

Research on the Optimization of After-Sales Parts Supply Chain Management Based on Supplier Management

-Taking SAIC General Motors After-Sales Parts as an Example

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How to cite this paper: Yu, Z.X. and Chen, Y.M. (2018) Research on the Optimization of After-Sales Parts Supply Chain Management Based on Supplier Management—Taking SAIC General Motors After-Sales Parts as an Example. *Open Access Library Journal*, **5**: e4976. https://doi.org/10.4236/oalib.1104976

Received: October 9, 2018 Accepted: November 23, 2018 Published: November 26, 2018

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Abstract

Nowadays auto parts industry supply chain management is becoming a booming industry which is full of opportunities and challenges. As a network node of supply chain, the reasonable optimization of the supplier not only affects the after-sales parts operating costs, operating performance, competitive strategy and the future development, but also affect the entire supply chain logistics cost, logistics strategy and competition strategy. Supply chain management research for Supplier management can effectively guide the auto parts manufacturers of the business environment, foster strengths and circumvent weaknesses, assess the situation, seize the moment, and gather more intense market competition in the future always maintain their advantage. Therefore, deeply studying the related theory of automobile after-sales spare parts supply chain, combined with the status quo and development trend of the automobile and accessories market in China, then optimization the basic model and operation strategy of automobile customer service parts supply chain in China, has a very important practical significance. Based on the customer service parts supply chain of SAIC General Motors, we analyze the operation characteristics and the status quo of this company; analyze the existing problems in the supply chain of the company's after-sales parts. Firstly due to the historical reasons, and the lack of overall concept of the supply chain, supplier order delivery rate is low, information feedback is not timely, inventory pressure is high, and supply chain management system is imperfect. Secondly the incomplete information and inaccurate predictions lead to unreasonable warehouse storage; inventory turnover rate is low. Finally, the market demand and the information are not shared caused low company's accessories sales and high proportion of transport costs. In the aspect of optimization design, firstly we analysis and improve reasonable management of suppliers, inventory structure, major items of operating costs and existing problems in SAIC General Motors. In the optimization design, we firstly analyse reasonable management of suppliers in order to reduce costs and in a timely manner to meet the market demand; Then the information integration of the parts system can scientifically synthesize information to reasonably predict sales volume, satisfy inventory optimization and strengthen cooperation with suppliers; Finally, adjust the structure of spare parts inventory according to the contact with the supplies; improve the company's inventory turnover rate, to make the whole supply chain inventory structure more reasonable accessories, so as to reduce the company's operating costs, improve customer satisfaction rate and satisfaction.

Subject Areas

Supply Chain Management

Keywords

Supply Chain Management, Aftermarket Parts Supply Chain, Supplier Management

1. Introduction

1.1. The Research Background

In recent years, with the development of China's economy, people's concept of consumption and after-sales service has gradually risen, which poses a new challenge to the scope and quality of social and enterprise services. At present, various advanced management experiences are integrated with each other to promote enterprises to continuously strengthen their own management capabilities and service efficiency. The realization of this process requires enterprises to strengthen supply chain management to enhance their core competitiveness. The rapid development and continuous updating of supply chain management required enterprises to have a systematic under-standing of its fields, especially in the context of the modern logistics operation gradually developing from a single service to a systematic service. The logistics operation drives the system to toward large-scale, systematic, automated and integrated direction. This is both an opportunity and a challenge to the supply chain management of enterprises. As a key link of supply chain management, supplier management plays an important role in defining enterprise development strategy. As an important part of company's after-sales business, supplier's delivery quality and speed have a direct impact on customer's after-sales experience. Therefore, it is necessary to enhance supplier's management ability. This paper took SAIC General Motors as an example to introduce how to improve the supplier management ability as an organic whole of the supply chain in order to better meet the diversified, personalized and timely customer needs.

1.2. A literature Review of Foreign Research

Since the 1930s and 1940s, scholars and experts from various countries have begun to study supply chain management, and look for the root causes and solutions of problems from various perspectives of the supply chain based on different issues. Since then, a large number of supply chain management models with the core of supply chain have been developed and utilized. As an important node of supply chain management, supplier has attracted many scholars to conduct research on their evaluation and management.

In 2005, the survey report published by DELL focused on the issue of extracting the interests of suppliers. It pointed out that the traditional increase of DPO will cause suppliers to lower their product financing costs and raise the price of products. The existing value chain model will lead to the rise of DPO chain reaction. The rise of the chain reaction, the biggest damage to the interests will be the manufacturers of primary products, which is very unfavorable for the healthy development of the entire industry, and pointed out that enterprises should be closely linked with suppliers and customers. In 2010, David M. Katz studied the impact of supply chain finance on improving supplier relationships in a survey entitled "Strengthening Supplier Relationships through Supply Chain Finance", which fully illustrated the development and application of supply chain and business processes in the management of working capital suppliers. Kessler and Chakrabatri [1] believed that under the cooperation of suppliers, companies can better identify potential technical problems and accelerate the development of new products and respond to market demands; Yli-Renko [2] studies showed that the creation, acquisition and utilization of knowledge can be promoted by building cooperative networks with suppliers. Miotti and Sachwald [3] found that collaboration with suppliers and customers had a positive effect on sales of innovative products through the second European Community Innovation Survey (CIS-2). Naude [4] proposed five dimensions to evaluate the quality of supplier partnership: trust, demand satisfaction, supply chain integration, power and profit, and the main characteristics of successful partnerships are constraints, coordination and trust, communication quality and participation, and conflict resolution. In terms of evaluation methods, DEA (Data Envelopment Analysis), as a non-parametric statistical method for dealing with multiple input and multiple output problems, is currently widely used in the evaluation and selection of suppliers [5] [6]. Tam [7] proposed to use the Analytic Hierarchy Process (AHP) to comprehensively evaluate the supplier's product quality, production capacity, product structure, marketing situation and market influence, and then select the best supplier.

