

Structure and Transformation of Enterprise Supply Chain Management in the COVID-19 Prevention and Control Era

Linyu Wang

Tourism Department, Hainan University, Hainan Province, 570228, China

*Corresponding author. Email: 2427943908@qq.com

ABSTRACT

In 2020, the COVID-19 pandemic swept the world, and now it is an era of COVID-19 prevention and control. This paper lists the concept of supply chain management (SCM) and its impact on enterprises, and then analyzes the existing problems and opportunities by literature review. Four solutions are concluded in this paper. Enterprises can better structure and change the supply chain by attaching importance to risk mitigation strategies and finding appropriate transformation direction, boosting government intervention and regulation, augmenting the supply chain resilience (SCR), and strengthening the cooperation and localization.

Keywords: COVID-19, Supply chain management, Transformation, Corporate structure, Corona-virus.

1. INTRODUCTION

The sudden outbreak of COVID-19 has upset the balance of many companies' supply chains. From the perspective of the whole supply chain (SC), both lockdown and isolation have led to the decrease of logistics and transportation efficiency and the disruption of international trade networks. Due to the delay of resumption of work, many inventory goods are abandoned, the capacity utilization rate of enterprises in the initial stage of resumption of work cannot be improved as soon as possible, and the global production and consumption demand remain depressed. Manpower shortages, increased costs, tight cash flow, and increased SC uncertainty are all the effects of the pandemic. The global SC is being restructured at an accelerating pace, which urgently requires a set of practical solutions. This paper studies the supply chain management (SCM) in the context of COVID-19 by literature review and PESTEL analysis, trying to help enterprises find a perfect SCM method. First, the concept of supply chain management and its influence on enterprises are briefly described. Then, the problems and potential opportunities in the development of SC are analyzed. Finally, the author puts forward four solutions on how SCM should be structured and transformed. The entire paper aims to help companies better prepare for the crisis in SCM caused by the pandemic.

2. SUPPLY CHAIN MANAGEMENT

2.1 Defining the Supply Chain Management

The concept of supply chain management (SCM) was widely known since the early 21st century. Chartered Institute of Procurement & Supply (CIPS) defines the SCM as processing goods from raw materials to finished products and services in the whole SC. Mentzer and other joint authors conceptualized SCM as a kind of assistance to state-owned and private companies to augment the long-term benefits and the Supply Chain (SC) wholly, thus systemically, strategically, and functionality coordinating, across the traditional business functions of specific companies and businesses in SC, the conventional business and the tactics. Several authors have classified SCM into a set of management processes, or a management philosophy and its implementation [1]. Douglas M Lambert and Martha C Cooper put SCM into a position of handling total business procedure excellently and representing a new method of managing the relationships and business with other sections of the SC [2]. Carmignani reckoned that SCM includes the analysis of the customer requirements and demands, information management, facilities and transit management, as well as pooling and inventory management. They form a cycle [3].

Apart from the above Thomas and Griffin (1996) regarded SCM as a kind of coordination and integration [4]. Stadler (2008) thought SCM consists of suppliers, manufacturing firms, distributors, customers [5], and so forth. SCM is expected to research product realization or service assignments to maximize total profitability.

2.2 The influence of supply chain management

Successful SCM determines the formulation of SC, thus improving the surplus of each part of the SC (Figure 1). For example, Apple inc. has established high-end product positioning by streamlining product lines and brand marketing, and achieved effective demand management through the bundling sales model of telecom operators. Apple firmly controls all nodes in the SC from raw material suppliers, Original Equipment Manufacturer (OEM) manufacturers to logistics service providers, and has built a SC system with Apple as its core [6]. Before Cook became the CEO, Apple had a mismatch between supply and demand. According to Steve Jobs Biography, bargaining power will be acquired by reducing the number of suppliers from 100 to 24 [7]. Besides, Cook will close warehouses and use the just-in-time (JIT) method, the best expectation of having precisely the necessary number of material accessible where and when it is needed, to reduce storage costs (Figure 2) [8].

It is the availability of accurate and timely information that decides the integration of the whole SC [11]. If the information is delayed or inaccurate, the bullwhip effect (when distorted information leading to tremendous inefficiencies is dispersed, the variabilities of demand order in the SC are amplified as they moved up from one end of a SC to the other) can be augmented, which will seriously damage the profits and increase the cost burden [9].

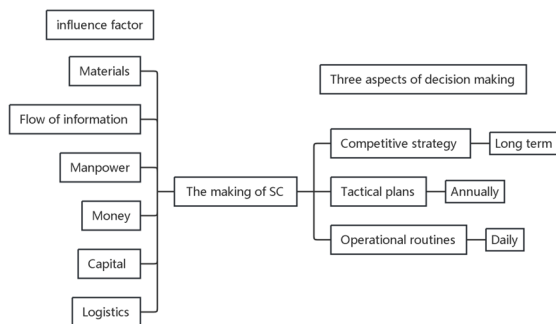


Figure 1 Three levels of SC formulation and influencing factors [10].

