

# Post COVID 19: Modified SCOR Model for Diagnosis of Problems in Supply Chain Management

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## ABSTRACT

*It is an understatement to say that our world has changed significantly over the last few months in the era of COVID19. The novel corona virus pandemic has resulted in unbelievable loss to the Indian economy as well as global economy and the loss of human lives has been exceptional in an era of global peace. After the COVID19 everything will be change and the supply chain system of industries will be affect drastically sheet. In this research a qualitative / quantitative methodology was developed for diagnosis of problem in supply chain after COVID19, which aims to quickly diagnose a company's supply chain. This methodology is divided into phases and questionnaires. The last phase involves the construction of a framework of operational and financial indicators, exclusively for logistics management. Said framework aims to have the double objective of serving as a management and diagnostic tool for the chain, as well as being the basis in the future for carrying out an open modality benchmarking program.*

**Keywords—**COVID19; supply chain systm; tools

## 1. INTRODUCTION

As the figure of infected increases every day, the COVID 19 pandemic will surely bring about a major economic downturn in 2020. The important point is, unlike other downturns this is not because of economic factor, but due to virtual incapacitation of human productivity. This is affecting every country and industrial sector. The total economic loss due to COVID-19 is expected to exceed \$4 trillion, almost 5% of the global GDP as per Asian Development Bank. The supply chain of every system will also affect by this problem[1].

The supply chain management (SCM) is as the set of three or more entities (can be organizations or people) that are directly involved in the processes and flows upstream and downstream of products, services, finances and / or information, from a source to a consumer. Likewise, three types of chains can be identified: the direct one, which involves the company, its suppliers and its customers; the extended one, which also involves the supplier's supplier and the client's client; and the last one, which involves all the upstream and downstream entities of the company.

Regarding supply chain management (SCM), we will also adopt the definition [2] in which chain management is shown as the systematic and strategic coordination of the traditional functions of the company (Marketing, Sales, R&D, Forecasting, Production, Purchasing, Logistics, Information Systems , Finance and Customer Service) and of the tactics developed throughout these functions, within a particular company and the rest involved throughout the chain, in order to improve long-term performance of both individual companies as well as the chain as a whole.

The main role of SCM within companies is a mix between strategy and execution. Chain management is a delicate mix of more detailed, quantitative (tactical) short-term oriented activities and broader spectrum, long-term oriented activities with qualitative characteristics (strategy) [2]. The potential of a well-designed and efficient chain management system has been recognized as way to advance in the fulfillment of the goals of a company, affirming, even, that a successful company uses logistics and its management as part of its competitive arsenal [3].

However, much has been written about how little these aspects are taken into account in companies. For example, many of the high-level discussions about the strategy to be developed throughout the supply chain are neither objective nor factual [4]. On the other hand, it has been stated that it is common for companies to not have a coherent strategy for the chain organized . According to a survey carried out in developed countries, during 1999, 58% of companies reported not having a clearly defined supply chain strategy [5].

Management must deal with all operations involved in supply chain processes, such as design, maintenance, information, logistics, and production. In particular, the company should have some methodology that is capable of evaluating the state of its chains and providing tools for the correct diagnosis of its operations.

For this, the main reference model found in the literature is the SCOR model, which is a product of the Supply Chain Council (SCC).

The “Supply Chain Operations Reference model” (SCOR) is largely based on company practices and is a candidate to become a future standard for the industrial world in operations management [6]. SCOR® was established as a model for the evaluation and comparison of supply chain activities and their performance. This model brings together the consensus of the members of the SCC, seeking to provide a unique framework that integrates the company's processes, its metrics, best practices and technology, within a structure that allows supporting and promoting communications throughout all the members of the chain, and to improve the efficiency, both of the SCM and of the activities carried out in the chain.

## **2. METHODOLOGY**

The model contains various sections organized around the five primary processes that are: Planning, Supply, Production, Distribution, Returns (Plan, Source, Make, Deliver, Return) [6]. By analyzing supply chain processes using the blocks above, the model can be used to describe any chain, from the simplest to the most complex, using a series of common definitions. In turn, it is focused on three levels of process: Level 1, which is aimed at management and serves to make decisions about the chain's strategy; Level 2, which points to the way of managing and structuring the chain; Level 3, which focuses on each of the processes developed in the chain [7]. Additionally, there is Level 4, which corresponds to the level at which the company internalizes the lessons learned from the rest of the levels and begins to apply practices and metrics specifically designed for its company. This level is excluded from the scope of SCOR® as it is precisely an individual task of each company [8].

