

# **Barriers of implementing supply chain finance: ISM-MICMAC approach**

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## **Abstract**

Managing the financial flow in the supply chain has been considered as crucial element in the supply chain management. SCF approach helps to enhance the financial flow and reduce the financial constraint from the supply chain. However, existing practice and process of SCF are facing various challenges in real world scenario along with very few studies in the SCF. The present study aims to identify different challenges faced by SCF. The method interpretive structural modeling (ISM) has been implemented to prioritize the selected factors and subsequently leveling them. This study has found long cash conversion cycle is the vital challenge, and lack of SCF training is less prioritize challenge faced by SCF. The implications and conclusion has been highlighted in the present study.

## **Keywords**

Supply chain finance (SCF), supply chain, interpretive structural modeling (ISM), Fuzzy MICMAC.

## **1. Introduction**

Finance is known as the life-blood of an organization, acquiring and managing finance properly can enhance the firm's profitability and flow of operations (Martin and Hoffman, 2017). Participants of the supply chain are mostly focusing on the flow of goods and information in the supply chain, but the prime factor is finance generally overlooked by them (Chen and Paulraj, 2004). Lack of proper management of the financial flow creates an obstacle for firms to arrange working capital to run their day to day business, enhance the credit risk ratio of the participants in the supply chain, buyer-supplier relations get affected and the chances of occurring loss in operation are enhanced (Ivashina and Scharfstein, 2010; Pfohl and Gomm, 2009). Thus to counter these shortcomings and problems, the new approach known as supply chain finance (SCF) can be implemented (Rogers et al., 2016). SCF came into existence after the global financial crisis (Gelsomino et al., 2016). Experts and participants of the supply chain looking for a better system that can reduce the financial risk problem in the supply chain and the application of SCF can resolve these problems (Robinson 2007; Demica 2007). SCF combines three important stakeholders of the supply chain namely, buyer, supplier, and SCF platform (finance provider) (Basu and Nair, 2008). SCF platforms include banks, PSUs, and NBFCs, and other private concerns that come up with various plans to avoid the financial constrained problem from the supply chain partners. SCF creates a win-win situation for buyers and suppliers as well as finance providers (Knox, 2005).

Hence, SCF would facilitate the supply chain participants to perform the various productive function by fulfilling the financial requirements such as: providing prompt payment to suppliers, enhancing the payment duration for buyers, deliver capital at a very low-interest rate, reduce credit risk, enhance productivity, and helps in managing finance in the supply chain (Wuttke et al., 2016; Hurtrez and Salvadori, 2010). But SCF faces various challenges during its successful application in the supply chain (More and Basu, 2013). As SCF is a new approach and still in the growing phase, different factors create obstacles in its proper application (Wuttke et al., 2016; More and Basu, 2013). In carrying out the study very few research works have been done to fill the literature and policy gap in the application of SCF in the supply chain for designing a financial constraint-free supply chain. Hence, the purpose of the study is to identify and analyze different challenges create obstacle in SCF application. In relation to performing this study, the following research questions have been developed:

1. What are the crucial challenges faced in implementing SCF?
2. How are the selected challenges in implementing SCF can be analyzed?
3. What are the empirical managerial implications of the study?

Based on the research questions, the following objectives have been derived:

1. To pick out various challenges faced in implementing SCF through literature support and experts' opinions.
2. The selected factors have been prioritized and analyzed by implementing interpretive structural modeling (ISM) and fuzzy MICMAC analysis.
3. The managerial implications have been highlighted to tackle the challenges.

The present study proceeds firstly, by identifying various challenges arising in implementing SCF through literature support and experts' opinions. The experts are consulted to finalizing the factors. The experts consulted include Supply chain experts, finance experts, finance managers, and bank managers. The rest of the paper has been carried out in the following ways: Section 2 represents the literature review, Section 3 represents application of the methodology, Section 4 discusses the results and discussion, section 5 highlights managerial application, and finally Section 6 highlights the conclusion part.

## **2. Literature review**

In the supply chain, the scarcity of finance, credit risk, increasing cost of debt, and poor management of finance is a big problem that can be solved by applying SCF (Klapper and Randall, 2011). The SCF approach enhances the financial flow in the entire supply chain and fulfill the financial requirements of the supply chain participants (Nienhuis *et al.*, 2013). Implementation of SCF in the supply chain can increase productivity, but implementing SCF has been becoming difficult because of various challenges (Xu, 2018). Technological, human resource, inter-firm, and intra-firm are the prime broad challenges faced by SCF (More and Basu, 2013). In this technical enabled era still, some of the firms used traditional and old methods which increase the chance of mistake and fraud (Lee and Rhee, 2011; He *et al.*, 2010). No proper training facility available for providing knowledge and information about SCF to individuals (Hofmann and Belin, 2011). The relation between different departments in a firm and relation with the external environment also affect the firm's business (Amid *et al.*, 2011; Birou *et al.*, 2011). These challenges create a hurdle for the successful application of SCF.