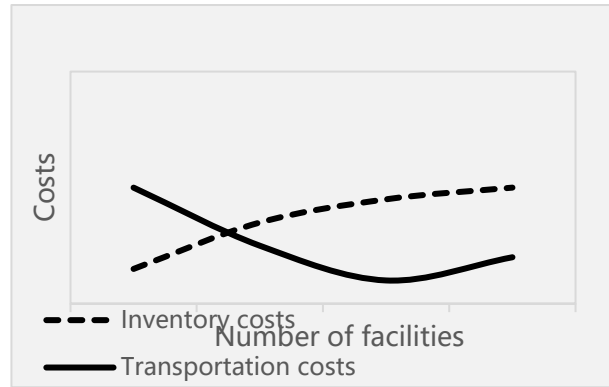


Figure 2 The relationship between the number of facilities and inventory cost and transportation cost.

However, excessive attention to cost minimization and benefit maximization may have a negative impact on the benefit maximization of SC. Instead of taking cost into the first consideration, the factors of technique, macro-economic, micro-economic, infrastructure and competition should be paid attention to. Besides, the obstacles of incentive, information processing, operation, pricing and behavior have led to optimal local different links in the SC or the aggrandizement of information delay, distortion and fluctuation in the SC. The proposal of Supply Chain Operations Reference (SCOR) seemed to take the above factors into account, but it only applies to SC activities for Corvette and other similar firms, instead of describing the logistics infrastructure for General Motors [12].

3. ENTERPRISES UNDER COVID-19

3.1 Problems and potential opportunities existing in enterprise SC

Actually, SC problems predate the pandemic. Kleindorfer and Saad boiled the SC problems down to general supply and demand coordination and major SC disruptions [13], while Wagner and Bode saw the problems coming from supply, demand, infrastructure, regulation and disaster [14]. Alok Raj and other co-authors applied the Grey Decision-Making Trial and Evaluation Laboratory (Grey-DEMATEL) method to analyze the SCM challenges. They concluded that Scarcity of Labor (PSL), Scarcity of Material (SSM) and Inconsistency of Supply (PIS) are three main challenges [15]. By using a literature review, a cross-functional mail survey, and 51 in-depth case analyses, Stanley E. Fawcett found that apart from technology, information, and measurement systems, the people issues, such as culture, trust, aversion to change, and willingness to collaborate are more intractable [16]. This is even more pronounced in the context of COVID-19, as people are under greater emotional stress.

The risk of a global downturn has risen due to COVID-19 since 2020 [17]. 94% of the Fortune 1000 companies were facing disruption in their supply chains. All the economy elements are intricately interrelated with anti-epidemic measures, and this has resulted in economic instabilities, which hints toward a fluctuation in market dynamics [18]. Based on the current epidemic situation, Song believed that enterprise raw manufacturing of the product supply, production resumption, procurement management, logistics, and marketing put forward new requirements for SCM. Fortunately, big shipping companies such as Msc, Hapag-Lloyd and CMA-CGM stated that they have minimized logistical losses [19]. Esha Thukral put emphasis on creativity, innovation and entrepreneurship. These three aspects are more needed in the pandemic [20]. From the macro level analysis, in the COVID-19 era,

enterprises are faced with more supply and demand reduction and increased uncertainty in the industrial value chain and the high risks due to lengthening the SC in space. For example, Hasbro has been hit hard by cross-border traffic controls. PESTEL analysis can better reflect the impact of macro factors on firms (Figure 3). Companies which are unfamiliar with SCM find it difficult to identify mitigation plans and contingency plans through cost, benefit or return on investment analysis from a micro perspective.

As for the potential opportunities, the biggest one is that global SC governance has started or is undergoing a smart, digital and platform transformation [21]. That is to say, the industrial Internet and intelligent manufacturing based on digital technology grow against the trend and are likely to become the dominant market in the future.

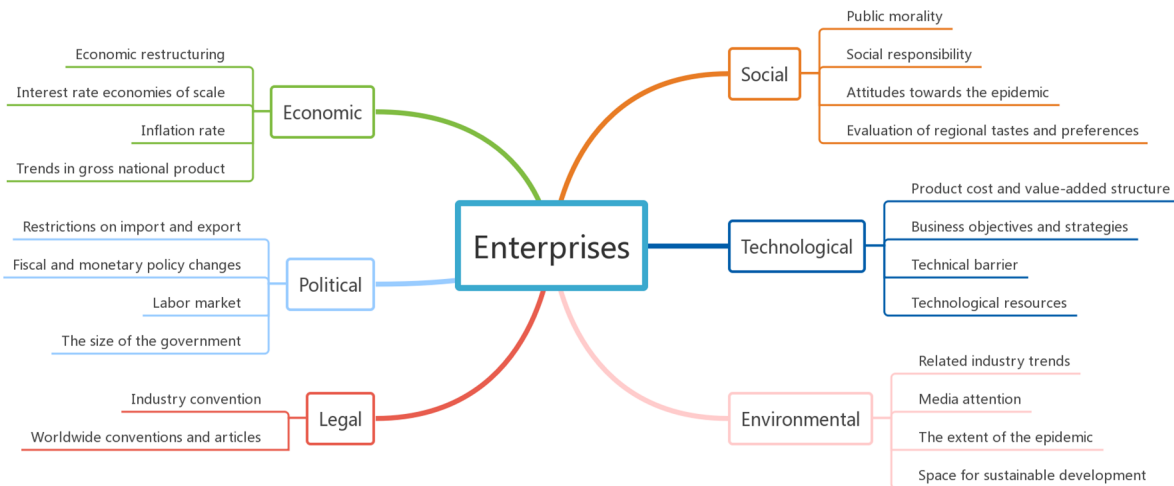


Figure 3 PESTEL analysis.