To sum up, the research on supplier management in supply chain is mainly focused on how to evaluate supplier relationship and maximize the value of supplier. The research on supplier management in supply chain has gradually changed from single project asset management to comprehensive asset management. How to optimize the internal project, extend to supply chain management, combined with enterprise marketing and strategic level, how to maximize the value of the company through working capital supplier management and working capital management supplier performance evaluation has not been clearly studied.

1.3. A literature Review of Domestic Research

China's related research on supply chain management started slightly later.

Chen (1999) pointed out in the research that the fundamental purpose of supply chain management is to improve customer service capabilities, give full play to the operational capabilities of the entire supply chain, and strive to improve customer responsiveness and service quality with minimum service costs. Yang (2005) found that the supply chain plan is closely controlled, and the supplier management information system should be introduced in time to coordinate the relationship between suppliers in the supply chain to ensure the timeliness and efficiency of procurement management to the maximum extent. And logistics information system to integrate supply, purchase and purchase lead time issues, to ensure that the company's parts procurement is timely, accurate and efficient. Luo et al. (2009) believed that enterprise supply chain cost management should focus on key procurement indicators such as delivery quantity, purchase time, delivery location, etc., and timely send them to suppliers through information, and manage information through suppliers. The system will check the specific location of the goods in time to ensure that the production and supply of the goods are closely connected. Tang et al. (2010) proposed to use the third-party logistics model (TPL), correlation model for supplier inventory decision-making and customer satisfaction analysis, put forward supply chain management principles and constraints to establish. Wang (2014) stressed that in the supply chain procurement environment, it is necessary to focus on supplier selection, assessment, appraisal and incentive work, taking supplier relationship management as the starting point, adopting bidding procurement, bargaining procurement and strategic procurement, carefully select cost-effective suppliers, strengthen the efficient connection of material production, cost control and supplier relationship management, and bring the cost-saving and cost control leverage effect of procurement management. Pei [8] proposed an activity-based costing (ABC) method to solve supplier evaluation and selection problems. Li [9] proposed a consistent method for transforming the evaluation information of all decision makers into a binary semantic variable based on fuzzy theory to solve the supplier's overall supply performance evaluation problem. Jia [10] constructed a supplier quality evaluation index system under SCM environment, and used BP neural network to conduct empirical research on supplier quality space. Wang [11] proposed a method for supplier evaluation based on the DEA game cross-efficiency model, which solved the problem that the supplier's index evaluation is often ambiguous to a certain extent. Xiong [12] studied the relationship among manufacturer trust, control mechanism and supplier performance, and analyzed the role of control mechanism as a guarantee mechanism of trust in improving supplier performance. Xie [13] focused on the quality of cooperation between suppliers and enterprises, and conducted a study on the unification of behavioral commitment and attitude commitment evaluation in the cooperation process. Zhang [14] studied the relationship between supplier cooperation and competitive advantage from three dimensions: strategic procurement, information sharing and supplier participation. Xiong [15] combined with the development of the automotive industry, proposed that a good supplier relationship can improve the performance of its product innovation through organizational learning.

Summing up the relevant research literature, we can find that the current research on supply chain management is from a separate to comprehensive transition, has formed a channel and supply chain management as the core management model. As the evaluation criteria of supply chain management are changing, the reform and development of supply chain management with channel as the core is taking shape. However, the research on Supply Chain Management based on supplier management in China is still imperfect, and there is no established gap in the establishment of a complete supplier management system. To be sure, supplier management is the constraints and key to supply chain management, and building a reasonable supplier management system is the focus of improving enterprise supply chain management. Supplier management promotion is an important part of enterprise development strategy, and after-sales accessories service as an important part of the company's after-sales business. The quality and speed of supplier delivery directly affect the customer's after-sales experience. It is the significance of this paper to develop the management capabilities of suppliers, enhance the operational cooperation of suppliers, and establish and improve the evaluation mechanism of suppliers.

