How can small specialized household pig farmers gain competitiveness along the pork supply chain in China

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Preface

The reason why I choose this topic is because I have always been interested in swine industry both in China and the Western world. With the development of Chinese economy, I believe that swine industry in China has a prosperous and fruitful future. With the adoption of modern pig farming technology and management from the Western countries, I hold the opinion that the Chinese consumers should have the possibility to enjoy the same level with regard to pork meat quality and safety. Yet, since the authorities pay lots of attention on growth of the modern commercial pork processers, it is critical for the specialised household pig farmers to compete on the market. However, the giant pork processors cannot satisfy the customers' demand with regard to quantity and flavour preference, thus, pig farming has been a traditional income resource for a large number of farmers in China for long time. All the reasons above stimulated me to conduct this research.

Deep appreciation is shown to my parents who have supported me for my study in a foreign country. Many thanks are given to the people has provided the information and support during my research. Moreover, special thanks are given to Dr. Emiel Wubben, who has provided valuable feedbacks and instructions. Last but not least, most respect are given to my supervisor Dr. Jacques H. Trienekens, who has guided me from the beginning until the end of the thesis.

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Management summary

Livestock production on the worldwide market has been influenced remarkably by the increasing consumer demand on high quality and safety. Since pig meat is the primary resource of animal protein for most of 1.3 billion Chinese people, pig farming industry is taken as one of the strategic industries by the policy makers in China. With the rapid economic development in China, pig farming industry has experienced significant changes within the past few decades, which switched from backyard pig farming dominance to specialised household and modern pork processing dominance. The general objective of this thesis is to find the competiveness advantage for small specialised pig farmers along the pork supply chain in China. The methods for conducting the research is by literature review. It consists of three aspects that help to conduct the general objective. Firstly, the study analysed the impact of international and domestic pig farming development on the Chinese specialised pig farming industry. Secondly, it investigated the possibility of vertical and horizontal collaboration on the value chain. Thirdly, the study identified the key success factors that may help the specialised household pig farmers to gain competitive advantage on the market. The study identified the key success factors for small specialised household pig farmers including know- how on market oriented production and rather high feeding efficiency. Thus, other factors including traceability system can be integrated to control the quality and safety of pork.

1 Introduction

1.1 Background

Han (2009) stated that China is the largest pork production country in the world based on the data collected from the Chinese Ministry of Commerce. It is estimated that pork consumption will grow steadily in both rural and urban areas in China. Moreover, the pork industry will be driven to emphasize quality, sanitation, and convenience in China as they already do in the United States (Pan & Kinsey, 2002). According to the report from China Animal Agriculture Association (Yao, 2009), the actual numbers of pigs raised in China is not known exactly – local estimates and estimates reported by the Food and Agriculture Organization of the United Nations (FAO) for 2009–2010 vary between 490 million and 618 million pigs per year (Yao, 2009). The total output of pork production reached nearly 52 million tons in 2006, accounting for more than 50% of the total pork production in the world (Han, Trienekens, & Omta, 2011). According to the statement of Xu (2004), pork consumption per person in China reached twice the world average level. Thus, the development of economy leads to the average salary increase, the pork consumption will continue to increase in China.

However, due to the massive development without strictly implementing quality measurement and strong control from the government, there has been a significant quality issue along the pork chain. This gives the opportunity for both domestic and international firms to grow in the pig farming sector. Currently, there are mainly three types of hog producers in China: small backyard household, specialized small farms and large commercial farms (McOrist, Khampee, & Guo, 2011), which can also be categorized to backyard, small, and large commercial farms(Yao, 2009). Thus, Han (2009) defined three types of hog producers in China that include backyard unspecialized households, specialized households and commercial farms. The backyard unspecialized households raise less than 50 heads per year, while specialized households raise 50 to 9,999 heads per year, and the large scale commercial farms raise over 10,000 heads per year (Han, 2009). Among these three types of hog farms, the small backyard farmers that under family-based business scale account for the most pork production, 62% of China's pork are produced from the small unspecialized hog farmers' backyards, 35% of the them are from specialized households, and only 3% are produced by the commercial farms (China Statistical Yearbook,2005). This study classifies three types of pig farms including backyard pig farms, small specialized pig farms, and modern commercial pig farms/processors. So as to meet the increasing demand of meat consumption, the Chinese government stimulates the development of modern large scale swine farms. Production of large scale swine farms rely on modern technology, grain-based feed and advanced management skills based on the findings of Cheng et al. (2011). Compared with large scale commercial pork processors, the specialized households lack of several competitive advantages including quality control, economy of scale, specialization and