Table 1: Challenges faced by SCF.

|    |   |  |
|----|---|--|
| 1  | Lack of SCF training facility available for individuals   | Hofmann and Belin, 2011;                                       |
| 2  | Shortage of SCF expertise for managing SCF properly       | Hofmann and Belin, 2011;<br>Deloitte, 2009                     |
| 3  | Rules and regulation by the government                    | Hudson, 2005; Camerinelli, 2009                                |
| 4  | Challenges arise due to the trans-boundary trading system | Flint, 2004; Hofmann and Belin, 2011                           |
| 5  | Old and outdated technology still in use in the operation | Hausman, 2005; Fairchild, 2005                                 |
| 6  | Lack of automated payment transaction                     | Lee and Rhee, 2011; He et al., 2010                            |
| 7  | Poor inventory management in the supply chain             | Ambrose et al., 2010; Hald and Ellegaard, 2010                 |
| 8  | poor cash flow management in the supply chain             | Hausman, 2005  |
| 9  | Conflicts between supply chain partners                   | Amid et al., 2011; Sarkis and Talluri, 2006                    |
| 10 | Supplier's poor financial condition                       | Leeuw and Fransoo, 2009; Singh, 2011                           |
| 11 | Longer cash conversion cycle                              | Hausman, 2005; Lindeen, 2010; Camerinelli, 2009; Siddall, 2010 |
| 12 | Diversified product line                                  | Ambrose et al., 2010; Hald and Ellegaard, 2010                 |

## 2.1 Literature on Solution methodology

ISM is a qualitative and interpretive technique that can solve complicated problems through discourse based on the structural mapping of complex interconnections of elements (Watson, 1978; Saxena and Seth, 2012). In this research, the ISM technique is used to identify the inter-relationship

among SCF challenges. MICMAC is a classification technique used to analyze driving power and dependence of SCF challenges (Saxena and Seth, 2012). Thakur and Ramesh (2016) have applied ISM and MICMAC analysis to define different barriers.

### **3. Method**

The ISM approach assists decision makers to identify most critical factor in the ranking and how these critical factors affects other factors in the system (Thakur and Ramesh, 2016) . To achieve our objectives, several steps defining procedure given below.

Step 1- different challenges arising in SCF application are identified through literature and experts opinion.

Step 2- relationship among different challenges identified through experts' opinion.

Step 3- structural self-interaction model (SSIM) is constructed to find out relationship of one factor with others.

Step 4- reachability matrix is prepared from SSIM, by converting the relationship among different factors into binary numbers.

Step 5- after reachability matrix, factors are rearranged to develop a hierarchal model.

### **Application of the methodology**

#### *Construction of SSIM matrix*

Various relationships among different factors can be identified with the help of the ISM technique (Thakur and Ramesh, 2016). In this study, circumstantial relationships are used to identify relationships among SCF challenges. To develop SSIM matrix, four relationships are defined among challenges  $i$  and  $j$ , by using four symbols:

- A, if  $i$  is predictor of  $j$
- V, if  $j$  is predictor of  $i$
- X, if  $i$  and  $j$  both predict each other.
- O, if no predict each other.

Table 2 Structural self-interaction matrix: SCF challenges



|            |   |   |   |   |   |   |   |   |   |   |    |   |   |
|------------|---|---|---|---|---|---|---|---|---|---|----|---|---|
| <b>3</b>   | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1  | 1 | 5 |
| <b>4</b>   | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1  | 1 | 6 |
| <b>5</b>   | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1  | 1 | 8 |
| <b>6</b>   | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1  | 1 | 8 |
| <b>7</b>   | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1  | 1 | 4 |
| <b>8</b>   | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1  | 1 | 4 |
| <b>9</b>   | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1  | 0 | 6 |
| <b>10</b>  | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1  | 0 | 8 |
| <b>11</b>  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1  | 0 | 1 |
| <b>12</b>  | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1  | 1 | 4 |
| Dependency | 1 | 2 | 6 | 6 | 5 | 5 | 6 | 8 | 8 | 5 | 12 | 9 |   |