Although SCOR is presented as the model to follow, it presents some difficulties for its application. In particular, one of the main difficulties detected lies in the hierarchical structure of the indicators presented by SCOR, which implies that in order to reach the level 1 indicators (which are necessary for decision-making), they must be calculated previously a significant number of level 2, 3 and up to 4 indicators (in the event that companies decide to carry a particular indicator). As an example, 142 level 3 indicators stand out regarding Responsiveness, 81 referring to Agility, 59 referring to Reliability, and 199 referring to Costs. Although it is understood that it is not necessary to calculate all the indicators to obtain the general idea, we understand that the large number of them can overwhelm the company, which must dedicate an enormous amount of time and resources to the selection of indicators to calculate and then another large amount of resources to search and find the necessary information. Furthermore, many of the SCOR indicators point to benchmarking against other companies. In countries like Uruguay, where there is great suspicion of sharing information between companies, and where not much progress has been made yet and studies on comparison of companies, we consider that implementing a model that is based on benchmarking cannot be applied satisfactorily, since the company will encounter great difficulties and barriers to obtain reliable information. For all the aforementioned, the initiative of this project arises to create some method that uses as a starting point the concepts used by SCOR (in particular the level 1 indicators), seeking to simplify the method to reach conclusions and results that support decision-making to improve chain performance, but without the complexity of the SCOR model and without requiring benchmarking information to find points for improvement.

## **3. MODEL DEVELOPMENT**

Theoretical-practical methodology for the diagnosis of the supply chain.- This section shows the developed model for diagnosis the SCM. The authors' initial objective is to contribute knowledge to the scientific and business community, providing a methodology for public use that may eventually serve as a tool for the self-evaluation of companies. This methodology is based on the literature review, and is structured mainly around the components of SCOR: Planning, Supply, Production, Distribution, Returns. However, we have sought to obtain a diagnostic methodology that is more summarized, that continues to combine qualitative aspects with quantitative indicators, but that implies faster execution and with fewer resources by the companies diagnosed. For this, the concepts taken from the SCOR model are complemented with concepts from other methodologies, both qualitative and quantitative [9].

The component referring to Make, which involves all production activities (inside the company) has not been developed in this methodology because, for the validation of the methodology, only one company in the wholesale sector could be obtained. /distribution. It is expected, in the future, to be able to continue improving and developing the methodology, where, among other aspects, it will seek to include the Make component.

The methodology proposed for the diagnosis of the chains is detailed below. It is structured in seven phases, which, in the opinion of the developer team, could be completed in a period of 10 to 15 weeks (1-2 weeks per phase). It is important to mention the fact that this methodology can be used both for the analysis of the entire supply chain of the company, a particular business unit, or even for the flow of a specific product. During the seven stages, 12 self-prepared questionnaires<sup>8</sup> are used as support tools, which are used to guide the diagnosis and facilitate the detection of both strengths and opportunities for improvement. The last stage involves the construction of an exclusive scoreboard for supply chain management, which must be personalized for each

company studied. Likewise, the indicators included in this table will be obtained throughout the diagnosis, as a result of the analysis of the responses to the questionnaires. The structure selected for said scorecard is the Balanced Scorecard (BS) model [10], since it is a management system that can channel the specific energies, skills and knowledge of all the collaborators of the organization, towards achieving long-term strategic objectives [11]. Furthermore, in all cases the level 1 indicators of the SCOR model will be used as a starting point.

