

Chapter 5

The Measurement Result of Exported Frozen Foods

From the research operation in chapter 3 and developing performance measurement framework in chapter 4, this chapter presents the result from the interview and measurement by the framework from chapter 4 in exported frozen food industry. In this step, the questionnaires were sent to the sample organizations and interviewing with informants about the criteria. The results are divided into 4 groups:

1. General Characteristics of the sample organizations
2. Supply chain performance measurement result
3. The SWOT analysis of the exported frozen foods
4. The TOWS matrix for exported frozen foods
5. The sensitivity analysis

5.1. General Characteristics of the sample organizations

The result about general characteristics of the sample organizations contains of the general status of informants and organizations that are explained below.

5.1.1. The general status of informants

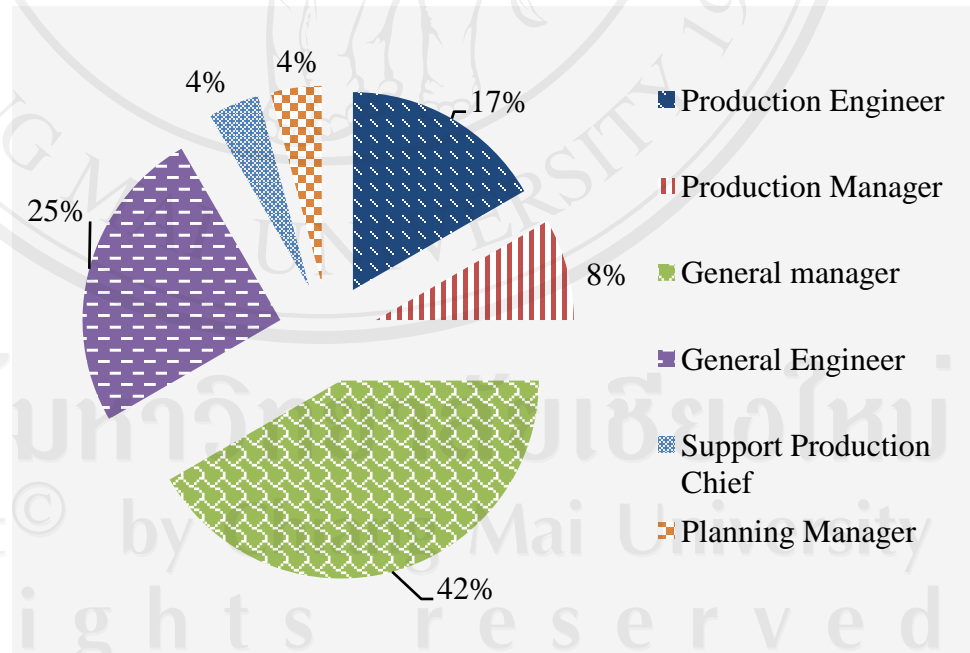


Figure 5.1 Percentage of informants divided by work position

According to figure 5.1, the diagram shows the most of informants are general managers more than 40%. The next rank is the general engineers as 26%, the planning engineers as 17% and the planning engineers as 8%. The smallest groups of informants are support production chiefs and planning managers for only 4%.

5.1.2. The type of the sample organizations

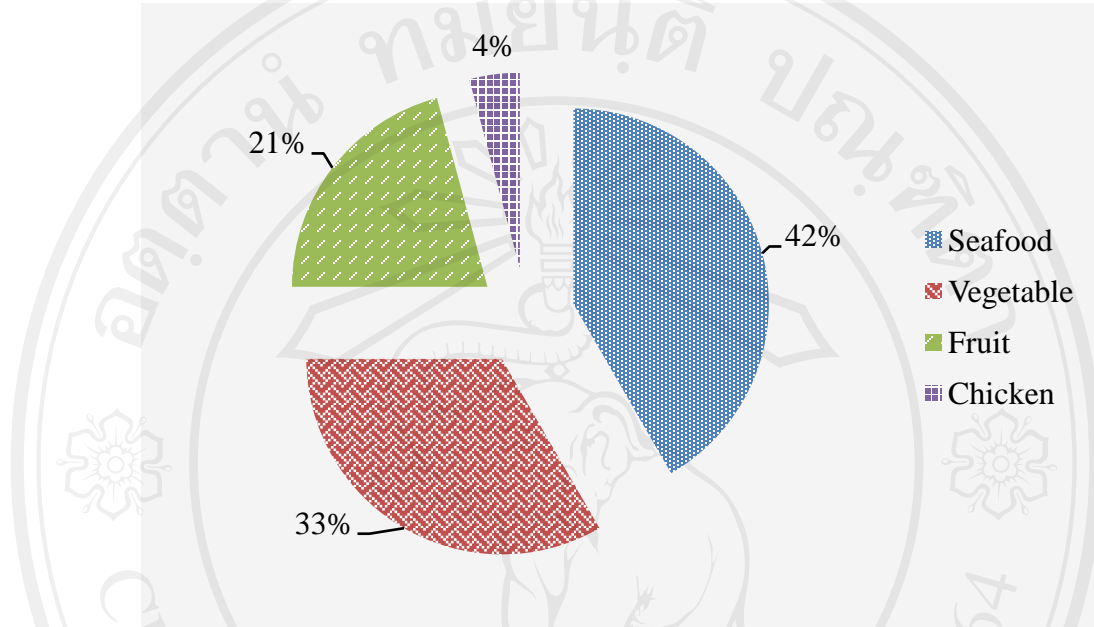


Figure 5.2 Percentage of sample organizations divided by product type

As can be seen for figure 5.2, most sample organizations that answer the questionnaires are frozen seafood manufactories as 42% that are 10 of 24 manufactories. The second rank is frozen vegetable manufactory for 33% or 8 manufactories. For frozen fruit and frozen chicken manufactories, there are 21% and 4%.

5.2. Supply chain performance measurement result

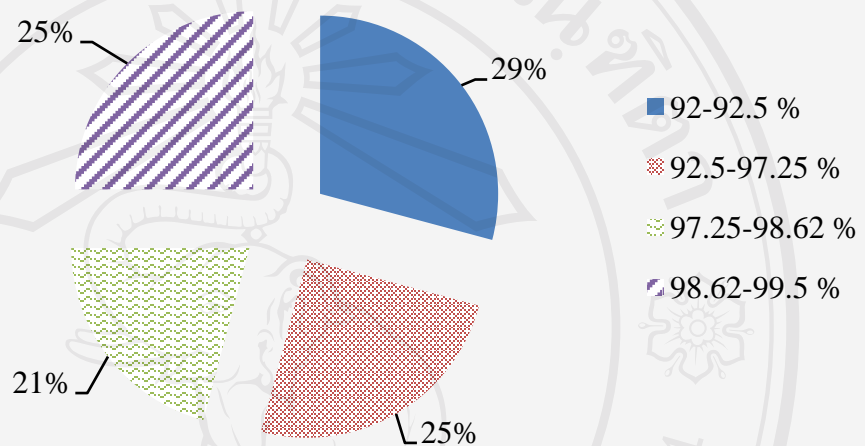
In this research, researcher uses quartiles data analysis to examine the level of measurement because the performance criteria that used in the questionnaire are open-ended questions. So the researcher uses quartiles data analysis to separate level of measurement into 4 levels that explain about each performance criteria with their details in next part.

5.2.1. Production accuracy rate

For this criterion, the researcher gathered the data by using the percentage of the products which the organizations can produce by planning per products. The ranges of data are divided into the following 4 ranges;

Table 5.1 Range of production accuracy rate

Range	Production accuracy rate
1	92-92.5 %
2	92.5-97.25 %
3	97.25-98.62 %
4	98.62-99.5 %

**Figure 5.3** Percentage of production accuracy rate

As can see from figure 5.3, the range with the highest frequency is 92-98% of production accuracy rate as 29 percent. The second ranges are 92.5-97.25% and which is 25 percent of the total sampling. And there is 21 percent of the smallest range which between 97.25-98.62%.

From the figure 5.3, it can be found that almost of the organizations have ability on production according to the plan in the same level. But during the highest frequency range of production accuracy rate is 92-92.5%, which is the lowest range of the data. From this result, the main reason is the characteristic of this type of industry which due to limitations of material and finished products. The limitations of them are about the preserve time, transportation duration and complexity of processes. Including the processes that produce by human labor are more than the processes that use machines, thereby the error or damage occur easily.

The criterion of production accuracy rate (figure 5.4) found that the highest percentage of mean is 97.30 which is fruit and followed by vegetable, seafood and chicken with their percentage means of 97.19, 95.10 and 95.00 accordingly.

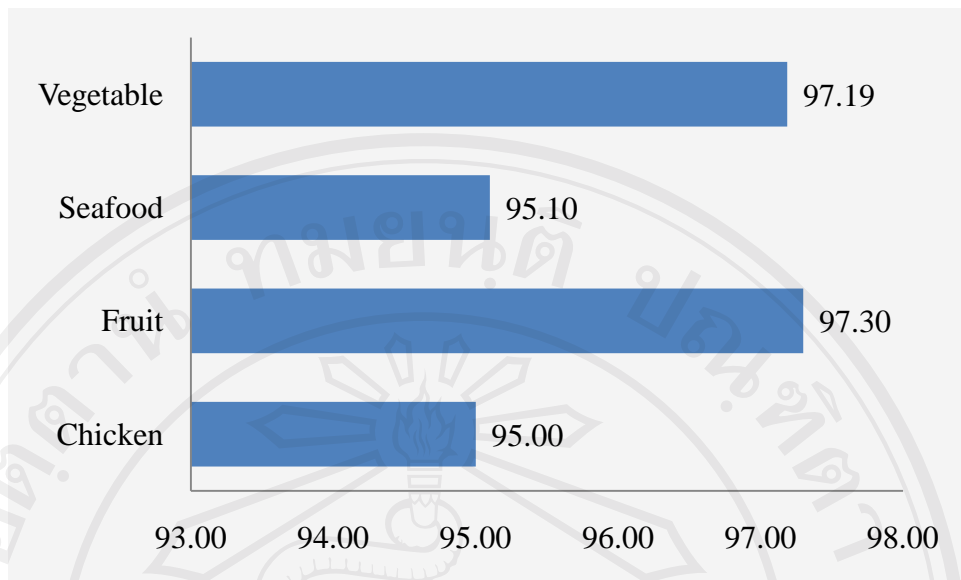


Figure 5.4 The comparison of each product type for percentage of production accuracy rate

After analyzed these data, it can be found that fruit industry has the highest production with the percentage mean of 97.3. The researcher have found out that the limitation of the different production partly contribute to the limitation of quality and/or quantity of different materials. The different types contribute to effective production plan of fruit industry than the other 3 types did. Furthermore, it may associate to the efficiency of machines, staffs, layouts within the factory including the complicated production processes. This is because most of the fruit materials for the export purpose need only the simple processes and the quality is already checked from the production site. Therefore, the complications of the process are lessen if compare with chicken materials which are more complicated such as to separate each part, trimming and portion out that contribute to time – consuming. In addition, most of the chicken production process need to use human labors rather than use the machines if compare with other frozen food industries. This reason contributes to the longer process than using machines to produce.