productivity (Jian, 2010). However, cooperatives formulation is not very popular for the household pig farmers in China. Most of them are operating individually without horizontal integration with each other. In order to compete with the large scale commercial farms, the specialized household pig farmers must consider to improve their competitiveness, cooperative can be one of the options for them to reach the goal (Schrader & Boehlje, 2006).

In terms of distribution channels, hogs are slaughtered mainly by slaughterhouses and big processing companies. After slaughtering, most of fresh pork meat is then sold on wet market, traditional market and supermarket (Han, 2009). This paper will focus on how the small specialized households hog farmers can gain competitiveness against the modern commercial farms on the pork market with the help of supply chain integration. The reason why small scale household pig farming are chosen for the research is because it is infeasible for large swine processors alone to meet the Chinese consumers' various needs for pork with regard to quantity, quality, and prices. At present, China needs some 600 million hogs annually (National Statistical Bureau of China, 2007). However, China's current large swine operations could supply only about 38 percent of the hogs needed (Wang, 2007).

However, for the development of household pig farming in China, there are several issues that the farmers have to tackle. It is concluded that household pig farmers need help urgently in three respects based on the findings of Jian (2010) and Li (2008). The first one is that government programs need to be implemented to help farmers buy insurance for their pigs and provide subsidies for sow farmers (Li, 2008). While such programs represent a positive step, they are not sufficient for the farmers. Secondly, local development agencies urgently need to make compulsory injections free and covered adequately by insurance. Livestock agencies need to improve veterinary services by training more qualified veterinarians and developing policies that will motivate them to provide quality services to farmers. Li (2008) also argued that concerned authorities must control the quality and regulate the price of veterinary drugs and services. Thirdly, farmers need help to safeguard their production and revenue. Despite the current high price of pork and the input like soy meals, few farmers are certain about the trend of hog farming sector in the future, therefore, farmers need government policies to reduce their revenue risk. The government has already implemented a policy to protect the bottom price of grains and it could extend it to pork production. Also, the government and local authorities are re-evaluating its tax system imposed on hog farming industry. Above all, Jian (2010) and Li (2008) concluded that household pig farmers are in need of help from the local government in order to fight against pig diseases and protect their animals.

As introduced before, the pork industry in China is currently dominated by small household pig farmers and slaughterhouses. The backyard pig farmers have been used to selling their

pigs to wet market, i.e. traditional spot market in villages and towns. However, there have been problems with quality issues that cannot be traced back due to lack of information system infrastructure and efficient government control on the chain (Yao, 2009). Meanwhile, large commercial pig farms are expanding rapidly in China, obtaining closer cooperation with the suppliers and customers, which shows a strong trend of vertical collaboration in the pork industry. To be more specific, this collaboration makes use of cold chains and delivers reliable products to customers. With large investment in pig farming and product retailing, the whole chain is monitored and controlled, the large commercial pig farming is expected to play an important role in Chinese pork sector in the future. Because of the large territory in China, it is not realistic for large pork processors to gain all the market share of the pork sector. It is expected to be of enormous competition between the commercial farms and other household hog farmers. In brief, this study will focus on small specialized household pig farmers because not only they produce most of the pork to the market so far, but also do they account for the large proportion of labor input in the whole sector. Although, the modern commercial pig farms can provide more quality meat on the market. The dominance of large scale commercial pork processors on one hand can harm the employment rate of the local specialized households groups which may bring serious problems to government, on the other hand, it may lead to less choice for consumers especially those live in rural areas. With the competition between these two groups, the pork sector will better fulfill consumers‘ various demand.