Table 4. Final iteration

| <b>Challenges</b> | <b>Reachability set</b> | <b>Antecedent set</b>   | <b>Interaction</b> | <b>Level</b> |
|-------------------|-------------------------|-------------------------|--------------------|--------------|
| <b>1</b>          | 1,2,5,6,7,8,9,10,11,12  | 1                       | 1                  | VI           |
| <b>2</b>          | 2,5,6,7,8,9,10,11,12    | 1,2                     | 2                  | V            |
| <b>3</b>          | 3,4,9,11,12             | 3,4,5,6,9,10            | 3,4,9              | III          |
| <b>4</b>          | 3,4,8,9,12              | 3,4,5,6,9,10            | 3,4,9              | III          |
| <b>5</b>          | 3,4,5,6,9,10,11,12      | 1,2,5,6,10              | 6,5,10             | IV           |
| <b>6</b>          | 3,4,5,6,9,10,11,12      | 1,2,5,6,10              | 6,5,10             | IV           |
| <b>7</b>          | 7,8,11,12               | 1,2,7,8,9,12            | 7,8,12             | II           |
| <b>8</b>          | 7,8,11,12               | 1,2,4,7,8,9,10,12       | 7,8,12             | II           |
| <b>9</b>          | 3,4,7,8,9,11            | 1,2,3,4,5,6,9,10        | 3,4,9              | III          |
| <b>10</b>         | 3,4,5,6,8,9,10,11       | 1,2,5,6,10              | 6,5,10             | IV           |
| <b>11</b>         | 11                      | 1,2,3,4,5,6,7,8,9,10,11 | 11                 | I            |
| <b>12</b>         | 7,8,11,12               | 1,2,3,4,5,6,7,8,12      | 7,8,12             | II           |