1.4. Significance

SGM is a typical manufacturing-oriented company. During the development process, it has undergone strategic adjustments and changes in various aspects such as organization, process, and market. Various problems have appeared in the process of supply chain management in the company. These problems are also representative, and there are similar problems in many similar enterprises. SAIC General Motors after-sales spare parts in the practice of supplier management constantly improve and innovate. Through the analysis of SAIC General Motors after-sales spare parts supply chain management related problems, understand the current similar enterprises in the supplier management process problems, help such enterprises to analyze the causes of problems and propose countermeasures to improve. Enterprise's supply chain management capability and overall business efficiency. Supplier management is an important part of supply chain management. If the supplier management is insufficient, it will cause some corresponding problems. This situation will not only improve the quality and efficiency of the service, but also hinder the company's room for improvement. In-depth study of the supply chain management of SAIC General Motors' aftermarket parts will help improve the company's management efficiency and management level. On the other hand, it also provides a basis for the combing of the business philosophy of similar companies in China and the formulation of strategic planning. The purpose is to enable enterprises to reduce operating costs, improve supplier operational coordination capabilities and service quality, establish and improve supplier evaluation mechanisms, and achieve the enhancement of corporate core competitiveness and sustainable development.

1.5. Methods

Research methods mainly include:

1) Theoretical research

From the perspective of the overall supply chain optimization, the main methods and technologies for supplier management include: effective customer response (ECR), supply chain inventory control technology (VMI and JMI), collaborative planning, forecasting and replenishment (CPFR) and JIT procurement and distribution.

2) Investigate the status quo and find out the bottleneck

From the perspective of planning and supplier management, we will sort out the process breakpoints and management blind spots in the current operation. In the process, it is necessary to carry out the research from the perspective of SAIC General Motors and from the perspective of suppliers, and fully investigate the supplier's understanding and implementation of the existing SOR and the effectiveness and rationality of the existing performance appraisal system.

2. Theoretical Overview

2.1. The Definition of Supply Chain Management (SCM)

The broad definition of supply chain management encompasses the entire value chain, which describes the procurement and supply management processes throughout the process from raw material extraction to end of use. Baatz further extends supply chain management to the recycling or reuse of materials. Supply chain management focuses on how to enable suppliers to leverage their processes, technologies and capabilities to enhance their competitiveness and collaborate on product design, manufacturing, logistics and procurement management functions within the organization. When all the strategic organizations in the value chain form a unified knowledge entity and run through the entire supply chain network, the operational efficiency of the enterprise will be further improved.

The narrow definition of supply chain management refers to the integration

of logistics in different functional areas within an organization, and strengthens the relationship between strategic suppliers through manufacturers and distributors to final consumers. By leveraging the capabilities and technology of direct strategic suppliers, especially early involvement of suppliers in the product design phase, it has become an effective means of improving the efficiency and competitiveness of manufacturers.

2.2. The Content of SCM

In general, supply chain management content should include the following aspects:

1) Strategic management of supply chain. Supply chain management itself belongs to the problem of enterprise strategy. Therefore, when selecting and participating in the supply chain, it is necessary to consider the issue from the height of the enterprise development strategy.

2) Information management. Information and the quality and speed of information processing are the key to whether an enterprise can benefit from the supply chain, and also the pivotal to achieve the overall benefits of the supply chain.

3) Customer management. It is the starting point of supply chain. As mentioned earlier, supply chain originates from customer demand, and finally customer demand, so supply chain management is to meet customer demand as the core operation.

4) Inventory management. Supply chain management is the use of advanced information technology to collect information on all aspects of the supply chain and market demand, and reduce the error in demand forecasting. Control logistics with real-time, accurate information, reduce or even eliminate inventory ("virtualization" of inventory), thereby reducing inventory holding risk.

5) Relationship management. By coordinating the node enterprises in the supply chain and changing the traditional "one-way beneficial" consciousness when trading between enterprises, the node enterprises can conduct transactions on the basis of coordinating the cooperative relationship. Thus, the overall transaction cost of the supply chain can be effectively reduced, the global optimization of the supply chain can be realized, and the profit of the node enterprises in the supply chain can be increased, thus achieving a win-win effect.

6) Risk management. Information asymmetry, information distortion, market uncertainty and other political, economic, legal and other factors lead to the operational risks of node enterprises in the supply chain; we must take certain measures to avoid these risks as far as possible.

2.3. Supply Chain Logistics Management Technology

1) Effective customer response (ECR)

ECR is to create a system that effectively responds to customer needs, what the customer needs to produce, rather than waiting for the customer to buy what is

produced. The core of ECR is to require suppliers and retailers to pay attention to the needs of consumers, shift their energy to understanding and demanding consumers' needs, and make consumers less money, time, energy and risk.

2) Vendor managed inventory (VMI)

VMI is to transfer the decision-making power of the customer to the supplier, and the supplier executes the decision-making power of the inventory instead of the distributor or wholesaler; VMI is to apply the supplier's ability to manage the inventory. JMI is a risk sharing management model of supply chain. It emphasizes the participation of both sides to make inventory plan together, so that every manager (supplier, manufacturer, distributor) in the supply chain process considers the coordination of each other, and then maintains the consistency of inventory among the adjacent nodes of the supply chain.

3) Joint managed inventory (JMI)

CPFR is a management technology based on supply chain integration. It applies a range of processing and technical models to provide a collaborative process that spans the entire supply chain. Improve the predictive accuracy by jointly managing business processes and sharing information to improve the accuracy of forecasting, ultimately improving supply chain efficiency, reducing inventory and increasing consumer satisfaction.

