

Supply chain management maturity and concept dimensions: a relationship framework proposal

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Abstract

Researches on Supply Chain Management have increased in relevance but there are still lacks in the literature about the dimensions that promote the maturity and success of SCM and a deeper understanding of their relations. Through a systematic literature review the present paper propose a framework to address those aspects.

Keywords: Supply Chain Management, Maturity, Concept, Framework

INTRODUCTION

Since the late 80s, researches focused on the Supply Chain Management (SCM) have grown significantly in importance due to its potential to generate opportunities to add value to businesses and to gain competitive advantage in today's global market.

Frederico and Martins (2012) conducted a systematic review of the literature of supply chain maturity and the maturity of performance measurement systems, proposing a theoretical model for the relationship between both.

With regard to the maturity of the supply chain, these authors studied the models developed by several authors among which stand out Stevens (1989), Ayers and Malmberg (2002), Lockamy III and McCormack (2004), Daozhi et al. (2006), Performance Measurement (2007) and Oliveira (2009), because they are more specific to the Supply Chain Management.

These various models present different dimensions to the analysis of maturity as well as different scales to it. There are also some variables that are identified as repeated in different models, sometimes with alternative nomenclatures but similar meaning.

For this reason, one of the important contributions of Frederico and Martin (2012) resides on the construction of a unique set comprising all dimensions presented by different authors, as well as one maturity scale to its maturity.

Although those authors already claim that "As these dimensions evolve over time, the greater becomes the level of integration and skills of supply chain management" (Frederico and Martins, 2012), there are still gaps to be better understood since the relationship between the dimensions and SCM's maturity was not the object of their study.

Thus, the aim of this article is to extend the knowledge developed by Frederico and Martins (2012), proposing a single theoretical model that inter-relates the eleven

dimensions identified by them and create the basis that may enable a greater understanding of how the maturity of each impacts the resulting maturity of the entire chain.

DIMENSIONS OF SUPPLY CHAIN MATURITY

Based in our maturity models of the authors already mentioned in the introduction, Frederico and Martins (2012) identified eleven dimensions of maturity of supply chain management, based on the model Lockamy III and McCormack (2004) plus additional dimensions that were considered by other authors, as described in the following Table 1.

Table 1: Maturity dimensions of Supply Chain Management on Frederico and Martins' Model (2012)

Costs
Customers
Processes
Technology and tools
Collaboration
Management
Performance measurement
Strategic focus
Responsiveness
Resource
Environment

The characteristics of each of the dimensions related by the authors are:

- Costs are associated with the level of costs and inventory in the supply chain;
- Clients are associated with focus given to customers within the chain management as well as the level of customer satisfaction;
- Processes concerns the formalization, integration, structuring of processes within the chain;
- Technology and tools are linked to the existence of information and tools to support supply chain management, such as statistical tools for demand forecasting and information systems, among others;
- Collaboration refers to the sharing of information, earnings and resources among members of the chain, communication and other joint initiatives within the chain such as product development and planning;
- Management is associated with excellence in project management within the supply chain, risk management and also the level of awareness and training of supply chain management;
- Performance Measurement is associated with the extent of the measurements of performance at the supply chain;
- Strategic Focus refers to the strategic goals which are given to the supply chain management by the chain's focused company and by its other members;
- Responsiveness is linked to the speed with which the supply chain responds to environmental changes, also in terms of volume and mix of products supplied;

- Resources are linked to the types of resources used in the supply chain, being they common (needed for execution of processes within the chain) and competitive (generate competitive advantage and are difficult to be employed by competing chains due to their differential);
- Environment refers to regulatory issues and credit incentives that favor the best performance of the supply chain.

Frederico and Martins (2012) considered three maturity stages: Initial, Intermediate and Advanced. The alignment on three levels was necessary due to the existing difference of the amount of levels between various models of maturity on the supply chain management.