1.2 Problem Definition

This study will conduct a research on how specialized household pig farmers gain competitiveness in the Chinese pig farming industry. Literature review will be conducted through analyzing the pig farming industry in both China and developed countries. The research scale covers the trend of pig farming, risk of the industry, problems of the household pig farming, and opportunities for the small household farmers to develop through market analysis tools. In order to reach the objective of the thesis, three business strategy models will be applied. The three models are PESTEL, SWOT analysis and Treacy & Wiersema’s Value-Discipline. Among the models, PESTEL analysis will be applied to analyze the impact of dynamic macro environment factors on the household pig farming in China. While, SWOT analysis is adopted to identify the competitive advantage and plan to achieve the goals. Treacy & Wiersema’s Value-Discipline Model helps the specialized household farms position themselves on the market and determine the competitive advantage. Thus, the advanced mechanism that the western developed countries’ pork industry will be taken as benchmarks for the Chinese pig farming industry. Certainly the advanced mechanism must be applied and adapted in consideration of the domestic situation in China. They can be further studied and improved in order to seal the gap between Chinese pork industry and other developed countries’ in respects of technologies, facilities, quality control and management etc. In order to approach the objectives, two steps will be taken to conduct literature study. The first step is to investigate the current development in the worldwide pig farming industry, especially in

the well developed countries, i.e. Denmark, UK, the Netherlands, Germany, U.S., to find how they can grow the business by applying what sort of mechanism/ business model. The second step is to identify the development in Chinese pig farming industry. Compare with that in the Western countries, to suggest the possibilities to improve their operations for the household pig farmers in the future.

General research question

- How do household pig farmers gain competitiveness along the supply chain in china?

Specific research questions

1. What is the impact of domestic and international pig farming development on household pig farming in China?
2. How do cooperatives influence the specialized household hog farmers in China, from horizontal integration perspective?
3. How vertical collaboration works for specialized household pig farmers along the pork chain?
4. What are the key success factors for household pig farmers in China?

1.3 Structure of the thesis

Chapter 2 analyses domestic and international pig farming industry, and find their impact on the specialized household pig farming in China, conclusion will be drawn at the end of the chapter. The method to conduct this research is literature review, which is related to the international and domestic pig farming. Chapter 3 investigates how the cooperative can influence the specialized household pig farmers in China. The method for this approach is by reviewing literature that is related to the development of cooperatives in both China and developed countries. Conclusion of the influence will be drawn at the end of the chapter. Chapter 4 identifies the possible effect of vertical collaboration work on the household farmers in China. Conclusion on the findings will be drawn at the end of the chapter. The method for this approach is by analyzing the well-developed pig farming countries in the Western countries, identifying their advanced technology and management, and then making recommendations for the improvement of Chinese small household pig farms in terms of vertical collaboration in China. Chapter 5 identifies the key success factors for household farmers with the strategic models including PESTEL, SWOT analysis, and Treacy & Wiersema Value-Discipline, and concludes the findings in the end. This is the chapter for the last sub-question. The methods of launching this aspect is by concluding the findings of the

previous chapters, and the strategic management tools are applied to evaluate the strategies that can help the small specialized household pig farmers gain competiveness in China. Chapter 6 is the discussion and conclusion of the essay, which is the final part of the study. This chapter covers the review of the research questions and the answers to the research questions. It summarizes the main points and results of the article.