Table 1: Summary of Phases

| Phases /Level | Topic of Analysis             | Utility  | Tools   |
|---------------|-------------------------------|--|---|
| 1             | Introduction                  | Form the work team<br>Get overview of the chain  | SWOT Analysis   |
|               |                               |  | Questionnaire 1 - Complexity of the chain                       |
| 2             | Flowcharts and chain problems | Understand the main problems and detect opportunities for improvement in the flow of products                  | Flowcharts<br>VSM<br>Questionnaire 2 - Problems In the chain    |
|               |                               |  | Questionnaire 3 - Main symptoms of problems                     |
|               |                               |  | Double Tree Diagrams of causes and effects                      |
| 3             | Planning                      | Evaluate the efficiency and effectiveness of the planning methods used by the company                          | Questionnaire 4 - Functional structure / involvement Management |
|               |                               |  | Questionnaire 5 - Metrics / goals for chain                     |
|               |                               |  | Questionnaire 6 - Risks and chain failures                      |
| 4             | Distribution and return       | Evaluate the activities and degree of customer relationship  | Questionnaire 7 – Integration with clients                      |
|               |                               | Evaluate post-sale activities and client-side feed-back channels   | Questionnaire 8 - Client sector activities                      |
| 5             | Catering                      | Evaluate the activities and degree of integration with suppliers   | Questionnaire 9 - integration with suppliers                    |
|               |                               |  | Questionnaire 10 - Sector activities Providers                  |
| 6             | Coordination and flexibility  | Identify the degree of coordination of the chain and its ability to adapt to changes in demand or provisioning | Questionnaire 11 - Index Coordination                           |
|               |                               |  | Questionnaire 12 - Flexibility                                  |
| 7             | Construction of scoreboard    | Select a set of indicators that allow the correct management of the chain                                      | Balanced Scorecard; SCOR®                                       |

### 3.1 Applicability of Model

The need to find a diagnostic model, which gathers the basic characteristics of a model as complete as SCOR®, but which at the same time is much “lighter”, It arises due to the situation of the majority of companies. On the one hand, we can assume from the literature survey that few companies have the habit and consistency in the use and monitoring of indicators to measure and control the activities carried out in their supply chains[12]. This makes it difficult to apply the SCOR® model and other methodologies, which are based on the comparison of a large number of indicators that provide an exhaustive vision of the state of the company's activities. On the other hand, from the literature survey, we found that many of the companies lack a culture regarding the documentation and analysis of failures or deviations [13].. This means that there is a lot of information, necessary to carry out comparisons with the SCOR model or the use of other methodologies, that the company does not have or that it owns but in an unusable way for diagnosis (at least without having to dedicate a great deal of number of hours of rework and retraining). Finally, we conclude that companies are, for the most part, very reserved and jealous regarding the disclosure of financial, operational and other information. This makes it difficult or impossible to generate a database to be used as benchmarking, a basic aspect to fully implement the SCOR model[14].

Based on the above, we consider that companies need a methodology that adapts to said reality. In order for it to be easily expandable to any industry or company, this methodology must involve a few man-hours on the side of the diagnosed company and, in turn, relatively little information. Of course, this methodology will not

have the scope or depth that others could have, such as the SCOR model. But given the reluctance observed in the majority of companies with respect to exposing and disclosing their data, and added to the fact of not wanting or being able to get involved in evaluation processes that imply an intensive use of resources, we aspire that our methodology can reach to have results similar to the other techniques [15-16]. To do this, we intend to undertake a qualitative analysis of the activities of the chain, and complement it with an exclusive scoreboard, which contains a minimum set of indicators that allow the company to have control and monitoring of the status of all the activities developed throughout the chain.

#### 4. CONCLUSION

Past COVID19, only few organizations with next-generation supply chain management software can manage downtime to deliver on customer commitments. Supply chains that are powered by new technologies such as AI, big data and machine learning have real-time visibility to strategize and mitigate risks. In case of destruction in supply chain system of industries, they need a system to detect and analyzed the situation. A supply chain platform that is built on a foundation of the aforementioned new technologies can trigger alerts based internal and external data feeds.

Supply chain management is decisive for achieving excellent sustainable financial performance. Given that the main objective of companies is to retain customers as a result of their activities and operations throughout the supply chain, we consider it important that companies succeed in developing the strategic objectives for manage the chain based on its overall objectives. Companies must promote collaboration between the different links in the chain, in order to work together to eliminate inefficiencies along the flow and improve the adaptability, flexibility and agility of the chains, thus improving customer service. By adoption of presented methodology industries may overcome the effect of past COVID19 on the supply chain.

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