Each level has different characteristics as following described:

- Initial: prevalence of high costs in the supply chain, low customer satisfaction, unstructured and disintegrated processes, lack of collaboration among members, absence of technologies and tools for demand forecasting and other activities, lack of strategic focus in the chain, little active project management in the supply chain, absence of risk management, performance measurement absence along the chain, lack of regulation and credit lines as support elements for the chain and use of basic and common resources;
- Intermediate: efforts to reduce costs in the chain, average customer satisfaction, documented processes and defined starting a more horizontal focus along the chain, cooperation between related functions at the supply chain management, use of technologies and statistical tools for demand forecasting and other activities, chain as a strategic focus, awareness, vision and competence in managing the supply chain by employees, good project management practices, basic level of risk management, existence of measurement performance, early regulations and lines of credit to assist the supply chain and use of resources, but still without differential in the supply chain;
- Advanced: chain with excellence in costs, overall customer focus and high level of satisfaction, fully integrated processes and structured along the chain, extensive use of information systems, profit sharing and information between the members of the chain, management excellence in projects and risks, wide performance measurement, supply chain seen as a factor of competitiveness in other chains, responsive action before the demand variations caused by customers, comprehensive regulation and credit lines for development of the supply chain.

THE INTER-RELATIONSHIP BETWEEN THE DIMENSIONS OF SUPPLY CHAIN MATURITY

In order to build a model that reflects the interrelations between the dimensions of supply chain maturity, first there must be established the criteria to sustain such analysis.

Main Constructs of Supply Chain Management

For Cooper (1997) the framework of supply chain management consists of three elements: Business Process, Management Components and Structure of Supply Chain.

On the other hand, for Stock and Boyer (2009) there would be other three clusters: activities, benefits and constituents/components. The activities are subdivided by those authors between material / physical, financial, services and information flows. The benefits would be distributed between creating value, creating efficiency and customer satisfaction. Finally, constituents or components have no subdivision, according to the author.

Mentzer (2001), for the global environment, divided into inter-corporate coordination and inter-functional flows in the supply chain (goods, services, information, financial resources, demand and forecast) and results (customer satisfaction, value, profitability and competitive advantage).

For the purposes of this study models Cooper and Mentzer were chosen because these are authors and constructs widely consolidated in the supply chain literature, have better adhesion to maturity dimensions raised by Frederico and Martin (2012) and good compatibility between each other.

Classification of Dimensions of the Supply Chain Management Maturity

Using as a basis the definitions of the models from Cooper and Mentzer, it was designed a conceptual model that integrates both constructs into a single system.

It is understood, however, that any model or system is a simplification of the reality and, as such, is unable to describe the fullness of a phenomenon, representing what is considered relevant by the observer's perspective which, in the concrete case, is an overview of the interrelations between the dimensions of supply chain maturity.

When studied in a greater detail a particular dimension may contain traces of different classifications within the proposed model and, for the objectives of this study, we sought to analyze the predominant characteristics of each dimension.

Starting from these prerogatives, it was drawn Figure 1, which graphically represents the model proposed by this study to the interrelations between the dimensions of the maturity of supply chain management, using the fusion of constructs from Cooper and Mentzer.

Thus, it is proposed the classification of the dimensions as follows:

a) Management Components

In this group are classified the dimensions that constitute the administrative elements themselves or tools / data supporting this management.

Thus, among the dimensions of the maturity of the supply chain, are classified in this group: process management, technology / tools, performance measurement and risk management and project.

b) Chain Structure

This group is made up of elements that form the characteristics of a given supply chain, namely: collaboration, strategic focus, responsiveness, environment and resources.

c) Business Process

Business processes according Cooper (1997), are activities that produce a specific value to the consumer. In other words, it can be said that are the main activities of its chain, not fitting, therefore, the inclusion of any dimension on the matters of maturity.

d) Results

In this group are the expected results for the supply chain management, materialized by the dimensions of costs and customers (satisfaction).

