How to optimize the outbound logistics process in Fangshan Food Company in order to guarantee the products quality and safety

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Executive summary

Fangshan food Limited, established in 2009, is a famous food manufacturing and processing company in Beijing. It is the subsidiary of Quanjude Group which is a famous limited-liability company in China owning several world-wide famous and time-honored restaurants and food companies. By now, Fangshan Company has more than 600 employees.

The line of business it is in are producing, selling and transporting food. The major products they produce are Chinese traditional foods and they can be divided into four categories: frozen food, processed food, seasoning and pastry. Its’ products have been sold in major cities across China. When talking about the clients, the four most famous traditional restaurants (Sichuan Restaurant, Quanjude Restaurant, Fengzeyuan Restaurant and Fangshan Restaurant), many supermarkets and stores are its clients. Fangshan Company also sells its products in its franchised stores and company-owned stores. By far, Fangshan Company has been developing rapidly since 2011. Just in Beijing, there are more than five hundreds clients.

In recent years, the food quality and safety problems have being a serious issue in China. Once the food quality and safety problems occur, it can have negative impacts on the company’s images and reputations. Therefore, recently with the trend of improving food quality and safety in China, Fangshan Company wants to improve its image and its whole supply chain performance in terms of the food quality and safety. As the manager of logistics and distribution center, Mr. Zhang is thinking about how to improve one of the supply chain components- outbound logistics process in order to avoid food quality and safety problems to occur during this process.

The research objective is to make recommendations to Fangshan Company about how to optimize the outbound logistics process in order to guarantee the products quality and safety.

The main question and sub-questions are listed below:

Main question: What are the root causes of the food quality and safety problems in the outbound logistics process?

Sub-questions:

1) To the safeguards Fangshan has now in outbound logistics process, are they properly adapted to the products’ characteristics?
2) What are the problems existing in the transportation management that could potentially cause the unsafe and bad quality foods?

3) What are the problems existing in third party logistics providers (3PLs) that could potentially cause the unsafe and bad quality foods?

4) What are the risks existing in distribution center that could potentially cause the foods to become unsafe and bad quality.

5) What are the risks existing in warehouse that could potentially cause the foods to become unsafe and bad quality.

In order to reach my research objective, the qualitative research is used and an investigation about the current situation of Fangshan Company has been initiated. Case study, observation and interview are the major tools used for collecting data and information. Meanwhile, all the data and information are collected and presented as research findings and the answers to the research questions.

Through collecting data and information, some problems which could cause food quality and safety problems are found in Fangshan’s outbound logistics process. In order to reduce the possibility of happening, some recommendations are provided. For the safeguards Fangshan has, making a packaging policy or standard with the professionals, holding training programs for the drivers, changing the packaging materials and cushioning materials etc. are recommended. For the transportation management, hiring more drivers or redesigning the shipping schedule, stricter selecting process for drivers, holding training programs for the route planners etc. are suggested. For the 3PLs, looking for two or three professional and reliable 3PLs which the business covers the whole country as well as optimizing the contract with 3PLs are vital. In addition, Fangshan Company is also recommended to choose a right location and set up a new distribution center, because in that case, it can reduce the risks of foods spoilage via reducing the delivery time and to be able to get a better control of the delivery process to other cities through expending the delivery areas to other cities. Last but not least, applying updated technology, such as automotive continuous temperature monitoring, having regular audit and random inspections for the equipments, cleaning the warehouse regularly in order to avoid insect pest and bacteria are suggested.
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Chapter 1 Introduction

1.1 Company profile

Fangshan food Limited, established in 2009, is a famous food manufacturing and processing company in Beijing. It is the subsidiary of Quanjude Group which is a famous limited-liability company in China owning several world-wide famous and time-honored restaurants and food companies. By now, Fangshan Company has more than 600 employees. The slogan of this company is to realize the win-win situation with clients through offering high quality products with Chinese characteristics as well as credible service.

The line of business it is in are producing, selling and transporting food. The major products they produce are Chinese traditional foods and they can be divided into four categories: frozen food, processed food, seasoning and pastry, such as spring pancake, hollowed sesame buns, moon cake, etc. Its' products have been sold in major cities across China. The factory is located in Daxing District in Beijing and the logistics and distribution center is in Tongzhou District.

When talking about the clients, the four most famous traditional restaurants (Sichuan Restaurant, Quanjude Restaurant, Fengzeyuan Restaurant and Fangshan Restaurant) in China are the key clients for Fangshan. Fangshan Company is responsible for providing some of its products, such as spring cake, sweet soybean paste etc to them. In addition, many supermarkets and stores are its clients as well. Fangshan Company also sells its products in its franchised stores and company-owned stores. By far, Fangshan Company has been developing rapidly since 2011. Just in Beijing, there are more than five hundreds clients. And it starts focus on the business in other cities.

Fangshan has its own fleet to transport products. Meanwhile, due to a lot of clients in China, it also cooperates with 3PLs and some regional agencies in order to deliver the products more efficiently.
Fangshan Company contains 12 departments (figure 1). The general manager office is responsible for the management and the communication with Quanjude Group. The quality control department usually monitors and inspects the quality of the raw material and products offered by procurement, manufacturing, warehousing and logistics departments. The total amount of the employees is about 600 for the whole company. However, before some holidays, such as Mid-Autumn Festival, every family will buy moon cakes to celebrate this festival. Thus, the number of employees will be increasing due to more demand in markets and the large pressure for marketing, producing and distribution. Some people will be hired as short-term employees. The number will be increased by at least 200.

### 1.2 research background

In recent years, the food quality and safety problems have been a serious issue in China. Bad quality and safety problems exist in many foods such as the dumplings containing bacteria, the milk powder containing a lot of melamine etc. These quality problems can also cause safety problems and potentially harm the human health.

When talking about the reasons causing these food quality and safety affairs, many process can result in these bad result. One of the reasons was because of the defective transportation process. These affairs have not only decreased the
company’s images, increased the customer defection, but also made a wave of food safety and quality scare in China.

As a famous food production company, Fangshan food limited company not only produces its own brand products, but also is the supplier of Quanjude, Fezengyuan who are the world-wide famous restaurants with a long history.

If the food quality and safety problems would occur in Fangshan Company, it has to take a lot of time to deal with it and even reparations could be paid to clients as well as reputation could be damaged. Therefore, recently with the trend of improving food quality and safety in China, the company wants to improve its image and its whole supply chain performance in terms of the food quality and safety.

As the manager of logistics and distribution center, Mr. Zhang is thinking about how to improve one of the supply chain components- outbound logistics process in order to avoid food quality and safety problems to occur during this process.

1.3 Problem definition

The problem is that although Fangshan Company wants to improve the outbound logistics process to guarantee the food quality and safety, it does not identify which factors can potentially have a negative impact on it. Therefore, only if the manager finds out what the problems are in this process, Fangshan can make a plan to optimize this process and even make an implementation plan to guarantee the food quality and safety.

1.4 Research objective

The objective of this research is to make recommendations to Fangshan Company about how to optimize the outbound logistics process in order to guarantee the products quality and safety.
1.5 Research questions

Main question:

What are the root causes of the food quality and safety problems in the outbound logistics process?

Sub-questions:

1) To the safeguards Fangshan has now in outbound logistics process, are they properly adapted to the products’ characteristics?

2) What are the problems existing in the transportation management that could potentially cause the unsafe and bad quality foods?

3) What are the problems existing in third party logistics providers (3PLs) that could potentially cause the unsafe and bad quality foods?

4) What are the risks existing in distribution center that could potentially cause the foods to become unsafe and bad quality.

5) What are the risks existing in warehouse that could potentially cause the foods to become unsafe and bad quality.

1.6 Chapter summary

In this chapter, the basic company introduction and research background are given in order to show a general understanding of this company and the current situation which the Fangshan Company is facing. Then, the research problem and objective demonstrate what this thesis is used for and what should be ultimately achieved. Finally, the research questions give an overview of all the key aspects that will be investigated.

In the next chapter- literature review, all the literature that will be used to solve the problems which mentioned before will be shown. This literature will help me both to inquire the problems in more depth and to find solutions to solve these problems.
Chapter 2 Theoretical framework

Introduction

In chapter one, the main question and sub-questions have been defined. Thus, in this chapter, the literature will be used to explore the problems in depth or to come up with solutions in order to solve these problems. Six relevant theories for this research will be discussed.

2.1 Food issues in food transport

In food industry, food safety and quality issues are the major concerns and focuses and they are becoming more and more important. Meanwhile, a growing number of people are paying attention to these issues.

2.1.2 Food safety

When talking about food safety and quality, it is necessary to be clear about what the food safety and quality issues are. Thus, the concepts of food quality and safety have been defined. Food safety which is defined by the World Health Organization (World Health Organization, 2010) is regarded as an assurance that “the food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use.” Safety is a component of quality. Food safety also refers to the avoidance of the environmental and other contaminants and sources of toxicity (physical, chemical or biological) injurious to health.

