Optimization of soft beverage inventory management in practice for SMEs:

A case study of JN Ltd. In China

Master Thesis within International Logistic and Supply Chain Management

Author: Lingxin Chen
Jiahong Xu

Tutor: Per Skoglund

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Lingxin Chen                                           Jiahong Xu
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Author: Lingxin Chen & Jiahong Xu

Tutor: Per Skoglund

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Abstract

Introduction: Nowadays beverage companies must focus on maintaining healthy finished goods inventory stocks in order to be able to decrease inventory costs, meet customer requirements and to obtain competitive advantage. However many beverage SME don’t have an accurate planning and forecasting to manufacturing inventories. Therefore they often face the problem of optimization in inventory management due to several different reasons. As a result, company loses its competitiveness. Thus, there is a need to coordinate Inventory activities of beverage SMEs to improve inventories’ planning. The purpose of this study is to analyze how inventory management is organized in a small Chinese beverage company.

Frame of reference: This research is based on the theoretical framework relates with Inventory Management (IM) and Retailer-managed inventory (RMI), vendor-managed inventory (VMI) and Collaborative Planning, Forecasting and Replenishment (CPFR). Empirical Data were collected through personal interviews and organization documents.

Methodology: The research strategy for this paper is a single case study. This strategy allows investigating topic in its real life context. The inductive approach is used for this research based on qualitative data. The major source of data collection was semi-structured interviews and the company’s documents. For analyzing data categorization approach was applied.

Conclusion: The study found that inventory management theories presented in scientific literatures are used in practice. To achieve better inventory management for beverage SMEs, the authors summarize four importance parameters based on literatures and findings. The authors also provide some suggestions based on the importance parameters in the conclusion to optimize the case company’s inventory management.
Table of Contents

1 Introduction .................................................................................................................. 1
1.1 Background .................................................................................................................. 1
1.2 Problem Discussion ...................................................................................................... 2
1.3 Purpose ....................................................................................................................... 3
1.4 Research Questions ..................................................................................................... 3
1.5 Disposition of the thesis ............................................................................................. 3

2 Theoretical framework ................................................................................................. 4
2.1 Inventory management ............................................................................................... 4
2.2 Factors affecting inventory management performance measurement .................. 5
2.3 Business models about inventory management ....................................................... 6
2.4 Retailer-Managed Inventory (RMI) .......................................................................... 6
2.5 Definition of VMI ....................................................................................................... 7
2.5.1 Benefits of VMI ..................................................................................................... 8
2.5.2 VMI’s model features .......................................................................................... 9
2.5.3 Critical success factors for implementation of VMI ............................................ 10
2.6 Definition and Principles of CPFR .......................................................................... 11
2.6.1 Benefits of CPFR ............................................................................................... 11
2.6.2 Implementing CPFR .......................................................................................... 12
2.6.3 Critical Factors influence CPFR adoption ......................................................... 14
2.7 Summary .................................................................................................................... 15

3 Methodology .................................................................................................................. 16
3.1 Generating the research topic .................................................................................... 16
3.2 Research approach .................................................................................................... 16
3.3 Research Strategy ..................................................................................................... 17
3.4 Literature Review ...................................................................................................... 18
3.5 Data Collection ......................................................................................................... 18
3.5.1 Interviews .......................................................................................................... 19
3.6 Data Analysis ........................................................................................................... 21
3.7 Method Evaluation ................................................................................................... 21
3.7.1 Reliability ........................................................................................................... 21
3.7.2 Validity .............................................................................................................. 22

4 Empirical findings ........................................................................................................ 23
4.1 Background information ............................................................................................ 23
4.2 Organization Structure of JN .................................................................................. 23
4.3 The inventory management in JN ........................................................................... 24
4.4 Inventory management activities with RMI model .................................................. 26
4.5 Inventory management activities with VMI model ................................................... 27
4.6 Inventory management activities with CPFR ........................................................... 28

5 Analysis .......................................................................................................................... 31
5.1 Inventory management ............................................................................................. 31
5.2 Different inventory activities with RMI model ......................................................... 31
5.3 Different inventory activities with VMI model ......................................................... 32
5.4 Different inventory activities with CPFR model ....................................................... 34
5.5 Development of inventory management for beverage SME ........................ 37

6 Conclusion ................................................................................................ 39
6.1 Managerial Implementation ................................................................... 40
6.2 Further Research .................................................................................. 41

References ................................................................................................. 42

Appendix 1 - Interview questionnaire ....................................................... 46

Figures:

Figure 1.1 Standards for SME beverage industry in China ....................... 2
Figure 2.1 Streams in inventory management ........................................... 4
Figure 2.2 The structure and flows characters in RMI ............................... 7
Figure 2.3 The structure and flows characters in VMI ............................... 8
Figure 2.4 The structure and flows characters in CPFR ............................. 11
Figure 2.5 Collaboration role alternatives ................................................ 13
Figure 2.6 Conventional Organization Roles with CPFR ......................... 13
Figure 2.7 Summary of three identified inventory management operations .......................... 15
Figure 3.1 Data collection process ......................................................... 19
Figure 3.2 Interview process ................................................................. 20
Figure 3.3 Overview of interviewees ...................................................... 21
Figure 4.1 Organization structure of JN .................................................. 24
Figure 4.2 Inventory management in JN .................................................. 25
Figure 5.1 Summary of analysis ............................................................. 39
Figure 5.2 Inventory management model for the beverage SME ............... 39
1 Introduction

This chapter is based on the area of our research, which describes the background of the study, followed by the specification of the existing problem. After this, the purpose and the research questions will be presented.

1.1 Background

The complexity of today’s supply chain requires manufacturers and distributors to search for new methods to reduce costs, increase efficiencies, reinvent channel models, engineer collaborative relationships, and span functional, cultural, and personal boundaries (Harsono, 2013). The most common solution to supply chain uncertainties is to build inventories, or safety stock, as insurance. High levels of safety stock increase the costs of holding inventory. High inventories at multiple point in the supply chain can result in the bullwhip effect. Low inventory levels increase the risk of stock outs or insufficient supply and lost revenues when demand is high or delivery is slow. In either event, the total cost including the cost of holding inventories, the cost of lost sales opportunities, and bad reputation can be very high. Therefore the advance planning and scheduling approach are important for the optimization of the inventory management. (Harsono, 2013)

In recent years, with rapid economic growth, the change of the customer demand in the Chinese beverage industry has transferred the mode from “push” into “pull”. According to Beverage Industry Report of China (2012), beverage suppliers has played dominate roles in the whole supply chain. In order to fulfill beverage retailers’ demands in time, beverage suppliers are used to holding more inventory (Zheng and Ping, 2008). As another literature also presents that the increasing competition in the beverage industry occurs more and more beverage suppliers have started to manage their beverage inventories in an effective way (Chow, 2011). For this reason, beverage companies have to focus not only on designing various new products, but also on the ways to shorten the lead-time of inventory planning and forecasting to reduce variable costs in inventories. (Beverage Industry Report of China, 2012) Thus, the inventory management is very important to the beverage companies.

Another feature of Chinese beverage market is its overwhelming majority of SMEs (Sheng, 2011). According to China’s official definition, small-medium enterprises are defined by the value of total assets, operating revenue and workforce (Zhu, Wittmann & Peng, 2012). Meanwhile, SMEs are classified into micro, small and medium enterprises (National Bureau of Statistics of China, 2011). On the basis of government’s current regulation, food and beverage SMEs are enterprises whose workforce is fewer than 300 people or annual revenue less than 100 million CNY. Actually different industries will have different standards to define SME in China (National Bureau of Statistics of China, 2012). The standards of beverage industry are shown as follows (Figure 1.1):

1
As previously mentioned, SMEs in beverage industry in China are facing the problem of inventory management in order to fulfill customers’ demands in time (Vaaland & Heide, 2007). Rajeev (2010) shows that inventory management really has some impact on labor productivity, capital productivity and returns to scale in respondent companies. For that reason, SMEs usually lack competitiveness with large enterprises, notably owing to the expensive pricing and long lead times (Zhu et al., 2012). Those challenges came from higher costs in production and logistics, as well as the complicated productive and planning in inventory management process (Grzegorz, 2009). As a result, it is imperative for SMEs to have a suitable specific inventory management method in order to reduce the lead-time and costs of the supply chain.

### 1.2 Problem Discussion

Up to now, a lot of studies have tried to find better ways for SMEs to conduct their inventory management. Yan (2010) mentioned that SMEs should keep forward in development and focus on producing high quality, low cost, low material consumption goods to establish its foothold in the fierce industry competition. It is proved by previous studies that making use of appropriate Inventory Management (IM) practices is one of the effective approaches to retain the competitive edge of the enterprise (Onwubolu and Dube, 2006). To meet the challenges from competitors, SMEs have to conduct integrated IM and capacity utilization to improve quality and reduce costs (Ricklavely, 1996). Chandra and Grabis (2005) argue that it is possible for a company to reduce its safety inventory and optimize customer service through accurate inventory planning, forecasting and decreasing replenishment lead-time. Rajeev (2010) argue also that some small medium enterprises tend to maintain huge stocks to react to market demand. However, Chandra and Grabis (2005) argue that excess stock brings negative impact on the inventory operation, since valuable storage space is occupied, and inventory costs are increased. This is very relevant in the context of SMEs, in order to exercise inventory planning and forecasting, the understanding of the parameters which influencing IM is necessary (Rajeev, 2010).

Though the theory of IM practices on a firm explains how companies should manage their inventory cost on order quantity and hence improve on their inventory performance is well explained in theory, however there is no specific qualitative study focus on SMEs’ inventory management and most studies' majority focus mostly on the discrete manufacturing industry's inventory management with little focus on the management of fast moving goods in SMEs (Coyle, Bardi & Langley, 2003). Therefore, this study is...
focused on management of fast moving goods industry, the beverage industry in Chinese SMEs.

1.3 Purpose

The purpose of this study is to analyze how inventory management of planning is organized in a small Chinese beverage company. In order to fulfill purpose of this study, the following research questions needs to be answered in this study.

1.4 Research Questions

RQ1: What are the problems for the beverage SME to use inventory management principles in practice?

RQ2: What are the important parameters for the beverage SME to implement inventory management of planning in practice?

1.5 Disposition of the thesis

This thesis consists of six chapters. The presentation of each chapter together with their component elements and objectives are listed below.

Chapter 1: Introduction. This chapter narrows down the topic and briefly talks about the background of the study, the problem discussion the topic and the aim of the thesis, in order to give readers a quick overview of the thesis.

Chapter 2: Theoretical framework. This chapter is for outlining on what theories and models the thesis is based on. It provides the definitions and concepts relate with Inventory Management (IM) and business models for IM that include retailer-managed inventory (RMI), vendor-managed inventory (VMI) and collaborative planning, forecasting and replenishment (CPFR).

