

Research on supply chain financing decision by leveraging risks and costs

Xiao Song

South China University of Technology

sonx911@163.com

Qiuping Huang

South China University of Technology

qiuqiu0624@126.com

KwanHo Yeung

South China University of Technology

thomasyeung913@hotmail.com

Xiande Zhao

South China University of Technology

xiande@ceibs.edu

Abstract

This study will investigate the effects of SCI by SCF organizer in both informational and physical aspects on the coordination and risk evaluation costs, and customer satisfaction and demand level. We will make case-comparison between identification of transaction structures and the controlling of transaction closed loops.

Keywords: Supply chain financing, Supply chain integration, Transaction structures

INTRODUCTION

In a typical supply chain scenario, the buyer's primary motivation is to stretch payables and earn interest of the cash flow (Basu and Nair, 2008; Demica Report, 2008; Citi Webinar Report, 2008). This tendency of the buyer improves its working capital position by increasing days of payable outstanding (DPO), but adversely affects the cash flows of its

suppliers that leads to a financially unstable supply base (Demica, 2007). To preserve the health of supply chain while at the same time maintaining efficiencies and economies is in the interest of all large firms, practitioners and scholars provide two approaches: 1. Improving the efficiency and effectiveness of supply chains; 2. Exploiting SCF services systems and techniques.

SCF, as a novel approach of financing, is based on the assessment of transactions and the participants of a supply chain. Unlike traditional financial services in which the collaterals are significantly taken into account, the SCF service providers are well versed on the credit analysis by leveraging objects via gathering sufficient data all over transaction participants, supply chain or even industry.

The objects of supply chain finance may be fixed assets, which provide a basis for the daily operation, and working capital, which is variable day-by-day (Pfhol, 2009). Christopher (2005) claims that production facilities, stocks and equipments for the transportation within supply chain network shall also be included as fixed assets, as the three factors build the logistics network. Plus, since the supplier relationships of machines in industrial companies play an important role in SCM as well, the scholar also considers machines as technical facilities for production.

The actor of supply chain financing is another conceptual construct that should be identified. Pfhol (2009) indicates three actors in SCF: 1. Primary members, including the suppliers, the customers, and the focal company of a supply chain; 2. Supporting members, like logistics service providers; 3. Financial intermediaries. At the same time, we also see some focal companies integrating the logistic services with their original operational process. Hence, the tide of operation-mix fuzzes up the identification of actors in SCF, and we are inclined to classifying actors of SCF as organizer and service provider from another dimension.

The risk pricing of SCF which determines the financing cost of loanee will definitely impact the demand of external capital. Credit rationing theory (CRT), can provide a theoretical grounding for the mechanism of risk pricing and the causal effects of supply chain integration and informatization. The theory of transaction cost economics (TCE), which supposes that the institutions try to minimize the coordination costs (incurred from the credit risk identification and process control) can give a shoot to discuss the coordination costs and risk-assessment costs in the operation of SCF service provider. Based on the two above-mentioned theories, information-processing theory (IPT) is worthy to be drawn, since informatization can theoretically improve capability of risk estimation, pricing and supply chain management.

This paper focuses on the effects of SCI by organizer (of SCF) in both informational

and physical aspects on the usage of SCF in terms of operation costs (coordination costs and risk evaluation costs), from the view of service provider of SCF, and the satisfactory and demand of SCF services from the view of SMEs (loanee). Plus, we will make case-comparison between two typical risk management strategies: Identification of transaction structures and the controlling of transaction closed loops.

To be more specific, research can set out to investigate this topic and include but not limited to the following questions:

1. Does the degree of SCI within supply chain decrease the costs of providing SCF services (of the closed loop model and the relationship based model)?
2. Does the degree of SCI within supply chain decrease the demand of SCF services?
3. Does the degree of SCI within supply chain enhance the experience of customers of SCF?
4. Does informatization of SCM decrease the costs of providing SCF services?
5. Does informatization of SCM decrease the demand of SCF services?
6. Does informatization of SCM enhance the experience of customers of SCF?

PROPOSED RESEARCH METHOD

This study is theoretically based on the findings of the detailed case studies we have done since August of 2015. Through the interviews with ten SCF projects implemented in four companies, we find the internal linkages among the efficiency of SCM, capability of information processing, effectiveness of SCF service and the relevant operation cost. Subsequently, this study will empirically weight the above-mentioned linkages with available second-hand data from SCF projects and first-hand data from clients.

In this study, we emphasize the detailed contextual analysis of a limited number of multiple case studies (Eisenhardt , 1989) for the following reasons:

First, the critical issues inherent the design and the implementation process of SCF services have not been yet deeply explored in the current literature. By exploring and contrasting the multiple cases, we can provide the inference on the logical relationships among various critical concepts of SCF, facilitating the development of SCF theories (Yin , 2009).

Second, our multiple case method preserves the vitality of various experiences as they happen as well as give deep insights and meanings which are included. By conducting multiple case analysis, we have a high confidence in examining the “what” and “why” of SCF risk and cost control practices, and identifying the implications on the competitive

advantage.

Third, the validity can be improved after repeated verification, validation in multiple.

