of the main flows and the involving parts:

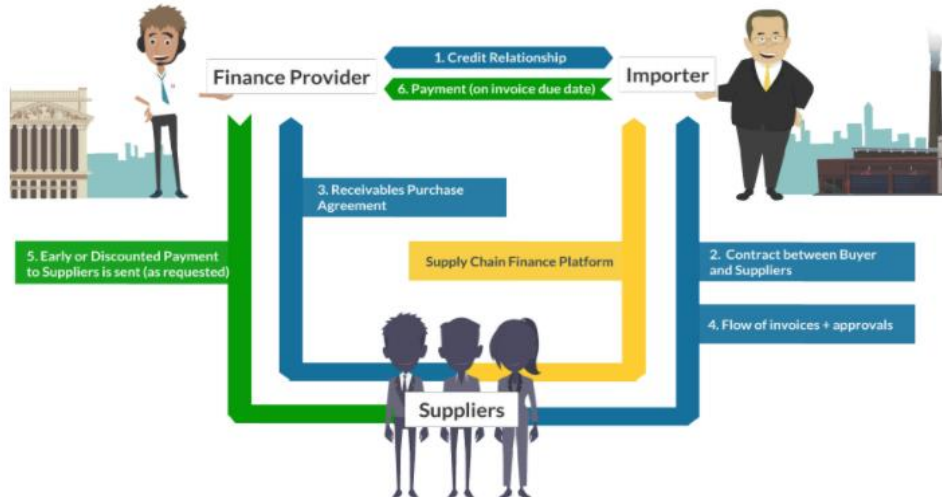


Figure 3 shows the circuit of FSCM.

The main focus is given on financial flows and what matters the most is that there is an informed view of the impact an alteration in working capital management processes in one organization can have on the rest parties across the supply chain and on final costs. As suppliers suffer by delayed payments which squeeze liquidity and affect negatively their cash conversion cycle, they rely on short-term borrowing, at rates which are higher than those the buyer could attain, in order to be able to operate properly. So due to the fact that suppliers' cost of capital is higher than that of the buyers (it is estimated to 3 - 4%) the overall financing cost of the whole supply chain will increase and as these additional costs tend to find their way back to the buyers later, the latter have the incentive to pull this kind of cost out of the chain by helping their major suppliers get better terms (lower lending rate, discount policies etc.) and improve processes. This helps in the direction of creating a "circle of trust" among the involving parties (buyers – suppliers - banks) and setting the framework for a win-win situation. For banking institutions on the other hand, FSCM was initially seen as a marketing "vehicle" to expand traditional financial products and get access to a broader client base, but nowadays they have managed to identify those elements which are necessary in order to better address their customers supply chain needs through proper business tools provided by FSCM, such as RF. And due to the fact that these products offer increased reliability, which in turn reduces the required liquidity thus, improving their capital adequacy ratios, it is of major importance in view of the application of the stricter rules of Basel III (fully operational from 2019). The key elements of FSCM are presented in the next figure, where six interconnected sub-categories are identified: process improvement (automation of transactions, elimination of paperwork), cash management (payments), risk management (mitigation of risks), working capital management (cash flow, inventories etc.) and MIS (visibility control). It is common sense among the research community and companies worldwide the fact that FSCM is a vital step towards the achievement of efficient supply chains. While back in the 1990s optimizing the physical product flow along supply chains was enough to give firms the desired competitive advantage, nowadays some firms reach their limits as further improvement potentials of the physical supply chain are increasingly difficult to identify and achieve. However, one area still abundant of potentials is FSCM since it considers the physical and financial flows simultaneously and with a holistic approach, i.e. planning, managing, and controlling of all processes and transactions related to financial flows along the entire supply chain. FSCM helps firms identify further means of reducing their working capital and improve processes along their supply chain, resulting in increased revenues and thus, profits. In addition, FSCM takes into account the needs and behaviours of employees and departments in the organization. As a result new tasks at the intersection of finance and supply chain management create new business areas for banks as well as financial and logistics service providers. The aim is to look behind the traditional "operation" FSCM approach. Moreover, FSCM is put at the epicentre of attention, contrary to the prevailing "process" conceptual framing and theories related to transaction cost, economics and competitive advantage. The main focus is on managing the financial flows of supply chains in order to achieve business value-added, with the terms of liquidity and profitability been the key issues along with cost reduction. Additionally, the banking factor, as the main financing source, is examined thoroughly concerning