Chapter 3: Methodology. This chapter presents how the authors come up with the thesis topic, the research approach and strategy with data collection for this thesis. The data analysis method is also discussed. The techniques for data collecting will be discussed along with reliability and validity.

Chapter 4: Empirical findings. This chapter sorts out the primary and secondary information of how the Inventory management theory works in JN Co. by doing interviews and documentaries so as to systematically collect empirical information.

Chapter 5: Analysis. This chapter intends to analyze and answer the first research question based on the data and literature reviews of previous theories. On the other hand, the authors also measure company’s performance of inventory management and address the gaps between theories and practical implementation for the small-medium sized beverage case company.

Chapter 6: Conclusion. This chapter summarizes the research results and answers the research questions. The future of the inventory management model for beverage SME will be discussed here as well.
2 Theoretical framework

This chapter starts with inventory management framework, for in-depth understanding of the framework content and purpose. In order to answer research questions of this study, the authors present factors, which influence inventory management and three main business models for inventory management collaboration in the whole supply chain. The interviews are conducted base on theories present in this section and theories are also used to fulfill the research purpose.

2.1 Inventory management

According to Vipul (2013), inventory management as controlling the business stock or controlling the goods flow and services as per customer’s demand while Deveshwar and Dhawal (2013) proposed that inventory management are methods that companies use to organize, store and replace inventory, to keep an adequate supply of goods at the same time minimizing cost. Choi (2013) indicates that effective inventory management is essential in the operation of any business. Thus, keeping stock is used as an important strategy by companies to meet customers’ needs without taking the risk of frequent shortages while maintaining high service level. As Axsäter (2006) describes that inventories make high cost, both in the sense of tied up capital and also operating and administering the inventory itself. It is argued that time from ordering to delivery of replenishing the inventory, referred to as the lead time, is often long and the demand from customers is almost never completely known (Axsäter, 2006). Therefore, managers should consider how to achieve the balance between good customer service and reasonable cost, which is the purpose of inventory management, involving the time and volume of replenishment (Borowiec and Liedberg, 2009). In Figure 2.1 presents the process of inventory management where the components of the whole supply chain work independently and information is transferred only at the level of adjacent links.

Figure 2.1 streams in inventory management Source: Kot, Grondys and Szopa (2011)

The arrows in Figure 2.1 point clearly to communication between individual chain links. Each link cares only for their own interests, being in close relationship with suppliers and customers. This behavior leads to maintaining a particular level of inventory in each link, which is kept in a ‘ready state’ in order to satisfy customer needs at any moment. Thus, a task of safety stock is to maintain a suitable level of customer service (Kot et al., 2011). Aiming at ensuring the highest standard of customer service, the companies must
bear the costs of: physical flow, maintaining the stock, depletion of the stock and other costs. (Kot et al., 2011)

### 2.2 Factors affecting inventory management performance measurement

According to Sun (2013), the aim of inventory management is ensuring continuity of supply chain and handling uncertainty of customer demand according to appropriate inventory strategies and methods of inventory control. Therefore, Sun (2013) introduce 3 main factors that managers should be considered in inventory management, cost demand and supply.

#### Cost

Too much inventory may increase inventory costs, while too little inventory may not fulfill customers demand. One of the inventory objectives is obtaining appropriate quantity of materials, consuming goods and finished products in right place and right time. There are five types of inventory costs as following: unit cost, order cost, setup cost, holding cost and shortage cost (Toelle and Tersine, 1989).

*Unit cost:* Waters (2008) says unit cost is total cost spent on purchasing divided by number of items. It is difficult to gain the accurate unit cost because suppliers sell different goods in different conditions. The unit cost helps companies to know the actual cost spent on the goods and improve the cost effectiveness (Waters, 2008).

*Order cost:* Order cost is which spent by companies for placing orders to suppliers. It includes a fixed cost and a variable cost. The amount of fixed cost is independent on the number of orders to be placed. It usually includes the cost of facilities and maintenance cost of the related system. By comparison, variable cost varies changes with the number of orders to be placed. Thus, it can tell the actual cost spent on orders. (Waters, 2008).

*Setup cost:* Setup cost is the cost spent preparing for placing orders. It involves two parts: fixed cost and variable cost. Fixed cost is used for equipment manufacturing goods or disassembly used products for remanufacturing. In contrast, variable cost compasses personnel cost, material cost and so on (Business Maxims, 2011).

*Holding cost:* Holding cost usually occurs when holding items in stock or holding inventory. It depends on quantity of inventory and is influenced by logistics activities such as inventory control, package, disposal and so on. It is related to tied-up money, storage space, loss, handling, administration and insurance (Waters, 2008).

*Shortage cost:* Shortage cost is caused by failure to meet customer demand and is independent on the length of time that keep customer waiting (Petrovic et al., 1999). Waterss (2008) states that shortage cost is not measured, and it is usually inaccurate as well as misleading. Companies are looking forward to holding stock instead of potential shortage as shortage causes damage to future sales and loyalty of customers.

#### Demand
Demand is fluctuating and unstable, it is difficult to match demand exactly (Cachon and Terwiesch, 2006). When demand occurs, warehouse should deliver some products to fulfill the market’s requirement, and thus demand reflects in the inventory system (Sun, 2013). Cachon and Terwiesch (2006) state that in the short period inventory are decided by managers according to historical records or research and analysis based on sales in the market.

According to related studies, demand is classified into several types. For the beverage industry, the most common type is cyclic demand, which means some products’ demand is response to season, or shows peak over time (Warkentin et al., 2003). On the other hand, there are deterministic demand and random demand which influenced by the demand quantity, demand rate and demand mode. Warkentin and Bajaj (2003) explain that deterministic demand is based on historical data for a specific area. By contrast, the quantity of random demand is difficult to ensure since it is easier to be affected by some factors outside system.

➢ Supply

Similarly to the two components mentioned above, cost and demand, which affect the inventory management, supply also can determine company’s inventory (Seully and Stanley, 1994). There are not only suppliers and manufacturers, but also resellers or even distributors who help buyers to determine inventory. They monitor buyers’ inventory status and get ready for resupply in advance, even before placing orders by buyers. Thus inventory replenishment can be controlled since vendors determine their order quantity, shipping and timing (Waller et al., 1999). In that case, information is transferred in the opposite direction from goods, which reduces carrying cost and minimizing stock out situations (Cetinkaya et al., 2000).

2.3 Business models about inventory management

To optimize inventory management through integrating three factors listed above, Barratt (2004) describes there are numerous potential opportunities for inventory management collaboration, which include Retailer-Managed inventory (RMI), Vendor-managed inventory management (VMI) and Collaboration Planning Forecasting and Replenishment (CPFR). Danielsson and Nilsson (2013) indicate RMI, VMI and CPFR are the main models to integrate supply chain through inventory management. Therefore these relevant inventory management business models that could be used to increase the integration among the supply chain members are described. All the three models are in the end summarized in a table to comparison and is followed by a discussion regarding which one might be the most appropriate one in the general.

2.4 Retailer-Managed Inventory (RMI)

Retailer-Managed Inventory (RMI) is a traditional approach in managing inventory in supply chains (Lee & Ren, 2011). It is often very little or no information is shared between members (Sari, 2008). The retailer places orders to the supplier to meet retailer's expected demand (Lee & Ren, 2011). After the retailer receives goods, the supplier will send invoice to the retailer (Gumus, Jewkes & Bookbinder, 2008). This implies that suppliers in the upstream supply chain develop forecasts based on orders from their
closest downstream customers, and not actual sales data (Sari, 2008). Each retailer makes their inventory decisions based on what they think will be most favorable for them (Gumus et al., 2008).

In figure 2.3, it shows RMI customers deliver orders’ information to the manufacturers and the good flow is from manufacturers to the end customers. It is no other agent and information platform between customers and manufacturers. It has been claimed that this can increase the bullwhip effect in the whole supply chain (Sari, 2008).

Figure 2.2 The structure and flows characters in RMI Source: Sari (2008).

Firstly, costs associated with this model, which the retailer need to bear which includes the fixed ordering cost, inventory-holding and backorder-penalty costs (Lee & Ren, 2011). The supplier on the other hand incurs fixed and variable costs of production and delivery (Lee & Ren, 2011). Sari (2008) states RMI is the traditional way of doing business and it is the supply chain structure with lowest level of supply chain integration (Sari, 2008). Secondly, the supplier does not receive information about the customer's needs in advance, the supplier is forced to anticipate needs and keep unnecessary safety stocks, and in order to meet all customers needs. Lastly, suppliers are often faced with an unexpected short-term demand, which leads to frequent changes in production and distribution, and creates additional costs (Lee & Ren, 2011).

The RMI is used for the lowest level of integration and collaboration, since each member optimizes his own part of the supply chain. Thereby, RMI could be used to describe the company with a simple supply chain network. This is however not considered an appropriate future alternative, since neither literature nor experts to support it. (Danielsson and Nilsson, 2013)

2.5 Definition of VMI

Vendor Management Inventory (VMI) is an important model in inventory management field (Guan & Zhao, 2010). Bowen (2003) states that VMI can optimize supply chain performance in the way, which the manufacturer helps determine the distributor’s stock amount. Yao et al (2012) confirm that VMI’s collaboration function enable an upstream firm to control inventories for its downstream partner, on the basis of inventory management policy. In the VMI model, retailers can save costs and increase profit, while vendors can maximize scale economies and flexible deliveries when realizing the integration of production and supply (Guan & Zhao, 2010). Figure 2.2 clearly shows the flow characteristics in a VMI (Sari, 2008).
2.5.1 Benefits of VMI

Reduced Cost

It is essential to solve the problem of the uncertainty demand, because fluctuating demand becomes obstacle to the fulfill customer’s requirement and make more profits. Ordering mode always worsen the problem of demand uncertainty when there is no solution for performance measurements, customers’ isolated scheduling, shortage or over stocks. (Liu & Yang, 2014)

One reason for choosing VMI is to decrease stock-out risk and amount of safety stock, while inventory turnover is increased, which contributes to cutting costs (Kuk, 2004). It also helps vendor benefit from economies of scale (Lee & Ren, 2011). According to Kulp, Lee & Ofek (2004), VMI raises the efficiency of production in order to increased product margins. Due to the collaboration and integration of supplier and retailer, the costs of the total supply chain always decrease (Lee & Ren, 2011). For instance, suppliers can offer good customer service with less cost by monitoring, controlling and forecasting the possible demand (Liu & Yang, 2014).

Improved Service

Retailers prefer few stock outs, because product availability often decides customer service (Liu & Yang, 2014). Thus, shorter cycle times and more accurate forecast lead to improvement of the customer service (Kuk, 2004). Lee and Ren (2011) also think that the inventory strategy is especially related to improved service performance and reduction of overhead costs, because the stock outs do not only mean the sales decrease, but also the goodwill is lost.