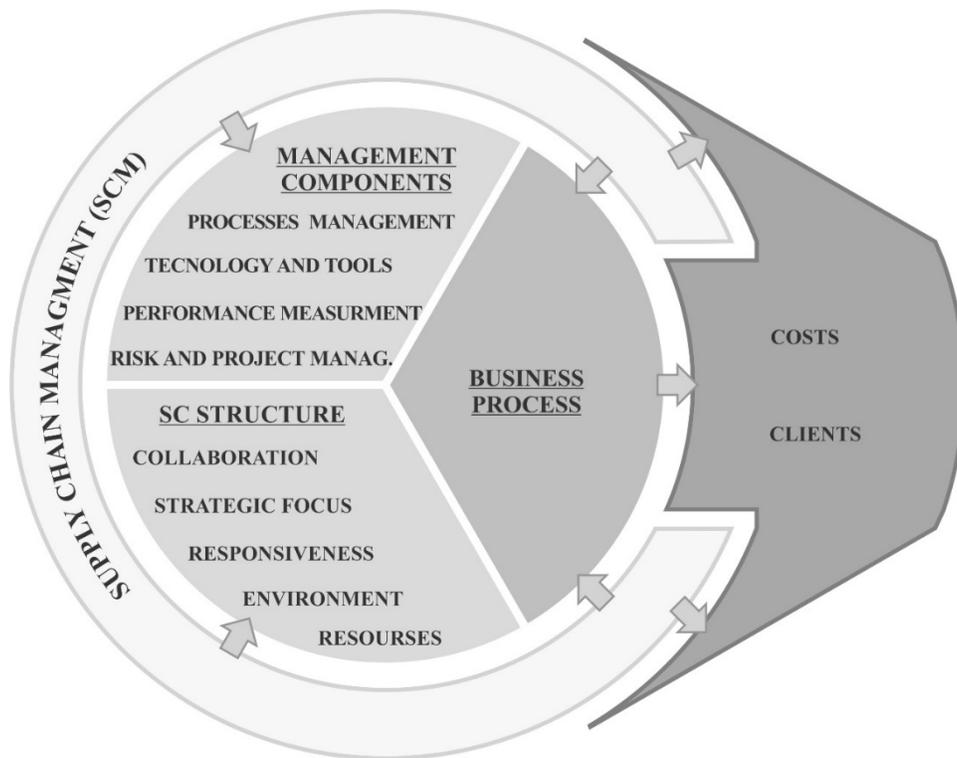


Figure 1 - Graphic representation of the Model Inter-relation of Supply Chain Management Maturity dimensions

SUPPLY CHAIN MATURITY

From the establishment of the model of inter-relationship between the dimensions, it is still necessary to understand them and how they determine the maturity of supply chain management as a whole.

It is important to recall, again, the concept that the whole system is a simplification of the reality. Thus, it would not be reasonable to establish a level of maturity for each of the eleven dimensions and, from that data, seek to establish a resulting level of maturity.

Therefore, this model adopted the model of three maturity levels of Frederico and Martins (2012): Initial, Intermediate and Advanced. Thus it is conceivable that a given chain will be classified in the maturity level at which are classified the largest share of its variables.

It is noteworthy that the maturity classification, either for the purpose of dimensions or for the whole chain, can't be established statically since it is imperatively dynamic as there is the need of comparison between different chains, potential results and new challenges by environmental changes or definitions of new strategic objectives.

CONCLUSION

This study proposes a model that integrates the eleven dimensions of maturity of the management of the supply chain proposed by Frederico and Martins (2012) in a single inter-relationship model.

As a result of this model, it is expected to be expanded the capacity to understand the phenomenon of SCM and its maturity, with consequences for theory and practice. It remains necessary, however, the development of case studies that could prove or disprove the adherence of this model to the reality and context of supply chain management.

To this end, it is recommended that those future case studies are explored in as much different contexts as possible in order to observe or question the real ability of generalization of this model to any supply chain.

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