LITERATURE REVIEW

Since 2005, there has been thousands of literatures focus on SCF in China. But a large part of these papers cannot give a deep insight on SCF, they simply describe the new concepts, the basic modes of SCF services or analyze the SCF risk control qualitatively.

In details, Yang (2005) discussed the correlation between SCF services and cash flow management of the SMEs, he also described the operation modes and service design of inventory financing. Yan & Xu (2007) analyzed three SCF modes which are account receivable financing, confirmed warehouse financing, and warehouse financing, and pointed out the distinctions among the three modes. From the perspective of the financial need of SMEs, He & Zhuo (2007) described three SCF modes which are account payable financing, chattel pledge financing, and account receivable financing. From the “win-win” perspective, Liu (2007) described the benefits of applying SCF services among SMEs, logistics corporates, and banks. Feng (2008) argued that realizing “win-win” was the goal of SCF, and she also described the significance of applying SCF services among core firms, focal firms, third-party logistics corporates, and banks. From the bank perspective, Yang (2007) analyzed the risks and risk control approaches of SCF services. Based on the data collected from experts, Yan (2007) built the indexes system of credit risk assessment for the bank that provided SCF services to the SMEs. Focus on account receivable financing, Wan (2008) argued that the bank needed to collaborate with the core firm in order to control SCF risks. It was possible that the risk control mechanism would fail if it was only executed by the bank. Xiong et al. (2009) focused on the SCF risk assessment and built the model of credit risk assessment based on the random data.

Recently, there are a few papers give a deep insight into SCF in China (Zhong et al., 2011, Lu et al., 2012). But all of them are modeling papers, their argument don't have the support with the data that come from management practice. Focus on prepayment financing, Zhong et al. (2011) researched on the retailer's optimal ordering and pricing under the condition of the initial capital constrained. Based on the numerical analysis, the paper concluded that ordering polices could be severely affected by the lack of capital and the retailer's order quantities could be improved. The financial services could create value for the retailer who faced capital constrained. In additional, the trade credit policy given by the upper manufacture mostly was better off the third financial service.

Focusing on account receivable financing, Lu et al. (2012) constructed a multi-stage decision-making model with or without accounts receivable financing respectively. They

concluded that, under the condition of financial constraints, small and medium suppliers without financing couldn't produce in succession, but could when they get accounts receivable financing. The financial institution got large financing income when the seller had less initial capital, but he would gain less benefit when the seller became strong enough. The small and medium suppliers, buyer and financial institution all benefited from accounts receivable financing.

Among the abroad researches, only a few papers are focus on the SCF defined in this paper even though there are a lot of papers are in the financial supply chain management (FSCM) scope. There are mainly three literature streams within the FSCM research community.

As shown in Figure 1, one literature stream focuses on the interface of finance and operations. Scholars study the benefits of the integration of both functions between finance and operations. The benefits are supposed to be the aspects of value creation and supply chain risk management. And they try to research the conditions under which the integration leads to better benefit. As shown in Table 1, examples of such literatures are the works by Ling-Yee & Ogunmokun (2001), Hofmann (2005), Guillén et al. (2007), and Randall & Li (2009).

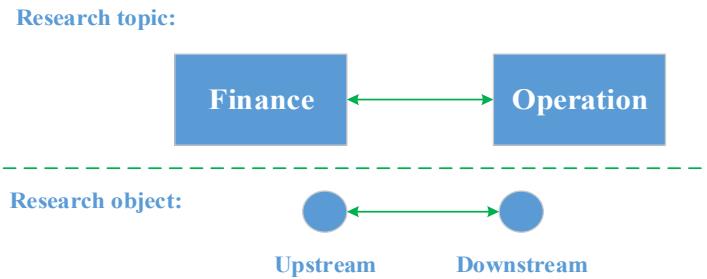


Figure 1 - Literature stream (Part 1)

As shown in Figure 2, one literature stream focuses on the operational decision in the context of financing arrangements between supply chain members. Large part of literatures within this area state that it very important to make the operational decision by taking advantage of credit between supply chain members appropriately. And the scholars try to verify the role and impact of credit under different context in supply chain. As shwon in Table 1, examples of the literatues are Thangam & Uthayakumar (2009), Zhang & Luo (2009), Mahata, G. C., & Mahata, P. (2011), Huang & Chung (2010), Ho (2011), Srinivasa & Kumar (2011), and Kouvelis & Zhou (2012). But this steam of literatures lacks the emphasis of collaboration between supply chain members and pays little attention to the bank.

Research topic:

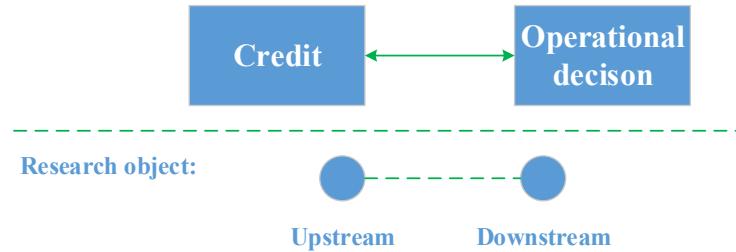


Figure 2 - Literature stream (Part 2)

Recently, one stream try to understand the SCF framework by paying the attention to the supply chain cooperation and involving the participation of the bank. They concluded that weak working capital causes firms to focus on FSCM. Based on transaction cost economics, they analyzed how these improvements stem from risk reductions, which were more effective if firms are integrated internally and externally. But there haven't been literatures try to research the SCF from the service provider (e.g. the bank) perspective in the field of FSCM (as shown in Figure 3).