With the help of VMI, service is improved by the coordinated replenishments with multiple customers. Suppliers could see the whole supply chain from above and distribute the scarce resources to the right customers. For example, delivery time for a non-critical customer could be much longer than that for a critical customer. Under VMI model, suppliers could improve the whole supply chain system performance without displeasing any individual customer. It could help suppliers use limited time to arrange the delivery’s priority while ensure highly qualified shipments (for example, timely shipment, flexible delivery, goods quality and other special requirements in shipment).
To sum up, VMI brings more profits for retailers because it causes higher product availability and service level, while less concentration on inventory monitoring and fewer ordering cost, especially compared with RMI (Kuk, 2004; Lee & Ren, 2011). It is possible for the vendor to optimize stock levels and distribution strategies (Kuk, 2004; Lee & Ren, 2011).

2.5.2 VMI’s model features

According to Pol and Inamdar (2012), the flows of information in VMI should be between two entities implies that the manufacturer and the distributor are exchanging additional data on a regular basis. In order to successfully execute VMI and solve the above, firms are obligated to provide suppliers with a few vital information like demand forecast, firm inventory level, order rate and etc.

Therefore, there are four main factors are involved in VMI implementation which are inventory levels, decision-making, information sharing and system integration (Pol and Inamdar, 2012).

- **Inventory levels**

*Inventory levels – From retailer to supplier*

This parameter tells the manufacturer the retailer’s inventory level, it should contains: the current stock quantity in retailer’s warehouse, the quantity in order, the quantity reserved for some customer orders, the backorder quantity or stock out and the stock status. It will help the manufacturers to forecast the volume of products they need to produce. (Pol and Inamdar, 2012)

- **Decision making related features**

*Sales history – From retailer to supplier*

This parameter tells the manufacturer the retailer’s sales quantities, This information is usually communicated on a monthly basis, for each reference it contains: the quantity sold over the last period, the number of sold lines and forecasts can also be provided by the retailer. (Pol and Inamdar, 2012)

*Order proposal – From supplier to retailer*

This communicates to the retailers the references and the quantities that the manufacturer advises to order, for each reference it contains: The Ship to location since several warehouses can be handled for the same distributor and the order quantity. This information is usually communicated on a daily basis. To increase efficiency agreements can be done between the retailer and the manufacturer to place orders only on certain days of the week. The purchase order, order acknowledgement and invoices are sent according to the standard flow, general flows of information in VMI set-up. (Pol and Inamdar, 2012)

- **Information sharing**

The information sharing in VMI is used for suppliers to control the customers’ inventory which involves information about inventory level, sales data, order status for tracking
and tracing, sales forecasting, production/delivery schedule and so on. (Lee H. L et al, 2000) The first alternative talks about how only the historical information is being used in the inventory controlling process. The system just simply shows quantities consumed by customers. In the second alternative, the forecast of future demands is integrated with VMI system; hence the delivery schedules could be built up through system. In the last alternative, not only the forecast of the demands but also the current allocations are integrated with VMI. (Vigtil, 2006)

- System integration level

System integration level concerns the inventory management when scheduling new replenishment orders for customers’ VMI request. First alternative only focuses in customers’ inventory, while the second alternative will also take suppliers’ inventory as a factor to consider when making planning. Third alternative has the highest vertical integration, linking customers’ and suppliers’ inventory as well as suppliers’ production line. In this alternative, information is shared through the whole supply chain; hence suppliers could adjust and make optimized decisions for replenishment and production. (Elvander, Sarpola & Mattsson, 2007)

2.5.3 Critical success factors for implementation of VMI

Singh (2013) combined amount of previous researches and summarized five the most important factors that lead to the success of implementation of VMI. After the research, he found out what are the prerequisites for the success of implementation and what facilitate the achievements of others. He developed a model to measure the relation between each requirement.

The first is top management support. During initial period, the idea understanding and support of VMI from the top is the critical factor to start implementing VMI. The extent of implementation is determined by top managers’ knowledge of complexities and willingness for supporting the change in the current supply chain. It helps to reduce customers’ inventory level and requires more flexibility of the firm to adjust to the production planning, as well as high-level collaboration with distributors to select product range and replenishment in marketing, etc. (Gumus et al., 2008).

The second critical factor is employee involvement. Employee involvement can be also seen as a key requirement to implement VMI, which lubricates the cooperation with different department and partners and execution of decisions. It leads to increasing the effectiveness and efficiency of inventory management and improving the competitiveness of the organization, and it also raises the enthusiasm of employees (Singh, 2013).

The third factor is investment in information systems and infrastructure. It is an essential requirement to implement VMI. Classen, Liu & Yang (2014) think information systems and infrastructure enable information more visible and available, and optimizing collaboration among the supply chain.

The fourth factor is vendor development. According to Classen (2008), vendor should hold the dominant position to ensure the correct implementing of VMI. There are possibilities for many VMI in reality implemented as vendor managed replenishment (VMR), because they do not ensure the pipeline fully controlled by vendor. According to Singh
(2013), vendor development is more like an independent action, which does not have strong driver and strong dependence.

Last factor is flexible *production planning and control* (Singh, 2013). It contributes to company’s quick response to different kinds of situations. It develops a better supply chain with better inventory management, timely delivery in lower cost. It also befits for vendor development, production planning and coordination.

### 2.6 Definition and Principles of CPFR

According to VICS (2014), Collaborative Planning, Forecasting and Replenishment (CPFR) are defined as business coordination involved multiple trading partners in the planning and customer service. CPFR links sales and marketing best practices, such as category management, to supply chain planning and execution processes to increase availability while reducing inventory, transportation and logistics costs.

The CPFR reference model provides a general framework for the collaborative aspects of planning, forecasting and replenishment processes. Figure 2.4 illustrates this framework, which can be applied to many industries. Each actor in this framework as collaboration participant, every part in the whole supply chain needs to work together to satisfy the demands of an end customer (Aviv, 2002).

![Figure 2.4 The structure and flows characters in CPFR Source: Sari (2008).](image)

#### 2.6.1 Benefits of CPFR

It seems difficult to conduct such a big collaboration among all involved partners, and the vital requirement of the model is to have a common view of cooperation. Hence suitable activities for your common target can be found to implement CPFR. Once the model is running at this level, the profits listed below should come together. (VICS, 2004)

- The knowledge and forecast is more accurate due to its reference information is collected from all the members.
- The partners have a better relationship with the process of increased collaboration and they probably find new opportunities the new form of cooperation.
Inventory and lead-time is reduced due to the new efficient forecast-to-order transferring and replenishment procedure, which increase the flexibility to the consumer demand and improving customer service, contributing to sales.

Increased forecast accuracy decreases buffer inventories and increases capacity utilization, since the production planning requires more reliable data.

Aligning forecast and production planning horizons reduce set-up times, and improve handlings and administration.

2.6.2 Implementing CPFR

To implement the CPFR, all the members of the whole supply chain, involving the manufacturer as the seller and retailer as the buyer, should participate in: (VICS, 2004)

- **Strategy and planning**, which establish the basic principles for the cooperative relationship. They make product mix decision and stock placement, arranging the schedules of the production process as well.
- **Demand and supply management** manage to fulfill consumer (point-of-sale) demand as well as designing schedule of delivery according to the order and shipment requirements in the planning stage.
- **Execution**: operation is conducted on the basis of IT system, including placing orders, preparing and delivering shipments, receiving and storing products in the warehouse, recording sales transactions and making payments.
- **Analysis**: not only planning and operating period are analyzed and monitored in order to prevent and react to the abnormal status, but also the performance of CPFR is measured according to the analysis result. It contributes to improvement of the whole cooperation.

While these four parts of collaboration are showed in logical order, most companies are never isolated from all of them at any moment in time. On the other hand, these collaboration activities influence each other during the implementation. For instance, execution results can affect strategy, and analysis can cause changes in forecasts (Chopra & Meindl, 2010). On the basis of different target of participants, collaboration may also focus on just one or several of the four activities (just Strategy & Planning), while the others are maintained as traditional status (Skjoett-Larsen et al., 2003).

CPFR improves and shares a lot in common with conventional mode and vendor-managed (VMI) and. The significant feature of CPFR different from others who takes the dominant position in three collaboration tasks: sales forecasting, order planning/forecasting, and order generation. Figure 2.5 compares these different models as follows.
Additionally, figure 2.6 presents the organizational roles that CPFR activities are playing on the perspective of the manufacturer and retailer. The manufacturer regards products or materials in stock as the factor to conduct sales forecasts, while retailer put the same element on the place of category plans and merchandise planning (Chopra & Meindl, 2010). Promotion is the result negotiated by both the sales representatives and buyers. Replenishment department of retailer decide its schedule and amount of replenishment according to the inventory level and delivery time from upstream, and manufacturer customer service and logistics department contrives to fulfill the demand from downstream (VICS, 2004). In many situations, these negotiations and activities happen independently instead of cooperation over enterprise structure (Chopra & Meindl, 2010).

![Figure 2.5 Collaboration role alternatives](source: VICS (2004)).

VICS (2004) indicates many CPFR solutions have moved into the stage of enhancing the process under the information infrastructure which involves: sharing forecasts and
historical data, automating the collaboration arrangement and joint business plan, evaluating exception conditions and enabling revisions and commentary. Therefore, the enterprise system of storing the status of production should be taken into consideration when designing a CPFR solution. CPFR technology can be deployed as a shared solution, or as a peer-to-peer network of interoperating CPFR applications. The shared solution can be operated as part of a retailer’s or manufacturers extranet (VICS, 2004).

2.6.3 Critical Factors influence CPFR adoption

VICS (2004) indicates different industries have different critical factors influence CPFR implementation. Aviv (2002) also claims there are 4 main factors for general industry which influence the CPFR implementation as follow:

- **Ability and willingness to share data:** CPFR involves sharing all data with your partner, which means all participants need to share sensitive information as well (Aviv, 2002). The sensitive data may be included the business plan, promotion plan, inventory data etc. To take full advantage of the benefits of CPFR, trading partners need to create a relationships founded on trust and share sensitive data and close collaboration demands reliability (Accenture, 2001). Therefore, the ability and willingness of share data are influenced all participants’ understanding of the business goals and then determine the effects of CPFR implementation.