Meanwhile, food safety plays an important role in food industry. Akkerman, Farahani, & Martin (2010) said that food safety can either be a competitive advantage for a company or a disaster. Meanwhile, Hobbe (2006) said the disaster could include a recall of the products, lost money and have negative impacts on reputation. HACCP INTERNATIONAL explained this issue in its report that food contamination is a major safety problem in Asia. This cost of food safety and quality problems is catastrophic including penalties, brand value and customer loyalty.

In terms of food safety, many standards and approaches have been set up in order to reduce the potential risks existing in food manufacturing and delivering processes. The hazard analysis and critical control points (HACCP) is one of the famous
approach which is aiming at identifying, eliminate the hazards in order to reduce the food safety risks. ISO22000 and British Retail Consortium (BRC) are also two useful systems which offer a management system to control food safety in companies (BRC Global standard-food, 2004)

2.1.1 Food quality

Food quality is also a significant element in food issues. The International Organization for Standardization (ISO, 1998) defines quality as “the totality of features or characteristics of a product that bear on its ability to satisfy the stated or implied needs.” It can be measured by the characteristics of the food which can satisfy the customers’ need, such as size, texture, flavor, taste, aroma, shape, color etc.

In terms of technologies used in order to guarantee the food quality, the time-temperature integrators or indicators which can monitor the temperature throughout the logistics process can be good choices (Giannakourou & Taoukis, 2006). Twinn (2007) stated that in order to keep good food quality, optimizing the machinery and processes as well as applying technology are necessary.

2.2 Outbound logistics process

When talking about outbound logistics, it is one of the elements in logistics and contains several activities in this process. As Murphy (2011) said that outbound logistics which is also called physical distribution is one of the components of logistics process. This process is related to the storage and delivery of the final products and information flows from the end of the production line to the final consumer. There are many elements in this process. It is including warehouse, transportation management, customer service, materials handling, the decision of facility location and packaging (Murphy 2011). Wu and Dunn (1995) stated that outbound logistics is more complicated compared with inbound logistics due to the higher products value and customer requirements in terms of delivery.

Secondly, the performance of each element in this process is related to each other. As the authors Wu and Dunn (1995) said, the decision about logistics management
has relations with the current situation and the situation of other departments. For example, the decision to build the plant in other country will limit the use of transportation modes and have influence on the location of the warehouse and distribution center.

Because this thesis is mainly focusing on foods, the outbound logistics process in food industry will be mainly discussed. Akkerman, Farahani, & Martin (2010) stated that shipping foods is more special compared with shipping other things, because the quality of foods is continuously changing during the supply chain. Therefore, the food quality and safety have to be taken into consideration. Meanwhile, outbound logistics process is not including the process from procuring raw material to manufacturing.

There are some key issues in outbound logistics process when delivering foods. The authors claimed that temperature control is playing a significant role on food quality and safety. When talking about the technology used in foods distribution, the efficient consumer response (ECR) which is a tool improve the product flow among distributor is applied.

From the management perspectives, the food distribution process can be divided into three types: network design (long-term management) including warehouse decisions, transportation links etc., network planning (mid-term management), such as product flows and delivery frequencies and transportation planning (short-term management) such as loading and route planning (Bitran & Tirupati, 1993).

Nyssa, Aylin, & Rachel (2010) also suggested some methods to control the food safety and quality in logistics process: “(1) employee awareness and training; (2) management review of records; 3) good communication between shipper, transporter and receiver; (4) appropriate loading procedures for transportation units; (5) appropriate unloading procedures for transportation units; (6) appropriate documentation accompanying each load (tanker wash record, seal numbers, temperature readings, time in-transit and time on docks, etc.); and (7) appropriate packaging/packing of food products and transportation units (i.e., good quality pallets, correct use of packing materials)”.

7
2.2 Network design and planning

First of all, the network design and planning are playing important role in logistics process. Network design and planning which is related to the distribution center and facility locations are the priority issues for logistics managers when talking about outbound logistics (Wu and Dunn, 1995). Facility location refers to choosing the places for distribution centers, warehouse and production plants in order to improve the logistics effectiveness and efficiency (Murphy, 2010). Bowersox, Closs, & Bixby Cooper (2010) stated that due to the changing environment, a systematic logistics planning and design methodology is vital and the logistics design include evaluate a lot of service options, cost assumptions and technologies. Murphy (2010) also explained that choosing an improper location will have negative impact on logistics effectiveness and efficiency.

Secondly, the network design can have significantly effects on food safety and quality, because it decides the possibility of foods recalls and the extent to which the products are distributed through this network. Meanwhile, it also influences the delivery efficiency which affects the extent to which the products suffer from quality degradation (Akkerman, Farahani, & Martin, 2010). Specifically, the distribution network design can have effect on how many people are involved in this process, how far the foods can reach and how wide the foods can be shipped.

Therefore, many things need to be considered when make decision about network design including the number of warehouse, the transportation links, the cost and customer service expectations, market for goods, labor condition, location of customer or supply markets as well as shipping directly or hub-and-spoke. Whether setting up a distribution center and whether use third part logistics providers also need to be taken into consideration.. Ackerley, Sertkaya, & Lange (2010) found that one of the food transport hazards is due to the improper transport units design and construction which is related to the network design and facility location. Overall, the most important issues in network design are the decisions to the locations of productions plants and distribution centers.

In order to design a good network, NSF International Supplier assurance audit (2012) explained minimum requirement for facility construction and design that the company must achieved in order to guarantee the food quality and safety. In addition, in order to get design an ideal network, some questions can be asked "what facilities should
be used? Which customers should be serviced from which facility?” (Melo, Nickel, & Saldanha-da-Gama, 2009)

The list below shows the major issues when selecting and operating a distribution center:

<table>
<thead>
<tr>
<th>The degree of transportation convenience, transportation links</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of customers</td>
</tr>
<tr>
<td>Operation cost</td>
</tr>
<tr>
<td>Updated technology</td>
</tr>
<tr>
<td>Labor issues</td>
</tr>
</tbody>
</table>

2.3 Warehouse management

When talking about warehouse management, it is necessary to get a general understanding of it. Lambert, Stock, & Ellram (1998) defined the concept of warehouse as a part of logistics process which stores the products between origin and consumption point. Murphy (2011) stated that the warehouse has major four functions: accumulation, allocation, assorting and sorting out. Warehousing can be realized through warehouse, distribution centers or cross-docking facilities. However, the difference between warehouse and distribution center is that warehouse is more focused on the use of space and distribution center focuses on the movement of goods. There are four types of warehouse: public, private, contract and multi-client warehousing which each have their own characteristics.

Lao, Choy, Ho, Tsim, & Lee (2011) said that due to the increasing concerns about food quality and safety, people pay attention to potential risks for food handling and warehouse is one of the important processes to control the food quality. The food quality assurance is related to the customer satisfaction.

There are many elements which could have effects on food safety and quality in warehouse management. One of the issues is warehouse security (Murphy, 2011). Pohle (2008) stated that it includes preventing theft, pilferage, heat and humidity, vandalism, fire and loss of electricity etc. These security problems will lead to the loss
of sales opportunities, customer dissatisfaction, more costs to improve the security and the increasing time on management issues. In addition, the workers also play an important role in warehouse security. Therefore, the employees should be hired through a formal hiring process.

Moreover, Murphy said that for the food service industry, the warehouse cleanliness and sanitation are vital. It can reduce the possibility of food-borne illnesses and increase the employee’s safety, loyalty.

Although the consideration of food quality and safety issues in warehouse management is limited, some authors still give some recommendations about how to reduce the risks when storing foods. Russo (2011) said that it is necessary to conduct regular audit which includes the inspection reports, temperature monitors, and random inspections for some equipment. In addition, never lose the chance to update the technology. Continuous temperature monitoring systems can also be used. In addition, limiting the storage time can protect foods from spoiling (Ekşioğlu & Jin, 2006).

Above all, in order to control the food quality and safety, the requirements for warehouse are as below:

| Security issues (pilferage, vandalism, heat and humidity, fire and loss of electricity etc.) |
| Screened personnel before hiring |
| Warehouse cleanliness and sanitation |
| Regular audit (inspection reports, continuous temperature monitoring, random inspections) |
| Update technology |

### 2.4 Transportation management

Many elements in transportation management have to be cared about, because transportation is a key activity in outbound logistics process. Bowersox, Closs, & Bixby Cooper (2010) stated in his book that the importance of transportation in logistics has been increasing over the last four decades. The function of transport does not only include product movement, but also product storage. The selection of
transportation mode and carrier are the most important decisions in logistics management. There are five transportation modes available for use (Bowersox, Closs, & Bixby Cooper, 2010): rail, truck, water, pipeline and air. They have different characteristics in terms of speed, availability, dependability, capability, frequency. In terms of the carrier selection, it is also an important factor in outbound logistics (Wu and Dunn, 1995). Russo (2011) said that the lowest cost is not the priority that the company should take into consideration. The carrier should meet some other criteria, such as on time pick up performance, delivery time, the reliability of the equipment and communication skills.