4) JIT Procurement and distribution

JIT purchasing is an advanced mode of purchasing and supplying. Its basic idea is to provide the right goods at the right time, in the right place, in the right quantity and in the right quality. It evolved from just-in-time production and was a continuous improvement to eliminate inventory and unnecessary waste. Punctual supply is necessary for just-in-time production. Therefore, just-in-time purchasing is an inevitable requirement of just-in-time production management mode.

3. Analysis of the Problems in the Management of SAIC General Motors's Aftermarket Parts Suppliers

3.1. Overview of Supplier Management

SAIC General Motors after-sales spare parts for the enterprise sold more than 10 million cars to provide quality spare parts services, after-sales spare parts up to 100,000 kinds, covering all parts of the car. Provide a comprehensive system of services from procurement, supply, maintenance to quality assurance. As a hub connecting suppliers and maintenance stations, the company manages and controls the parts supply of various platforms reasonably, including more than 1000 accessories enterprises at home and abroad, more than 1700 4S shops, more than 500 locomotive workshops, 7 parts warehouses and Deco accessories agents. Ensure that every spare parts are strictly certified and carefully screened, fully cover all types of SAIC GM vehicle spare parts, to create an efficient distribution network, to achieve no break-point supply. So that SAIC owners can get reliable and reliable accessories service immediately.

3.2. General Situation of SAIC General Motors Aftermarket Parts

The components of SAIC General Motors' aftermarket parts supply chain management include four parts: parts sales strategy, parts sales coordination, parts logistics, parts planning and control. The planning and control of accessories is the core of the entire business process. The Parts Sales Strategy Department is the key to affecting parts control. Since the quantity of finished parts is easily affected by factors such as supply and market, the inefficient supply of parts is the main problem of low efficiency, the urgent sales task, the high requirements of production technology, and the higher requirements for the supply of parts. As the supply department of the supply company, because some parts are non-standard parts and need to be ordered from outside, it will inevitably lead to outsourcing production, which is one of the potential risks affecting the delivery progress. The effective connection between outsourcing services and production is the main way to resolve this contradiction.

3.3. Supply Chain Management Mode and Composition

SAIC General Motors' aftermarket parts supply chain management and brand sales, Pan Asia after-sales engineering, manufacturing departments, parts sales collaboration, parts logistics, parts planning and control, finance and procurement are closely related. It is a management system that includes the division of responsibilities between these departments and the daily business development.

SAIC General Motors' aftermarket parts supply chain management capital flow system begins with the bank and ends with an online settlement platform or an offline store. The logistics system starts from the parts supplier and passes through the logistics and transportation links and sales links to the consumers. First, the dealers propose product orders that are oriented to meet the needs of the market consumers, detailing the types of products, quantity, arrival time and so on, coordinated by the accessory planner to suppliers at home and abroad as well as SAIC General Motors production workshops, then through its production, and the corresponding raw material ordering, storage space arrangements.

3.4. Supply Chain Organization Structure and Management Process

SAIC General Motors' aftermarket parts supply chain management and brand sales, Pan Asia after-sales engineering, manufacturing departments, parts sales collaboration, parts logistics, parts planning and control, finance and procurement are closely related. It is responsible for the construction of the management system for the division of responsibilities and the daily business development of these departments.

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3.5. Problems in Supplier Management

1) Large inventory pressure

The high inventory pressure makes it impossible to maintain a low stock level of inventory, which is closely related to the "bullwhip effect". Due to this information impact, upstream suppliers tend to maintain higher inventory levels than downstream suppliers. The existence of the "bullwhip effect" will have serious consequences for enterprises, thus weakening the competitiveness of enterprises.

The main reasons for the high inventory pressure are:

a) The revision of demand forecast is not accurate; in the traditional supply chain, each node enterprise always uses its direct downstream demand information as the basis for its own demand forecast. Due to incomplete information, wholesalers and distributors can also make more inventory decisions, leading manufacturers to produce more products.

b) Order batch decision is not wise; in the supply chain, each company will order upstream, in order to reduce order frequency, reduce costs and avoid the risk of out of stock, sellers often order in accordance with the best economic volume. At the same time, suppliers often require sellers to order in a certain number or period of time. At this time, in order to obtain the goods as soon as possible or the goods are obtained in full, or in case of emergency, the order may increase the order quantity and increase the inventory.

c) Price fluctuations lead to increased inventory pressure.

d) The shortage game; when the demand for certain products in the market increases, retailers and distributors will predict that these goods will be in short supply, which will lead to an increase in orders. However, when the demand cooled down or the shortage ended, the large order quantity suddenly disappeared, causing errors in demand forecasting and judgment, resulting in increased inventory pressure.

2) Order delivery rate failed to meet expected goals

The reasons for the low order delivery rate, the unsuccessful delivery of some suppliers or the inability to deliver the distributors in time are mainly due to the following reasons:

a) The delivery of raw materials is not timely and the delivery is not timely; because the raw materials are not timely, the production may not be completed on time, resulting in failure to deliver on time.

b) Causes of production; if the production plan is unreasonable, the production staff can not get to the job immediately, and the production of non-conforming

products is more.