- **Internal and external collaboration:** For the internal collaboration, the senior management must assume the role of CPFR sponsor for each of the trading partners to ensure that the necessary resources (Human Resources, Marketing department and Financial department) are prioritized and dedicated to the project (Accenture, 2001). On the other hand, for the external collaboration, the selection of partners is a big challenge to CPFR (Aviv, 2002). Trading partners who wish to collaborate with each other need to assess the potential relationship according to anticipated, realistic benefits, pertinent to common business goals. Therefore, a successful relationship should ‘close fit’ on these aspects is preferred, or some indication that the potential exists to develop a relationship with joint objectives and goals. (Accenture, 2001)

- **Technical infrastructure:** In CPFR implementation, the availability of new technology can simplify and enhance the speed and flexibility of supply chain collaboration. Based on the degree of collaboration, various tools can support CPFR, from simple spreadsheet programs to applications, which included the ERP (Enterprise Resource Planning) software or specific CPFR solutions. For that reason, the technical infrastructure is a fundamental factor to make CPFR achieve success. Furthermore, financial cost should be taken into consideration when purchasing and using qualified technical infrastructure. (Accenture, 2001)

- **Measurable KPI’s (Key Performance Indicators):** The main purpose of using Key Performance Indicators is to measure the overall performance of the relationship between supplier/manufacturer and manufacturer/retailer and to track development. A second role of the KPIs is to be found in sharing them regularly with key trading partners. They may be used for intra- and inter-company wide benchmarking and provide a clear definition for setting common improvement targets. It is critical that the trading partners agree and fully understand the composition and calculation of each single KPI. (Aviv, 2002)
## 2.7 Summary

As can be understood from earlier chapters, it exists a lot of supply chain policies in the literature, which all got their specific advantages. Table 2.4 presents a summary of the inventory management policies previously described.

<table>
<thead>
<tr>
<th>Main Areas</th>
<th>Collaboration</th>
<th>Information Sharing</th>
<th>Type of Replenishment</th>
<th>Main Advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMI</td>
<td>Often rather low</td>
<td>Often rather low</td>
<td>Retailers make forecasts and invoice the supplier.</td>
<td>The retailer makes only decisions based on what is beneficial to them.</td>
</tr>
<tr>
<td>VMI</td>
<td>Medium</td>
<td>Medium</td>
<td>The vendor makes the inventory replenishment decisions on behalf of the customer by e.g. minoring inventory levels and actual product withdrawal (POS data).</td>
<td>Increase supply chain visibility, real consumption drives forecasts, decreased stock-out risk, increased inventory turnover, decreased costs due to economies of scale, improved service performance.</td>
</tr>
<tr>
<td>CPFR</td>
<td>High</td>
<td>High</td>
<td>Forecasts are developed together in the supply chain and are based on the POS information that is shared among supply chain members.</td>
<td>Increased supply chain collaboration, long-term relationships, reduction of inventory, real consumption drives forecasts, increased supply chain visibility among supply chain members.</td>
</tr>
</tbody>
</table>

Figure 2.7 Summary of three identified inventory management operations (Authors development)

Sari (2008) investigates the benefits of RMI, VMI and CPFR, as well as through simulation studied when the different approaches seem beneficial to implement. Firstly, Sari indicates that CPFR and VMI both have a large impact on inventory management performance. The results from Sari's study also shows that companies save much more costs through the implementation of CPFR than implementing VMI and RMI for inventory management. Sari (2008) states that total customer service level and inventory management cost mainly judges inventory management models’ benefits. Therefore, Sari’s (2008) results also implies that the decision of which approach to implement in a specific company’s inventory management depends on three factors which are: accurate inventory planning and forecasting in advance, replenishment lead times and uncertainty in the market demand. If the uncertain demand is high, the CPFR helps the company get much more benefits than VMI. However, Sari’s (2008) research is based on the simplest situation, but the reality tends to be more complex.
3 Methodology

In this section will present the research process usually includes formulating and clarifying the topic, reviewing the research approach, choosing a research strategy, collecting data, analyzing data and method evaluation. Authors will explain the reason behind the choices of method for this study.

3.1 Generating the research topic

The authors’ first idea was to do research project based on a specific company’s needs to improve its inventory management. Though contacts in China, the authors found a company that showed its initial interest in supporting its business operation in this research project. After the authors got an overview of the case company’s business activities, the case company gave out problem of inventory planning and forecasting in the business running, which has recently emerged and become a management bottleneck for the company. Therefore, the authors thought the inventory management in a beverage SME management context would be a good topic to do this thesis project. On the other hand, the research project is particularly of practical relevance for the company.

3.2 Research approach

According to Saunders, Lewis & Thornhill (2007), it is very important in what extend you are clear about the theory at the beginning when you start to do your research, because it will be directly related to the question that concerns the design of your research project. Saunders et al. (2003) claims there exists three types of research approach: one is the inductive approach, in which the researcher collects data and develops theories as a result of the data analysis, the second one is deductive approach, in which the researcher develops certain theories and/or hypotheses and design a research strategy to verify the hypotheses, the last one is abductive approach, in which the researcher combine the inductive and deductive approach to fulfill the research purpose. Considering the purpose and research questions of this study, the authors choose the inductive and qualitative approach as the legitimate approaches to be used.

**Inductive research**

Inductive approach in used for the researcher collects data and develops theories as a result of the data analysis. (Saunader et al., 2007). As Saunders et al. (2007) indicate induction emphasizes in the following five aspects: the collection of qualitative data, more flexible structure, researchers are seen as part of the research process, less need to generalize, and close understand of the research context.

In order to fulfill the purpose in this study, the authors have to collect data from the case company for deep understanding of the company’s inventory management context and problems. And then the authors need to clarify what inventory management model are similar with this case company’s using. After clarifying the company’s practical situation, the authors compare the difference between this company’s approach and the inventory management models presented in the literature. Therefore, the authors find a range of relevant theories review and analyze the relevant inventory management theories. The authors collect data through interviews, which are made by authors to analyze
the inventory management framework in existing theories, which are different from the practical implementation in a Chinese beverage SME.

Qualitative study

Qualitative study is used for identify how and why things happened and the qualitative data refers to all non-numeric data and data that has not been quantified. (Saunders et al., 2007). Grix (2004) also indicates qualitative research is characterized by the use of methods that try to investigate reasons behind the phenomenon in the nature. However, this research is aim to gain a deeper understanding of inventory management models in existing literatures and practical implementation in Chinese beverage SME and how the difference influences the practical implementation.

“For qualitative study, there is a number of ways to seek to describe, translate and come to terms with the meaning.” (Saunders et al., 2007). Qualitative interviews is a good way to seek to describe and translate the phenomenon and meaning in the nature context, it should be more flexible, due to the elasticity of changing emphasis during the interview, which can results in more depth, detailed and significant information (Bryman & Bell, 2007). In this study, the authors decide to conduct semi-structure in-depth interview because the operating and marketing managers are the key person in JN as the person could offer valuable information needed about inventory management strategy and also employees who work in the warehouse and marketing department could offer useful information about the company’s practical implementation of inventory management.

3.3 Research Strategy

Case Study Research

Case study approach is a research strategy for investigating a particular phenomenon in its real life context with defined boundaries of interest; for instance an organization, industry or specific type of operation (Hansson and Xu, 2014). Bai and Zhong (2008) also list other reasons for conducting case study, for example, to evaluate a case, or to help companies to change (Gummesson, 2000). Yin (2003) indicates the case study could solve the research questions such as "what", "why" and "how". There are two major types of case study, single-case study and multiple-case study (Yin, 2003). ‘The single-case study is analogous to a single experiment, and many of the same conditions that justify a single experiment also justify a single-case study’ (Yin, 2003). Compared with single-case study, multiple cases’ evidence is often considered more compelling and the overall study is regarded as being more robust and the distinct disadvantage of multiple-case study is that it requires extensive resources and time and cannot be taken lightly (Yin, 2003).

In order to fulfill the purpose of this study, the case company agrees to offer related data, the authors decide to select single case study method for this study because the purpose is to analyze the how the beverage SME organize the inventory management, and then based on analysis of the difference from general inventory management and beverage inventory management, the authors try to explain how these difference influence the practical inventory management and in the end provide a mixed inventory management approach for beverage SMEs. In the end, the authors provide some future improving
suggestions for the case company as well. Therefore single case study research strategy helped the authors to fully understand the research context in case company and acquire considerably deep understanding about inventory management issues by constraining the research scope (Halinen and Törnroosb, 2005). This strategy also provides with possibility to collect data from different additional sources including interviews, annual reports, corporate homepages, etc. Moreover single case studies are useful for deep investigation dynamic and complex areas – like, business networks and partner relationships (Vissak, 2010). As the case is all based on comparing the parameters in existing inventory management model with practical implementation model that case company are using and then authors will find out the difference and explain how these difference influence the case company’s inventory management. At the same time, this research could be analyze the case company in more details instead of conclude a general results from comparing different companies. After setting the research strategy, then it could go to the data collection step.

3.4 Literature Review

In order to design more specific and objective interview questions, the authors used three frameworks summarized from related literature, the first one provided a framework to examine a company’s readiness to implement a VMI policy, while the second one RMI provided a framework which connects a company’s inventory management only with its retailer, and the last framework is used to examine CPFR model in a company’s inventory management. The latter was used to describe important aspects relating to the research and provided the basis for the report structure, as well as a manner to classify the areas of difficulty identified from the interview results (Chopra & Meindl, 2010).

The database that were found by: Google Scholar, Science Direct, Diva and Primo. And the most common key words used in the searching of literature were: Inventory management, SME, Beverage Industry, Retailer-managed inventory, Vendor-managed inventory, Collaborative planning forecasting replenishment in inventory management. The articles were selected based on relevance to the topic, since the research area is under continuous development, the latest published article provided the report with the recent findings within the subject, and thus makes the findings of this research relevant and up-to-date.

3.5 Data Collection

In order to answer research questions, the authors choose literature review and interviews as the approach to collect data. Saunders et al. (2007) indicate when a case study is conducted, multiple-source data that can provide different data could be set in different form. One of the purposes to use multiple-source in this thesis is to understand the overview of the phenomenon from literature reviews to help authors complete the empirical data collecting. Another purpose is that multiple-sources make confirm the reliability of data from case company in order to understand the challenges in their inventory management. Therefore, it is very important to apply interviews and literature reviews as the data collection method in this study. The data Collection process is illustrated in figure 3.1 below:
3.5.1 Interviews

In order to fulfill the purpose of this study, the authors collected primary data mainly through semi-structured in-depth interview by Skype with the managers and employees of JN, because it is a fast and direct way to obtain specific information from the case company, which may not be available publicly (Liu and Yang, 2014). The authors select semi-structured interviews approach to all interviews that are conducted, which assisted the authors in keeping focus on identified questions and digging deeper into the questions. The semi-structured in-depth interview allows a certain degree of flexibility during the interview (Liu and Yang, 2014). Additionally, all interviews are conducted separately in Chinese for convenient communication with Chinese managers and employees. Thus, the whole interview content was translated into English by authors.

In semi-structured in-depth interview, the interview guide is designed on the basis of theoretical framework, therefore, the authors need to have a list of key questions (Appendix 1) and the whole interview basically follows the structure that is made by authors. During the interview, new questions will always come up according to the answers of the interviewees, as well as the order of questions would also be varied depending on the flow of the conversation.