3.2 Solutions to the structure and transformation of SCM

Under the epidemic, onerous uncontrollable factors will put enterprises in a disadvantageous position. Hereinafter, this paper lists several reliable methods for the structure and transformation of SCM. The SCM structure refers to the type of organization as well as the hierarchical relation in the status of organization and the duty of operation between the SCM department [22].

3.2.1 Attaching importance to risk mitigation strategies and finding appropriate transformation direction

William used to put forward a transformation theory and Marietta believed fundamental firm changes begin by looking at the challenges from technical, behavioral, and social perspectives [23][24]. Six methods can be used to identify SCM risks. They are Cause and Effect Diagram, Pareto Analyses, Checklists, Panel Consensus, Delphi

Method, and Supply Chain Mapping. Risk mitigation strategies such as outsourcing - even offshoring - parts of the business, seeking suitable strategic alliance and supply partners, revising supply contracts and incentive schemes and so on, are focusing on shortening product lead times and reducing overall logistics costs.

With the practice of digital concepts such as cloud computing, big data and digital economy, digital transformation of enterprises seems to be an inevitable trend. Enterprises can turn over tedious work to artificial intelligence to do, which can greatly liberate productivity and stimulate creativity. In addition to the digital transformation, enterprises can also consider the platform transformation and diversified transformation. Shifting many of people's offline needs to online gratification would not only reduce the risk of infection, but also stimulate spending and get money circulating.

3.2.2 Strengthening government intervention and regulation

The government should speed up the construction of

a new development pattern in which domestic and international double cycles promote each other, and carry out macro-control and counter-cyclical adjustment of economic activities. The government can help enterprises solve financing constraints and financing gaps by increasing the amount of capital investment and improving the credit level of enterprises.

There are also different methods for different links in the SC. The government can provide a subsidy rate to the cost of manufacturer's greenness efforts and grant a per unit subsidy to the manufacturer for the demand for green product [25].

3.2.3 Augmenting SC resilience (SCR)

SC resilience includes SC engineering with SC consensus, management strategy and design principle, SC coordination with SC function and joint planning, SC agility with goods flow speed and SC transparency, and SC risk management culture [26]. Its core is Event- Based Supply Chain Early Warning System (EWS).

SCR has different points of note. Braunscheidel and Suresh suggested that agility plays a pivotal role in strengthening the resilience of SC, while Chopra and Sodhi focused more on the visualization of requirements [27][28]. Craighead et al. and Falasca et al. listed density, complexity and node criticality as the determinants of SC elasticity [29][30]. Enterprises diverged in their responses. Retreat strategies, like a distress sale of assets, laying off employees, and taking new debts, which in the far-reaching term can impair the competitive power of the company, were opted for by firms. Others acted in a more resilient manner, which includes engaging celebrities to bring their goods live broadcasting, setting online channels for product promotion, thinking over the new demand of the customers, in case of SC disruption, and sourcing from new suppliers. Resilient and agile ways are pro-competitive approaches, and they make sure that a business can pull through to be in good shape as it was before or even tougher [31].

3.2.4 Enhancing cooperation and localization

Enterprises can simplify approval procedures, support the resumption of work and production of important enterprises in the industrial chain, and resume transportation and logistics. At the same time, they can also change the number of distribution centers appropriately, and promote the resumption of work of non-local personnel. Thus, the effective resumption of work and production of upstream and downstream enterprises of the SC can be promoted, and the normal operation of the SC can be ensured.

The company should strengthen the cooperation of SC participants in SC structure and function, improve team maturity and the relevant relationship management

system, and increase the flexibility and adaptability of response mechanism and coping strategy, so as to reduce SC vulnerability.

4. CONCLUSION

This paper focuses on solving the structure and transformation problems of enterprises' SCM under the normalization of COVID-19 prevention and control. By analyzing the problems from macro and micro perspectives, the author puts forward four solutions: paying attention to risk mitigation strategies and researching appropriate transformation direction; boosting government intervention and regulation; strengthening SC resilience; and enhancing cooperation and localization. The paper, however, has its limitations and drawbacks. For instance, it does not provide a better model which can replace SCOR or give solutions to all issues. Apart from that, this paper does not mention the lucubration of national strategic level. In that case, future research can focus more on the optimal solutions to existing problems and potential problems.

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