3) Supply chain management system is unperfect

The purpose of implementing supply chain management is to reduce the order arrival and delivery cycle, improve flexibility, reduce waste and increase profits. Whether these objectives can be achieved depends on whether effective coordination can be achieved and the risk caused by uncertainty can be reasonably controlled, which is also the key to the supply chain management system to solve the problem. Although SAIC GM has unified operating guidelines and system documents for supplier management, the uneven implementation of suppliers can not be satisfactory. Therefore, SAIC GM should perfect its own management mechanism according to its own environment.

4) Information feedback and docking are not timely

The lack of physical technology facilities in the supply chain can lead to delays in existing information feedback systems. There may be some financial, statistical reports, indicators and supply and demand information released in a timely manner, and biased on post-mortem analysis; feedback is not timely, resulting in increased decision-making errors. On the one hand, suppliers have low cooperation and do not play a full synergy. Suppliers cannot obtain information on supply and demand through unified channels. On the other hand, due to the insufficient attention of suppliers to after-sales parts, the feedback of problems encountered in the process of parts supply is not timely, and there is no supplier's information docking, and it is impossible to deal with related problems of suppliers in time. There is no systematic documentation of the supplier's problems for real-time capture and follow-up processing.

4. SGM Aftermarket Parts Supplier Management Solution Optimization

4.1. Supplier Management Demand Analysis and Target Design

1) Demand analysis

The supplier's demand analysis is the process of connecting with suppliers through effective market analysis, consumer research, sales forecasting, order management, and shipping commitment. First of all, the sales department needs to propose solutions that can be deeply researched in the field and provide product development direction based on the annual sales plan, phased market research, and consumer demand analysis. According to the development of the preset product functions and the judgment of the market demand, the company needs to predict the product sales demand at a certain stage in the future; and then make clear adjustments according to the specific customer orders. Regular products are subject to the customer's order. Shipment of finished parts should follow the FIFO guidelines. After receiving the order, the accessory system should first verify the inventory information and then consider whether it needs to be ordered from the supplier based on the verification result. The accessory system adjusts the quantity according to the stock and calculates the demand quantity of the corresponding parts, and finally sends the ordered order information to the supplier for ordering.

The customer (dealer), through the order provided by the system, enables the sales department to develop a corresponding sales and demand plan (annual forecast plan). Fluctuations in demand in the aftermarket lead to uncertainty in the customer's order forecast. Even if forecast based on sales history data, it is impossible to fully accurately analyze future order trends and changes in customer demand. Although it has certain reference value, it also affects the accuracy of the prediction results. Shanghai General Motors Pure Parts Co., Ltd. plans the forecast for the next time period on a monthly or weekly basis. Depending on the part properties (frequency of delivery and cycle, etc.), the accessory system will issue a purchase order for the next cycle to the supplier based on the actual market demand and inventory of the part. Then, according to the historical demand situation and the inventory consumption situation, the revised plan predicts the supplier stocking reference.

2) Target design

The optimization of the supply chain process of SAIC General Motors' aftermarket parts requires the design and optimization of the supply chain in the entire logistics and information process of SAIC General Motors' aftermarket parts, including product specifications, custom types and quantity confirmation. The main purpose is to achieve logistics cost savings between suppliers and enterprises while meeting customer needs.

In the process of supply chain management, SAIC General Motors' after-sales accessories need to be configured with an adjusted operating system based on information functions and division of labor between different departments. The system transmits information between upstream and downstream of the supply chain of SAIC General Motors' aftermarket parts, complements the functions of different departments, coordinates the work objectives and resource allocation of each department, strengthens customer demand response, ensures timely information transmission, and ensures that the overall efficiency of the supply chain is improved.

This paper mainly analyzes the specific problems existing in the management of SAIC General Motors' aftermarket parts suppliers. Through the investigation of the status quo, field visits and other means to find out the bottleneck, form an improvement plan, and implement the solidification, so as to effectively solve the problem and achieve the desired goal. Therefore, the research objectives of this paper are mainly divided into two levels: business level and strategic level.

a) Business level:

- Reduce the purchase cost of after-sales service parts;
- Reduce the inventory of after-sales accessories;
- Improve the quality of after-sales accessories;
- Shorten the lead time of after-sales service parts;
- Improve parts satisfaction and customer satisfaction.

b) Strategic level:

- Comprehensively improve the supplier's performance appraisal management system and focus on supply capacity mining; Establish an effective supplier management mechanism to improve the coordination of suppliers;
- To create a collaborative management platform for Shanghai GM and suppliers' after-sales service accessories to promote communication and follow-up mechanisms.

4.2. Supply Chain Management General Plan Design

SAIC General Motors aftermarket parts information management system can be divided into system setting function, basic data function, management function, total warehouse management function, workstation management function, report management function, etc. according to functions. By setting the operation rights of different types of users, users can log in with a password and then operate according to different positioning functions of their own rights. The details are as follows.