its interaction with the operation of the firms and also risk (financial, credit etc.) is addressed. Traditionally supply chain decisions are usually close to operational management instead of financial management. However FSCM is a financial solution to develop the supply chain management, and in return the improved supply chain efficiency will enhance financial performance and subsequently business efficiency. Following the burst of the global financial crisis and the severe negative impact on economic conditions, the management of working capital has become critical due to the provoked long cash flow cycle time from procurement to sales. Firms are seeking an appropriate financing method to their own as well as their trading partners, but the conflicted goals among buyers and suppliers increase the complexity to build up a mutually beneficial process. The buyers wish to delay payments for their specific financial situations and the suppliers on the other hand desire to accelerate collections. The application of FSCM methods in supply chains can create win-win conditions for the collaborating partners through simple and fast payable processes.

#### IV. LITERATURE REVIEW

After the clarification of the term FSCM a review of selected referred journal articles follows in order to gather and analyze systematically the recent developments on the field. By scrutinizing both theoretical and empirical literature and giving emphasis on the contemporary aspects of FSCM in terms of collaboration among companies, suppliers and financing institutions, not only problematic areas are identified, but also useful conclusions come to surface and certain suggestions are proposed. It must be pointed out that the articles which analyze the topic of Supply Chain Finance (SCF) were also included in the review process provided that there was no clear distinction among the latter and FSCM. The research literature is divided into the following two main categories for purposes of separation and organization of the review:

1. Financial aspects-conceptual framing
2. Performance measurement - KPIs [5]

##### **I. Financial aspects-conceptual framing**

Hofmann (2005) notes that SCF is based on three constitutive elements:

- Institutional of actor, it can be only a business actor in supply chain and/or involve financial institution, private investor and government.
- Characteristic of supply chain management, regarding regulations in cooperation in supply chain system such as contract regulation, financing system, pricing policy, etc.
- Financing function, types of utilization of financing such as for investment, operational capital, goods supplying, marketing, etc.

These elements, which can be understood as a framework of SCF, are taken into account, while making value chain decisions in a financial way. He also identifies collaboration characteristics in SCF by pointing out that while the typical financial activities are designed for single businesses or their subunits, an application of these tasks in a supply chain environment requires a modification to consider inter-organizational aspects. The adaptations needed to design a supply chain-wide performance system are superimposed by the influences focused on covering the special aspects of SCF.

Baiman S., Rajan M.V. (2002) investigates collaborative SCF and show that there are two special aspects to take into account, each of them illustrated by a short case. Firstly, investing in projects that would otherwise be beyond their individual organization's scope of consideration (collaborative supply chains), implies an increase in the number of investment alternatives. Thus, a financial collaboration with the firm's most significant supplier not only offers new investment options, but also diminishes the existing opportunity cost and resulting in enhancing the supply chain process. Secondly, the optimal investment alternative is the one delivering the highest value to all collaborating entities, considering the cash flows of all participants when deciding about different alternatives. The arising opportunities of collaborative investment activities (e.g. incremental capital expenditure), collaborative debt management, and ways to jointly influence the costs of capital (Weighted Average Cost of Capital - WACC), represent areas for further improvement that should be thoroughly researched in future studies.

Mark van Laere (2012) deploys a model that can be utilized in order to quantify the value of the benefits from reverse factoring for all the involved parties i.e. the buyer, the supplier and the financing institution in an international setting. Furthermore, the author examines the impact of the newly established Basel III regulatory framework on SCF and consequently on reverse factoring. However, the impact on product level is proved not to be clear, but it constitutes a useful approach so as to incorporate the effects of Basel III rules in SCF. Moritz Leon Gomm (2010) suggests a framework in order to investigate the financial issues in SCM and showcases that there exist huge opportunities for SCM professionals if they add on financial issues the SCM perspective. SCM has the potential to improve the capital cost rate as a critical supply chain driver of shareholder value, apart from the improvement in sales and cost cutting.