Research topic:

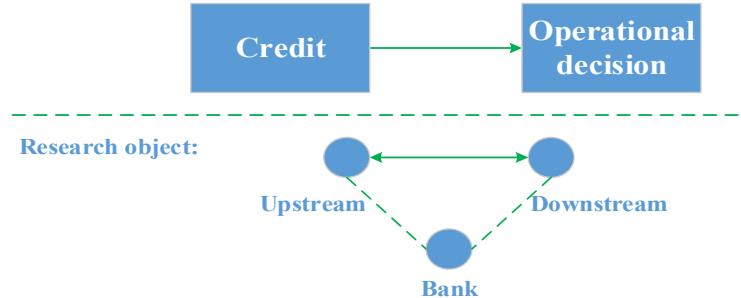


Figure 3 - Literature stream (Part 3)

Based on a review of literature and operation practice, it is obvious that there is a need of supply chain integration and information sharing within and between participants of a SCF project. This research is going to propose a conceptual model that can provide guidance for future SCF strategy-making, innovative practices and researches.

ACKNOWLEDGMENTS

This research is supported by a Major Program Grant (71090403/71090400), a Major International (Regional) Joint Research Project (71420107024) of the Natural Science Foundation of China (NSFC), National Natural Science Foundation of China (#71473087), Project of Chinese Ministry of Education (14YJC630162) and two vertical projects of China (x2jmN5140240, 2014HQPY04). It is also supported by

the Institute of Supply Chain Integration and Service Innovation at South China University of Technology.

Bibliography

Blome, C., & Schoenherr, T. 2011. Supply chain risk management in financial crises—A multiple case-study approach. *International Journal of Production Economics* 134(1): 43–57.

Craighead, C. W., Blackhurst, J., Rungtusanatham, M. J., & Handfield, R. B. 2007. The Severity of Supply Chain Disruptions: Design Characteristics and Mitigation Capabilities. *Decision Sciences* 38(1): 131–156.

Dennis, & Jones, S. 2010. Supply Chain Finance : Lower Your Costs and Build Stronger Supply Chains. *Export Wise* (Spring): 33–34.

Guillén, G., Badell, M., & Puigjaner, L. 2007. A holistic framework for short-term supply chain management integrating production and corporate financial planning. *International Journal of Production Economics* 106(1): 288–306.

Ho, C.-H. 2011. The optimal integrated inventory policy with price-and-credit-linked demand under two-level trade credit. *Computers & Industrial Engineering* 60(1): 117–126.

Kouvelis, P., & Zhou, W. 2012. Financing the Newsvendor: Supplier vs. Bank, and the Structure of Optimal Trade Credit Contracts. *Operations Research* 60(3): 566–580.

Lee, C. H., & Rhee, B.-D. 2011. Trade credit for supply chain coordination. *European Journal of Operational Research* 214(1): 136–146.

Mahapatra, S. K., Narasimhan, R., & Barbieri, P. 2010. Strategic interdependence, governance effectiveness and supplier performance: A dyadic case study investigation and theory development. *Journal of Operations Management* 28(6): 537–552.

Mahata, G. C., & Mahata, P. 2011. Analysis of a fuzzy economic order quantity model for deteriorating items under retailer partial trade credit financing in a supply chain. *Mathematical and Computer Modelling* 53(9-10): 1621–1636.

More, D. 2013. Challenges of supply chain finance: A detailed study and a hierarchical model based on the experiences of an Indian firm. *Business Process Management Journal* 19(4): 624–647.

Srinivasa, R. N. R., & Kumar, M. V. 2011. Short-term financing in a cash-constrained supply chain. *International Journal of Production Economics* 134(2): 407–412.

Teng, J., Min, J., & Pan, Q. 2012. Economic order quantity model with trade credit financing for non-decreasing demand. *Omega* 40(3): 328–335.

Thangam, A., & Uthayakumar, R. 2009. Two-echelon trade credit financing for perishable items in a supply chain when demand depends on both selling price and credit period. *Computers & Industrial Engineering* 57(3): 773–786.

Wuttke, D. a., Blome, C., Foerstl, K., & Henke, M. 2013. Managing the Innovation Adoption of Supply

Chain Finance-Empirical Evidence From Six European Case Studies. *Journal of Business Logistics* 34(2): 148–166.

Wuttke, D. a., Blome, C., & Henke, M. 2013. Focusing the financial flow of supply chains: An empirical investigation of financial supply chain management. *International Journal of Production Economics* 145(2): 773–789.

Lu Jihui, Ceng Lifei, Zhou Weihua. 2012. Supply chain decision analysis and the value of the accounts receivable financing research. *Journal of management science* 15 (5): 10-18.