5.2.2. Damage rate

As gathering the data from the damage rate from product and the data collected from the evaluation form from the organizations are almost similar, the researcher has summarized the outcomes into the frequency graph form as shown in table 5.2.

Table 5.2 Range of damage rate

Range	Damage rate
1	0-0.75%
2	0.75-1.5%
3	1.5-2.25%
4	2.25-3

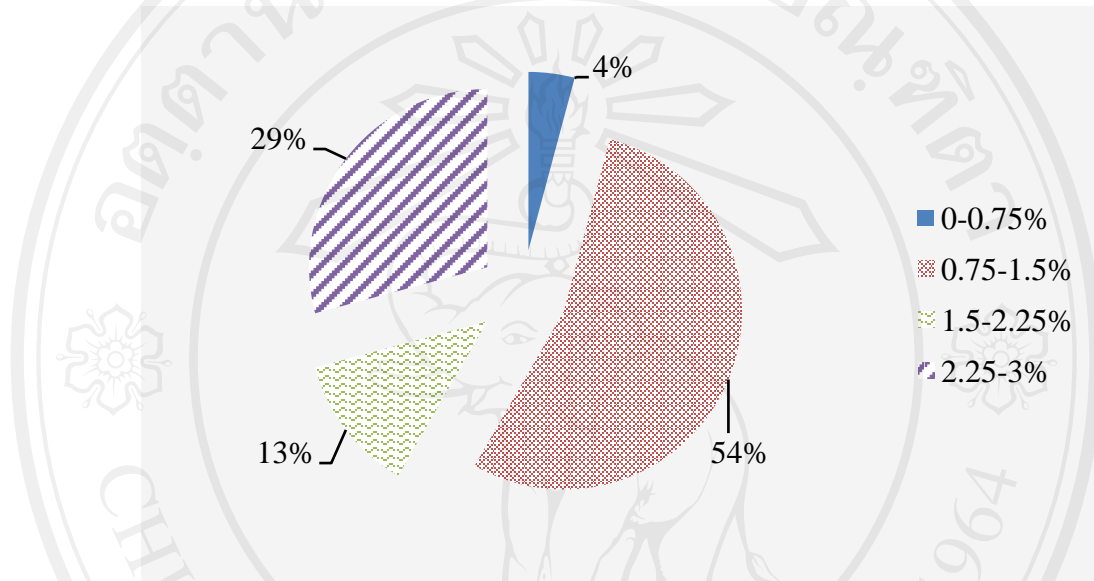
**Figure 5.5** Percentage of damage rate

Figure 5.5 demonstrates 0.75-1.5% of the damage rate of product by calculating from the total percentage of 54 from the total information and the mean of the damage rate from the product is 1.68%.

From the survey, the damage rate of the total product occurred in the organizations is less than one percent more than a half of the total organizations. It can be found that there are the low rates of the damage rate in the respondent organizations. This is because the organizations enable to control the quality of production process. Besides, those respondent organizations operate their food industry for the export purpose.

In terms of the damage rate in the figure 5.6, it can be found that seafood has got the highest percentage mean which is 2.10 and followed by fruit, vegetable and chicken with the percentage means of 1.80, 1.19 and 1.00 accordingly

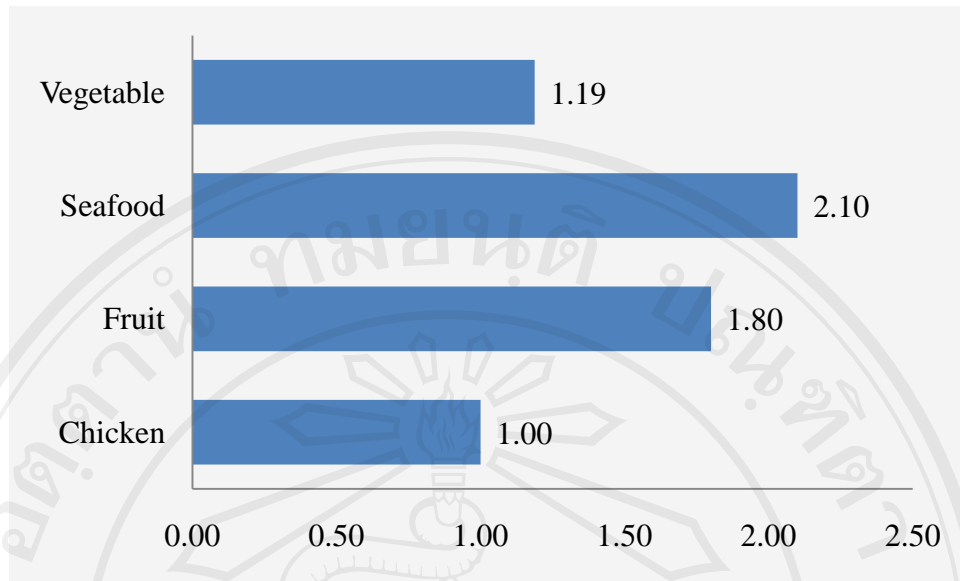


Figure 5.6 The comparison of each product type for percentage of damage rate

After analyzing the data, it was found that that chicken has the lowest waste rate when compare with other food industries .It could be explained that the condition of chicken product could be maintained easier and longer than perishable product. Another reason is that almost factories that produce food made from chicken have their own farm. Thus, they can control the quality of materials and no risks from the transportation and inventory issues. For seafood, the wasting rate seemingly high because of the limitation of time and transportation. This is because most of the materials are delivered from the South of Thailand but the most of factories located in the midland.

5.2.3. Ratio of transportation and inventory cost

This criterion will calculate the costs of inventory and transportation by comparing the total costs of product in order to know the expense ratio of inventory and transportation. Therefore, it can be compared the differences of the total cost. In addition, inventory and transportation of both materials and products are such the priority issues for the food industry. Hence, the researcher has gathered the data and divided the range of data into 4 ranges as;

Table 5.3 Range of Ratio of transportation and inventory cost

Range	Ratio of transportation and inventory cost
1	30-32.5 %
2	32.5-36.25 %
3	36.25-42.5 %
4	42.5-45 %

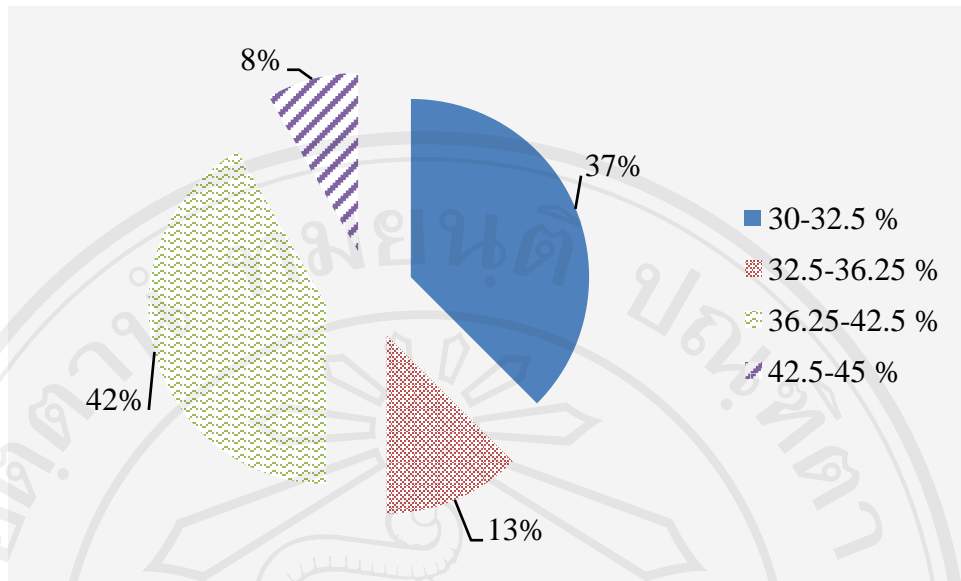


Figure 5.7 Ratio of transportation and inventory cost

As shown in figure 5.7, the highest range of frequency is allocated in the range of inventory cost between 36.25 – 42.5 % and calculated as 42 percent from the total sampling. The second range is the range of transportation and invention is 30 -32.5 % which is 37 percent of the total sampling. There is 13 percent of the third range which between 32.5 – 36.25 %. Finally the last range is the smallest range with 8 percent between 42.5 – 45 % of the total cost.

After analyzing the criterion of inventory cost, it can be found that almost of the organizations, there are the high costs of inventory and transportation. This is because quality is the most important for the food industry. Apart from the quality that can be controlled strictly, the transportation of both materials and products is also very important in terms of the temperature control that contribute to the high expense of transportation if compare with other industries. Beside, the materials used in some industries are far away from the production site and the cost of transportation seems rather high as well as the temperature control process of products and materials inventory which also occur high cost.

From the criterion of inventory and transportation cost which shown in figure 5.8, seafood is calculated as the highest mean equal 41.75 percent and followed by fruit, chicken and vegetable with 35.50, 35.00 and 34.38 percent accordingly.

