Proceedings of the 8th International Conference on Economic Management and Green Development
DOI: 10.54254/2754-1169/129/2024.18350

A Study of the Impact of Supply Chain Management on Improving Corporate Competitiveness: The Case of Bosch

Yuqing Feng[1,a,*]

[1]*Entrepreneur College, Xi'an Jiaotong-Liverpool University, Suzhou, 215000, China*
a. Yuqing.feng22@student.xjtlu.edu.cn
**corresponding author*

Abstract: In an open economy, market competition is not merely an enterprise-to-enterprise phenomenon; rather, it is increasingly evident as supply chain-to-supply chain competition. In light of the accelerated globalization and regional economic integration, it is becoming increasingly evident that a single enterprise is no longer capable of maintaining a monopoly in the market. As a result, it is a dynamic reflection of the comprehensive competitiveness of the entire supply chain. In this context, this paper presents a comprehensive examination of the significant impact and function of supply chain management on enterprise operations and management. To this end, it employs the case of Bosch to provide an empirical analysis of the optimization measures of enterprise operation and management under supply chain management. A combined approach of enterprise and supply chain management is adopted to unify qualitative analysis and quantitative research. In addition, a logical approach has been employed to analyse the issues and design potential solutions, as well as to examine the optimisation of enterprise operations and management within the context of supply chain management, involving a systematic process of analysis, comparison and referencing.

Keywords: Supply Chain Management, Bosch, Management and Operations, Optimisation Strategies.

1. Introduction

The enterprise supply chain management practice of Western developed countries demonstrates that modern enterprise production, management and operation under the supply chain management mode, particularly enterprise procurement management and warehouse management, is a complex systematic project [1]. To implement supply chain management innovation, enterprises must provide customers with more cost-effective products and services through organic integration of upstream and downstream suppliers and distributors, with lower supply chain production costs and efficient management, in order to be invincible in the fierce market competition [2]. The paper actively draws on the successful practice and useful experience of supply chain management in developed countries, analyzes the impact and role of supply chain management on enterprises in China, and explores the optimization of enterprise management under the supply chain management mode by combining with the empirical analysis of Bosch Company.

The remaining parts of this paper are as follows. Chapter 2 provides an overview of the main concepts and theories, which serve as the theoretical foundation for this paper; Chapter 3 analyzes the current situation of Bosch's supply chain management and operations, which is the research focus

DOI: 10.54254/2754-1169/129/2024.18350

of this paper; and Chapter 4 presents optimization countermeasures for Bosch's management and operations under the supply chain management, which is the research result of this paper. In comparison to similar studies, this paper offers both theoretical and practical insights, which is not only conducive to the innovation of the research paradigm of management and operation under the supply chain management mode of China's enterprises, but also conducive to the optimization of the quality of Bosch's operation management and the enhancement of the core competitiveness of enterprises.

2. Theoretical Foundations of Supply Chain Management

2.1. Modern Value Chain Theory and Durkheim's Idea of Organic Solidarity

The theory was developed in the 1980s by Michael Porter, a renowned American management scientist, as a business management concept and operational model to emphasize the theoretical hypothesis that member firms of a value chain can add value to their products or services by strengthening cooperation and collaboration through a clear division of labour and responsibilities between them [3]. The importance of the division of labour in Turgot's idea of organic solidarity is re-emphasized here, with the division of labour increasingly taking on roles previously performed by a shared collective consciousness. In a sense, value chain management is not only a management concept, but also an enterprise management mode under the supply chain management mode. In order to achieve the value-addedness of all enterprises in the whole chain, the value chain theory requires member enterprises to strengthen the sense of cooperation, and reasonably use the modern supply chain decision-making system to replace the previous decision-making system that lacks flexibility and integration, so as to strengthen the information-sharing ability among member enterprises in the supply chain, and eliminate the phenomenon of information silos and information distortion to the greatest extent possible [4].

2.2. Hall Encoding-decoding Theory and Bullwhip Theory

Encoding and Decoding in Television Discourse comes from an academic lecture given by Hall at the University of Leicester in 1973. Hall suggests that the audience of popular culture is not entirely passive, but is able to interpret media texts and participate in the production of information according to its own position [5]. Meaning is not "transmitted" by the transmitter but "produced" by the receiver, and the interpretation of texts is a process of social negotiation. This reminds me of the bullwhip effect in manufacturers. The core essence of the bullwhip effect is that the fluctuation of orders along the supply chain from retailers to wholesalers to manufacturers to suppliers continues to intensify, the repetition of a "decoding" process, it is difficult to avoid distorting the supply chain of demand information, each link of the demand estimates are different, which leads to the supply chain disorders, resulting in distortion of information [6]. While the decoding in Hall's theory exists only at one level, information distortion in the enterprise exists at three levels: top-down, bottom-up and horizontal. In this process, information may be redacted, misplaced or even amplified. No matter where in the supply chain, this can have a detrimental effect.