1) Customer (dealer, etc.) order

According to the product quantity, category, delivery address and other information in the sales orders of each workstation or e-commerce website, the customer can provide the sales product requirements and submit the information to the information system. The demand information will be released to the warehouse, inventory management personnel, and customer service personnel at the same time to realize the information obtained by multiple parties at the same time. Corresponding to the real-time situation of different regional inventory, the warehouse organization arranges packaging/shipment to customers. Inventory managers assess whether inter-pool transfers are required. The customer service personnel accept feedback such as the customer's out of stock/missing, internal coordination and related personnel to solve and so on. Simultaneous information transfer can solve the problem of information lag to the greatest extent, and facilitate the decision-making and work execution of multiple departments.

2) Supplier shipment plan release

The supplier shipping planner checks the finished product inventory in the system according to the sales order demand, and obtains the order planning of the additional product after confirmation by the inventory manager. Based on past sales records and current product promotion plans, the sales department usually forecasts the sales of products for the next four weeks. The main purpose is to reduce the over-order by flexible order planning. The confirmation of the delivery date is also adjusted according to the changes in production conditions and orders. In order to deal with the abnormal handling of order status in time, an order period plan of about 30% is usually made.

3) Spare parts planning and control management

SAIC GM parts after-sales parts engineering changes frequently, and some

parts purchase cycle is long. Parts planning and control management are mainly divided into two aspects: supplier and procurement information management. The supplier consists of two parts, a local supplier and an overseas supplier. Purchasing information management mainly maintains supplier information and main parts data such as lead time, minimum packing quantity, minimum order quantity, unit price, payment terms and trading conditions in the system. It should be noted that once the order factor or the external environment causes problems in the purchase of raw materials, the purchasing personnel need to be in close contact with the supplier to confirm whether they can deliver the goods according to the order, or temporarily transfer the goods from the supplier to maximize the number of customers required by dealers. At the same time, the system will automatically display the engineering alternatives to the relevant warehouse management personnel, engineering personnel, sales personnel and customers.

4) Logistics management

The logistics center realizes the uniform deployment and sorting of finished parts and warehouses. The management personnel of the logistics center inventory receive the ordering time, arrival time and corresponding quantity of the accessories through the information system. Therefore, it is possible to prepare the site for the receipt of the accessory order in advance, and verify the information of the warehousing accessories and import them into the system. In terms of storage and assembly of finished products, the management staff arranges the delivery of warehouses and accessories by receiving the goods transfer information from 4S shops/Deco dealers/car workshops from different regions, and automatically deducts the inventory quantity. The warehouse and accessories finished product information is notified to the financial personnel through the system, which facilitates timely settlement. The inventory status of the finished goods warehouse and accessories can be opened to the supplier through the information management system, so that the supplier can understand the inventory status of the entire supplier and arrange the raw material stocking and finished product production arrangements in time.

5) Warehouse management

The sorting scheme proposed by the logistics center was finally realized in the warehouses in each region. It is an important principle of warehouse management to ensure the accuracy of the finished products in the process of receiving, transferring and clearing, and the storage environment of the finished parts. Regularly perform the positioning and counting of the finished parts and the inventory, and enter the corresponding information into the warehouse management system to ensure that the accounts match.

6) Financial management system

Financial management is divided into settlement system, transportation distribution management system and logistics analysis system. Financial information management focuses on sales orders and procurement expenses, and settles different businesses according to different human and technical capital.

7) File information management

The file information management system can be divided into system preparation functions, sales functions and other functions according to the functional flow. Among them, the system preparation function mainly records the update of the file information and the insertion of the new function, and records information such as the sales order, the production cycle of the finished parts, and the inspection result of the raw material quality. The sales function is mainly to determine the sales order and query historical data, etc., so that the sales department can manage the customer and the sales plan.

4.3. SGM Aftermarket Parts Supply Chain Management Implementation Measures

1) Management manual

SAIC General Motors' aftermarket parts supplier management requirements regulations include supply capabilities, supply chain problem communication, transportation, packaging, library management and break point management. The supply chain problem communication includes parts planning and fore-casting, description of parts orders, problem reports, material shortage alarms, supplier evaluations and claims. The management manual begins with the following three aspects.

a) Process document

- Identify the overall process and applicable scenarios;
- Identify the actions, requirements, time and responsible parties of each step of the process;
- Stipulate that the supplier completes the necessary operations in the corresponding system;
- Standardize the modification of the original data and clarify the approval process.

b) Supplier problem communication

- According to the types of common problems, develop a FAQ knowledge base to solve 80% of the regular problems of suppliers;
- The remaining 20% of the difficult problems are coordinated by special personnel to avoid multiple docking;
- Form a preliminary knowledge management system.

c) Supplier performance indicators

- Translating internal requirements into performance indicators for suppliers, following SMART principles (specific, measurable, achievable, relevant, time-bound);
- Grab the data collected from the system on a monthly basis to increase transparency for suppliers.

2) Supplier evaluation system

The existing procedures are not detailed enough in the assessment of projects

and standards, resulting in some projects that are not understood, opaque and unfair. Secondly, there will be problems such as the lack of effective trace ability and review of the original data, the audit system and the understanding of the supplier, and the inability to implement follow-up in a timely manner. Therefore, it is still necessary to continuously adopt a method of refining the process and specifying the responsible party to improve the standardization and visualization of the entire process. The future can be optimized from the following two aspects:

a) Refine KPIs, especially the breakdown of delivery cycles: ASN, visualization, delivery accuracy, safety stock reduction, communication coordination, demand forecasting, engineering quality, etc.;

b) Design reward and punishment mechanisms, specify the frequency and method of settlement, so as to achieve a more fair, easy to accept and enforce the purpose.