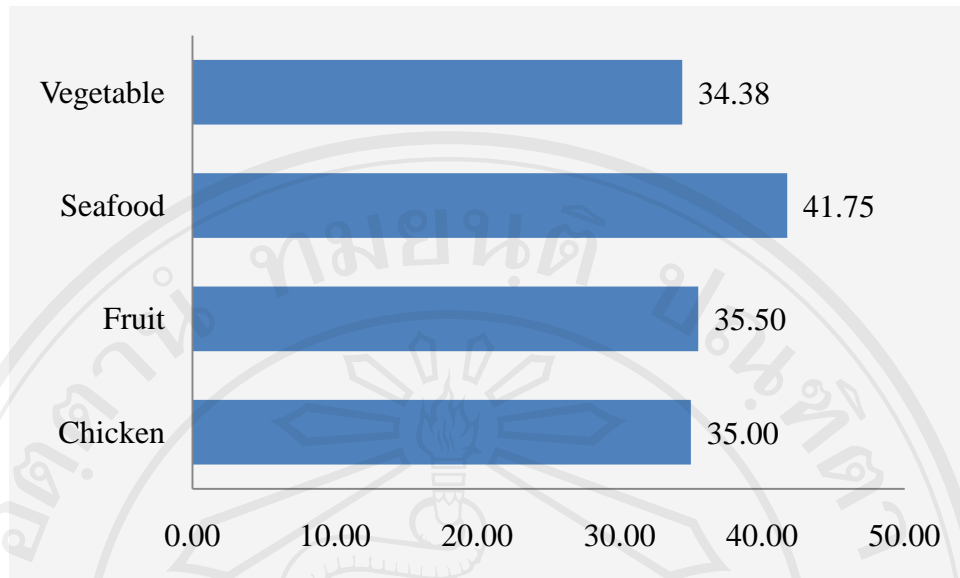


Figure 5.8 The comparison of each product type for ratio of transportation and inventory cost

From the following data, after analyzing, it can be found that seafood has the high inventory and transportation cost obviously if compare with other types of food. This is because seafood needs to be careful about transportation more than other types in terms of the types of processed food including the limitation of production and transportation. For example, when the material like shrimp is delivered to the factory, it needs to be separated whether it is still alive or already dead. Hence, the quality of inventory and transportation needs to be more extra. Besides, as mentioned before about the distance of transportation, seafood material needs to be transported in a long distance because of the origin is far away from the factory. If we consider about the food type and the lowest waste rate, it is supposed to be chicken because most of the factories normally have their own chicken farms so they can decrease the transportation and inventory risk.

5.2.4. Customer complaints

Regarding to the customer's complaint data, the researcher gathered the data by using the percentage of the complaint which can be solved possibly and the percentage of complaint which the organizations confess those complaints as the real problem. The ranges of data are divided into the following 4 ranges;

Table 5.4 Range of customer complaints

Range	Ratio of customer complaints
1	90-95%
2	95-96%
3	96-98%
4	98-100%

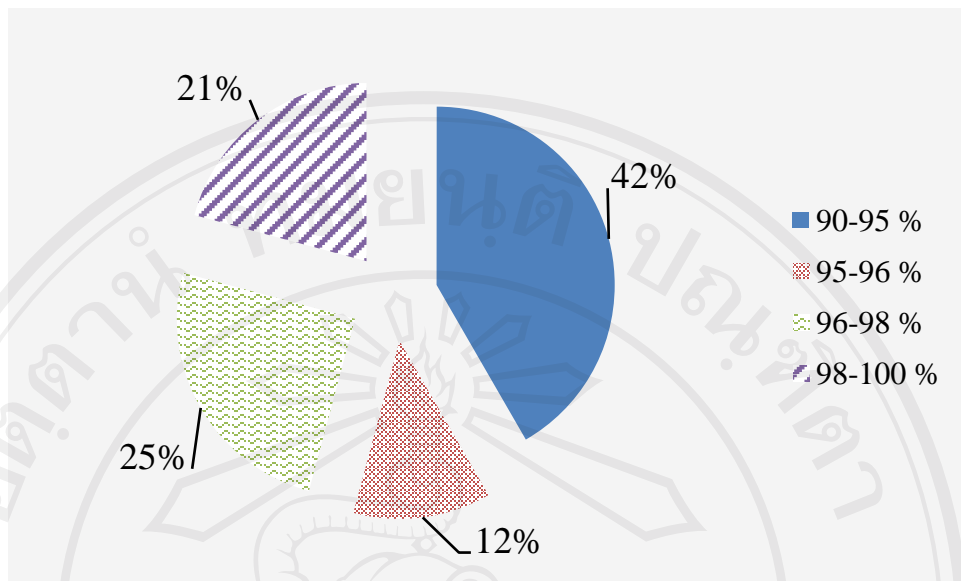


Figure 5.9 Percentage of customer complaints

Figure 5.9 describes that almost organization can possibly solve the customer's complaint. There is 42 percent of the organizations can solve in the range between 90 – 95 %. While 25 percent of them are allocated in the range of 96 -98 % and 21 percent of them are between 98 – 100 %. Lastly, there is only 12 percent of the complaint in the range of 95 -96 %.

From the investigation, the outcome reveals that the respondent organizations can figure out the customer's complaints more than 90 percent of the total complaints. Therefore, it can be summarized that the organizations give precedence to the complaints. However, if consider from the following 4 ranges, almost of the organizations can solve the problem in the range of 90 – 95 percent which is the lowest range. This may be because of the quality problems of the products that not easy to figure out.

From the figure 5.12 which shows the result of the criterion of customer's complaint, chicken is the highest with 100 percent followed by vegetable, fruit and seafood with 96.75, 95.40 and 94.65 percent accordingly.

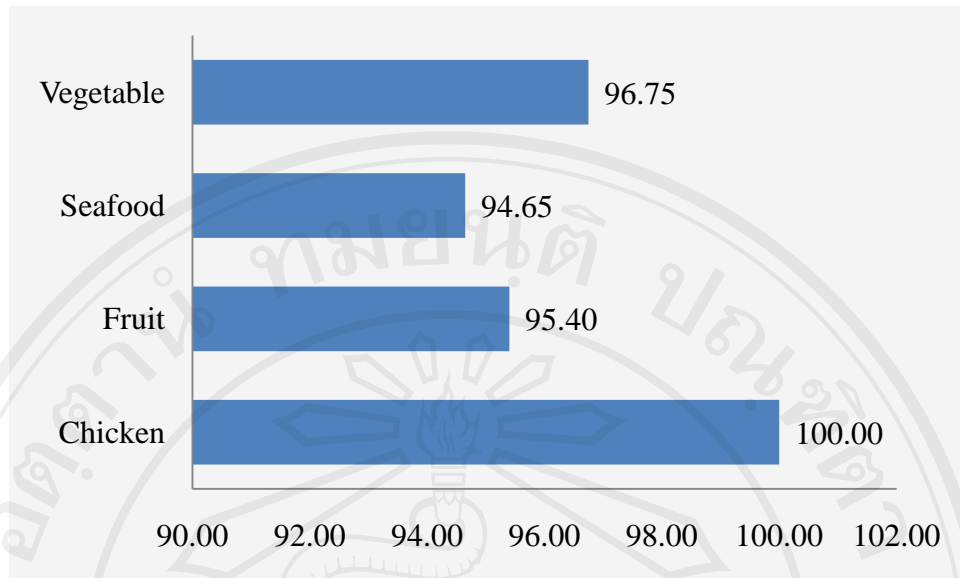


Figure 5.10 The comparison of each product type for percentage of customer complaints

The following data reveals that food industry like seafood has solved the customer's complaint in the lowest range which is 94.65 percent if compare with other types of food in the same industry. This means if compare seafood with other types of food, seafood industry can solve the customer's complaint in the lowest rate. The researcher analyzes the problems that occur from the production and find that it originates from the quality of materials which need to be solved from the whole system. However, this may contribute to the high cost, time – consuming so the entrepreneur cannot solve the total problem properly and some customer's complaints cannot be solved as they prefer. In contrast, for chicken, the industry can respond to the customer's complaint perfectly because the factory is quite big and the system is well organized including the operations are almost the closed system. Thus, if the problems occur, it can be solving immediately and directly to the point.

5.2.5. Customer on-time rate

In the issue of the customer on-time rate, the researcher investigates the percentage of purchasing order which is delivered on time to the total purchasing order. The ranges of the data are divided into 4 criterions as can see from table 5.5.

Table 5.5 Range of customer on time rate

Range	Customer on-time rate
1	95-98.3%
2	98.3-99.06%
3	99.06-99.5%
4	99.5-100%

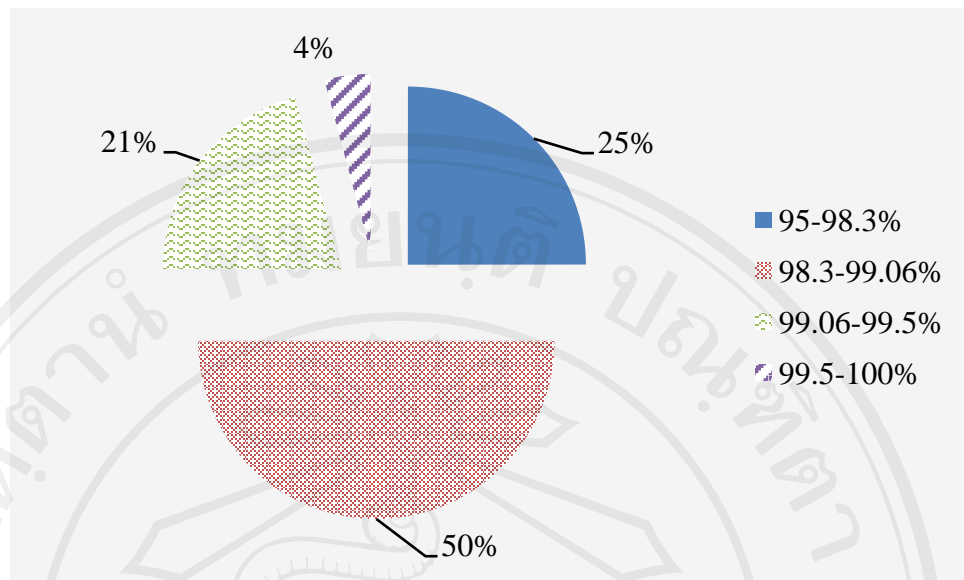


Figure 5.11 Percentage of customer on-time rate

As shown in figure 5.11, 67 percent of the total respondent organizations can deliver the products to customer on time in the range of 98.3 – 99.06 % from the total purchasing order. And the next range which is 99.5 -100 % is calculated as the percentages of 13 percent. The last two range are in the same percent at 8% are the range of 95-98.3% and 97 – 98-3% as 8 percent.