Interviews were conducted with one background introduction meeting by phone, one general inventory management strategy information meeting by Skype, and face-to-face interviews with five managers and three employees individually by Skype and post interviews by phone. Each interview is recorded and briefly summarized note taking. All interview questions are designed to give enough information about the case company’s inventory management implementation. Therefore, the semi-structured in-depth interview enables to fulfill the purpose and bring sufficient information to conduct an analysis.

Interview Process
Before the first interview, the authors send the email to the CEO of the firm and make an appointment for the first meeting by phone. The first meeting was made by phone to discuss with the CEO of the case company about the study and informing how the study would be performed, and what areas would be analyzed and questioned during the next interviews.

The second interview was made by Skype, which followed by semi-structured in-depth interview questions to get the background, organization structure and general information about JN inventory management. And then clarify which theoretical model presented in the literature is much more similar with JN inventory model.

The third interview was dividing into two parts, one for the managers who work in operating, marketing, sales and manufacturing departments, the other one for the employees who work in these departments. The semi-structured open questions design should based on the parameters are presented in the theory chapter but it is flexible to changing emphasis during the interview, which can results in more depth, detailed and significant information by managers and employees’ answers.

The last interview was the semi-structured post interview to answer the missing information on considered for the authors needed to fulfill the purpose.

In order to answer research questions of this study, authors select suitable participants who can answer these semi-structured questions related with inventory management (in Figure 3.3). Therefore, participants should include CEO, two managers works in operating department, two managers work in marketing and sales department, one manager comes from manufacturing department and three employees works in these departments.
### Figure 3.3 Overview of interviewees (Authors development)

#### 3.6 Data Analysis

Semi-structure interview is executed and all the process will be recorded. Transcripts are analyzed using the method of data display and analysis for this study, which is a qualitative method used for "identifying, analyzing and reporting patterns (themes) within data" (Braun and Clarke, 2006). Saunders et al. (2007) also provide an overview of qualitative analysis process. The analysis process should start by classifying non-standardized qualitative data that have been collected into certain categories. It is a prerequisite that the data can be meaningfully analyzed later (Braun and Clarke, 2006). Therefore, the analysis part follows the structure in the theoretical part. The authors portrayed the structure and whole supply chain process of the company from the interviewees’ answers. From interviews, the finding part is categorized into three main parts such as: what is the currently inventory management in the case company compares with RMI, VMI and CPFR models (both from managers’ and employees’ perspectives) in the company’s business. Those contributed to following further analysis. In the analysis part, the authors separately compared the firm’s current status with three inventory models (RMI, VMI and CPFR) to achieve the difference. Then the authors tried to analyzed the reasons behind those difference, not only based on the structure and supply chain of the enterprise, but also to the theoretical framework. Therefore, the conclusion would contribute to the case company as well as the inventory management models research for fast moving industrial SMEs.

#### 3.7 Method Evaluation

##### 3.7.1 Reliability

Saunders (2007) defines reliability as “to the extent to which your data collection techniques or analysis procedures will yield consistent findings”. The objective of reliability is to minimize inaccuracy and biases in the research (Yin, 2003). There are tactics to strengthen reliability of case study: use of a case study protocol, and development a case study database (Yin, 2003). A case study protocol established for this study includes data collection techniques, case study design and interview questions (Posazhennikova...
and Kravchenkova, 2012). In order to ask the research questions, all interviews are recorded and interview transcripts are verified by participants and all printed materials provided by the company, such as presentations, reports and other internal documentation, are included in the database. Thus, reliability is increased with the possibility to follow research process and to repeat the study anticipating the same results.

### 3.7.2 Validity

Saunders (2007) depicted validity as “Whether the findings are really about what they appear to be.” Yin (2009) divided validity into three different categories: construct validity, internal validity and external validity. The construct validity concerns the measures used for the concept. The internal validity is mainly used for explanatory studies, referring to certain conditions that lead to others. And the external validity focuses in if the conclusions reached could be generalized or not. To achieve high validity in this thesis, the authors apply appropriate theories to build up the data collection framework and select the most relevant participants to the topic of the thesis. In order to avoid the risk of respondent’s bias and invalid information, the interviewees are on the condition of anonymity during the interview. To avoid the misunderstanding of interviews, the authors summarize the whole interviews’ contents in Chinese and then send them to interviewees to make sure there are no misunderstandings during the interview. After the confirmation from interviewees, authors will translate contents in English.
4 Empirical findings

This chapter presents the information about the case company’s inventory management through the interview. It is organized as follows: background of the case company, organizational structure about the company, identifying the activities of inventory management in the case company and description of different theoretical activities tailored to manage company’s total inventory of finished goods.

4.1 Background information

JN Beverage Company was established in 2014. JN aims at selling the healthy beverage products in the whole China. Max Z. and Mike S. invest the beverage company with total 80 million CNY register capital in Hangzhou. This is a beverage manufacture has its own brand of two own SKUs and the company produces products for other retailers in China. They have two own SKUs called Maca and Huayu. The company's products are highly different from their competitors because the beverage products have special functionality and the target customers are the high profit margin category in the beverage market. As CEO said since the products are manufactured with ecological and healthy concept, their products are easier to be recognized by customers in the market.

Currently, JN operates its business in more than 70 cities in China and their annual revenue reaches more than one hundred million CNY in the of 2014. With the increasing of JN's product consuming (e.g. the consumption of Huayu from 7065 bottles to 19048 bottles in one month), JN needs to face with a serious problem about inventory planning and forecasting. In order to fulfill retailers’ demands, JN has to manufacture products in advance. But the case company doesn't have any standardize approach to plan and forecast inventory in their inventory management. For this reason, JN always has the stock out or overstock problems in inventory management.

Due to beverage products have limitation of expiration date, if beverage products occurrence keep long in stock, the case company will has a great financial loss in the end. On the other hand, if the case company does not have enough inventory to fulfill retailers' demands, it also lost opportunities to gain much more market share. Therefore, JN is facing the problem of achieving optimal inventory management in their business right now.

4.2 Organization Structure of JN

As the literature mentioned before, all participants in the whole supply chain influence inventory management. In order to help JN to find out where the trouble is in their inventory management. The authors present the organizational structure in JN.

The organizational structure in JN has two layers, as Figure 4.1 shows. On top of the organizational structure, CEO acts as the top manager of JN, while all the other departments lie in the low layer.

The CEO engages in decision-making and controls the whole company’s business planning which includes the future development and partnership.
The marketing and sales department is responsible for market positioning, competitors analyzing, inventory forecasting, collaborating with retailers to analyze market trends regarding retailers' sales history for each product item. Sales people often make business trips to the retailers to negotiate and communicate the product quality, delivery time, and sales status and so on in order to improve the accuracy of inventory forecasting.

In the manufacture department, employees have a responsibility to follow products planning from sales department and procure raw materials to produce corresponding quantities productions.

The operation department is in charge of monitoring the orders’ process from retailers, contacting third party logistics providers for delivery, offering IT support, arranging transportation for inbound and outbound in warehouses and assisting to the marketing department regarding sales forecasting issues.

The last department is finance, which manages the cash flow, tracks the payment process from retailers and supports the whole business plan in JN.

![Organization Structure of JN (Authors development)](image)

### 4.3 The inventory management in JN

JN’s inventory management mainly focuses on inventory planning which is based on the salesmen's inventory forecasting, manufacture department’s production order modification, and warehouse department’s feedback. During JN's inventory management process, firstly the sales department collects the demands information from retailers, which includes inventory forecasting, sales request or actual sales orders, delivering the demands information. After the data collecting, the salesman transfers the production order to manufacture department. Secondly, the manufacturing department will make sure the volumes of raw materials whether to finish production orders or not. After raw materials confirmation, warehouse employees will deliver raw materials or spare parts to production line to prepare for manufacturing. Thirdly, all finished products will be
packed up and sent to the warehouse is close to the factory. The last step is shipping finished goods from the warehouse to retailers. The operation manager depicts out the inventory management process of JN's finished goods delivery as shown in (Figure 4.2).

**Inventory Management Process**

During the whole inventory management process, each step affects the inventory management differently. Firstly it starts from the sales department, sales people are in charge of understanding product demands and order requirements from retailers and also need to forecast the product demands for the further market based on the inventory outbound history from retailers. However, the inventory forecasting from salesmen is not accurate, because a sales employee mentioned: "Every salesman has sales quota and the salary will be hugely influenced by the completion of sales quota." Therefore, a lot of salesmen finish their sales quota by pushing retailers to place so many orders that retailers hold a lot excess inventories in the end. Therefore, for the future inventory forecasting, retailers will not continue to place orders to JN.

The second step comes to the manufacture department. Ideally, the manufacture department will produce goods based on production orders from sales department. But when production orders come to the manufacture department, employees will modify final volumes of products based on their experiences. As the manufacturing manager mentions: "The preparation lead time for production is quite long, and the factory has to manually optimize the manufacturing volume and extend production times in order to save the total costs." Generally, before starting production, it takes 5 to 6 hours to prepare for manufacturing, and the practical manufacturing time for a batch of productions only takes 1 to 2 hours; after all productions are done, employees have 2 to 3 hours to clean up the whole production line. It is easy to conclude that if the production volume is too low, the preparation cost is too high for each SKU. In order to save the cost of products, the manufacturing department would like to produce more in once manufacturing.

The third and forth steps relate to warehouse management. Currently, there is a big problem in the warehouse management, which is in the warehouse, employees put the packaging materials and finished goods randomly that causing a big problem in inventory management for space. The materials and finished goods randomly placing will waste a lot of space. In the company's warehouse usually workers just put finished goods to available space where is vacant, which made everything in a mess. As the operation manager mentioned: “Beverage is extreme sensitive to the date of manufacture because the expiration date will greatly influence the beverage sold in the market.” For

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**Figure 4.2 Inventory management in JN.** (Authors Development)
the expiration data control, the batch management is needed to be considered due to the different batches may be produced in different time periods, the company needs to track which batch is shipped to which customers to avoid fleeing goods. Theoretically speaking, JN should obey the rule of first-in first-out (FIFO), but currently they cannot manage it.

As the operation manager indicates the company is currently following a make-to-stock strategy to produce beverage productions, with the implication that the safety level of stock is very important to them. But actually the company doesn’t have any safety stock because retailers’ orders may not be the same as real demand and manufacture department changes inventory volumes without any discussion with other departments. For this reason, there are two challenges that the company is facing in inventory management: the first challenge is the retailers only share information with salesmen rather than operational people in the company. Therefore, the company always has problems with stock out or overstocks, which increases holding costs, storage costs in inventory management and diminishes JN’s sales share in the market as well. The second challenge is that the company doesn’t make every internal department work together in inventory management. The top management team would like to complete the inventory management process with each department and retailers, but employees are lack of training to manage inventory or collaborate with partners in the whole business.