2 Impact of international and domestic pig farming development on Chinese specialized household pig farmers

2.1 Introduction

As introduced in Chapter 1, pork meat is the primary animal protein resource for Chinese citizens. Although the dominance of pork consumption is being challenged by other meat like poultry, mutton and aquatic products though, the share of pork consumption is decreasing from 90% in the 1980s to 65% in 1998 (Han, 2009). With the rapid economic development, the consumption of fresh pork and proceeded pork products is rising significantly. Thus, pork consumption is important for Chinese people in terms of living standard improvement. As for specialised household pig farming in China, it has been growing rapidly during these years. Cheng et al. (2011) stated that the number of household swine farms increased by 204% from 2002 to 2006. Due to significant increase on pork consumption from domestic market, remarkable number of backyard pig farmers changed their focus from crop farming to pig farming. In the past, the aim of pig farming used to be using fertilizer produced from backyard hog farming on crop cultivation. Within the past few decades, the pig farmers have changed their pig farming operation for gaining capital by increasing grain feed utility, improve feed efficiency and shorten the time for reaching slaughtering weight. So as to identify the problems and shortage of the Chinese household pig farming, it is necessary to compare the Chinese pig farming industry with other advanced pig farming countries. This chapter will initially study modern and advanced pig farming industry in Western countries and current development in domestic pig farming industry, then identify their impact on specialized household pig farming in China.

2.2 Global pig farming developments

According to the statement of Trienekens et al. (2009), people in Western countries are more and more concerned about food quality and safety in agri-food supply chains. For the pork product, consumers are demanding leaner and environmental friendly meat. Hence, consumers are developing more critical attitude towards the food they buy and consequently demand more information for the food chain. In other words, food chain is becoming increasingly transparent to the consumers. The authors also argued the benefits of chain management including uncertainty and risk mitigation, time saving, costs saving, effectiveness increase, value adding, and quality improvement. All the benefits mentioned above originated from the exchange and measurement of quality information among the chain participants. Hoste (2010) stated five opinions on the prospects for pig farming in Europe with stress on challenges and opportunities. Firstly, he pointed out that pork

production efficiency has risen to keep feeding the consumers. The rising pork production efficiency is resulted from modern technology development on pig farming, which can help to improve yield per hog. Consequently, fewer pigs can be raised to reach the same pork production quantity as today. Thus, feeding efficiency is also expected to be raised in reducing feed consumption. For instance, the feed conversion ratio that measures how many kilos of feed produces 1 kilo of pork. In the Netherlands, the ratio can be from 2.65~2.9:1, compared with 3.5~3.8:1 in China (Monnikhof & Kranenberg, 2000). Moreover, he argues that better horizontal and vertical collaboration among participants along the chain is needed so that potential of savings can be fully utilized. This will be approached through thinking of efficiency improvement and good management skills. Thirdly, Hoste states that the production costs in different farms vary significantly. He applies the indicators of average production costs per slaughter weight to individual farm's performance. This parameters can be applied by the Chinese household pig farmers evaluate their operation. Fourthly, Hoste indicates the industry needs to take consumers' wishes into consideration, i.e. convenience, quality, safety etc. Last but not least, Hoste concludes that the triad "People, Planet and profit" is necessary for the sustainability and development of pig farming sector, in addition, pigs (animal) warfare is also critical for the further growth of pork industry. In an attempt to clearly show the prospects of pig farming developments in the EU, table 2.1 is created as below.

Table 2.1 Prospects of pig farming development in the EU

1	Modern technology development leads to rising pork production efficiency
2	Increasing feeding efficiency results in less feed consumption and less cost on feed
3	Indicators is used for evaluate average production costs per slaughter weight
4	Fulfill consumers' demand i.e. convenience, quality, safety
5	People, Planet, and Profit are import for the development of pig farming industry

2.3 Pig farming development in China

2.3.1 Introduction of Chinese pig farming industry

(Han, 2009) described that China has the biggest pork production and consumption in the world. On the one hand, pig farming industry in China is developing rapidly with regard to the production efficiency, on the other hand, it is also changing rapidly in respect of pig farming types. This part of the study is investigating the current situation in Chinese pig farming

industry from pig breeding, pig fattening, pig slaughtering to fresh pork and pork product consumption along the chain. Moreover, due to increasing pork consumption, pork import is also introduced at the end.