From the investigating of the customer on-time rate issue, every organization can deliver their products on time over 95 percent which seemingly high. In addition, almost of them more than 70 percent can deliver in the range of 98 -99 %. The result can be referred that the organizations aim to respond the customers' demand as their high priorities.

According to the ability to deliver the product to customer on time which shown in figure 5.12, vegetable has got the highest percentage mean which is 98.94 and followed by fruit, seafood and chicken with 98.40, 98.25 and 98.00 percent accordingly.

This criterion shows that vegetable industry has its own ability to deliver on time with the highest percentage mean equal 98.94. This may be because types of the products are processed to be canned food products. Therefore, the industry is able to spare a large amount of stock and the food ordered are not variety or change in the production process as other type of food do especially chicken. From the investigating, chicken product has the ability to deliver on time the less. This is because to process chicken product, the planning system needs to be cleared and the most of the capability is labor. Besides, chicken product order can be change as often as the customer's demand and the factory needs to have a flexible production. Lastly, this type of food can offer a variety type of product in the same way.

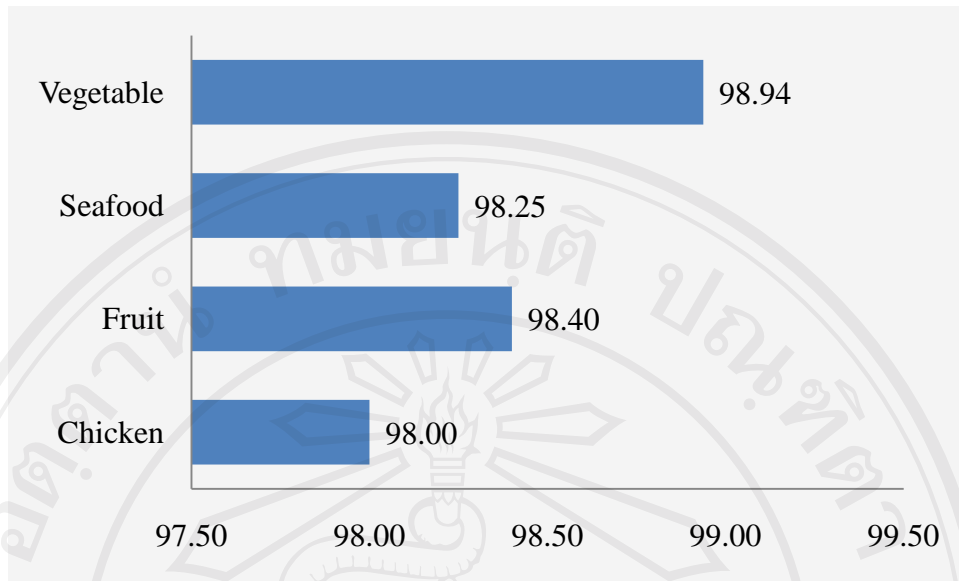


Figure 5.12 The comparison of each product type for percentage of customer on-time rate

5.2.6. Supplier on-time rate

In the consequence of the ability of the supplier to deliver the materials on time, the researcher collects the percentage of the material purchasing order which derive on time to the percentage of the total material purchasing order. The following data are separated in 4 ranges as shown in table 5.6

Table 5.6 Range of supplier on-time rate

Range	Supplier on-time rate
1	90-94.3 %
2	94.3-96.7 %
3	96.7-97.6 %
4	97.6-99 %

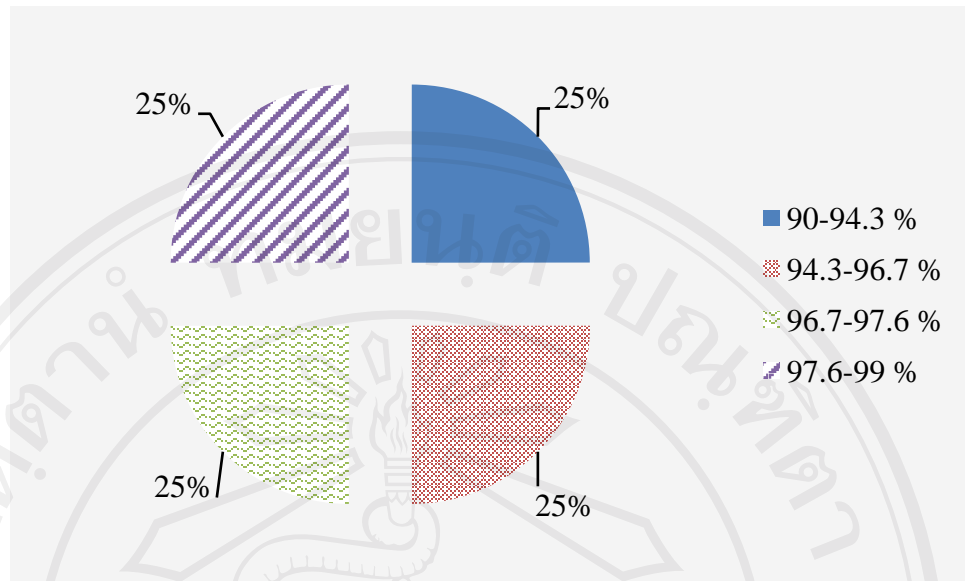


Figure 5.13 Percentage of supplier on-time rate

According to figure 5.13, it shows that the evaluation result of the supplier's ability to deliver. Obviously, the respondent organizations have their own abilities to deliver the materials and they consist of 4 similar ranges.

By collecting data from organizations in the survey, it can be found that the entire supplier can deliver material to the organization on time is more than 90 percent. The overall perspective shows that the organizations manage their suppliers in a good level. But if compared to the management of customer, the organizations manage it better.

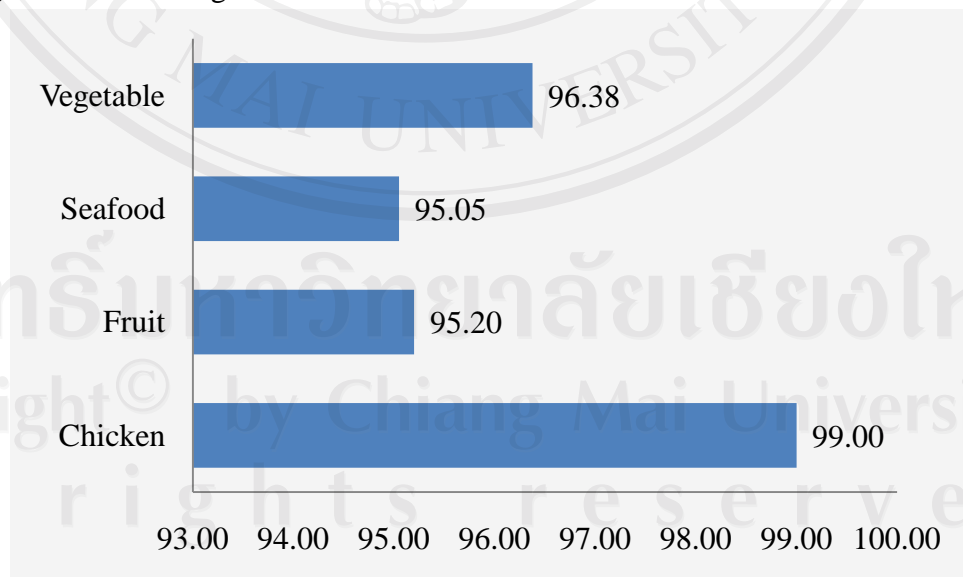


Figure 5.14 The comparison of each product type for percentage of supplier on-time rate

As regard to the supplier's ability to deliver the materials on time (figure 5.14), chicken is calculated as the highest mean with 99.00 percent and followed by vegetable, fruit and seafood with 96.38, 95.20 and 95.05 percent accordingly.

After analyzing the evaluation, chicken is delivered on time by the supplier with the highest mean because this kind of factory normally has its own chicken farm and the supplier has a tiny role in this case. Moreover, the factory generally has a clear policy with its supplier so both of them can manage the close relationship to each other. On the other hand, if compare with the seafood industry, the supplier has a low rate of deliver the materials on time because there are several suppliers operate the same business and seasonal problem is also the major problem. Furthermore, this kind of factory cannot control the production which may cause some mistakes or deliver the materials late.