Van der Vliet K., Reindorp M. J. & Fransoo J. C. (2013) highlight trends that widen the range of trade-offs to be considered in an SCF initiative and clarify the relevance of these trends through a case study of two European firms. These firms' primary target is to generate value from their SCF initiative, but their approaches show different strategies for addressing supply chain risk and the opportunity to customize supplier relations. They also propose a conceptual





framework which places SCF practices and identifies the need for further research on strategic and tactical considerations.

## II. Empirical surveys: Performance measurement - KPIs

Lambert and Pohlen (2001) state that most of the supply chain metrics used to measure performance are unable to capture the value and profitability drivers in the supply chain. Therefore, they proposed a specific framework for developing supply chain metrics which translates performance into shareholder value using the EVA method.

More recently, Craig Shepherd and Hannes Günter (2006) aim to address the shortage of research into performance measurement systems and metrics of supply chains by critically reviewing the contemporary literature and suggesting possible opportunities for future research. The article provides taxonomy of performance measures and argues that despite considerable advances in the related literature in recent years, a number of critical issues have not yet received adequate attention, including the factors influencing the successful implementation of performance measurement systems for supply chains and the forces shaping their evolution over time.

In a European study [Ceccarello, C., Nesar, G., Pestre, C., Roman N., Poisson V. (2002)] into financial indicators and supply chain integration that used the supply chain operations-reference model (SCOR) to benchmark five financial indicators i.e. days of inventory, receivables, payables, return on investment and asset turnover, and the level of integration and collaboration, a significant correlation among SCM practice and these evaluated indicators was found.

Elmuti, D. (2002) studied the impact of supply chain management on overall organizational effectiveness so as to identify problems that affect supply chain management success. The results of the research showed that organizations generally considered themselves as successful at managing their supply chains, achieving significant improvement in organizational performance, but on the other hand they have not reached the order of magnitude of improvements ascribed to supply chain management.

At a macro-level, Hendricks and Singhal (2005) analyzed the association between supply chain glitches and financial operating performance. They used a sample of 884 glitches announced by publicly traded firms and tested them against a sample of control firms of similar size and industries. On average, the glitches lead to 6.9% lower sales growth, 10.7% higher growth in costs and 13.9% higher growth in inventories.

Wesley S. Randall and M. Theodore Farris II (2009) show how firm financial management techniques can be used to improve overall supply chain profitability and performance. The proposed methodology includes scenarios that highlight potential supply chain improvements gained by collaborative management of cash-to-cash cycles and sharing WACC with trading partners.

MR Fellenz, C Augustenborg, M Brady and J Greene (2009) explored current models and practice regarding the dynamics of financial flows along global supply networks. Their work was mainly based on data collected from technology and service providers that focus on such issues along global supply networks and identified requirements for improved solutions to supply chain finance challenges. This research has particular relevance in the light of the disruptions that the global credit crunch has brought to global financial system and the related changes that are likely as responses to these disruptions.

Ronald H. Ballou (2007) provides ideas for researchers and managers which are valuable in defining their action agendas for improving supply chain operations. The main challenges to be addressed, as identified by the author, are the need for a mechanism of sharing the benefits of cooperation among the supply chain members, for enhanced relationship skills of supply chain managers and for improved methods of estimating the revenue contribution potential of the supply chain.

Chae, B. (2009) highlights the need for the development of key performance indicators (KPIs) for the purposes of measuring and monitoring supply chain performance. He seeks to offer a practical approach to performance measurement and to present a list of key KPIs. This paper offers insights from industry in the area of supply chain performance measurement and a practical approach to developing performance metrics. It concludes that companies should focus on only a small list of KPIs which are critical for their operations management, customer service and financial viability. Potential KPIs should also be developed for each of SCOR model's four meta-processes (plan, source, make, and delivery) and need to be hierarchically grouped such as primary and secondary metrics.