At present, SAIC General Motors has initially formed a visualized executive management and performance review, as follows (Figures 1-3).

3) Trainning

In order to meet the needs of the company's operations, strengthen supplier relationships, and conduct training in phases. After the SAIC General Motors leads the supplier, this training can be gradually standardized and scrolling. The training has the following objectives:

a) Training activities to meet the needs of suppliers for strategic development of the company;

b) Training activities to meet the needs of the company's annual operations;

c) Training activities to meet the knowledge, skills, attitudes and experience required by the supplier to perform his or her job at a highlevel;

d) Training provided by the company to meet the needs of suppliers and achieve its supply chain planning goals.

4) Electronic journals







Figure 2. (a) Contract signing; (b) Manufacturing bill of materials; (c) Advance payment progress; (d) Feeding progress.



Figure 3. Supplier audit results distribution.

Regularly build electronic mobile communication channels, improve the utilization rate of the existing "supplier communication platform", and make a second development, and put the management manual and performance appraisal generated in the project online and mobile.

On the one hand, the company can set up the latest notice bulletin board to update information on bidding notices, training, interactive event notices, system notices, accounts receivable/payable exceptions, special order warnings, etc. On the other hand, the company can add industry dynamics column to timely push on industry news, latest technology trends, enterprise development, supply chain literature selection (technical sharing, cost reduction strategy, collaborative experience), improvement cases, individual or collective recognition, etc.

5. SGM Aftermarket Parts Supply Chain Management Plan Implementation Guarantee and Effect Evaluation

5.1. Supply Chain Management Plan Implementation Measures

1) Form a reform plan and implement solidification

a) Develop customized supply chain and operation management related training, guide the refined improvement of daily management operations by typical suppliers, improve the enthusiasm of business cooperation, and improve the delivery ability of suppliers;

b) Form a standardized management system and system, improve the efficiency and strength of SAIC General Motors' management of suppliers, and strengthen the relationship and visualization with suppliers. Need to refine the requirements of supplier management, the entire implementation process, process modularization, module data, data operation, operation system, and finally form a standardized management document;

c) Improve the supplier's data management evaluation mechanism, strengthen the penetration and influence of the existing performance appraisal mechanism, and prepare for the long-term and in-depth development of supplier capabilities and the on-line docking of SAIC General Motors after-sales team big data application analysis.

On the basis of the above programs, we will have a solid theoretical foundation and then refine the implementation measures. The specific refinement measures are as follows (Table 1).

2) The supplier quality management work is carried out in sub-items

a) Routine AR product sampling (oil oil/maintenance products/plastic);

b) Market risk case response (law enforcement inspection);

c) Market parts quality problem feedback processing (ASC\FMC\PAC and other feedback parts quality defects);

d) Supplier engineering problem score evaluation (mainly based on supplier error issued/market risk case/parts quality problem feedback several aspects of evaluation);

e) Synergistic SQE and QD gradually established the supplier quality management process for after-sales parts. Firstly, the Purchasing Department clearly included the after-sales accessory PRR in the new operation method, and clarified that it can be operated according to the "Supplier Operation Quality New Test Trial Operation Method". Secondly, for the case of the after-sales parts that procured the purchase of PRR, the same management mode of the production part is used for management tracking. For the case where the purchase of the PRR is still not completed within 3 to 6 months, the case is reported to the QMC. In the "Supplier Operation Method for Supplier Quality Rating New Rules", the aftermarket accessory PRR is not limited to the listed "aftermarket

Entry	Measures	Person liable	Support department	Condition	Completion time
1	Scoring system update; supplier performance appraisal scope is perfect (DD, Deco and other business performance report development)	ХҮ	IT	In the implementation	2017-08
2	Capacity survey, winter and summer parts mobilization meeting	ХҮ	After sale	Finish	Year
3	Supplier compliance rating, supplier classification	XY	After sale	In the implementation	Monthly
4	MR regular meeting, key supplier performance improvement	XY	logistics/PC & L	In the implementation	Weekly
5	Supplier Management Regulations Update (additional compensation, PRR upgrade, etc.)	YX/XY	Purchase	In the implementation	Year
6	Convene key supplier workshop meetings and daily interviews to strengthen supplier training	YX/XY	Purchase/SQ E	In the implementation	Monthly
7	WeChat provider platform function development and operation and maintenance	YX	IT	In the implementation	Year

 Table 1. Detailed implementation of supplier management.

parts PRR". For some major cases, it can be raised to "Customer Satisfaction PRR" and "CS1/CS2".

3) Organize ASCM training camp

The purpose of the event is through a series of games and discussions, SAIC General Motors after-sales accessories planners can better understand the power of innovation in the process. With the team's company, analyze the problem and solve the problem, so that in the future work, we can better use the strength of the team to innovate and think. The training continuously cultivates employees' innovative thinking ability through four aspects: participation, science, continuity, and fun. Subsequent plans to organize suppliers to participate in the ASCM training camp.