5.2.7. Rate of returned product

In terms of the measurement of returned product rate, the researcher measures from how many times the products are sent back to how many times the products are delivered. In this case, the ranges are divided into 4 ranges as follow;

Table 5.7 Range of returned product rate

Range	Rate of returned product
1	1-1.875 %
2	1.875-2 %
3	2-2.0625 %
4	2.0625-3.5 %

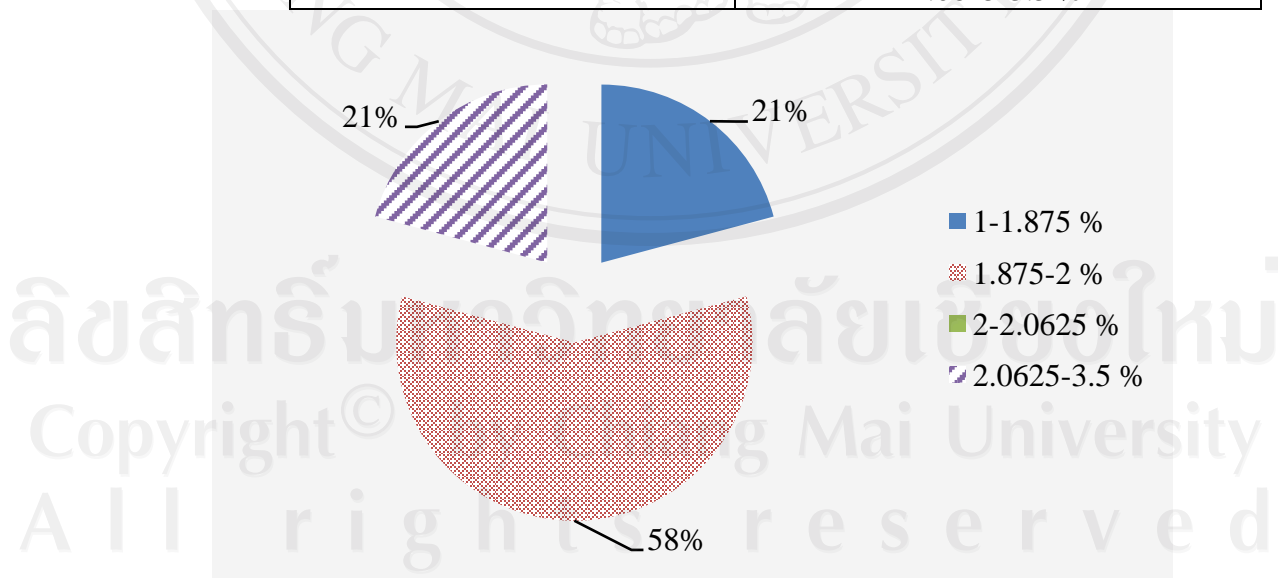


Figure 5.15 Percentage of returned product rate

As can see from figure 5.15, once the organization responds to the survey, the returned product rate is 1.875-2 % from the total delivered product. Inferior to the first

range, the frequencies of the range are similar and equal to 21 percent which are the range of 1-1.875 % and 2.0625-3.5 %. And the lowest frequency range is 2-2.3% as 0 percent.

Regarding to the data, the respondent organizations have the returned product rate not over 3 percent but if separate the ranges, it can be found that over 50% of the organizations have sent back rate between 1.875-2 %. The reasons of sent back are because of the safety or the quality of their products. And those reasons are rarely because of the product characteristics because the organizations need to sign the contract with their customers in advance.

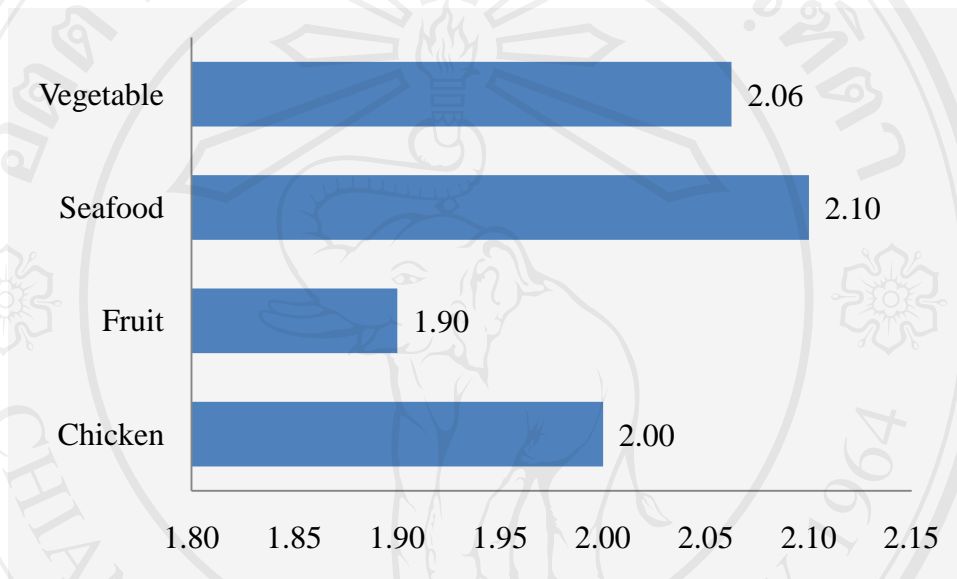


Figure 5.16 The comparison of each product type for returned product rate

In terms of the returned product rate which shown in figure 5.16, seafood has got the highest mean of 2.10 percent and followed by vegetable, chicken and fruit with 2.06, 2.00 and 1.90 percent accordingly.

According to the data derived from the survey about the sending back product, it reveals that seafood is sent back more than other type of food because of the limitations that mentioned before such as the limitations of inventory, transportation including the quality of materials took into the production line and difficult to control so the products are possible to sent back. In contrast, fruit has a product sent back in a low rate because the export process of this type of food is relevant to the chemicals or contaminants that exceed the standard. In the process of export procedure, the examinations are taken place so the rate of sending back is supposed to low.

5.2.8. The customer contract and the level of information exchange

The researcher gathered the data by referring to the 4 levels of information exchange as shown in table 4.4.

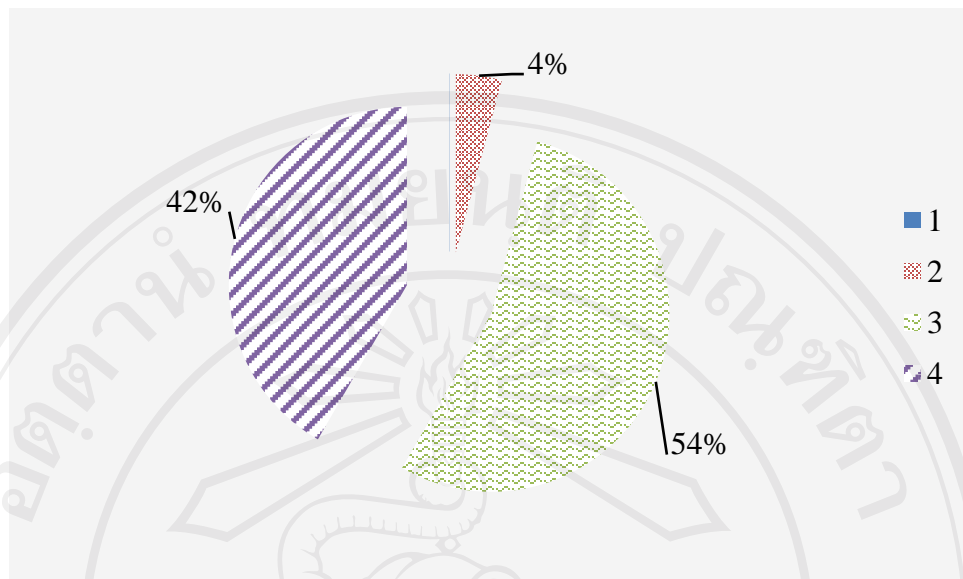


Figure 5.17 The result of the customer contract and the level of information exchange

According to the measurement of the customer's contract and the level of information exchange in figure 5.17, most of the organizations are categorized in the 3th level which is 54 percent. Moreover, there are 42 percent of the respondent organizations signed the formal contracts with their customers including the information exchange and obviously planning to be charitable to each other which allocated in the 4th level. The last one is categorized in the 2rd level and is calculated only 4 percent. In this case, the organizations exchange their information but not charitable enough to each other.

In case of the information exchange or contract between organizations and customers, more than a half of the respondent organizations signed the formal contracts or regulations with their customers in order to the development planning but not fully charitable to each other. This action refers that the organizations give precedence to their customers.

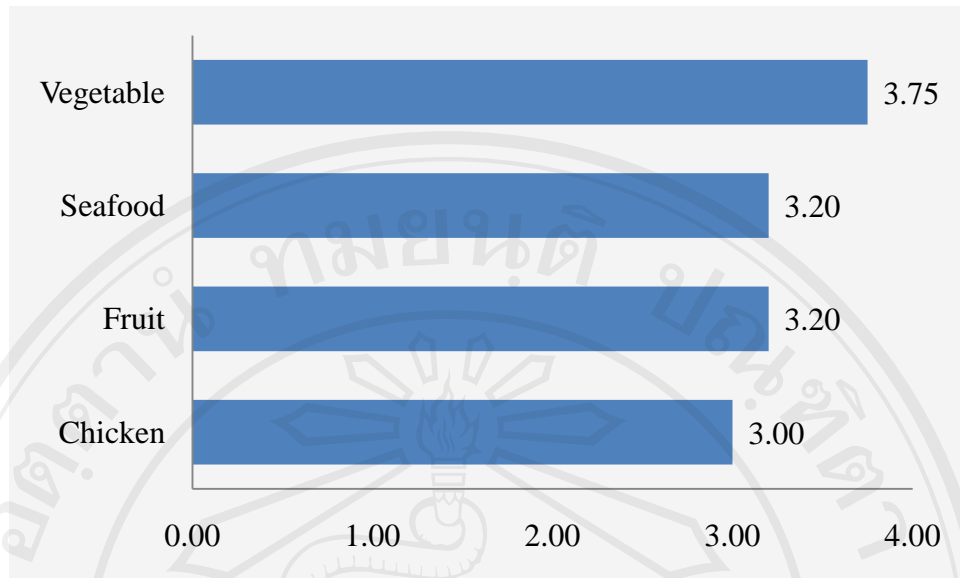


Figure 5.18 The comparison of each product type for customer contract and the level of information exchange

In case of the contract between the customers and the level of information exchange, vegetable is calculated to the highest mean with 3.75 percent and followed by vegetable, seafood and chicken with the percentage of 3.20, 3.20 and 3.00 accordingly (figure 5.18).

From the following data, the most interaction of information exchange is vegetable because this kind of food industry needs to have a proper plan. The plan is about when to deliver and how many. Since the materials can preserve only in a short time but the plan needs to do in a long term so the materials need to be confirmed. In contrast, the less interaction of information exchange is chicken food because the production process is already well organized. Therefore, the information exchange is only focusing on the types of food and how much they would like to order.

5.2.9. The supplier contract and the level of information exchange

The researcher collects the data by classifying the information exchange into 5 levels as same as the customer contract and the level of information exchange that shown in table 5.8.