3. Bosch's Supply Chain Management Operation Status

3.1. Basic Developments at Bosch

Bosch, founded in 1886, is one of Germany's industrial companies engaged in the industries of automotive and intelligent mobility technology, industrial technology, consumer goods, and energy and building technology [2]. The Bosch Group is renowned globally for its pioneering products and

DOI: 10.54254/2754-1169/129/2024.18350

system solutions. To enhance efficiency and flexibility, it is continuously striving to optimize its global supply chain network. The Company has implemented advanced supply chain management systems, leveraging big data analytics and Internet of Things (IoT) technologies to enable real-time monitoring and predictive maintenance. This digital transformation not only improves production and distribution efficiency but also boosts transparency and responsiveness within the supply chain. Besides, Bosch is committed to sustainable supply chain management, focusing on reducing carbon emissions and resource consumption to promote green supply chain practices. These initiatives have strengthened Bosch's competitive edge and laid a solid foundation for its continued growth in the global market.

3.2. Status of Procurement and Inventory Management at Bosch

The research revealed that Bosch has implemented a functional matrix management model in its organizational structure design, with eight functional departments, namely, personnel administration, finance, marketing, purchasing, development, manufacturing, quality assurance, and logistics, of which purchasing, manufacturing, and sales are the departments that have the closest relationship with supply chain management. Bosch assigns responsibility for various operations within the company to departments and specific individuals, which better achieves economies of scale within the function, promotes in-depth knowledge and skills improvement, and also helps the organisation to achieve its functional objectives [7].

4. Key Issues in Bosch's Supply Chain Management Operations

4.1. Procurement Management Issues at Bosch

Through field research and data collation, more than 200 suppliers of Bosch are listed, as shown in Table 1.

Table 1: Distribution Statistics of Some Suppliers of Bosch (Source: Bosch's Website)

Serial No.	Items	Number of Suppliers	Annual Purchases (million)	Proportion of Purchase Amount	Average Vendor Purchases (million)
1	Casting Blanks	17	3312.57	51.25%	176.89
2	Machined parts	64	859.44	15.64%	15.22
3	Steels	12	356.12	6.37%	32.89
4	Copper	4	37.23	0.89%	8.23
5	Plastics	15	126.33	2.41%	7.8
6	Sheets	15	1157.32	20.32%	80.23
7	Bolt nut	34	134.85	1.73%	4.74
8	Low-value consumables	60	16.22	0.41%	0.28
9	Stationery	3	8.35	0.98%	2.46
10	Total	224	6008.43	100.00%	328.74

From the statistics in Table 1, Bosch still has many suppliers whose annual purchase orders are less than RMB 30 million. Analyses show that one of the main reasons for such a situation is that Bosch, in order to take full advantage of the current development of China's automotive parts suppliers, which are many and varied, relies on the price to enhance the role of procurement management to support the company's cost savings, profit increases and fixed assets to improve the

DOI: 10.54254/2754-1169/129/2024.18350

rate of return. In fact, for so many suppliers of raw materials, Bosch in earning huge purchasing revenue, but also invariably lost a lot of potential revenue, pay a lot of opportunity cost, because for those suppliers who are not very large production scale, both the production technology and production process have certain problems, which largely affects the production and supply of high-quality automotive parts and accessories of Bosch.

4.2. Inventory Management Issue at Bosch.

As mentioned above, inventory control in the supply chain management mode not only helps to reduce the inventory level, but also helps to avoid the "bullwhip effect" in inventory management to the maximum extent possible, however, in the field research and interviews, we found that there are still many problems in the management of auto parts and raw materials inventory in Bosch, centrally embodied in the following Lack of supply chain inventory management awareness [8]. Firstly, Bosch lacks a holistic view of the supply chain; Bosch often ignores the interests of raw material suppliers of many parts and components due to the requirements of downstream customers, and often changes its production plan without authorization. Secondly, Bosch neglected the sense of perfect service in customer management; the management of Bosch developed the auto parts business in time. However, when providing spare parts for customers, i.e. downstream vehicle manufacturers, it ignored the advance period of customers' requirements and the matching problems of specific spare parts, and often provided customers with spare parts of either low quality or delivery methods and prices that failed to meet customers' requirements, resulting in the increasing inventory of auto spare parts, which squeezed a large amount of working capital [9].

5. Bosch’s Management Operations Optimization under Supply Chain Management

5.1. Optimisation Strategies for Purchasing Management at Bosch

Firstly, the differentiated management of suppliers represents a key factor in effectively improving the relevance and efficacy of supplier management. In particular, Bosch maintains that supplier management should be a priority in cases where technical specifications are particularly demanding and the number of suppliers is relatively limited. Conversely, in the case of suppliers with less demanding technical specifications and a greater degree of standardization, Bosch can streamline its management procedures to align with its established management model.

Secondly, when evaluating potential suppliers, Bosch should have strategic thinking and supply chain management concepts, not only focusing on the evaluation of suppliers' financial indicators, but also paying attention to suppliers' non-financial indicators, and striving to achieve an all-round systematic evaluation of suppliers' equipment management, quality control, process tracking, and production capacity enhancement, etc., in the context of globalization.