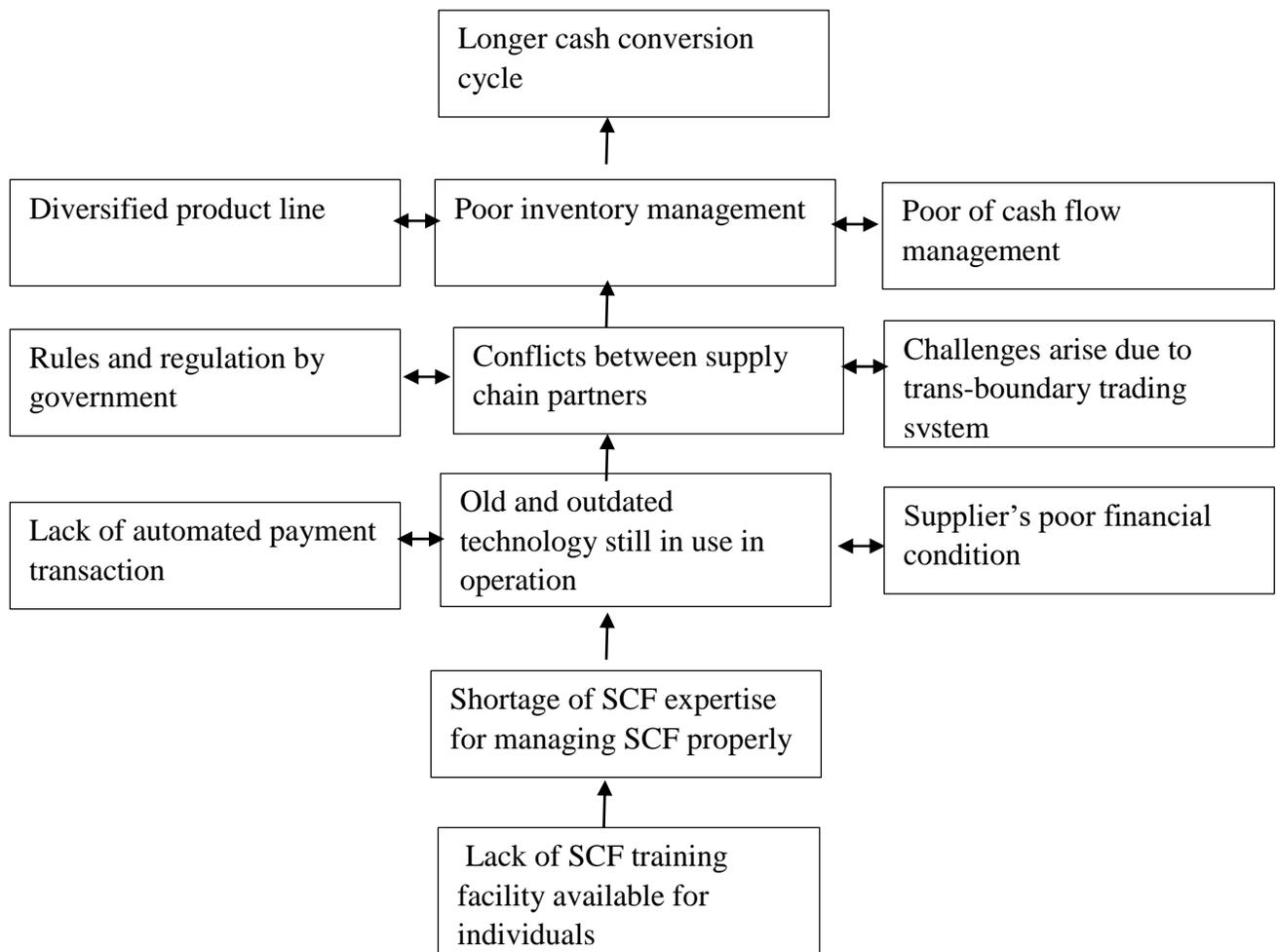


Figure 2. ISM based model

### *MICMAC analysis*

SCF challenges need to be classified and analyze to develop the ISM under study. MICMAC helps to classify the scope of each factor indirectly (Saxena and Seth, 2012). The sum along the row indicates the driving power and the sum along to column represents dependence. All factors are divided into four group independent, dependent, autonomous, linkage respectively. Independent elements consist of strong driving power but weak dependence power, dependence elements consist of factors having weak driving power and strong dependence, autonomous elements consist of factors having weak driving power and weak dependence, linkage elements consist of factors having both strong driving and dependence.

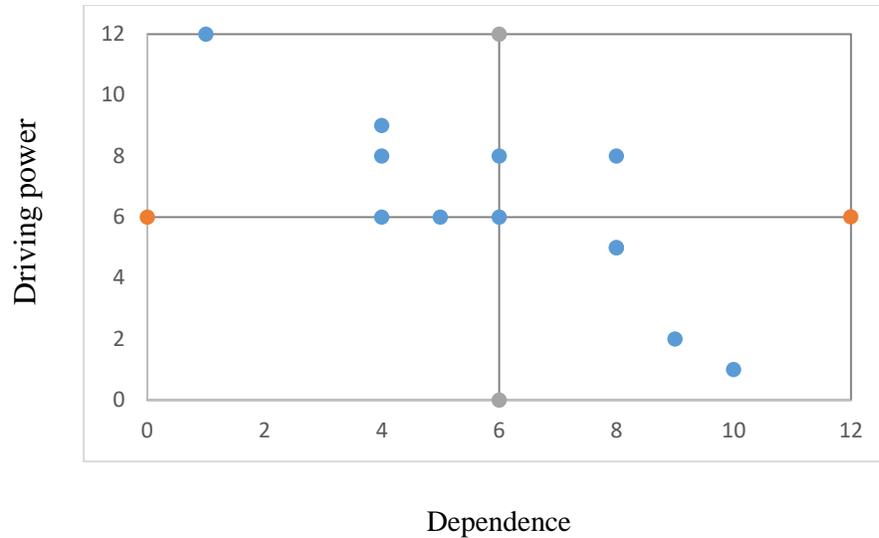


Figure 1. Analysis of driving and dependence power of challenges of SCF

#### 4. Results and Discussions

The analysis of the study using the ISM has found that ‘longer cash conversion cycle’ is most challenging factor for SCF, and can create obstacle in its successful application. ‘Poor inventory management in the supply chain’, ‘poor cash flow management in the supply chain’, and, ‘Diversified product line’ have attained second level. Consecutively, ‘Rules and regulation by the government’, ‘Challenges arise due to the trans-boundary trading system’ and ‘Conflicts between supply chain partners’ attained third level. The government rules and regulations and trans-boundary trading are external factor, which affect the business operation and creates challenges for SCF (Hudson, 2005; Flint, 2004). ‘Old and outdated technology still in use in the operation’, ‘Lack of automated payment transaction’, ‘Supplier’s poor financial condition’ attained fourth level. In order to improve operational efficiency, organization should use the new information and technology, but the use of old and obsolete technology may harmful for business (Hausman, 2005). ‘Shortage of SCF expertise for managing SCF properly’ and, ‘Lack of SCF training facility available for individuals’ attained fifth and six level respectively. Limited information and knowledge of SCF among individuals is a big challenge, much importance should be given towards the training program (Hofmann and Belin, 2011).

## **5. Managerial implications of the study**

The present research reflects important challenges that should be looked after for the successful application of SCF. The results of the study have been discussed with experts and the following implications are developed:

1. Training and knowledge about SCF should be provided to more individuals with practical examples for better understanding.
2. Supplier selection should be done properly to avoid any future conflicts.
3. All new technology should be accepted and applied by the business for smooth operation in business and avoiding any disruption.
4. Managers should control Inventory management and cash flow management properly.
5. Much emphasis should be given to reducing the duration of the cash conversion cycle.

## **Conclusion**

Identifying the challenges is the first activity organizations should perform. Without Proper information about different challenges, managers cannot take suitable decisions to tackle them. SCF is a very useful aspect for any supply chain and able to reduce and avoid financial constraints from the supply chain. For the proper application of SCF in the supply chain, managers should look after different challenges and try to avoid these on an advanced basis. More concertation should be given towards the major challenges, by solving these major challenges organizations can enhance their productivity and flow of operations.

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