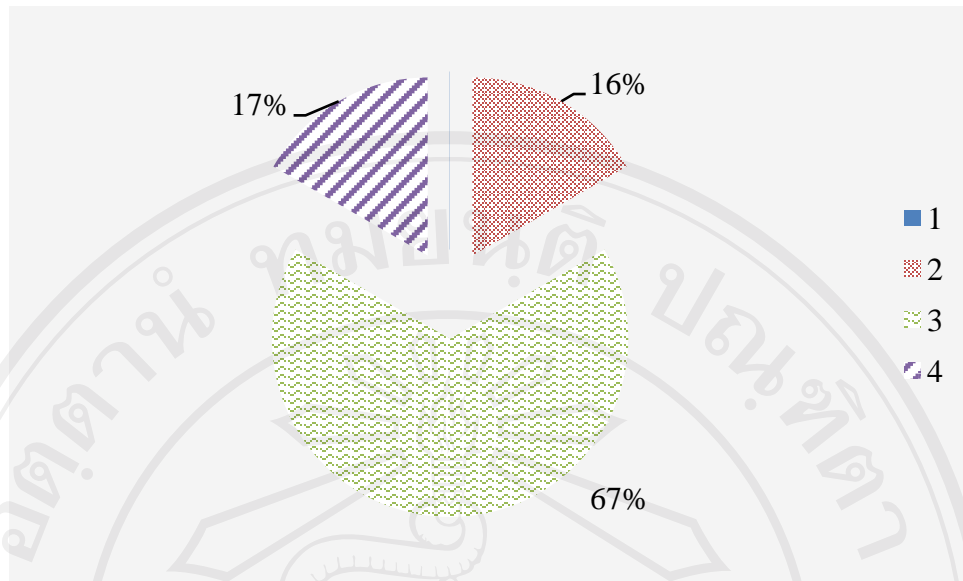


Figure 5.19 The result of the supplier contract and the level of information exchange

Figure 5.19 indicates the percentage of the information exchange level of the respondent food industry. It refers to the level of the information exchange between the organizations and the suppliers. The highest percentage is 67 and stated in the 3th level which means the organizations and the suppliers exchange their information apparently and some of them charitable to each other. The next level is the 4th which is 17 percent and the 2rd level is 16 percent of the total data.

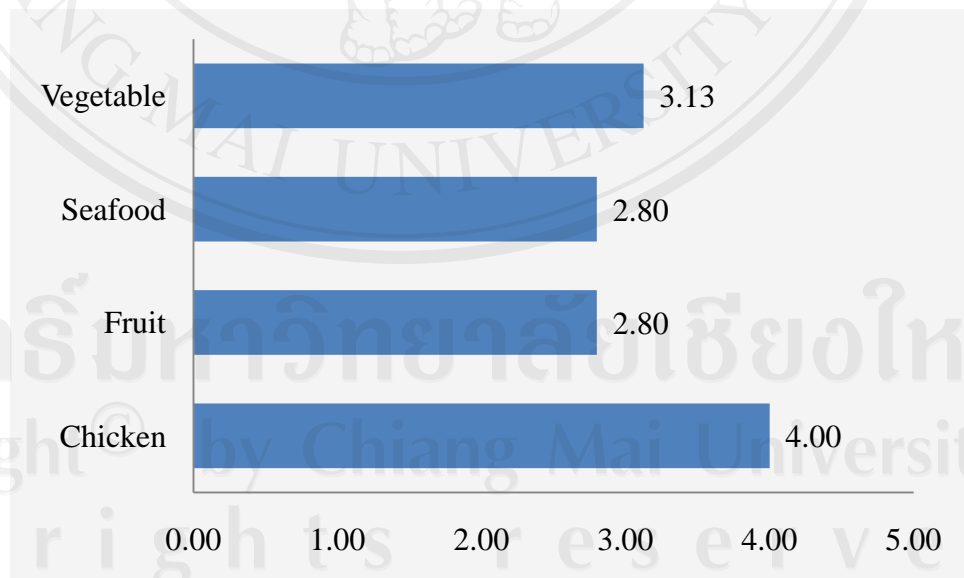


Figure 5.20 The comparison of each product type for supplier contract and the level of information exchange

According to the information exchange and the contract between the suppliers and the organizations, most of the organization set their formal contracts and

information exchange with the suppliers and some charitable to each other. They agree to exchange the information before deciding to make the purchasing. It can be said that almost of the organizations give precedence to their customers more than do with their suppliers.

Finally, for the procedure of the contract between the organizations and the suppliers (figure 5.20), chicken has got the highest score with 4 and followed by vegetable with 3.13, fruit and seafood with 2.80.

From the measurement of information exchange between the organizations and the suppliers of this industry, there is the most interaction in chicken industry because the chicken supplier operates in the same factory. The operations include the selecting of chicken lineage, nourishing, quantity and transportation. This means the factory can manage these kinds of operations directly and the information exchange will take place immediately. Moreover, the factory can also keep the previous data for the future plan. Shrimp and fruit industries have the minimum rate of information exchange because it depends on several suppliers. Thus, the coordination of planning and information exchange will be difficult and most suppliers operate small business so that the investigations are not complete if compare with chicken industry.

The first main criterion is efficiency which includes production accuracy rate, damage rate and ratio of transportation and inventory cost. The measurement result shows that the score of production accuracy rate of most of organizations is rather medium as 2.417 with the means as 96.250 and the SD as 2.743. The score of damage rate is the lowest score as 2.333 with the means as 1.688 and the SD as 0.930. It shows that there is still waste in the manufacturing process and the organizations should plan to reduce waste to increase the performance of supply chain performance. The obvious main cause is the constraint of material that is uncertain in both of quality and quantity. From this cause, the production planning is difficult and the process is complex. It depends on the worker skill rather than machine's potentials. The result of ratio of transportation and inventory cost criterion illustrates that the transportation and inventory cost of the most organizations is high at the score as 2.792, the mean as 37.708 and the SD as 4.995. Besides, it is found that apart from the limitations of the material, the transportation planning is also low but the storage of frozen food needs to be controlled according to the exported standard from importer and food quality. The overall performance of the efficiency of the frozen food industry is rather in medium level as score 2.455 and should be resolved immediately.

The second main criterion is responsiveness which includes customer complaints, customer on-time rate and supplier on-time rate. For the customer complaints criterion, the result shows that the organizations can solve to most of customer complaints and the delivery is accurate and timely at a medium score as 2.250 with the mean as 95.729 ,the SD as 3.025 and 2.042 with the mean 98.485, the

SD as 1.250. Due to the good product's quality, high performance of production planning, good quality control in production and the organization can solve the problem in the level which does not affect to the customers. From this result, it shows that this industry focuses on the customer's expectations as the first priority. In the supplier on-time criterion shows that the organizations can manage in order to maintain the relationship between suppliers in good level as 2.500 with the mean as 95.688 and the SD as 2.944. However, when compared to the customer on-time rate, this mean is in lower than customer's. The overview performance in this main criterion is rather in a rather low level as the score 2.199.

In the quality main criterion, the result shows that most organizations have the returned product in the high level as the score 2.792 with the mean as 2.000 and the SD as 0.655. Due to the standards of importing countries are different in different countries that are affecting the production. The production has to be controlled to meet the expected quality and requirement of customers in each country. This part has been directly affected by production process, which must be controlled in accordance with the standard of each country.

The inter-organizational alignment includes the customer and supplier contract and level of information exchange. The score of customer's is 3.375 with the mean as 3.375, the SD as 0.576 and the score of supplier's is 3.000 with the mean and the SD are 2.985 and 0.624. The score of both criteria remains high, but the comparison between the mean of supplier is still less than customer's mean. Due to the fact that the organizations focus on the customers' side more than the suppliers'. As well as the customer order must be pre-ordered for a long time that needs to communicate much higher than communicate with suppliers. The overview performance in these criteria is rather high as the score 3.283.

The overall performance of exported frozen foods supply chain is in the medium level as the score 2.560. In terms of dealing with customers is in the good level. In term of organizations management is moderate and if there is an improvement, it will increase the performance of supply chain management. In the term of dealing with suppliers, the level is relatively low. It should be focused and more consolidated to increase the performance and enhance competitiveness of the exported frozen foods.