In addition, the third part logistics companies (3PLs) are also used. But it should be used carefully. Checking out the 3PLs, their carriers and track records are necessary, such as making sure that the equipments in trucks are working well and clean as well as well-maintained. Because once the products are shipped by them, you cannot do anything. In addition, using 3PLs has both advantages and disadvantages. Wonginta & Sirisoponsilp (2011) said that although 3PLs can help company reduce costs, using less-than-truckloads can increase the uncertainty of delivery time which could be a disaster for food companies. Selviaridis, Spring, Profillidis, & Botzoris (2008) concluded several benefits and risks of 3PLs, such as loss of feedback, loss of control, inadequate expertise, reduction of financial risks etc.

From food transportation perspective, Russo (2011) stated that it is a challenge for food companies to move, store food products which are sensitive to temperature as well as select the carriers and monitor the loads. Specifically, the food transport includes such things which need to be taken into account: time, vehicle, route planning and temperature control. The temperature disruptions can have negative impacts on food quality. For example, in some cases, such as meat delivery, the retailers always expect to receive the products early in the morning instead of in the afternoon and different vehicle are used due to different capacities the vehicle have (Belenguer, Benavent, & Martinez, 2005). Moreover, the refrigeration capabilities are also a consideration in food delivery process (Chung & Norback, 1991). Meanwhile, the monitor of loading dock temperature is very important and it is also useful to pre-cool trucks before loading. In the article written by NSF International Supplier assurance audit (2012) explained many requirements for dock maintenance and transport.
Due to the food quality is continuously changing during transportation process, some risks are also need to be cared about. Ackerley, Sertkaya, & Lange (2010) concluded some risks which will cause the food hazards during transportation: “lack of security, improper holding practices for food products awaiting shipment or inspection, improper temperature control, cross-contamination and improper loading practices, conditions or equipment.” In addition, some kind of foods, such as raw seafood, raw meat, and ready-to-eat foods have the most likelihood of the happening of risk. In order to avoid them, the training program and good communication are necessary. The author Hsu, Hung and Li (2007) explained their ideas that “the degradation quality problems always happened when the time the cargo hold is open and vehicles are serving the customers.”

In terms of technology, the total quality logistics (TQL) can help company evaluate the performance and communicate with the drivers and clients. Standard operating procedure (SOPs) is a rule to protect food. Using product temperature sensor which is put on the products and temperature monitor are also useful. In addition, to know when to get expert advice is also important (Russo, 2011). Selecting 3PLs should be very careful and should take company reputation and performance into consideration. A good 3PLs knows how to select a proper carrier and help company to off-load something, such as routing guides so that the company can focus on what you do best.

Moreover, some other methods which are used to plan route and manage vehicle are put forward, such as setting up a distribution center in order to deliver the foods to several customers located in different places and using an undetermined number of vehicles in order to reduce the transportation time (Akkerman, Farahani, & Martin, 2010), minimizing the transportation time and distance, improve drivers’ knowledge to guarantee food safety etc (Akkerman, Farahani, & Martin, 2010).

Overall, the list below is the key issues for transporting foods:

<table>
<thead>
<tr>
<th>Mode selection (use appropriate transportation modes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrier selection</td>
</tr>
<tr>
<td>3PLs (carrier selection, vehicle selection, equipments in truck, track record, routing guide, truckload)</td>
</tr>
<tr>
<td>Temperature control (product temperature sensor, expert device etc.)</td>
</tr>
<tr>
<td>Route planning</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>Transport schedule (reduce transportation time)</td>
</tr>
<tr>
<td>Proper loading and unloading process (proper loading and unloading practices)</td>
</tr>
<tr>
<td>Security check and record of transporters</td>
</tr>
<tr>
<td>Appropriate documentation accompanying each load</td>
</tr>
<tr>
<td>Drivers' knowledge (employees awareness and training)</td>
</tr>
<tr>
<td>Proper sanitation of equipment</td>
</tr>
<tr>
<td>Food transporter certification programs</td>
</tr>
<tr>
<td>Use proper technology (GPS or RFID)</td>
</tr>
<tr>
<td>Managers review the records</td>
</tr>
</tbody>
</table>

### 2.5 Packaging and material handling

Raheem (2012) stated that packaging is a method to conserve, preserve, sell and distribute foods. It plays a significant role in whether these foods get to the consumers with safe and good quality conditions.

Firstly, when packaging, the products’ characteristics have to be taken into consideration due to some characteristics may have higher risks when handling and shipping. As Raheem (2012) said that many factors have to consider when choosing the package to different products. According to Murphy (2011), the product characteristics can have impacts on packaging and materials handling, especially the products’ physical characteristics. First of all, the basic three types of goods-liquid, solid and gas have different packaging requirements. Secondly, the ability to prevent damages from external factors is also a consideration for package design. Thirdly, the density of one product is also a characteristic that should be pay attention to. It is worth noting that one of the products- perishable foods has special requirements in terms of packaging, loading etc.

Some ways are used to protect the foods quality and safety from packaging perspectives. The packaging has three main functions: promote, protect and identify the product. Building-block is a small unit which is normally put into a large unit. It is a tool to protect the product due to this small package is sturdy. In addition, the protective package should have more functions: enclose the material, bind products to avoid undesired movements, separate, cushion and position the contents, and be safe. Labeling is a key component for packaging that it is used for the outbound logistics system to control the goods. It is not only including the labeling of weight, but
also the instructions for use. The labeling can also influence the effectiveness and efficiency of logistics.

In general, there are two types of packaging material—rigid and flexible packaging. The rigid material contains glass, plastics bottle, cans and so on. The flexible packaging includes plastics films, paper, cloths etc.

Overall, the requirements for packaging are as below:

<table>
<thead>
<tr>
<th>Proper packaging material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper labeling and transporter instructions</td>
</tr>
</tbody>
</table>

**2.6 Customer service and quality management**

Customer service is related to customer loyalty. Bidgoil (2010) stated in his book that customer service is a number of activities used to satisfy customers and it could be one of the competitive advantages for company. It also plays an important role to keep customer loyalty (Kyj, 1994). There are many elements involved in customer services. The basic factors of customer service are availability, operational performance and service reliability.

From the logistic perspectives, Bowersox, Closs, & Bixby Cooper (2010) stated that the primary value of logistics is to satisfy the customer requirements. He even said that customer service represents logistics. Bidgoil (2010) said that seven R’s can represent the idea of good customer service—delivery the right things to the right place at the right time in the right condition for the right cost and three steps of services can be found: pre-transaction, transaction and post-transaction. Pre-transaction is about the customer service policy, rules and contingency plans. Transaction step is about the activities during the process of delivery, such as transportation planning. Post-transaction step is support activities, such as returns, repairs.

When talking about the relationships between food quality and customer loyalty, a survey conducted by RMG’s 2008 Leaky Bucket stated that the food quality plays a significant role on building customer loyalty (Cebrzynski, 2008). And food quality is related to customer confidence which could have huge impacts on economy. Figure 2.6 demonstrate the opinion of Janneke, Lynn, Van Trijp, & Reint Jan (2004). one of the famous cased is the pesticides in baby food, the report written by e Environmental
Working Group and the National Campaign for Pesticide Policy Reform the negative customer stated that several pesticide residues were found infant foods and the infant food companies lost millions of dollars in sales (Dekryger, 2008).

Limited articles talked about the relationship between customer service and food delivery, but some suggestions were still found. In order to keep customer loyalty, some tips are mentioned by Karyn (1999), such as proactive instead of reactive in food safety; promote consumer confidence via cooperating with Health department, holding volunteer programs to teach food safety etc.

2.7 Case study

YURUN Group is one of the Top10 companies in China and one of its businesses is meat producing and processing. In order to guarantee the food safety and quality during shipping process, the company bought several different types of full-automatic refrigerated vehicles. In every vehicle, the temperature monitors are used in order to monitor the temperature through the whole time. Meanwhile, ERP system and GPS are also used. (中国冷链物流专业委员会, 2013)
2.8 Chapter summary

In this chapter, the literatures related to this research have been discussed and these will be applied to support the research findings and recommendations in the following chapters.

The next chapter is research methodology which will illustrate the research methods and techniques used as well as all the elements related to research process.
Chapter 3: Research methodology

Introduction

In this chapter, all the things related to research process will be discussed. First of all, problem definition, thesis objective, main question and sub-questions will be shown in order to demonstrate the basic information about this research. Secondly, the literature overview and relevance tree will be used to show all the elements which this research covers. Thirdly, the research methods will be explained. Finally, the timetable of this research will be shown.

3.1 Problem definition

The problem is that although Mr. Zhang wants to improve this process to guarantee the food quality and safety, he does not identify which factors can have negative impacts or have potential negative impacts on it. Only if he finds out what are the problems in this process, can he make a plan to optimize this process and make an implement plan to guarantee the food quality and safety.

3.2 Objective

The objective of this research is to make recommendations to Fangshan Company about how to optimize the outbound logistics process in order to guarantee the products quality and safety.

3.3 Concept definition

Outbound logistics process:

The process related to the storage and movement of the final product and related information flows from the end of the production line to the end user.
Food quality:

The International Organization for Standardization (ISO, 1998) defines quality as “the totality of features or characteristics of a product that bear on its ability to satisfy the stated or implied needs.”

It can be measured by the characteristics of the food which can satisfy the customers’ need, such as size, texture, flavor, taste, aroma, shape, color etc.