Finally, Bosch should pay attention to the science and rigour of the supplier management mechanism, correctly handle the relationship between technical confidentiality and strategic cooperation, strive to achieve organic unity of the two, and lead the strategic cooperation of suppliers. In practice, we can make use of the annual supplier conference to invite suppliers to anonymously evaluate the comprehensive performance of the supplier’s access stage, inquiry and contracting stage, sample stage, mass production stage, self-discipline, long-term relationship development, etc., which will help build a closer cooperative relationship with suppliers.

DOI: 10.54254/2754-1169/129/2024.18350

5.2. Optimisation Strategies for Inventory Management at Bosch

First of all, Bosch should actively implement zero inventory and no inventory management mode. For Bosch, when spare parts are in a state of turnover in various stages of procurement, production, sales and distribution, it can be understood as the concept of zero inventory status.

Secondly, Bosch should implement graded inventory management for all kinds of raw materials for auto parts production. For example, the inventory management mode of key spare parts: key spare parts have the characteristics of high purchasing amount and large inventory possession, therefore, in choosing the inventory management mode of key spare parts, emphasis should be placed on purchasing cost control and inventory control, so as to reduce the purchasing cost and inventory possession as much as possible. Another example is the inventory management mode of leveraged spare parts: leveraged spare parts have the characteristics of strong substitutability, fierce competition in the market, and low risk of out-of-stock, therefore, the inventory management mode of leveraged spare parts should be selected with the purpose of reducing the occupation of inventory capital and improving the turnover rate of inventory capital, and the implementation of the no-inventory mode.

Finally, the requisite specifications of the inventory management model for general-purpose spare parts are as follows. Given the high versatility, sufficient supply, and low risk of stock-outs associated with general-purpose spare parts, the selection of an inventory management model for these items should prioritize the minimization of management costs and the adoption of economic batch management, with the aim of simplifying the inventory management process for such spare parts.

6. Conclusion

With the advent of a new historical period, the division of labor among enterprises has been progressively refined. Enterprise management operations should be guided by supply chain management, which should in turn strengthen the relationship management between suppliers and customers. Furthermore, the resources and competitiveness of upstream and downstream related enterprises should be integrated organically, with the core enterprise acting as the leader. Attention should also be paid to information exchange and information sharing, as well as strictly implementing inventory and procurement management in accordance with market-driven and order-driven principles. Finally, the quality of enterprise management operations should be effectively improved. In the context of enterprise management operations under a supply chain management mode, it is essential to adhere to the strategic principle of prioritizing the supply chain management and its value-added ability as a primary management position within the enterprise. Additionally, it is crucial to adhere to the holistic principle, focusing on the division of labor and cooperation within the enterprise while simultaneously expanding to upstream and downstream enterprises to establish a cooperation mechanism encompassing information sharing, benefit sharing, and risk sharing. Furthermore, it is vital to adhere to the principle of customer-centeredness, emphasizing the importance of market demand and timely response as key factors influencing the enterprise's operations and supply chain management. The principle of customer-centeredness should be adhered to, with market demand and a timely response being the fundamental starting and ending points of enterprise operation and supply chain management.

References

[1] *Denner, V. (2017) Business Model Innovation: Some Key Success Factors at Bosch. Springer International Publishing.*

[2] *Bosch. (2024) Bosch is banking on Innovations, partnerships, and acquisitions – cost reduction remains in focus. . https://www.globenewswire.com/news-release/2024/04/18/2865227/0/en/Bosch-is-banking-on-innovations-partnerships-and-acquisitions-cost-reduction-remains-in-focus.html*

[3] *Cattaneo, C. (2023). Value Chain Management. In: Idowu, S., Schmidpeter, R., Capaldi, N., Zu, L., Del Baldo, M., Abreu, R. (eds) Encyclopedia of Sustainable Management. Springer, Cham.*

[4] *Dunning, J. (1993) Internationalizing Porter's Diamond. Management International Review, 33(2): 55-70.*

[5] *Dunning, J. (1992) The Competitive Advantage of Countries And The Activities Of Transnational Corporations. Transnational Corporations, 1(1): 135-168.*

[6] *Chen, F. (1993) Decentralized Supply Chains Subject to Information Delays, Graduate School of Business. Electric Perspectives, 25(1): 44-55.*

[7] *Chu, C.X., Gad-Elrab, M.H., Tran, T.K., Schiller, M., Kharlamov, E. and Stepanova, D. (2023) Supplier optimization at Bosch with knowledge graphs and answer set programming. Lecture Notes in Computer Science, 200-204. https://doi.org/10.1007/978-3-031-43458-7_38*

[8] *Jaber, M.Y., Bonney, M. and Jawad, H. (2017) Comparison between Economic Order/Manufacture Quantity and Just-in-Time Models from a Thermodynamics Point of View. Computers & Industrial Engineering, 112: 503-510. https://doi-org-s.elink.xjtlu.edu.cn:443/10.1016/j.cie.2016.08.023*

[9] *Kogut, B. and Zander, U. (1992) Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology. Organization Science, 3(3): 383-397.*