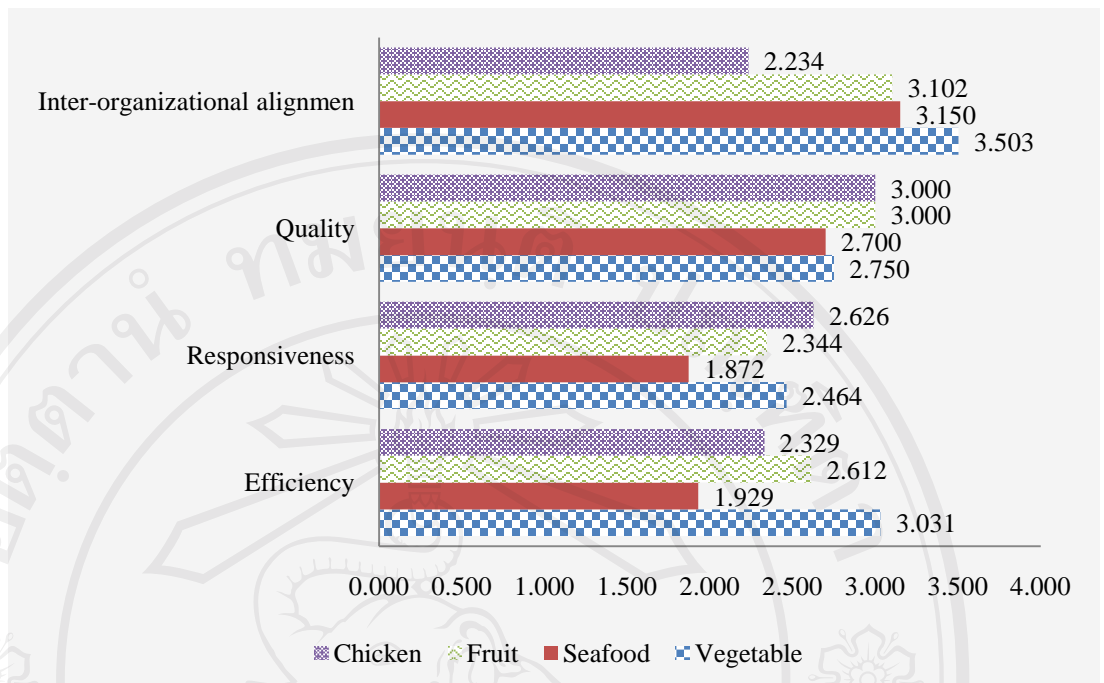


Figure 5.22 The score of main criteria of performance divided by product type

From the figure 5.22 which shows the score by simple additive weighting method, in term of efficiency, the frozen vegetable industry has the best performance as 3.031 points and the last rank is frozen seafood as 1.929. Due to the fact that the frozen vegetable organizations have managed quite well, especially most of them have farms to produce material directly to the manufactories. Therefore the problem which caused by raw material is lower than other type then the score of efficiency is high. In terms of responsiveness has found that every industry has the approximate score. The highest score is 2.626 at the frozen chicken industry and the industry at lowest score is the seafood industry at 1.872. The main causes of this still are raw material and its management. For the quality section, the highest score is 3.000 at the frozen fruit and chicken industry. Because these industry's steps are not very when compared to other types so the waste from manufacturing process is low. The industry that has the lowest score is frozen seafood as 2.700. Due to the fact that the steps of processing are quite complex and material that looks quite different from each supplier. In the last criterion is the Inter-organization alignment, the result shows that the industry has to exchange information between organizations with the highest score id frozen vegetable as 3.503. For the frozen food industry has to make long-term contracts with customers so the level of information exchange is high but for the frozen vegetable industry, most of large organizations have been doing be contracted with farming and it needs to contact the supplier, which makes the level of information exchange between organizations with more.

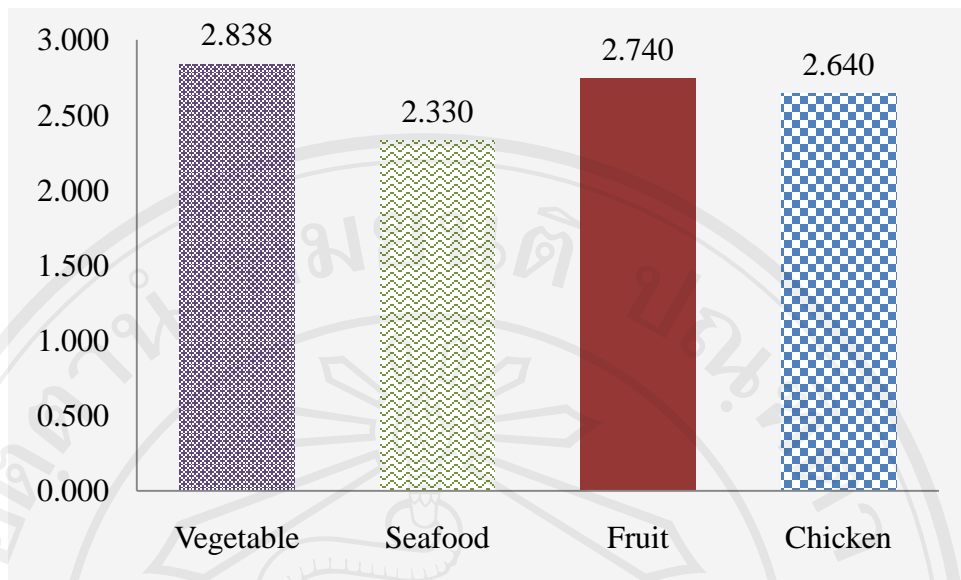


Figure 5.23 The score of performance measurement divided by product type

From the analysis of measurement result divided by type of products (figure 5.23), the overall performance of frozen vegetable industry can manage the supply chain better than others as 2.838. From the measurement shows that this type of industry can solve the customer complaints and dealing with suppliers in the higher level than others. This demonstrates both customers and suppliers management well. For the measurement of frozen fruits and chicken which get score as 2.740 and 2.640, the performances in terms of production accuracy rate and customer on-time rate have remained at high level. But if the criteria which related to suppliers, the level of result has remained at lower level. It shows that organizations internal management better and supplier management supposed to be improved. The result of frozen seafood measurement which has got the lowest score as 2.330 found that the main problem of this product is management. In terms of damage rate and returned product rate are in the highest level if compared with other industries. Including the percentage of customer complaints that are solved is low and ration of transportation and inventory cost is high. That shows the management of both suppliers and customer is still low when compared with other industries.

If analyzing the result of measurement in the balance scorecard perspectives, it found that the criteria with related to customer have high percent to response with the customer. That shown the perspective of manufactories is same as the perspective from the experts. The first rank of customer criterion is the “Customer contract and level of information exchange” with the point as 3.375. It shows the most sample organizations can contact with the customer in high level. As the criteria of customer complaint and customer on-time rate, the point of these two criteria is shown in the low level but the percentage of them is quite high. But the point of them can show only the most sample organization can deal with the customer in the same range at the

middle range. From this result, it shows that the point from measurement is consistent with the weight from the expert interview.

The learning and growth perspective and the internal process perspective are the perspective that represent terms of organizations management. They have the related criteria which are Supplier contract and level of information exchange, damage rate, supplier on-time rate and rate of returned product. From the measurement result shows that except the Supplier contract and level of information exchange, the point of them is in the middle level. Rate of returned product criterion is the second score and the third one is supplier on-time criterion. From this result, it shows that the organizations still consider and are good in the perspective which relate with organization management. But if comparing between the customer perspectives, it is still in the low level and that is consistent with the point from the expert interview.

The financial perspectives which get the lowest weight from the expert interview relate with the rate of transportation and inventory cost criterion. The result for measurement shows that the organizations can manage their cost in the good level. So it shows that the result from the measurement and the expert interview is inconsistent. This represents that although the weight of financial from expert interview is low but perspective from the organizations still give the high priority about the financial term.

From The measurement result which presented in the beginning, researcher has analyzed the SWOT of supply chain management for exported frozen foods industry based on this measurement. The summary of the SWOT analysis is shown in the next section.

5.3.The SWOT analysis of the exported frozen foods

The performance measurement results that the researcher gathers from the sample organizations show the strengths, weaknesses, opportunities and treats by the SWOT analysis of the overall supply chain management in the exported frozen food industry as you can see in table 5.9.

5.3.1. The strengths of the exported frozen foods

5.3.1.1. High perfection of order fulfillment

The organizations have high ability for ordering fulfillment in the right customer, right time and right quality because the competencies of raw materials and procedures. In addition to this, the exported frozen food manufactories need to be certified by the exported standards; for example, GMP, HACCP and animal welfare. The significant issue is traceability for all procedures and raw material sources in order to get the confirmation from the customers that the products are safety enough. Since organizations inspect raw materials before the production processes; the inspection period is decreased including product quality assurance. As a result, Thai exported frozen food industry provides the confidential to the customers in production and product quality. In addition, Thailand delivers high performance in food

producing and exporting because it is agricultural production and raw materials based that can be produced in various ways which response to customer requirements. The other strength of Thailand is labor. The workers in Thailand are high quality and have been well trained. Therefore, the agricultural products from Thailand are value-added and get market share more than other countries.

5.3.1.2. Good ability for solving customer complaints

Regarding to the performance result, most organizations have high score in solving customer complaints that shows characteristic of exported frozen food industry. They also focus on customer satisfaction and then they try to solve the entire customer complaints. The customer complaints represent the voice of customers that organization must solve them immediately. If the organizations cannot do it, they will lose their customers. On the other hand, customer complaints still show how to develop the processes within organizations. The solutions are divided into 3 categories; solving at the results, solving at the cause and preventing the problem. In addition to this, the organizations should focus on complaint assessment that what is an effect of the problems or how serious of the problems to permute them that which one have to solve first. It is clear that exported frozen food industry has a good management in both solving and prevention the problems that customer complain. Besides, it shows the good statement of exported frozen food industry in solving customer complaints, responsiveness and satisfaction enhancement in the cast that organizations can solve the problems immediately.

5.3.1.3. High customer contract and level of information exchange

The agreement and level of information exchange between the organizations and customer of exported frozen food industry are in the high level for most of sample groups. It presents the good relationship with customers. For the organizations' perspective, it means they can manage customer relationship and operation in high performance. In some cases, the organization can serve customers without waiting their requests. Moreover, production planning can be planned with customers to achieve the goal easily, more directly response their requirements and decrease the damage rate that occurred by no quality products. In addition to production, traceability is the most important part of food production. If the relationship with customers is high, the organizations and customer can check back and trace in every process easier. Including customers will be more convenient to source the materials and the process as well.

5.3.2. The weaknesses of the exported frozen food

5.3.2.1 Production accuracy rate

The main cause of production problem is unstable raw materials from the supplier especially agricultural raw materials because the main materials are vegetable, fruit, and meat that their preserved period is very short. Besides the production time of each material is seasonal and most of farmers don't have enough knowledge and new technologies about food industry and the food standards that have

to be qualified about quality and chemical using. It's the cause of selecting materials before taking them to production line and uncertainty of numbers and quality of them are occurred. Other reasons are quality control and management that are not good enough for the organizations.

Table 5.9 The SWOT analysis of the exported frozen foods

Strengths	Weaknesses	Opportunities	Threat
- High perfection of order fulfillment	-Low production accuracy rate	-Support from government	-New strong competitors
-Good ability for solving customer complaints	-Low supplier contract and level of information exchange	-Increasing of market demand	-Food standard from the importers
- High customer contract and level of information exchange		-Supply chain management approach integration	

5.3.2.2. Supplier contract and level of information exchange

For food industry, raw materials are the main part and most of organizations receive them from suppliers or farmer. But the measurement result shows that the level of information exchange with suppliers is quite low if compare with customers' level. It represents the uncertainty of taking raw materials to the production line and it contributes to several problems in production; for example, planning, production, delivery and responsiveness to customer requirements. Besides it affects the quality of the products. Because the importance of standard is traceability and product quality, especially for exported food, the information and cooperation between organizations and suppliers are significant. If organizations have good management about this, their ability to compete will be increased.