Food safety:

Food safety is defined by the World Health Organization (WHO, 2010) as the assurance that “the food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use.” Safety is a component of quality.

It refers to the avoidance of the environmental and other contaminants and sources of toxicity (physical, chemical or biological) injurious to health.

3.4 Relevance tree

In order to help Fangshan company to identify which factors can have negative impacts on food quality and safety in chapter four (research finding) and to optimize the outbound logistics in terms of food quality and safety, the relevance tree is used to show the key research points and literatures that should be focus on.
FIGURE 2 Relevance tree

References:

<table>
<thead>
<tr>
<th>Food issues in logistics</th>
<th>World Health Organization (2010); Akkerman, Farahani, &amp; Martin (2010); Hobbe (2006); BRC Global standard-food (2004); HACCP (?); ISO (1998); Giannakourou &amp; Taoukis (2006); Twinn (2007)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outbound logistics</td>
<td>Murphy(2011); Wu and Dunn(1995); Akkerman, Farahani, &amp; Martin (2010); Hobbe (2006); Bitran &amp; Tirupati (1993)</td>
</tr>
<tr>
<td>Network design and planning</td>
<td>Wu and Dunn(1995); Murphy(2011); Bowersox, Closs and Cooper(2010); Akkerman, Farahani, &amp; Martin (2010);</td>
</tr>
<tr>
<td>Category</td>
<td>References</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Warehouse management</td>
<td>Lambert, Stock, &amp; Ellram (1998); Murphy (2011); Lao, Choy, Ho, Tsim, &amp; Lee (2011); Pohle (2008); Russo (2011); Ek, &amp; Jin (2006)</td>
</tr>
<tr>
<td>Transportation management</td>
<td>Bowersox, Closs and Cooper (2010); Wu and Dunn (1995); Coyle, et al. (2011); Russo (2011); Belenguer, Benavent, &amp; Martinez (2005); Chung &amp; Norback (1991); NSF International Supplier assurance audit (2012); Ackerley, Sertkaya and Lange (2010); Hsu, Hung and Li (2007); Russp (2011); Akkerman, Farahani, &amp; Martin (2010)</td>
</tr>
<tr>
<td>Packaging and material handling</td>
<td>Raheem (2012); Murphy (2011); Nyssa, Aylin, &amp; Rachel (2010)</td>
</tr>
<tr>
<td>Customer service and quality management</td>
<td>Bidgoil (2010); Kyj (1994); Bowersox, Closs and Cooper (2010); Bidgoil (2010); Cebrzynski (2008); Janneke, Lynn, Van Trijp, &amp; Reint Jan (2004); Dekryger (2008); Karyn (1999)</td>
</tr>
</tbody>
</table>

### 3.5 Research methodology

In order to reach my research objective, the qualitative research will be used. The purpose of the qualitative method is to explore issues, to understand the human behavior and to find the answers to some questions (Mason, 1996).

The qualitative research is used when the researcher has to enter and investigate context in order to conduct his research. For my research, in order to get the answers to the sub questions and main question, an investigation about the current situation of Fangshan Company will be initiated.
When talking about the tools which are going to be used in the qualitative research, case study, observation and interview will be used. John stated in 2010 that a case study involves the study of an issue explored through one or more cases in a bounded system. It focuses on an organization, person, location or event judgmental sampling and can help people to understand the complexity. Because my main question is to identify the root causes of the food quality and safety problems happened in the outbound logistics process. Therefore, the case study can help me to explore this question in a bounded system which determines what factors are involved in the outbound logistics and what factors are related to the food quality and safety.

In addition, observation and semi-structured interview are other two tools. Mr. Dunn (2005) said that semi-structured interview is the interview based on the predetermined questions which is as a guideline. “At the other end of the continuum are unstructured forms of interviewing...” For example, the interviewee Mr. Zhang who is the manager of logistics and distribution center will give his opinions and describe the working process. Meanwhile, observing the outbound logistics process and making record are also necessary in that case.

The table below shows specifically the people who I am going to interview, observe and the reason why these people are going to be interviewed and observed.

<table>
<thead>
<tr>
<th>Interview:</th>
<th>reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zhan Zhang (the manager of logistics and distribution center)</td>
<td>Mr. Zhang has worked in this company for more than ten years and knows this company very well. Through interviewing him, the basic and general understand of the line of business in this company and the current situations of logistics and distribution center in terms of management which could have large impacts on this research will be given.</td>
</tr>
</tbody>
</table>
Observation:

| Logistics and distribution center in Fangshan | I will use unstructured observation and be a complete observer to develop a thorough understanding of this center. The working conditions, process, technology used in all departments will be focused on. Through observation, some potential problems which the manager and employees do not realize could be found. |

Documents:

| The food safety law of the People's Republic of China (source: http://www.gov.cn/flfg/2009-02/28/content_1246367.htm) | This law can provide me a basic concept and criteria about food storage, delivery, producing and selling in terms of food quality and safety. |
| Contracts with 3PLs and regional agency (source: from Fangshan Company) | These two types of contracts provide me an overview of the cooperation among Fangshan, 3PLs and regional agency. Meanwhile, the clauses can be used to know the responsibility of each party. |
| Driver scheduling table (source: from Fangshan Company) | Thought looking at it, the route and schedule will be known in order to understand the working status in logistics department. |
| Client and regional agency lists (source: from Fangshan Company) | The name and number of clients and regional agencies in Beijing and other cities are listed in order to get detailed information about them. |
3.6 Data analysis

The approach used to analyze the qualitative data is template analysis. Template analysis (King, 2007) is a way to qualitative data. The data is analyzed through developing a coding template which reflect the themes and organized in a proper manner.

3.7 Evaluation standards

Guba (1981) stated four standards for judging whether the qualitative research is trustworthy. They are credibility (internal validity), transferability (external validity), dependability (reliability) and confirmability (objectivity) which belong to validity and reliability.

Credibility:

According to Merriam (1998), the credibility is concerned about “How congruent are the findings with reality?”. According to Trochim and Donnelly (2007), it is about the results which you come up with are credible and believable. For my thesis, I am going to interview the logistics manager and observe working conditions. In order to get credibility, I will respect them and reflect the respondents’ opinions and facts as much as I can. A credible research can help this company to solve the problems in outbound logistics process and help it to be stronger and competitive.
Transferability:

Merriam (1998) defined the transferability which is also called external validity "is concerned with the extent to which the findings of one study can be applied to other situations" in order to achieve transferability in my thesis, I am going to describe my research context and background thoroughly in order to help my readers to have an entire understanding of my thesis. Meanwhile, some of the findings and recommendations in this research could be applied to other companies, especially in the food industry.

Reliability:

Based on the statement made by Lincoln and Guba (1985), it is also called dependability. It is talking about whether the same results can be achieved if the work can be repeated again in the same conditions via the same methods. In order to achieve reliability, I will describe my research in detail including research design, data collection, and implementation etc. to enable other researchers to know my working process and repeat the work. If this research is reliable, that means the findings and recommendations are correct and Fangshan Company can use them without doubt.

Confirmability:

It refers to the results could be confirmed or corroborated by others. The results should not with personal bias. For confirmability, my findings will be the results from the information and opinions gave from my informants rather than my opinions. Only if I do this research without bias, can I give a right and objective results and gain validation from others.

3.8 Timeline for the various activities

<table>
<thead>
<tr>
<th>Action</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thesis proposal</td>
<td>30 March-20 April 2013</td>
</tr>
<tr>
<td>Introduction</td>
<td>20-30 April 2013</td>
</tr>
<tr>
<td>Literature review</td>
<td>1-10 May 2013</td>
</tr>
<tr>
<td>Methodology</td>
<td>11-30 May 2013</td>
</tr>
<tr>
<td>Research finding</td>
<td>1-20 June 2013</td>
</tr>
<tr>
<td>Conclusion + recommendation</td>
<td>20-10 July 2013</td>
</tr>
</tbody>
</table>
 Finish writing thesis | 15 July 2013  
Defense | 10 September 2013

3.9 Chapter summary

In this chapter, the research methodology is discussed and the research plan has also been presented. In the next chapter, the research findings related to the answers to the sub-questions will be explored.
Chapter 4: Research finding

In this chapter, the research questions mentioned in chapter 3 will be answered. The findings are demonstrated based on the theory in Chapter 2 and methodology which are described in Chapter 3. These findings will be used to solve research problem-to identify the factors which have (potential) negative impacts on food quality and safety in outbound logistics and achieve the research objective-to make recommendations to Fangshan Company about how to optimize the outbound logistics process in order to guarantee the products quality and safety.

4.1 Research Question 1: To the safeguards Fangshan has in the process, are they properly adapt to the special products?

Because Fangshan Company is a food company, it is necessary to know the characteristics of the products it produces in order to understand the basic packaging, storage and delivery requirements for these products and which characteristics will easily lead to the unsafe and bad quality situation. If the products have special characteristics, probably they need special care in this process.