4.4 Inventory management activities with RMI model

This section is used for presenting inventory management activities relates with RMI model in the case company and describing the company’s thought about improvement of the RMI model for the beverage industry in the future.

Currently

JN uses a traditional inventory management approach, retailers manage inventory by themselves, and JN’s inventory level is controlled by JN’s own experiences mixed with actual order volumes from retailers.

Generally, the retailers make the inventory decisions through salesmen. During the decision-making process, salesmen will present market demands and trends information to retailers and the salesman is the only channel to communicate with retailers. Therefore, salesmen have a huge impact of inventory control in the whole inventory management. As findings mentioned before, each salesman has sales quota and salaries will be hugely influence by the completion of sales quota. Therefore, the inventory forecasting or sales orders must be differently from true orders in the market.

To make matters worse, the manufacture department produces product based on the actual orders from sales department as if from retailers, but the final decision of inventory level and the production quantity, will be modified in order to keep the total production cost efficient. Therefore, the manufacturing department will always adjust the products’ volumes by their own experience when they decide to manufacturing.

Future
For the future retailer-managed inventory approach, JN considers to allow the retailers to get involved in JN inventory management especially in fetching retailers’ real demands. If retailers can be involved in the inventory planning, it will help JN to get much more accurate production orders and fulfill retailers’ real demands in time. Due to the beverage products’ limitation of expiration date, involving retailers in the inventory management will also avoid risks of products’ expiration, stock out and overstock problems.

4.5 Inventory management activities with VMI model

This section is used for explaining inventory management activities which relates with the VMI model in the case company and describing the company’s thought about improvement of the VMI model for the beverage industry in the future.

Currently

Until now JN doesn’t have any complete systems or models to achieve the goal of managing retailers' inventory directly. But the company could review inventory management activities through the following activities in VMI as below:

Inventory Levels: As the manufacturing manager mentioned before, the factory will produces inventory volumes on the basis of the orders from retailers and manufacturers' experience, not based on retailers' sales or inventory history.

Inventory decision making process: The sales department forecasts retailers’ demands by market investigating and few retailers' sales history. Retailers only exchange information with salesmen, no other departments are involved in the decision making process. Therefore, some salesmen may deceive and push retailers to place more orders to achieve the sales quota. It may leads to a different inventory level from the real demand.

Information sharing: Most information sharing is about order volumes, payments and few sales histories from retailers. No other deeper information about inventory status and planning from retailers.

System integration: JN only has an order system to help retailers to place orders on the cloud platform, which increases the success rate and reliability of order confirmation. The company doesn't have any vendor systems because of budget and knowledge of technology.

Top management support: Managers think they give enough support to the inventory planning and forecasting, but there are still many errors with the inventory management and demand forecasting in execution.

Employee Involvement: Even though managers think all departments’ employees are participating in inventory management activities, but employees don’t think they are real involved in the inventory management process. A employee works in the warehouse said: “Our department is not collaborate very well with sales department and manufacture department, we only take charge of picking up goods in the warehouse and shipping finished goods to retailers, but we don’t have any discussion and coordination with other departments.”
Future

JN thinks VMI is an interesting idea to manage retailers’ inventory. If JN can manage retailers’ inventory in an efficient way, it will help both JN and retailers to keep inventory at a safer level. For the beverage industry, there are two main challenges to overcome; firstly, it is impossible to manage all retailers’ inventories directly, because beverage retailers also have secondary retailers in the whole supply chain. Even though JN tries to manage direct retailers’ inventory but it is difficult to manage secondary retailers’ inventory. Secondly, a complete vendor information exchange system requires too much cost for the small-medium size company.

Therefore, JN points out that the company may not use the entire VMI model, but the company can coordinate with retailers to get the inventory status feedback and sales information from retailers, then the company tries to provide the most suitable solution to fulfill retailers’ demands in time. JN believes that efficiency inventory management provides an opportunity to avoid risks in both JN and retailers. It will help all participants to make forecasting of inventory or manufacture more accuracy and avoiding a lot unnecessary loss, for instance, the extra holding costs, storage costs, sales loss and so on.

4.6 Inventory management activities with CPFR

This section is used for presenting inventory management activities, which relates with the CPFR model in the case company and describes the company’s thought about improvement of the CPFR model for the beverage industry in the future.

Currently

JN just uses partial theories of the CPFR, because the company does not have the full set of systematical inventory management knowledge nor complete operational system. Also, there are many industrial limitations (such as decentralized retailers) blocking JN to do comprehensive information and strategies sharing. The following part shows how JN operates the inventory activities with CPFR.

Strategy and planning: JN has its own production and inventory strategy for the future development, but it is not designed for the cooperative relationship. The strategy is only used for expanding the market share based on the research of the beverage market. At the present stage, JN will not consider to share the product business plan with all retailers because lots retailers not only sell JN’s products but also many other competitors’ products, which makes extreme difficult to build a trustful and cooperative strategy with all retailers.

Demand and supply management: JN does not have a comprehensive solution for demand and supply management. The inventory demand forecast is based on experiences mixed with sales orders.

In order to give more buff time for factory, the manufacture department would receive forecasted volume orders of incoming month from sales department on 25th or 26th per month. Then the factory arranges the production plans according to sales forecasting from sales department to make decisions of preparing raw materials. In the ideal plan, the factory just needs to manufacture twice a month when actual orders are placed,
which is the most efficient way. In fact, the factory conducts production manufacturing 5 or 6 times per month. Currently there is no efficiency collaboration about the demand and supply management to optimize the inventory.

**Execution:** As mentioned before, JN has a cloud order system to help collect retailers’ real sales orders after the down payments are made. JN will arrange operation department to pick up goods from warehouse and use Third Party Logistics Company to ship goods to the retailers in the end.

**Analysis:** So far there have been no department has responsibility to analysis the exception conditions during the whole inventory management process. What JN has is just some history data collections like outbound logs or sales orders logs.

**Ability and willingness of information sharing:** JN’s information sharing basically stays at order volumes and payments. The sales manager said: “We don’t have any collaboration with retailers’ inventory information sharing and future business plan, because most of the retailers don’t care about the inventory information sharing rather than sales profits when retailers negotiate with salesmen.” Actually JN is willing to collaborate with retailers and also wants retailers can directly share their inventory information with JN, because it is helpful for JN to control and plan the inventory level to be held in the warehouse.

**Internal and external collaboration:** For the internal collaboration, on the surface, all departments are involved in inventory management, but each department only focuses on its own tasks, not real collaborating with each other. A Operation manager said: “We will not join in inventory forecasting with sales colleagues and sales department will never gets involved in shipment planning or tracking, nor inventory level designing either.” Sales employees also mentioned that most employees only focus in working for their own department rather than having a more coordinating sense with each other. For the external collaboration, retailers only coordinate with salesmen and all the information is only exchanged between retailers and salesmen, no other departments in JN.

**Technical infrastructure:** JN only has one technical system to help retailers place order right now, but does not have any other technical infrastructures in the company.

**Key performance indicators measurement:** JN has not defined any specific key performance indicators for inventory management but for the sales. In the warehouse, most of employees don’t have any higher education before, it is very difficult for them to manage inventory in a scientific way.

**Future**

JN thinks the collaborative planning, forecasting and replenishment is a very scientific approach to control the inventory level. But due to the beverage industry’s characteristics, JN thinks the information sharing is a sensitive problem in the whole business. JN will not share all business information (such as business plans, inventory plans) with all retailers, because there is a big competition in the Chinese beverage market, retailers not only sell JN’s products but also many other competitors’. If retailers know any confidential information about the company’s business and inventory strategies, the retailers will compare with other competitors’, then make decision, which could maximize retail-
ers’ own profits. In a worse case, the important business plan and inventory plan of JN may be disclosed to other competitors, which will greatly influence JN’s strategy implementation in the market.

Therefore, CEO wants to integrate the order system with retailers’ stock system, JN could share some parts of market information with retailers and vice versa wants retailers can open their inventory levels to JN. A operation manager motioned that it is difficult to achieve the mutual information sharing with retailers because many retailers basically stay at the level to use the manual inventory recording and the information exchange system will cost a lot of money and time to train the retailers, moreover, JN also needs lots of resources to build up a professional system to integrate retailers’ inventory system. In the end, JN wants to find build a simple system platform to invite their retailers to participating in inventory planning, forecasting and replenishment, which is almost blank in JN currently.
5 Analysis

In this chapter empirical findings are analyzed based on the present theoretical framework. The authors explore what difference between implementation and literatures and with explanation the reason behind these differences regarding to optimization of inventory management in beverage SME. In the end of this section, the authors develop a mixed inventory management model for the beverage SME as well.

5.1 Inventory management

Academic research emphasizes strategic importance of inventory management that involves demands, supply and cost (Eroglu & Hofer, 2010). According to these importance factors, some literatures highlight various ways to managing inventory tend to work in different ways. First of all, each approach may have its own objectives and performance measures differently or even conflicting with the company’s overall performance (Choi, 2013). From the other perspective, even each approach works differently but it might help the company to figure out anything that not be monitored in inventory management. (Axsater, 2006). Furthermore, efficient inventory management can be a company’s competitive advantage (Kot et al, 2011).

Nowadays, the difficulties in managing inventories in a organization come from a fact that commonly each department is lack of efficient collaboration between each other, therefore each department might conduct inventory management differently, which results in inefficiencies for the whole inventory management. (Borowiec and Liedberg, 2009)

JN organizes, as a complex network to serving different retailers scattered around the China – in total JN owns more than 70 retailers currently. In JN’s organizational structure, each department managed inventory information autonomously and the inventory planning, forecasting and replenishment are implemented in a low collaborative level. In this discrete way of managing inventory that leads to stock out and overstock are always happened in the company's daily business. Therefore, JN has the inefficient problem of the inventory management and coordinating with different business units. In order to improve the beverage company's inventory management, the authors will analyze the findings and literature to find out a suitable way to manage inventory planning, forecasting and replenishment in the beverage industry.

5.2 Difference inventory activities with RMI model

According to the literatures and findings, the authors found JN inventory management approach is very similar with RMI model, but there are still some differences from academic literature such as the information sharing in production orders' decision-making.

In the literature, RMI is known as a traditional approach in managing inventory and RMI is used for the supply chain structure in the lowest level of supply chain integration (Sari, 2008). It implies that suppliers in the upstream supply chain develop forecasts based on orders from their closest downstream customers, without any history sales data. In this collaborating model, it is easy to observe that very little or no information is
shared between members (Sari, 2008). All retailers make the inventory decisions based on what they think will be most favorable for them (Gumus et al., 2008).

According to the findings, JN maintains inventory level through its experiences mixed with actual production orders from retailers and JN also has some information are shared by retailers. In the production orders’ decision process, all orders and inventory forecasting are based on the information sharing between salesmen and retailers; manufacturer is also involved in the final production order decision. Therefore, it is different from the theoretical RMI presents that retailers share little or no information during the order process.