5.2. Supply Chain Management Plan Implementation Guarantee

To ensure that the ultimate benefits are realized, internal resources need to be configured to conduct and maintain day-to-day operations management and to ensure that project results are effective in the long term.

For the training section, focus on potential supplier selection, training course organization, training course tracking, and supplier participant feedback;

For the management manual section, maintenance and update of the FAQ library, maintenance and update of the performance indicator library, maintenance and update of the management manual, and supplier feedback information collection and analysis; For the electronic publications section, use the management of existing communication platforms (such as supplier account rights management, simple maintenance of systems and data), data collection, editing and distribution of electronic publications.

In the process of company supply chain optimization, it also involves the management of warehouses, the adjustment of personnel, the adjustment of policies and the transformation of working methods. These changes will have some problems and obstacles in the implementation process, which requires the cooperation and support of many parties.

5.3. Effectiveness Evaluation of Supply Chain Management

1) Digital management

First of all, the supplier's materials, quotations, platform data, monthly reports and other digital processing, the enterprise can easily determine the current operating conditions. Secondly, strengthen the management of existing suppliers, the various departments of the enterprise should play a supervisory role, suppliers' products in the enterprise to achieve "transparency", and constantly urge suppliers to improve the quality of their products. Long term strategic partnership has been established for outstanding suppliers.

a) The edition of "KPI Monthly Report" was revised according to the KPI changes in 2017, and KPI sections of "logistics", "engineering" and "marketing" were added. The score of "plan" was adjusted. The weight distribution of total score is adjusted. The KPI rule text is adjusted.

b) Registration platform mobile version. In order to enable supplier partners to fill in the application materials immediately during the activities and meetings, a mobile registration website and two-dimensional code were developed to facilitate supplier handwriting. The supplier can register on the registration platform by applying for registration of SAIC General Motors enterprise micro signal and scanning the two-dimensional code. The mobile version interface adjusts the page structure according to the use habits of mobile phones. The content of the mobile version is consistent with that of the computer version.

2) Simplify complex work processes

First, the purpose of doing this is to reduce the internal audit steps. Through the new information management system, the human influence factors in management can be minimized. Eliminate some non-value-added activities in the original process and reduce costs. Through the information management, the original manual review part is replaced by the system, which improves the efficiency and reduces the probability of error. Secondly, in the original process, the transportation plan, material distribution, inventory management, etc. in the supply chain management need to be notified in writing, the communication efficiency is low, and under the management of the information system; these work can be completely replaced. Establishing a shared database greatly reduces the cost of information, reduces internal friction, reduces the workload of people and the obstacles caused by slow communication. It also gives employees more time and energy to focus on their work area.

3) Data comparison before and after

a) 2017 ASN, the average satisfaction rate of orders increased by a percentage point

It can be seen from **Table 2** that the management of the supplier through the internship has improved the ASN one-time satisfaction rate, the weekly satisfaction rate of the order, and the secondary satisfaction rate. Among them, the ASN one-time satisfaction rate is the most significant.

b) Comparison of number of registered people and number of businesses

It can be seen from **Table 3** that the total number of registered merchants and the total number of registered merchants in May 2018, compared with May 17, nearly doubled. This has played a great role in information sharing and timeliness of supply management for aftermarket parts. **Figure 4** and **Figure 5** show the number of hits and visits to vendors' platforms. **Figure 4** and **Figure 5** show

Table 2. The average satisfaction rate of orders increased by a percentage point.

Month (average)	ASN once satisfied rate	Order weekly satisfaction rate	Order once satisfaction rate
Raise percentage point	6.00%	2.50%	3.60%

Table 3. Comparison of number of registered people and number of businesses.

Time	Total number of registered persons	Total number of registered businesses
In May 2017	1299	449
In May 2018	2414	883







Figure 5. Supplier platform access time.

that the total number of hits and visits to vendors' platforms has increased over the past 17 years.

6. Summary

This paper takes SAIC General Motors spare parts after-sales as the research object, and optimizes the supplier management problems in the current supply chain management. It is hoped that SAIC General Motors spare parts after-sales in the entire industry can be outstripped by this way. Through the analysis, we find that the company has the problems of high inventory pressure, low order delivery rate, not timely information docking, and imperfect supply chain management system. Through further optimization analysis, the new spare parts information module is redefined, the spare parts inventory structure and source are adjusted, the inventory turnover rate is increased, and the mode of receiving and processing orders is adjusted and improved. In terms of improving the economic benefits of spare parts and reducing logistics costs, this case can provide some guidance and reference for other similar enterprises. The article is summarized as follows:

1) The current supply chain situation of spare parts of SAIC General Motors is analyzed theoretically, and the problems existing in the operation of spare parts supply chain of SAIC General Motors are analyzed qualitatively, and the causes of the problems are put forward.

2) On the basis of actual management, the optimization plan of SAIC GM aftermarket supply chain management is put forward.

3) After implementing the optimized supply chain management scheme, the

evaluation of the scheme is summarized, hoping to provide reference for similar enterprises.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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