4.1.1 What does Fangshan Company produce and deliver?

Fangshan Company is a food company responsible for food processing, food sales and food delivery. The products it produces can be divided into four categories. The first category is seasoning, such as sweet soybean paste. The second category is processed food, such as spring pancake, sesame seed cake. The third type is frozen food, such as Tangyuan. The last type is pastry, such as moon cake. Overall, there are more than fifty products produced by Fangshan Company.

When talking about which products Fangshan Company are delivered, another food manufacturing company Sanyuan JinXing food Company (Sanyuan) has to be mentioned. It is also a subsidiary of Quanjude Group and it is responsible for producing and processing meat products, such as vacuum-packed roast duck, duck tongue. Due to Sanyuan Company do not have right of sales, Fangshan Company is also in charge of delivery and distributing Sanyuan’s products as distributor. Therefore, Fangshan Company is not only responsible for delivering products which
are produced by its own company, but also is in charge of shipping and distributing products which are produced by Sanyuan Company.

Compared these products with six types of high-risk foods during transportation (Nyssa, Aylin, & Rachel, 2010) including fresh produce refrigerated raw and ready-to-eat foods, frozen foods, raw meat and poultry, eggs and egg products as well as raw seafood, most of the products delivered by Fangshan Company are high-risks which means the products need special care during shipping process.

4.1.2 What characteristics of these products?

First of all, the products are all belonging to food products which mean they have different deadline of consumption. Specifically, some of the processed foods, such as sesame seed cake, should belong to perishable food which means the period of validity is short (normally 3-5 days). For the seasonings, such as sweet soybean paste, the period of validity is medium (normally 3-6 months). However, for the frozen and vacuum-packed products, the period of validity is more than 6 month (normally up to 12 months). Therefore, the perishable products which the deadline of consumption is very short need to be cared and delivered to the clients as soon as possible.

Secondly, based on the food texture and packaging, the products can be divided into two types. Some of the processed food and pastry are squashy and fragile, such as eggs and moon cake. They are packaged into plastics package or carton. Another type of products is crushing resistance, such as vacuum-packed meat, seasoning and frozen food. They are packaged into plastics case/paper or vacuum package. Until now, Fangshan does not have a normal standard or policy about the packaging. Therefore, these products which are fragile and packed into such kind of packages which are easy to be deformed, such as carton, have more risks during transportation.

Thirdly, according to the storage condition, the products can be divided into three types. The first kind is the products which need to be stored in normal temperature (normally less than 25 degrees). The second type is the products which need to be kept in cold storage (normally between 0-4 degrees). The last kind of products must be freeze preservation (normally between -18- -6 degrees). Therefore, for the products which need to be stored under 0 degrees have more risks during shipping process as there is higher demand for temperature control.
4.1.3 Answer to Q1

According to the literature review, packaging is used to promote, protect, and to identify the products. There are two packaging standards for foods. One is using proper packaging materials; another is having proper label and transporter instructions. In that case, through observation and interview, the practice of Fangshan Company needs to be improved. First of all, although the products can be easily identifies through packaging that the products’ names are printed with large fonts, some kinds of products cannot be protected very well due to improper packaging materials. Specifically, these products which are fragile and squashy are packed into carton and plastic box without any cushion materials in it. Thus, the product could be damaged if the packaging is damaged. Secondly, the labeling needs to be optimized that some handling requirements need to be written on the packaging. Especially for the fresh and frozen foods which have a higher requirements for temperature. For example, the information of temperature variation on a box can make the transporter and receiver know the requirements for temperature and this also can influence the speed of handling these products. In addition, the transporter instructions are not found in packaging.

4.2 Research Question2: What are the problems existing in the transportation management that could potentially cause the unsafe and bad quality foods?

4.2.1 What is the actual outbound logistics process in Fangshan (route, steps, how to delivery to them)?

According to chapter 2 literature review, the outbound logistics is about storage and movement of products from the end production line to the customers. It manly includes warehouse, transportation management, customer service, materials handling, the decision of facility location and packaging.

For Fangshan Company, the outbound logistics process is shown on the figure below. After the products are packaged in the factory in Tongzhou District, they are shipped to the warehouse in Daxing District. Then, the employees working in logistics department will communicate with clients and schedule the time, route, transport
mode and the number of shipments according to clients’ requirements and the current situation. After that, the fleet will deliver the products to the clients based on the schedule.

FIGURE 3 Outbound logistics process in Fangshan

One thing which needs to be mentioned is that during the delivery process, the 3PLs and regional agencies are also used to help Fangshan deliver the products. For the clients in Beijing, some of the products are delivered by Fangshan’s own fleet. Meanwhile, it also uses 3PLs which are called Beijing Ershang Logistics Limited and Beijing Haihechun Logistics Limited Company to ship. However, for some of the clients, the regional agencies are hired to be in charge of management, communication and delivery issues with them. For the clients in other cities, Fangshan Company also uses regional agencies to help it to administrate and communicate with the clients and the regional agencies have the right to decided which 3PLs are used and which transportation modes are used. In the Appendix1, it shows the name of the regional agencies and their responsible areas.
4.2.2 Who are the clients for Fangshan Company?

Fangshan Company as a Chinese famous traditional company has many clients in China. The first kind of clients is restaurants which also belong to Quanjude Group. They are called Sichuan Restaurant, Quanjude Restaurant, Fengzeyuan Restaurant and Fangshan Restaurant. Fangshan Company is responsible for providing some of its products, such as spring cake, sweet soybean paste etc.

In addition, many supermarket and stores are its clients. Fangshan Company will also sell its products in its franchised stores and company-owned stores. Just in Beijing, there are more than five hundreds clients. In the Appendix 2, the detailed information of clients in Beijing is listed. In other cities, there are also many clients. As mentioned before, Fangshan’s own fleet and two 3PLs are in charge of shipping products to the clients in Beijing and the regional agencies are mainly responsible for managing, selling and transport its products to the clients in other cities.
What transportation modes are used and shipping schedule?

In Fangshan Company, it has its own fleet. There are totally 19 trucks in this company and this fleet is mainly serving the shipment to the 32 company-owned stores and 76 other stores in Beijing. Meanwhile, it is also in charge of delivering products from manufacturing in Tongzhou District to the warehouse in Daxing District. The volume of products transported is more than 2000 tones every month. The specific types and number are list below:

Refrigerated truck:

<table>
<thead>
<tr>
<th>type</th>
<th>number</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.5 tons refrigerated truck</td>
<td>2</td>
</tr>
<tr>
<td>1.98 tons refrigerated truck</td>
<td>5</td>
</tr>
<tr>
<td>1.85 tons refrigerated truck</td>
<td>3</td>
</tr>
<tr>
<td>1.56 tons refrigerated truck</td>
<td>2</td>
</tr>
<tr>
<td>1.39 tons refrigerated truck</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
</tr>
</tbody>
</table>

Van:

| 1.9-1.99 tons van             | 5      |
| Total                         | 5      |

Special vehicle:

| For delivering duck           | 1      |
| Total                         | 1      |

In Beijing area, the mode used for delivery is truck. However, in other cities, the choice of mode selection is not decided by Fangshan, because the regional agencies have the right to decide it and the regional agencies always use 3PLs to help them transport the products from Fangshan Company.
For some of the clients in Beijing, the drivers in Fangshan's fleet are responsible for shipping products directly to them. 3 drivers are responsible for shipping products to 60 supermarket and stores at night from 3:00am to 11:00am based on three routes. 16 drivers transport products to 31 company-owned and franchised stores from 8:00 to 16:00. 3 persons are in charge of the shipment from factory to warehouse from 4:00 to 16:00. However, there is no regular car inspection. In that case, the drivers are busy at shipping products to the clients every day and probably they are overworked. Thus, the shipping schedule is not very rational which can cause driving fatigue and drivers could be careless when handle these products. The traffic accident could harm the diver, moreover, the carelessness and accident could lead to food safety and quality problems. In addition, lack of inspection will increase the potential risks of equipment and vehicle breakdown which will lead to food spoilage and delay of shipping.

Is there any training program before and during they work?

Some training programs are initiated by Fangshan Company. There are three kinds of training programs: introduction training programs, specialized training programs and on-the-job training programs. The introduction training program is focused on the basic knowledge, operation and rules of this company. The specialized training program is initiated by each department in order to learn the operation and specific working process of every department in depth. The on-the-job training programs are used for getting in-depth knowledge of something, such as improving safety and quality awareness. However, the training programs are not very specific in some areas that not every employee is trained in terms of his or her job duty. The training programs in this company are very general.

4.2.5 What technologies are used in transportation process?

For our own trucks, the refrigerator equipments are used during the process. Meanwhile, GPS and thermometer are used to track products and the temperature.

4.2.6 How to select the employees? What are the criteria?
Based on the government law related to food industry, the food industry practitioners must have health certificate. Therefore, the employees must get health certificate. Specifically, different department has different requirements and criteria for employees. For the managers in Fangshan, they should have higher-level education degrees in related fields and have years of work experience. For employees, they should have degrees in related field. For example, people work in quality control department should get at least bachelor degree in food engineering, fermentation engineering, food science etc.

In logistics and distribution department, drivers are playing an important role in moving goods from one place to another. When selecting drivers, the drivers should have drive license and type of driving license should be at least B2.