Umberto Dello Iacono, Matthew Reindorp and Nico Dellaert (2015) showed that market dynamics can significantly influence the lifecycle and value of a SCF arrangement. This was achieved by creating a model of market dynamics for reverse factoring, a specific type of SCF arrangement. The authors identify the following market factors as key for direct benefits:

- competition
- interest rates
- receivables volumes and
- Firms' working capital goals.

The authors concluded that reverse factoring can yield direct benefits for all supply chain participants, but that these benefits are highly dependent to market conditions.

Grosse-Ruyken, P.T., Wagner, S.M. and Jönke, R. (2011) examined the contribution of the cash conversion cycle (CCC) as a proper measure of a firm's performance. The empirical results indicate a significantly negative relationship among the CCC and return on capital employed (ROCE). The authors argue that the optimal level of CCC for responsive supply chains must be assessed holistically and conclude that the proper working capital management depends on the business model, its specific supply chain design configurations and risk aspects within the supply chain. Yang, S.A. and Birge, J.R. (2011) make usage of a model that explicitly captures the interaction among firms' operations decisions and financial risks. They demonstrate that with demand uncertainty, supply chain efficiency is improved, via trade credit, by acting as a risk sharing mechanism. Supply chain management and supply chain finance are undergoing a vast transformation. Since the average cost of purchased materials, components, and services across manufacturing firms frequently exceeds 60% to 70% of the total cost of operations (Wagner, 2006a), the effective management of the product, information and funding flows along the entire supply chain is critical. Competition among firms nowadays means competition between supply chains and networks (Borgatti and Foster, 2003; More and Babu, 2009; Smith and Buddress, 2005). The importance of successful supply chain management has been highlighted by a variety of empirical studies that have investigated the relationship between well designed supply chain management and a firm's profitability (D'Avanzo et al., 2003; Ellram and Liu, 2002; Ou et al., 2010).

#### V.OBSERVATIONS

The review shows that FSCM is a scientific field at its infancy, with exponential growth in interest from researchers and practitioners, mostly driven by the current financial crisis and the consequent recession. However, a set of key features were identified to prevail:

- a reliance on the manufacturing and consumer goods industry for empirical as well as analytical illustration
- a predomination of transaction cost economics and strategy-based competitive advantage theoretical grounding
- the usage of survey-based research in investigating the relationship between SCM and financial performance
- the utilization of analytical conceptual, as well as empirical statistical sampling and case study methods.

#### VI.CONCLUSIONS

It is clear that a supply chain measurement system which consists of either financial or operational measures alone is generally inadequate. Moreover, the majority of the studies have adopted financial and/or operational measurements to estimate the improvement and performance of the examined firm (i.e. either buyer or supplier). The notion of FSCM, however, entails measuring the performance of the entire supply chain rather than just the performance of the individual supply chain partners.

#### VII.FUTURE SCOPE

For improving the theory, there is great scope for development by using theories such as principal-agent theory or property rights theory to explain the value of co-operative financing models in supply chains. Analysis of the use of information (the information flow) in supply chains not just for planning purposes but also for improving financial decisions may also offer interesting insights. For service providers, especially financial and logistics service providers, new business models can be found in developing solutions that combine the needs of logistics, SCM and finance. This also indicates the necessity for SCM, logistics and finance professionals to collaborate at a micro-level. At a macro-level, the financing institutions such as banks, must work more closely with logistics service providers and related consultants to develop new innovative FSCM solutions in terms of proper products. Many of the financial elements presented in this paper comprise the employment of an external service provider. Due to the novelty of the FSCM approach, the market for service providers offering this type of services is still at early stage. Logistics and financial service providers are increasingly trying to adapt to the changing requirements though. How successfully collaborative financial processes can be outsourced will primarily depend on how far companies are prepared and willing to open up large parts of their financial system (openness of inside financial plan of companies). Given the findings of this paper, it seems justified to predict an ever increasing significance and dissemination of FSCM in the future, not only stemming from and focusing on crisis, but also in every aspect of the modern business world. But in order for FSCM to take the next step the following conditions have to be met: [6]

- Standardization
- Market consensus and
- Structural and organizational changes within banks.

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