During the interview, there are some explanations behind the difference between reality and theory. For the beverage industry, quick response and products' expiration are very important to both manufacturers and retailers. In the Chinese beverage industry, usually the beverage manufacturer has a complex network with different retailers across the whole China. In order to fulfill retailers' demands in time, the beverage manufacturer will produce products in advance. Therefore, the beverage manufacturer has huge stocks in their warehouse. If retailers don't have any information sharing with this beverage manufacturer, it definitely influences the manufacturer's forecasting about production and inventory management. Therefore, the beverage industry is not satisfying RMI model in the inventory management.

In the findings, even though JN’s salesmen have information sharing with retailers, but most salesmen would like to push retailers to place more orders to earn selling bonus. Therefore, it may lead to the forecasting errors because the salesmen push the retailers in a wrong way. In fact, if the retailers cannot sell all the products in the end, they will not continue placing orders to JN anymore. On the other hand, JN will face the overstock problem in the warehouse. Even sometimes the orders' information may not be accurate, but the information sharing is very necessary to JN to forecast and plan the inventory level in the future demands. In order to improve the accurate of order forecasting, JN needs to consider allowing the retailers to get involved in JN’s inventory management. Because if retailers can be involved in the inventory management directly, it will help JN to make a more precise inventory forecasting accompanying with salesmen’s information, as well as fulfilling the retailers demands in time.

Therefore, the authors found out some key characters to involving retailers in inventory management in the beverage SMEs. Due to the JN’s widely network of retailers, involving the retailers in the inventory management and frequent mutual communications will help both JN and retailers to avoid risks of products' expiration, stock out and overstock problems. The sales history and inventory status from retailers do not limit the information any more. Therefore, plenty information sharing could allow JN help retailers making orders easier, and JN itself will have a high turnover rate in inventory management because of responsive supply and in time delivery.

5.3 Different inventory activities with VMI model

Academic literature presents VMI as a supply chain collaboration program that allows an upstream firm to manage inventories for its down-stream supply chain partners (Guan and Zhao, 2010). VMI is taking charge of the replenishment of stock based on the specifically inventory control policy, while vendors are benefit by integrating the
operational decisions of production and supply in order to maximize economies of scale and flexible deliveries in the distribution process. (Yao et al., 2012) During the interview, the managers in the case company points out they don’t use the entire VMI concept right now because the complex networks with retailers and the secondary retailers. For the beverage SME, it is impossible to manage all retailers' inventories directly. But in the future the case company may consider coordinating with retailers to help the retailers to analyze the inventory status and provide suitable inventory planning to the retailers. Even though the case company does not use the whole VMI model, but also presents how did they utilize some factors from VMI model in their inventory management.

In the findings part, the authors presents how the case company controls the inventory level, makes decision process, shares information, integrates ordering system and so on. According to the findings, the authors found the differences between what did the case company do and academically literature.

**Inventory Levels:** JN’s inventory level is not settled like the VMI literature presents. JN does not have enough information about current stock quantity or stock out instances from retailers. JN only knows the quantity of production orders and few sales histories from customers. Therefore, JN only produces inventory volume based on the retailers’ orders mix with JN’s previous experiences. The reason behind this difference because retailers lack of the mentality about information sharing, retailers only care about the sales profit but ignore the importance of inventory management.

**Decision making process:** According to Pol and Inamdar (2012), VMI decision-making process should include sales history from retailers to manufacturers and order proposal from manufacturers to retailers. In fact, JN does not make any order proposals to retailers and the retailers only share their sales history to salesmen not directly to the manufacture department. Due to salesmen deceive and push retailers place more orders, the manufacturing department will produce products might be far different from actual demands. The reason behind this problem is the internal collaboration doesn’t work very well, each department lacks of communication and discussion.

**Information sharing:** Academically literature presents information sharing in VMI, which involves sales data, order status, inventory level, sale forecasting, delivery schedule and so on (Lee et al, 2000). Comparing to the literature, JN only has information sharing about order volumes, payments and few sales histories from retailers. It is not enough to understand retailers’ inventory status. Therefore, it is difficult to make an accuracy inventory decision without enough information from retailers. As the authors mentioned before, the reason behind this difference is the retailers are lack of the mentality of information sharing and the case company also be short of the trust from retailers.

**System integration:** Elvander et al. (2007) point out the system integration level influences the inventory management when retailers decide to place or schedule new replenishment. From the findings, JN only has a system in helping retailers to place orders on the cloud platform, which decreases the ordering lead time and increases the success rate of order confirm, but JN doesn’t have any system integration with their retailers because JN doesn’t have enough capital and professional technological knowledge to integrate systems.
**Top management:** In the literature, the top management team has to support retailers to reduce the stocks in retailers’ warehouse and closer collaboration with retailers. JN’s top managements think they give enough support to the retailers’ inventory planning and control, according to JN can provide products to retailers on time. But there are still many problems with the inventory management and demand forecasting in the JN’s inventory decision process because the top management doesn’t monitor each department’s activities and lacks of training about inventory management as well.

**Employee Involvement:** Singh (2013) claims the employee involvement can be a vital requirement for implementing VMI. According to findings, JN's employees point out they doesn’t think they are involved in the inventory management. The employees mentioned each department is not collaborated very well with the other department. For instance, the warehouse employee only takes charge of picking up goods from warehouse and making outbound shipment without any inventory forecasting with sales colleagues, at the same time, warehouse employees do not have any systematical training with inventory management.

According to these difference from the academically VMI model, the authors find out VMI may be an interesting idea to manage retailers’ inventory in fast moving beverage industry, but it might be not suitable for beverage industry to manage inventory. In this beverage industry, it is too complex to manage the retailers’ inventory directly. In this very high turnover rate industry, it takes lots resources to counting and managing inventories. Therefore, helping retailers to manage the inventory will be a very tough question and most SMEs don't have enough budgets to building a complete vendor system.

Therefore, the beverage SME may not use the entire VMI model, but the beverage SME could refer partial sections in VMI model. For the beverage SME inventory management, the in-time information sharing of inventory changes will help both actors to understand and make better decisions to manage inventories. Beverage SMEs should proactively coordinate with retailers to collect the inventories’ status and sales information from retailers. After more information is gathered, the beverage company could provide a better solution to fulfill retailers’ demands in time. This sectional VMI approach will help all participants make forecasting of inventory or manufacturing more accurate and avoid a lot of unnecessary cost like the extra holding costs, storage costs, sales loss, etc.

But in practical implementation in the beverage industry, the employees are lack of inventory management knowledge and training, the top management team lacks of enough support to assist employees. In order to implement this sectional VMI approach in a right way, firstly the employees should be trained by top management team to help employees, and then the appropriate resources should be invested in the inventory management.

**5.4 Different inventory activities with CPFR model**

According to VICS (2004), CPFR links sales and inventory management in best practices, such as supply chain planning and execution processes to increase availability while reducing inventory, transportation and logistics costs. CPFR provides a general framework for the collaborative aspects of planning, forecasting and replenishment processes (Aviv, 2002). According to the interview, the case company points out they use
some parameters from CPFR to manage and forecast inventories. Comparing to the theory, the authors summarize difference between ideal CPFR model and practical implementation.

**Strategy and planning:** As VICS (2004) mentioned that strategy and planning establish the ground rules for the cooperative relationship. It determines the product mix and placement, designing event schedules for the period as well. In the findings, JN has its own production and inventory strategy for the future development, but JN does not share the strategy and planning to retailers. In the beverage industry, it is difficult to have a long-term collaboration between retailers and manufacturers. In the beverage industry, retailers are not only cooperated with just one beverage manufacturer but also other beverage competitors. If the beverage manufacturer shares business strategy with retailers, the retailers might divulge the strategy to your competitors. Therefore, it is difficult to build trustful and cooperative strategy with all retailers in the fast moving beverage industry.

**Demand and supply management:** According to VICS (2004), demand and supply chain management contrives consumer (point-of-sale) demand, together with order and shipment requirements over the planning period. Based on the findings, JN doesn’t have any comprehensive approach to manage demand and supply in their business. The manufacture department would receive forecast sales of incoming month on 25th or 26th every month. The ideal plan is to manufacture twice a month, which is the most efficient way. In fact, they conduct production manufacturing 5 or 6 times per month currently. Currently it is not an efficient way to manage demand and supply and optimize the inventory due to the fluctuated demand and order placing.

**Execution:** In the execution part, lots of operations are included such as placing orders, preparing and delivering shipments, receiving and stocking products on retail shelves, recording sales transactions and making payments (VICS, 2004). As the authors mentioned before, JN has a cloud order system to help retailers to place inventory decision after the down payment is made. After the sales order is confirmed, JN will arrange operation department to pick up goods from warehouse and plan delivering shipments with Third Party Logistics Company to ship goods to the retailers in the end. It is obvious that JN just uses partial ideas to facilitate the execution part. Because the beverage SME lacks of complete system to track all retailers' sales transactions and stocking products. Also the beverage fast moving industry is too complicated to execute all activities from CPFR.

**Analysis:** Until now, JN doesn’t have any departments in charge of analysis the exception conditions during their whole inventory management process, because the beverage SME thinks the analytical department is unnecessary so far.

**Ability and willingness of information sharing:** The ability and willingness of information sharing which means all participants need to share all data with your partners, even the sensitive information (Aviv, 2002). Based on the findings, JN’s information sharing basically stays at order volumes and payments. JN doesn’t have any collaboration with retailers’ information sharing about any business or inventory strategies, because in the beverage industry most retailers don’t care about the information sharing rather than the sales profits. On the other hand, retailers also collaborate with the beverage company's competitors. Therefore, JN doesn’t want to share the sensitive infor-
information with retailers, but JN are willing to get inventory status information from retailers to help the retailers to replenishment in time. At the same time, it is helpful for JN to control and plan their inventory level in the warehouse as well.

**Internal and external collaboration:** Aviv (2002) mentions that in order to improve the effective of collaboration of forecasting, planning and replenishment, the senior management should assume the role of internal collaboration, and selection of the external partners should consider the potential relationship according to anticipated, realistic benefits and common business goals. In the findings, the senior management team doesn't assume the internal collaboration in the whole company, therefore all departments are only focus on their own tasks, not collaborate with each other. For the external collaboration, the selection of retailers is only based on the realistic benefits right now, not consider the long-term relationship and common business goals in the future. The reasons behind these problems are divided into two aspects. Firstly, because the fast moving goods has low profit margin, the beverage manufacturers only pay attention to the short-term realistic benefits, not long-term relationship. Secondly, the senior management team lacks of knowledge and responsibility of monitor each department's collaboration.