4.2.7 Answer to the Q4

Based on the list of requirement for transporting foods and other relevant literature in Section 2.4, Fangshan has meet some requirements, such as using proper transportation mode, using proper technology. However, a lot of problems need to be solved. From the findings, some conclusion can be come up with. First of all, the transport schedule is improper. Specifically, the number of destinations is a lot that the clients are not only located in Beijing, but also in other cities. Especially in Beijing, there are more than five hundreds clients. The more clients it has, the more difficult it is to manage. Meanwhile, according to the driver schedule, all the drivers are working everyday and some of them start working at 3:00am. In addition, some of them need to work 12 hours a day due to a large number of clients in Beijing. If the route planning or driver schedule is not reasonable, it could cause the delay in delivery or driver’s fatigue driving which will not only harm the food quality, but also threat to the safety of life.

Secondly, the selection of 3PLs needs to be improved. Although Fangshan has its own fleet, the number of trucks it has is low compared with the clients it has in Beijing. Therefore, Fangshan cannot deliver the products to all the clients in Beijing which means the transport capacity of Fangshan is low. In addition, Fangshan cooperates with some regional agencies, but the delivery activity is still via 3PLs which are hired by regional agencies and the regional agencies have the right to decide which 3PLs to use. Therefore, Fangshan cannot actually control the delivery process that it does not even know which 3PLs are hired to help regional agencies to delivery. That increase
the potential risks of management control which will also cause the food quality and safety problems. The details about 3PLs in Fangshan Company will be discussed in next question.

Thirdly, based on the interview and documents, the trucks and equipments in Fangshan Company are not regularly inspected which means this is a big potential risks for delivery process. Once the truck is broken down, the products cannot be delivered on time and the broken refrigerating unit can cause the food spoilage.

Meanwhile, the cleanliness of the vehicle is unscheduled which could also increase the risks of food spoilage.

In addition, according to the interview, Fangshan does not pay attention to the security issues which is also related to the monitoring both the situation of products and the drivers during shipping process to avoid pilfering.

Last but not least, the criteria of selecting drivers in Fangshan are incomplete that getting a driving license is the only requirement. This will not only increase the risk of security incidents, such as pilferage, as the driver is not credible, but also it could also increase the risk of food spoilage, because the driver is lack of experience in handling foods.

4.3 Research Question 3: What are the problems existing in third party logistics providers (3PLs) that could potentially cause the unsafe and bad quality foods?

4.3.1 What are the criteria to select 3PLs?

According to the interview, when selecting 3PLs, Fangshan Company is mainly focused on the product distribution capabilities such as owning enough trucks, being familiar with road, being familiar with receiving procedures and costs, price etc.

4.3.2 Which 3PLs are used? What are their responsibilities?

Beijing Ershang Logistics Limited Company and Beijing Haihechun Logistics Company are used to ship products to the most of the clients in Beijing area. In addition, the 3PLs are also in charge of collecting payments and receipt. In terms of the clients in other cities, the regional agencies are responsible for managing, selling
and communicating with them. Meanwhile, the regional agencies have the right to
decide which 3PLs are going to be used. In that case, the 3PLs used for shipping
goods to client in Beijing are fixed. However, the 3PLs used for shipping in other cities
are uncertain and Fangshan Company even does not know their name. This will
increase the shipping risks due to the different criteria used when regional agencies
select the 3PLs, such as less-than-truckload or full-truckload. As mentioned in
Chapter 2, less-than-truckload has higher risks than full-truckload, because the trucks
have to go more than two destinations and longer delivery time could be needed.
Meanwhile, according to Selviaridis, Spring, Profillidis, & Botzoris (2008) said, losing
control and lack of communication makes Fangshan cannot know what is happening
during shipping process.

4.3.3 How to guarantee the delivery performance?

In article 6 of the contract with 3PLs (appendix 4), the 3PLs’ responsibility and
required delivery performance are described. Meanwhile, Fangshan Company
monitors their performance through evaluating their performance at the end of each
month. However, regarding to the real-time performance of 3PLs, Fangshan
Company cannot do anything.

4.3.4 CONCLUSION

Based on the standards for choosing 3PLs in Chapter 2, some problems exist in
Fangshan Company. Although there are two 3PLs used for delivering products to the
clients in Beijing and Fangshan describes the requirements to 3PLs in the contract,
Fangshan is not able to monitor their activities during the process in real time. It
cannot know what is happening during the delivery process, whether the drivers
handle these products in a proper way, whether the temperature in the trucks is right
as mentioned in the contract and where the products are right now etc. These
situations could put Fangshan into danger.

In addition, in order to deliver products to the clients in other cities, the 3PLs which are
selected by the regional agencies are also used. Thus, Fangshan Company does not
know their capability and they are completely controlled by regional agencies instead
of Fangshan Company. For example, regional agencies can decide whether to use
full-truckloads or less-than-truckloads. As mentioned before, the limited information
feedback, lack of communication, lack of standard procedures and even lack of track record will cause high risks. Meanwhile, the food quality and safety cannot be guaranteed due to the 3PLs capability cannot be assured.

4.4 Research Question 4: What are the risks existing in distribution center that could potentially cause the foods to become unsafe and bad quality?

4.4.1 Where is the distribution centre located in?

According to the interview, Fangshan’s warehouse which is located in Daxing District in Beijing is the distribution center. However, it is more focused on storage of products and the use of the space. Therefore, it does not have a real distribution center which the function is quick movement of products.

As mentioned before, distribution network design is very important in food industry and the distribution center also plays an important role in shipping foods. Lack of distribution center and incorrect facility location will have negative impacts on delivery efficiency and the extent to which the products are distributed through this network (Akkerman, Farahani, & Martin, 2010). In addition, it also influences how many people are involved in this process, how far the foods can reach and how wide the foods can be shipped. Therefore, the location of facility should be chosen carefully and distribution center cannot be placed by warehouse.

4.4.2 CONCLUSION

The distribution center and warehouse are all used for warehousing. However, their functions are different. Based on the literature review, the warehouse is focused on storage of products. But the distribution center is focused on quick movement of products. Especially for the food company, the time plays an important role in logistics. In that case, this distribution center is more like a warehouse which is focused on storage rather than movement. The longer the products stay in the warehouse, the less fresh the products are due to the limited edible period. In order to guarantee the high food quality and delivery to the clients in other cities, the products should be able to be delivered to all the clients as soon as possible. In that case, as mentioned before, Fangshan Company cannot control the 3PLs activities in other cities. This will increase the risk of food spoilage, if the 3PLs are not very professional and handle
these foods improperly. According to the literature in Chapter 2, the distribution center can increase the efficiency of delivering products and expend the delivery areas. Thus, these two advantages are very useful for Fangshan Company, because they can reduce the risks of foods spoilage via reducing the delivery time and to be able to get a better control of the delivery process to other cities through expending the delivery areas to other cities. Therefore, setting up a distribution center is necessary.

In addition, due to too many clients in Beijing urban area and many clients in other cities, the location of the distribution center is also a problem due to the distribution center right now is located in rural area in Beijing. That is less convenient for transportation and could increase the shipping time.

4.5 Research Question 5: What are the risks existing in warehouse that could potentially cause the foods to become unsafe and bad quality.

4.5.1 What type of warehouse is used? What is the function of it?

Fangshan Company has its own warehouse. It is located in Technology Street No.23, Jiugong Town Daxing District. Its responsibility is accumulation, allocation, assorting and sorting out. First of all, the products are transported from factory in Tongzhou District to this warehouse. Secondly, the products will be allocated from large quantities into smaller quantities. And then, the products will be assorted based on clients’ requirements. Finally, the products will be sorted out based on the destinations.

What is the storage time for these products from finishing producing to starting shipping them?

According to the interview, the storage time is different. But it should be no longer than one third of the period of validity. For example, if the period of validity of spring cake is 90 days, this product should be stored no more than 30 days.

4.5.3 What are the requirements to store these products?

Based on the interview and the product descriptions, for the fresh and frozen food, it must be stored in low temperature warehouse. The temperature should be 0°C—4°C.
For our warehouse, three types are used: low temperature warehouse (0-4 °C), room temperature warehouse (20 °C) and freezer (<-18°C).

4.5.4 How to monitor the food quality in warehouse? What technologies are used in warehouse management?

The Thermometer is used in warehouse management. Meanwhile, every day, some people are responsible for checking the temperature for several times and fill in the temperature recorder forms. However, the temperature control is artificial that the temperature problems can be found only when the employees check it and there are no electronic monitors that can monitor the temperature in real-time and alarm to employees. In addition, in terms of others important issues stated by Pohle (2008) in warehouse management, Fangshan’s warehouse does not pay attention to them, such as security issue which will lead to loss of sales, customer dissatisfaction, sanitation issues which could increase the possibility of food-borne illnesses and reduce the employee’s safety, loyalty.