5.3.3. The opportunities of the exported frozen food

5.3.3.1. Support from government

In the present, Thailand is one of the best food producer and exporter in the world because there is a high potential to produce for export purpose, an availability of material and the capability of Thai entrepreneurs. As product quality and types improvements are met the market demand, several Thai's processed food products are exported in the top rank of the world and already well known. This reason contributes to the support in this industry from the government because it generates a large amount income to the country, local contents are used over 90%. In addition, the government also establishes several policies to support this industry such as the information system and food industry data network to link an effective coordination, strengthen and support small and medium business. The model scheme

is created for small and medium business development, supported product and distribution channel development. Moreover, product and package are improved to add value as well as exported product is improved to create a good image of high quality food product and the establishment of ASEAN center for expertise in food contact materials.

5.3.3.2. Increasing of market demand

The previous research totally agrees that overall image of frozen food market seems to be growing because the consumers increase their consumption not only for the main course but also consuming more snack or savory. In addition, consumer lifestyle is focusing on convenience and easy to cook. Therefore, sales are increased and the frozen food entrepreneurs start to expand the product line in order to increase alternative choices and buying frequency for their customer. Apart from that, the imports of Thai frozen food demand in several countries are increasing such as Japan with 127 populations. Japan can produce several kinds of food but still insufficient for the national consumption. This is because the ratio between area and productivity are only 40 percent of the consumption demand. Thus, imported food proportion of Japan is high and types of food are vary such as fresh food, refrigerated food, frozen food and processed food. Moreover, tsunami and exploded Nuclear Power Plant are also contributed to the import demand increasingly. The opportunity of Thai food import to Japan seems to be increase accordingly. For the food quality, Thai products are enabling to export to Japan without any problem because Thai exporters can respond Japan's demands.

5.3.3.3. Supply chain management approach integration

Under the present high competition in business, launching new product and delivery to the customer need to be quick. As well as the product life cycle seems to be shorter and the customer's expectation also higher. These factors drive organization to figure the best way out to respond the customer satisfaction in order to compete with the competitors and be a guarantee of business survival. Presently, most of the organization initiates to invest and focuses on the supply chain management strategy. This is because the only way to decrease their cost and increase the competitive advantages. Furthermore, the progression of communication and transportation technology are continuing (such as wireless communication, internet and fast track delivery) and affect the evolution of supply chain and supply chain management technique.

As this industry supply chain management is varying, the opportunity to adapt supply chain management principle in several processes is possible. Specially, between organization and supplier that not good enough if compare with the management between organization and customer. Supply chain Management principle is focusing on the material management as the main point, then focusing on the inventory and finally well known as the way to respond the customer effectively.

5.3.4. The treats of the exported frozen food

5.3.4.1. New strong competitors

The competition of food industry is very high in the present globally because there are more than 200 countries export food products. Most of food products are similar and export to the same market such as the United States, European Union and Japan. Moreover, if consider about the world exporters, there are about 15 countries such as the United States, Canada, Australia, China, Brazil, Argentina, Vietnam and Thailand.

The new food product exporters put forward high competition by using their potential and labors. Hence, they affect export ability of Thai exporter which is used to be Politics of Specialist countries such as Vietnam and Western Europe.

Vietnam is where most of the populations are agriculturist, agriculture products are similar to Thailand because of the same weather atmosphere. As its natural resources are plentiful and cheap labors, Vietnam is the most important competitor which lessens Thailand's profit. China is one of the most important competitors as it has high potential to compete because of the very large plant area, high number of populations and cheap labors. As a result of new exporter entrance to this market and has strong potential, Thailand dramatically confronts with its potential to export in food industry.

5.3.4.2. Food standard from the importers

Non-tariff Barrier operation of product standard and quality under the regulation of Sanitary and Phytosanitary Standard (SPS), the regulation of Non-tariff Barrier (NTB) and environment condition are brought up from developed countries to be the import regulations and standards. Those regulations and standards are created to protect the production and for well sanitary of populations within the country. They are contained in the World Trade Organization (WTO) in Sanitary and Phytosanitary Standard since 1995 and used to replace the tariff barrier which needs to decrease and unable to use in the future. Hence, the food product production needs to be considered more about this condition. In addition, the countries that produce food product will use high standard of technology but less effect to environment, good quality of product and well sanitary for the consumer.

Sanitary measure becomes the necessary condition for thorough exporters. However, high cost from the following condition becomes a problem for the minor producers because fixed cost per unit will be higher than in the future. Export food industry structure will finally turn to the fewer exporters but from the big organizations that can adapt in this condition. As the production process enable to assess traceability about the material source, there are only big organizations can compete in the high competition. Apart from that, the exporter necessary to get the receipt from the foreign market as the border pass in order to present to the consumer that the product has high quality. Hazard Analysis and Critical Control Point (HACCP) is only a primary certificate. A factory assessment by the importers will be

increased but it is good for them because they will trust on Thai product. For example, Thai's boiled chicken was exported even though there was a spread of bird flu. This is because the importers were satisfied when the assessor visited the factory in Thailand.

The survival of Thailand food industry depends on the ability to adapt, raise the production quality without stopping, being aware, and adjusting the production prior to the condition release. The information is derived from the major importer is compared as a warning. The joint venture with the major importer will let the factory know the consumer trend of other countries, enable to adjust immediately and more effective.

5.4.The TOWS matrix for exported frozen foods

According to the SWOT analysis of exported frozen foods, they show the strengths, weaknesses, opportunities and treats of the overall supply chain management in the exported frozen food industry. The researcher uses the TOWS matrix to indentify the approach in solving problems and developing which are presented in table 5.10 as follows;

5.4.1. Apply transport management and new technology to planning

The result shows that the most problems are derived from raw materials especially transportation and storage of raw materials or products. For product transportation, there is not a lot of problem because products are processed so the period of preserving is increase and transporting more easily. On the other hand, the material transportation and storage contribute to several problems and the main reason is preserving period which is very short. For example, the main material of frozen seafood industry is marine fish or shrimp and the distance between source of materials and manufactory is very far. Then the transportation and storage cost are high as well as the damage that occurred during transportation is also high. Therefore, applying Logistic approach and product distribution is suggested.

1. Choosing the suitable type of transportation because the raw material has limitation of preserving period that affects on inventory and transportation. We can manage the preserve period by choosing suitable transportation then the damage from this cause will be decreased.

2. Distribution is presented to be suggestion to solve this problem. Due to the characteristics of materials, most of them are produced from different famers and distance to manufactory is different and far especially seafood industry. Therefore, the transportation should be planed more clearly to decrease time - consuming and the cost.

5.4.2. Apply supplier management approach

According to the main idea of supply chain management is focus on the cooperation between organizations and customers or suppliers but the measurement result of Information exchange level is low. It presents that most of organizations

don't have enough cooperation with suppliers. That is a cause of many problems later so the organizations should consider or manage their relationship with suppliers more.

Table 5.10 The TOWS matrix for exported frozen foods

	Strengths-S	Weakness-W
	-High perfection of order fulfillment - Good ability for solving customer complaints - High customer contract and level of information exchange	-Low production accuracy rate -Low supplier contract and level of information exchange
Opportunities-O	SO-strategies	WO-strategies
-Support from government -Increasing of market demand -Supply chain management approach integration	- More research about food and market (S1,S2,S3,O1,O2)	-Apply new technology to planning (W1,W2,O3,) -
Treats-T	ST-strategies	WT-strategies
-New strong competitors -Food standard from the importers	-Introduce new products (S1,S2,T1) -Apply transport management (S1,S2,T2)	-Apply supplier management approach(W2,T1)

1. Apply supplier management approach in every related operation because of supplier relationship is very important to manage. Furthermore, the production plan and suppliers are the main effect to the financial statement, ability to operate, profit of organization and it also affects directly to production costs so applying supplier management approach such as supplier assessment in process. On the other hand, the organization should realize that each supplier has different importance because of frequency or number of material orders and material cost. Including the market condition of each material is different thus the management for each supplier should be decided. It depends on suppliers and their products to maximize the delivery and services to meet the needs of customers.

2. Apply the new technology of supply chain management as much as possibility to continue the flow of information quickly and accurately for all of members in supply chain. Besides, it raises the relationship level and decreases the mistakes that caused by communication. For example, apply e-commerce for customer relationship management or RFID to prevent the lost information, check and decrease the mistakes in production, inventory and delivery.

5.4.3. More research about food and market and introduce new products

The organization should consider about research and development for study and focus on the possibility of market that what kind of demand in the market; for example, what styles of Asian market or categories of Europe market are and what kind of demand in domestic market. Then analyzing the possibility of future market that the organizations can present new product as well as developing existing products to increase value of products. Because nowadays several countries that produce the same product can manufacture with the lower cost than Thailand does. However, if comparing with the quality, Thai products offer more quality and acceptability. So we should promote this strength of quality and innovation.

This topic will associate with the studies and research of market trends and opportunities. It focuses on how to produce product or service and meet the customer's need including the way to distribute product or service into the market. The market factors normally called 4 Ps' which are Product, Price, Place and Promotion. For the innovation pathway, product innovation is occurred from product or service development and it will set in premium pricing. Another innovation pathway is the processing innovation which may lead to be the price and logistic innovation leader. It relates the consideration of how to deliver product or service on time and considering about distribution channel. Furthermore, media innovation may contribute to new opportunities to create promotion of product and service. Research technique and new product development can be done by considering that when the product is developed, it will change or affect the market factors at least 2 of them or not. If yes, that product should be developed and will be regarded as one of the future innovation. It is not just only an innovation but it also will be the way to find the new market to export and should associate with private sector for further study about threats and problems of trade barriers in each country such as regulations and sanitations.

Food product is a substitute product so if the price of one product is higher, the consumer will consume other product. Another case is when epidemic occur with one animal, the consumer will consume another animal replace. For example, the European Union (EU) case, it is released the restrain measure of importing some kinds of vegetable that found pest problem from Thailand. Therefore, the EU chose to order from other countries and it effects to Thai vegetable exporters in terms of market share snatching. To export various kinds of food product is an alternative way to increase the export ability in export industry. Thailand export several kinds of food such as vegetable, fruit, domestic animals and aquatic animals. This helps to increase the competitive advantage in terms of alternative choices and the product characteristics can be developed in various types so if one product is affected, another product will be one of another choice for the consumer.