**Technical infrastructure:** As Accenture (2001) mentions the availability of new technology can simplify and enhance the speed and flexibility of supply chain collaboration. From the findings, JN only has a technical system to help retailers place order easily and doesn’t have flexibility collaboration with retailers. In the beverage industry, usually a small-medium size company doesn’t have any technical knowledge and enough budgets to establish any other technical infrastructure in the company.

**Key performance indicators measurement:** The main purpose of using Key Performance Indicators is to measure the overall performance of the relationship between manufacturers and retailers (Aviv, 2002). But actually in findings, JN doesn't have any key performance indicators for relationship with retailers. Firstly, in the beverage industry, some retailers are not so stable; retailers sell different beverage brands to the secondary retailers at the same time. Therefore, JN is difficult to build a long-term relationship with all retailers. Secondly, most employees don’t have high-level education, for this reason, it is difficult for employees to manage inventory in an efficient way like building up a reasonable and scientific KPI system.

For the company’s inventory management, the collaborative planning, forecasting and replenishment is very scientific approach to control the inventory level. But due to beverage industry characteristics, it is not appropriate approach to manage inventories. Firstly, the main challenge of using CPFR is sensitive information sharing. In the beverage industry, the retailer not only has one beverage company’s products but also has other beverage company’s products. In order to avoid the retailers divulge important business and inventory strategies to competitors, the beverage manufacturer will not share any sensitive information to retailers. Although the case company does not want to share all information with all retailers, but the case company still wants to integrate this order systems with retailers’ stock system. JN would like to share some market information with retailers and also hopes retailers can open their inventory level to JN.

Secondly, in order to optimize the beverage manufacturer's inventories, the senior management team should assume the collaboration between each department in the compa-
ny. An efficient collaboration in the internal organization will avoid a lot misunderstanding about inventory management.

Thirdly, due to the particularity of beverage industry, manufactures don't have a trustful relationship with retailers. For this reason, it is not easy to build a good collaboration with each other. In order to solve this barrier, the manufacturers need to build up a simple platform to invite retailers to participate in the inventory planning, forecasting and replenishment, which is helpful to keep the inventory in a safe level for customers and helps retailers get much more profits from market as well.

5.5 Development of inventory management for beverage SME

Based on the analysis of literatures and the empirical findings, the authors combine the practical inventory management in beverage industry and academically literatures to summarized unsuitable parameters from literatures and useful parameters for optimizing the inventory management in the beverage. Based on the useful parameters from these three models, authors will develop a mixed inventory management approach to the beverage SME.

<table>
<thead>
<tr>
<th>Unsuitable parameters from theory to practical inventory management in beverage SME</th>
<th>Useful parameters from theory for inventory management in beverage SME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RMI</strong></td>
<td><strong>VMI</strong></td>
</tr>
<tr>
<td>Forecasts are only based on orders from the closest downstream customers, without any history sales data. Very little or no information is shared between both internal and external members.</td>
<td>In the Information flow, retailers play an important role. Retailers needs to based on the real sales history to set order plan to manufacturers.</td>
</tr>
<tr>
<td>Managing all retailers’ inventories directly. Vendor system integrates with all retailers’ inventory management system.</td>
<td>In-time information sharing of inventory changes (inventory status, sales history etc.) from retailers. Top management team supports employees to manage inventory.</td>
</tr>
</tbody>
</table>
chain.
Analytical department to evaluate
the quality of execution
Build an advanced technical sys-
tem.
Set KPIs for inventory manage-
ment.
Have a long-term relationship
with all partners.
Senior management team has
to assume the internal and ex-
ternal collaboration.
Build a simple collaborative
platform for exchanging in-
formation between manufac-
turers and retailers.

**Figure 5.1 Summary of analysis** (Authors development)

Based on the summary of analysis (Figure 5.1) and actual conditions of beverage SME,
the authors think the case firm needs a mixed model, which combines RMI and VMI with minor part of CPFR in figure 5.2.

**Figure 5.2 Inventory management model for the beverage SME** (Authors development)

The figure 5.2 presents a mixed model for beverage SME fast moving goods. In order to
improve the efficient of inventory planning and forecasting, the manufacture, ware-
house and retailer have to share sectional useful information (inventory level, sales his-
tory and order plan) in a simple cloud platform. This platform is useful for each actor in
the whole supply chain can understand the inventory status and plans for the future
manufacturing in time. The critical success factors to implement this model that should
include: the RMI’s order information share from retailers to manufacturers; the VMI’s
in-time information sharing of inventories’ changing from retailers and top management
has to supports employees to manage inventory; the CPFR’s assuming the internal and
external collaboration by senior management team and build a simple collaborative plat-
form for information exchanging.
6 Conclusion

This Chapter will answer the research questions as the authors mentioned in the beginning and also discuss the managerial implementation for the case company and further research as well.

The purpose of this thesis is to analyze how inventory management is organized in a small-medium Chinese beverage company. In order to fulfill purpose of this study, the following research questions needs to be answered in this study:

RQ1: What are the problems for the beverage SME to use the planning of inventory management models in practice?

Academic literature presents several inventory management models such as RMI, VMI and CPFR models that will be in charge of coordination of supply chain activities to optimize the inventory management. According to the results of analysis, First problem is that the beverage SME cannot live without the retailers' sales history and orders' information, because the beverage SME thinks the quick response and accuracy forecasting are highly important in the inventory management. Instead, the beverage SME also cannot share all information to all retailers, because most of the beverage partners will not easily to build long-term relationship with manufacturers. Therefore, no information sharing from customers or all information sharing with retailers are not suitable for the beverage fast moving industry.

The second problem is that the beverage manufacturer cannot manage all retailers’ inventory directly, because the beverage manufacturer has a complex network with all retailers in different cities. Therefore, it is impossible to tracking and monitoring every retailer’s inventory status by the manufacturer.

The third problem is building a complicate information system to involve all partners in the business. The beverage SME doesn’t have enough budgets and knowledge to build up a complicate information system to support its inventory management.

The last problem is difficult to have a long-term relationship with retailers. Due to the beverage industry’s characters, most retailers are only care about the short-term profits not the long-term development, therefore it is difficult to set KPI or build a analytical department to measure all inventory management activities whether to efficient or not.

After finding out the problems of using theoretical inventory management in the beverage SME. The study showed that the important parameters of managing beverage inventories in practice to answer the second research question.

RQ2: What are the important parameters for the beverage SME to implement the planning inventory management models in practice?

Based on the results of analysis, the authors summarized three main important parameters for the beverage SME to implement inventory management in an efficient way, which are:
**Information sharing**: For the beverage fast moving industry, the sectional information sharing is a useful way to response retailers’ production orders quickly. Order quantities but also the information about the sales history and inventory status from retailers and market information sharing from manufacturers as well do not limit the varieties of information.

**Technical framework**: Building a simple collaborative platform is a requisite qualification for exchanging information between manufacturers and retailers. Even though the beverage SME has limitation about budget, but a simple technical platform is necessary for the beverage manufacturer to keep in touch with retailers.

**Top management support**: For the beverage industry, internal and external collaboration will influence the whole inventory management. Therefore, the top management team should monitor the internal departments' collaboration and also in charge of selecting the suitable retailers who has realistic benefits with manufacturers.

**Employee Involvement**: The employee is one of the most important actors in the beverage inventory management. Actually in the beverage industry, most employees are lack of knowledge about inventory management and they don’t have any inventory training by their company. It triggers the inventory management concept cannot implement very well in practice. Therefore, the employee involvement is the last important parameter to manage beverage inventories in the beverage SME.

### 6.1 Managerial Implementation

Based on the results of important parameters for the beverage SME to manage inventories from this research, firstly the case company has to pay attention to the information sharing with retailers. As the authors mentioned in the analysis part, the effective information sharing will keep both JN’s and retailers’ inventories at a healthy level. Therefore, JN should open some appropriate informational to retailers and also needs to encourage the retailers to share the inventory level and status to the case company to optimize both inventory management.

Secondly, in order to exchange information in an efficient way, the case company should consider to build a simple inventory management system to provide a platform for retailers to upload the retailers’ inventory status, sales history and so on. Even though the case company has some budget limitation, but this information platform can bring a lot benefits for the future inventory management.

In the end, the top management support and employees involvement are very important for the inventory management. The top management should monitor the internal collaboration between each department and select the external partners with realistic benefits and trust. For the employees’ involvement in the inventory management, the employees are given some inventory management training. Therefore, the employees with a systematize knowledge training will bring a good future to manage inventory in the beverage industry.
6.2 Further Research

In this study, the authors already found out importance parameters for beverage SMEs. These importance inventory management parameters are divided into four areas such as; information sharing, technical infrastructure, top management support and employees involvement. Therefore, the further research could go much more deeper with how the beverage SME to implement these parameters to manage inventories. For example, if the beverage SME wants to build a technical infrastructure, who should be involved in this activities and how the top management team controls changes in their inventory controlling. Another further research could be developing these parameters to a comprehensive inventory management model for beverage SMEs. It could be further improved for the inventory management in beverage SMEs.
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Appendix 1 - Interview questionnaire

*Questions for Company Information:*

1. Please state the company’s background.
2. What is the company’s organization structure?
3. How many retailers do you have and where they are located?
4. What kind of customers do you have?
5. How many kinds of products do you have?

*Questions for Inventory Management:*

6. How many warehouses do you have?
7. What are the problems of inventory management in your company?
8. How can you decide each item’s inventory quantity level empirical?
9. How long do inventories stay in the warehouse in average? Why?
10. How does the company monitor inventories status in warehouse and buyers?
11. What kind of information system do you have for managing inventory?
12. Describe the components of your inventory management cost.

*Questions for RMI:*

13. Do you allow retailer to manage inventory? Please describe how do you coordinate with your retailers?
14. How do you forecast your retailer’s demands? Who should be involved in?
15. How do you set the safety stock for each item?
16. As a products provider, what are the challenges with retailer-managed inventory?
17. If all the information is collaborated and communicated perfectly, will you allow retailers to manage the inventory in the factory directly?

*Questions for VMI:*

18. Do you try to manage your retailers’ inventory? How do you handle it?
19. If you want to develop vendor-managed inventory in the future, how do you develop the current inventory management?
20. What is your company’s purchase order process? Who will be involved in this process? (VMI)
21. If all the information collaboration and system integrate perfectly, will you want to help retailers replenish goods directly in order to avoid inventory risk?
Questions for CPFR:

22. How do you collaborative planning, forecasting and replenishment your stock in your business?

23. What elements do you consider in collaborative planning, forecasting and replenishment?

24. How do you share your information with your suppliers and customers? (VMI RMI CPFR)

25. What kinds of information you shared with your suppliers and customers? (VMI RMI CPFR)

26. Could you please explain how are you doing in these areas? (Ability and willingness of information sharing, Internal and external collaboration, Technical infrastructure and Key performance indicators measurement)

27. If you have an ability to operate CPFR, will you want to collaborate with all integral departments and retailers to planning and forecasting together?