4.5.5 CONCLUSION

Based on the findings, the warehouse management exists some risks which could cause food quality and safety problems. First of all, the manager is not paying attention to the warehouse security that he ignores preventing theft, pilferage, and vandalism, fire and loss of electricity etc. Monitoring the warehouse is finished by few employees irregularly instead of constant electronic monitoring. This could increase the risk of food quality and safety problems as it is not a real-time monitoring. Meanwhile, based on the interview, the selection of employees should be improved, because employees play an important role in warehouse management and security issues are related to employees. They should be completely credible. And the vandalism or loss of electricity could also lead to food spoilage and bad quality of food. In addition, the warehouse management is lack of regular audit, such as temperature monitor or equipment inspection reports etc. lacking of regular audit could increase the occurrence of unexpected events which will also have negative impact on food quality and safety. Moreover, the technology used in warehouse is outdated that monitoring temperature is finished by employees. For the sanitation issue, no people
are responsible for cleanliness which means the warehouse could be contaminated by bacteria or other things, such as air pollution.

4.6 Chapter summary

In this chapter, the research findings are presented as the answerers to the sub-questions. In the next chapter, the research conclusion and recommendation will be illustrated in order to answer the main question: what are the root causes of the food quality and safety problems happened in the outbound logistics process and achieve the research objective: make recommendation to Fangshan Company about how to optimize the outbound logistics process in order to guarantee the products safety and quality.
Chapter 5 Discussion

In this section, the findings back to the problem definition will be discussed. Specifically, making an overview of what the implications of the former are for the latter and explaining how the literature and findings can help the company will be illustrated. Meanwhile, how the results of my work can be used to answer the questions in order to solve the problem.

In order to explain how the literature and findings can help the company and solve the problem, the objective and problem definition have to be mentioned again.

The problem and the reason why this research has to be done are because although Fangshan Company wants to improve the outbound logistics process to guarantee the food quality and safety; it does not identify which factors can potentially have a negative impact on it. Therefore, only if the manager finds out what the problems are in this process, Fangshan can find solutions and make a plan to optimize this process.

Based on this situation, finding out the problems existing in the outbound logistics process is the priority. Therefore, in order to find these problems, the literature review and research findings are used. Specifically, the literature review is used to review all the knowledge related to the outbound logistics process and give an overview and framework about how to initiate this research and which activities in this process are needed to be pay attention to. In other words, these provide a guide to looking for the findings. For example, through working on the literature review, all the elements in outbound logistics process have been found including warehouse management, transportation management, network design, packaging and material handling and the research question and sub-questions are generated based on these elements.

Meanwhile, through literature review, almost everything related to this research is mentioned and different authors give different opinions about different issues. The different opinions about the food quality and safety problems which could be happened in outbound logistics process are mentioned. These will be a hint to find out the problems existing in Fangshan Company. In addition, the different opinions about how to avoid food quality and safety problems are also a reference to generate the recommendations for this case. For example, Russo (2011) said that it is necessary to conduct regular audit which includes the inspection reports, temperature monitors, and random inspections for some equipment. He stated some good methods to
preventing food quality and safety, and his opinion could also be a good recommendation for this research in order to optimize the outbound logistics process.

A research finding is a key chapter in this thesis that it demonstrates the current situation about all the activities in Fangshan’s outbound logistics process. Through finding out the current situation and analyzing these situation based on the literature review, the problems existing in Fangshan’s outbound logistics process are easy to be identified. As mentioned before, identifying the problems in outbound logistics process is vital and the priority. Only finding out the problems, the recommendations can be given in order to solve these problems.

This chapter is mainly talking about how the literature and research findings can help the company and this research. In the next chapter the conclusions and recommendations will be stated.
Chapter 6 Conclusion and recommendations

Introduction

As mentioned above, the research findings have been collected and relations between the former and the later are also stated. In this chapter, the conclusion of the research findings and the recommendations related to these research problems are listed in order to achieve the research objective. Meanwhile, the limitations about this thesis will be discussed as well.

6.1 Conclusion and recommendations

Through doing this research, some problems are existing in Fangshan Company and these could cause the food quality and safety problems happen during outbound logistics process. In order to reduce the possibility of happening, some recommendations are provided.

6.1.1 Research Question 1: To the safeguards Fangshan has in the process, are they properly adapt to the special products?

Conclusion

First of all, Fangshan Company does not have a standard or policy about the packaging. Although the products can be easily identifies through packaging that the products’ names are printed with large fonts, some kinds of products cannot be protected very well due to improper packaging materials.

Secondly, the labeling needs to be optimized that some handling requirements need to be written on the packaging. Especially for the fresh and frozen foods which have a higher requirements for temperature. In addition, the transporter instructions are not found in packaging as well.

Recommendations
First of all, as the product characteristics can have impacts on packaging and materials handling, especially the products’ physical characteristics (Raheem, 2012) and some characteristics may have higher risks when handling and shipping, company should make a packaging policy or standard with the professionals about which material should be used to package which products, the size of the packaging box, which cushioning materials should be used in order to protect different products etc. Through making this policy with professionals, proper packaging can have positive impacts on food quality and safety.

Secondly, holding a training program for the drivers is also a way to reduce the risks. The content of the training program is to introduce the characteristics of all the products they delivery and teach them how to handle different products as well as increase their awareness of different food texture and the products with higher risks. In addition, company should launch transporter instructions to the drivers and check whether they are on top of handling different products via exams.

Thirdly, the packaging materials and cushioning materials should be changed according to this policy made with the professionals. Meanwhile, the labeling should also be standardized and optimized, especially use special handling labels for the products with higher risks, such as “FRAGILE”, “UNER-5”, because labeling is a key component for packaging to help identify the products and instruct in use (Murphy, 2011).

Due to Fangshan has many kinds of products, these recommendations can help Fangshan to solve the problems existing in packaging and labeling in order to handle different products with different characteristics.

6.1.2 Research Question 2: What are the problems existing in the transportation management that could potentially cause the unsafe and bad quality foods?

Conclusion

First of all, the transport schedule and driver schedule are improper. Specifically, the number of destinations is a lot that the clients are not only located in Beijing, but also in other cities. Meanwhile, according to the driver schedule, some of the drivers have to work about 12 hours. If the route planning or driver schedule is not reasonable, it
could cause delay in delivery or driver’s fatigue driving which will not only harm the food quality, but also threat to the safety of life.

Secondly, the selection of 3PLs could cause problems. Fangshan cannot actually control the delivery process that it does not even know which 3PLs are hired to help regional agencies to delivery. That increase the potential risks of management control which will also cause the food quality and safety problems. The details about 3PLs in Fangshan Company will be discussed in next question.

Thirdly, the trucks and equipments in Fangshan Company are not regularly inspected which means this is a big potential risks for delivery process. Once the truck is broken down, the products cannot be delivered on time and the broken refrigerating unit can cause the food spoilage. Meanwhile, the cleanness of the vehicle is unscheduled which could also increase the risks of food spoilage.

In addition, Fangshan does not pay attention to the security issues which is also related to the monitoring both the situation of products and the drivers during shipping process to avoid pilfering.

Last but not least, the criteria of selecting drivers in Fangshan are incomplete that getting a driving license is the only requirement. This will not only increase the risk of security incidents, such as pilferage, as the driver is not credible, but also it could also increase the risk of food spoilage, because the driver is lack of experience in handling foods.

**Recommendation**

As Russo (2011) said the food transport includes such things which need to be taken into account, they are time, vehicle, route planning and temperature control. In order to solve the problem about improper driver schedule and transport schedule, hiring more drivers or redesigning the shipping schedule is necessary. This is for better transport efficiency which will have impacts on food quality and safety. Meanwhile, when selecting drivers, only holding a driving license is not enough. The drivers should have working experience in one food company and at least 10 years driving experience. These old drivers have had some knowledge about how to handle food products and how to deal with the emergencies when delivering. They will help company to protect foods and reduce the risks during shipping process.
In addition, as improving employees’ knowledge to guarantee food safety (Akkerman, Farahani, & Martin, 2010) is also a way to optimize the transportation management, some training programs can be used for the route planners and telling them how to make a good schedule and route in order to increase the transport efficiency and decrease the delivery time. Moreover, loading and unloading as well as taking care of the products during shipping process play important roles on transportation management. Therefore, the training programs regarding to these activities are also needed.

For the third problem, the regular inspection and random inspection for truck and products as well as regular cleanness are necessary, because awaiting inspection will cause the food hazards during transportation (Ackerley, Sertkaya, & Lange, 2010). Due to the trucks are used every day, they had better be checked every week or even every three days to guarantee the trucks do not have any potential problems which could cause traffic accidents.

During delivering, the security check is also vital to prevent products from pilfering. Thus, the security check with documentation accompanying each load and record of transporter are two useful methods to solve this problem. After finishing delivering process, the manager should review the records and documentations to make sure foods were safety during delivering process.

6.1.3 Research Question 3: What are the problems existing in third party logistics providers (3PLs) that could potentially cause the unsafe and bad quality foods?

4.3.1 What are the criteria to select 3PLs?

Conclusion

Although there are two 3PLs used for delivering products to the clients in Beijing and Fangshan describes the requirements to 3PLs in the contract, Fangshan is not able to monitor their activities during the process in real time. These situations could put Fangshan into danger.

In addition, in order to deliver products to the clients in other cities, the 3PLs which are selected by the regional agencies are also used. Thus, Fangshan Company does not know their capability and they are completely controlled by regional agencies instead
of Fangshan Company. For example, regional agencies can decide whether to use full-truckloads or less-than-truckloads. As mentioned before, the limited information feedback, lack of communication, lack of standard procedures and even lack of track record will cause high risks. Meanwhile, the food quality and safety cannot be guaranteed due to the 3PLs capability cannot be assured.

**Recommendation**

According to the current situation, it is recommended to look for two or three professional and reliable 3PLs which the business covers the whole country, as Russo (2011) explained that selecting 3PLs should be very careful and should take company reputation and performance into consideration. A good 3PLs knows how to select a proper carrier and help company to off-load something, such as routing guides so that the company can focus on what you do best.

The products which are shipped to the clients in other cities are also delivered by these two professional 3PLs, such as DHL. The reason is because a professional and reliable 3PLs which the business covers the whole country always has their own advanced tracking systems and can handle the products properly in a professional way. They also can plan a route based on the destinations reasonably. Meanwhile, due to food products, 3PLs are required to use full-truckloads. Although this method will increase the costs, it is a way to guarantee the products can be delivered to the clients in time which could have positive impacts on food quality and safety.

Secondly, optimizing the contract with 3PLs is also important in terms of food quality and safety and company should divide the responsibilities with 3PLs, such as add requirements for sanitation and inspection for trucks, hand in the transport record etc.

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**6.1.4 Research Question4: What are the risks existing in distribution center that could potentially cause the foods to become unsafe and bad quality.**

**Conclusion**

According to the research finding, Fangshan only has a warehouse and does not have a distribution center. The longer the products stay in the warehouse, the less
fresh the products are due to the limited edible period. In order to guarantee the high food quality and delivery to the clients in other cities, the products should be able to be delivered to all the clients as soon as possible. In that case, as mentioned before, Fangshan Company cannot control the 3PLs activities in other cities. This will increase the risk of food spoilage, if the 3PLs are not very professional and handle these foods improperly. In addition, due to too many clients in Beijing urban area and many clients in other cities, the location of the warehouse is also a problem due to the location is located in rural area in Beijing. That is less convenient for transportation and could increase the shipping time from Beijing to other cities.

Recommendations

Company should choose a right location and set up a new distribution center. As Akkerman, Farahani, & Martin (2010) said that setting up a distribution center can help company to plan route and manage vehicle more efficiently and deliver the foods to several customers located in different places. Moreover, the distribution center can increase the efficiency of delivering products and expend the delivery areas. Thus, these advantages are very useful for Fangshan Company, because they can reduce the risks of foods spoilage via reducing the delivery time and to be able to get a better control of the delivery process to other cities through expending the delivery areas to other cities. Meanwhile, the choice of location should be based on the suggestions mentioned in chapter 2. Specifically, when choosing a location, the degree of transportation convenience, the location of customers, operation costs and labor issues should be taken into consideration.

6.1.5 Research Question 5: What are the risks existing in warehouse that could potentially cause the foods to become unsafe and bad quality.

Conclusion

Based on the findings, the warehouse management exists some risks which could cause food quality and safety problems. First of all, the manager is not paying attention to the warehouse security that he ignores preventing theft, pilferage, and vandalism, fire and loss of electricity etc. Monitoring the warehouse is finished by few
employees irregularly instead of constant electronic monitoring. These security problems will lead to the loss of sales opportunities, customer dissatisfaction, more costs to improve the security and the increasing time on management issues (Pohle, 2008).

Meanwhile, the selection of employees should be improved, because employees play an important role in warehouse management and security issues are related to employees. They should be completely credible. The vandalism or loss of electricity could also lead to food spoilage and bad quality of food.

In addition, the warehouse management is lack of regular audit, such as temperature monitor or equipment inspection reports etc. lacking of regular audit could increase the occurrence of unexpected events which will also have negative impact on food quality and safety.

Moreover, the technology used in warehouse is outdated that monitoring temperature is finished by employees. For the sanitation issue, no people are responsible for cleanliness which means the warehouse could be contaminated by bacteria or other things, such as air pollution.

Recommendations

First of all, in order to avoid theft, pilferage and vandalism, improving the security issues are necessary. Especially, workers play an important role in warehouse security (Pohle, 2008). Therefore, the employees should be hired through a formal and strict hiring process. When selecting the employees, company should pay attention to whether he or she has criminal record and check whether he or she can be trusted. Therefore, the candidates should be screened very carefully.

In the warehouse, the updated technology, such as automotive continuous temperature monitoring is recommended, as Ek¸sio¨glu & Jin (2006) said “never lose the chance to update the technology”. This will provide company a continuous record of temperature and alarm manager when the temperature is improper.

Meanwhile, in order to avoid the occurrence of unexpected events on food quality and safety, the regular audit and random inspections for the equipment are vital. In addition, the warehouse should be cleaned regularly in order to avoid insect pest and bacteria which could cause food safety and quality problems. Meanwhile, it can
reduce the possibility of food-borne illnesses and increase the employee’s safety, loyalty (Ekşioğlu & Jin, 2006).

6.2 Arguments against implementing recommendations

Most of the recommendations will not only cost money, but also diminish the profits or raise the prices, such as hiring more drivers, holding training programs and update technology; therefore there could be arguments against implementing these recommendations. But in fact, it is worth to take these recommendations into account as Fangshan is a food company which is closely related to human health. As Russo (2011) said the lowest cost is not the priority that the company should take into consideration. Some other criteria, such as on time pick up performance, delivery time, food quality and the reliability of the equipment should be taken into consideration.

In that case, the food quality and safety problems have being a serious issue in China; people are worried about eating bad quality food. Fangshan as a famous company in China with a lot of clients, offering the high quality food and keep the reputation are vital. If the food quality and safety problems occur in Fangshan Company, it has to take a lot of time to deal with it and even reparations could be paid to clients as well as reputation could be damaged. This situation could even result in company failure.

Based on the severely negative consequences and the current situation of China’s food, inputting money and optimizing the outbound logistics process to reduce the probability of the food quality and safety problems based on these recommendations are necessary.

6.3 Limitation of work

This is only a first general overview of the important factors and the problems identification and solutions are all based on these factors. This may not be enough to guarantee food safety and quality at Fangshan yet. Therefore, more elaborate analysis needs to be done especially with regard to the choice of specific location of
distribution center, which 3PLs should be used as well as who will be invited to train these employees at what time etc. Meanwhile, an implementation plan should be made as a guideline for Fangshan Company and can be easily used by Fangshan.
Bibliography

15. HACCP INTERNATIONAL. *Eliminate the hazards, reduce the risk*. Australia: HACCP.

Appendices

1. The regional agencies for some of the clients in Beijing and clients in other cities

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2. The clients in Beijing for Fangshan Company

安安伟业商贸公司  代理区域河北地区；
科学伟业商贸有限公司  代理区域内蒙古商事中心及顺义地区
建设伟业  代理区域河北石家庄地区；
唐山康胜商贸有限公司  代理区域河北唐山地区；
汇嘉伟商贸公司  代理区域北京永旺超市系统；
3. Shipping schedule

物流部共有货车司机 22 人。

早班司机 3 人，工作时间 凌晨 3：00 至 11:00。负责三条线路共 60 家商超丰泽园专柜的凌晨配送工作及北京站专卖店夜间不定期配送工作。

白班工作人员 16 人，工作时间 8:00 至 16:00。负责日常 31 家直营连锁店配送工作（和平门每日两趟）、机场送货、专柜专卖 16 家、下午进行（邮局、集采、团购大份）下的配送工作。

夜班司机 3 人，工作时间 凌晨 4：00 至 16：00，负责盘库补货工作，忙时或机动情况发生时增至每人每天三至四趟。

4. Contract with 3PLs

乙方的权利和责任

6.1. 乙方负责完成甲方分配的工作，遵守甲方的业务流程、操作规范、服务要求、管理制度等与乙方履行本合同项下各项义务有关的要求；

6.2. 乙方履行本合同项下各项义务时，必须统一着装，并做好相关的服务培训工作。保证车厢整洁，并做好相应的消毒清洁记录。

6.3. 乙方承担配送过程中产生的相关费用。乙方负责每次将甲方需运输的货物运抵甲方指定目的地。乙方自行解决用于提供运输服务的车辆使用中涉及到的一切相关证件、费用、人员。

6.4. 乙方在货物运送过程中，发生的交通意外、违章罚款、人员伤亡等责任事故全部由乙方自行承担，由此造成甲方货物损失的，乙方应予以赔偿。

6.5. 由于乙方原因造成甲方与客户之间违约的，乙方赔偿因此给甲方造成的直接经济损失。
6.6. 乙方在送货时，如遇客户拒收，应第一时间通知甲方相关业务人员，进行协调处理。确认拒收的，由送货人员在出库票上注明原因，未注明拒收原因的，则甲方库房不予收货，所有损失和责任由乙方负责。

6.7. 本合同有效期内，乙方不得配送其他与甲方货物产生竞争的同类或相似产品。

6.8. 根据甲方提出的服务整改意见，乙方有责任提交有针对性的服务整改措施。