2.3.2 Analysis on Chinese pig farming industry

So as to analyze the current development of Chinese pig farming industry. It is useful to compare the situation in China and developed countries, like the Netherlands. A report written by Monnikhof and Kranenberg (2000) is studied to describe the Chinese pig farming sector in respects of productivity, hygiene and processing. Thus, the report investigated the gap between Chinese and Dutch pork chain from different perspectives including: pig farming productivity, pig breeding, pig fattening, pig slaughtering, level and trend of pork consumption, pork distribution channels and pork import. The difference is discussed in the following paragraphs.

a. Pig farming Productivity in China

Dutch pig farming productivity is chosen to identify the pig farming productivity in China. (Monnikhof & Kranenberg, 2000) compared pig farming productivity between China and Netherlands from four perspectives, weaning days, lean meat yield, feed conversion ratio and carcass weight.

Table 2.2 Pig farming productivity difference in China and the Netherlands

Productivity	China	The Netherlands
Days of weaning (days)	35	21
Lean meat yield	46%	55%
Feed conversion ratio	3.5~3.8:1	2.65~2.9:1
Carcass weight (Kilo)	76	87

The table above shows considerable difference in pig farming productivity between these two countries. Days of weaning is 14 days longer in China than that in the Netherlands, while, lean meat yield is nine percent lower in China than that in the Netherland. Feed conversion ratio that is a measure of converting feed mass into increased body mass. It differs incredibly between these two countries. In china, the value is 3.5~3.8:1, while in the Netherlands, the rate is lower to 2.65~2.9:1. Last but not least, carcass weight in China is also lower by 11 kilo compare with that in the Netherlands. Thus, Neo and Chen (2009) also pointed out that the Chinese pig farming industry is relatively underdeveloped compared with other Western developed countries in terms of carcass weight, feed conversion ratio and lean meat yield. In conclusion, this studies states that pig farming productivity in the Netherlands is higher than that in China.

b. Pig Breeding in China

Monnikhof and Kranenberg (2000) stated that China has the most swine breeds in the world, with more than 60 local swine breeds that rise mostly in rural areas. McOrist et al. (2011) pointed out that the main breed groups in China include Taihu valley breeds, the leaner meat breeds, two ends black hog breeds, smaller hill pig breeds and local fatty hog breeds. After 1900, leaner European breeds were imported from British, Russian and German colonies. The pig breeding improvement program was carried out the whole 20 century. Taihu valley breeds have been playing an important role due to its high productivity, placid and fertility. In order to comply with the consumer preference, the pork chain actors have been carrying out more lean meat production with shorter grow-up period and a higher feed conversion rate, China also imported quality breeds from other countries including England, Denmark, Canada etc. The main breeds imported are Yorkshire, Duroc and Landrace. Thus, so as to improve pig breeding from the authority perspective, McOrist et al. (2011)introduced that the Chinese government is focusing on supporting pig breeding by provide various support including insurance, financial allowance and subsidies for farm breeders and pig breeding programs, exemptions for farm taxation, free CSF and killed PRRS injections.

***Figure 2.1** Rural pork sellers in Jiangxi Province selling fresh cuts of native fatty pork*

c. Structure of pig fattening

(Han, 2009; Monnikhof & Kranenberg, 2000) classified three types of pig farms in China, backyard, specialized and commercial. In general, lean pork is mainly produced in the large commercial pig farms, while backyard pig farms produce much fatter pork. (Neo & Chen, 2009) identified that small backyard and specialized household pig farms that raise less than 100 pigs a year still accounts of 70% of total pork production by 2005 in China. Yet, since the modernization of pig production in China is developing dramatically in respects of advanced breeding, more compound feed usage and veterinary services improvement, the authors illustrated the trend of the pig farming industry would be that the share of backyard pig farming is decreasing significantly while the specialized and commercial farms are gaining increasingly market share. Based on the interview conducted by Jian in his research (2010), there are five main socioeconomic obstacles that harm the backyard pig farming in rural areas of China: lack of labor, low return on investment, veterinary services shortages, lack of government support and pig manure disuse. These factors bring the decline of pork

production of backyard pig farmers. Above all, combined with the findings of the authors above, it can be concluded that the shift of the pork production trend is driven by several factors, which include the government support, quality and safety improvement, preference and favor of urban citizens on lean pork stimulates the development of commercial farming which request large investment and modern technology.

d. Pig Slaughtering

Zhou et al. (2012) pointed out that the slaughtering technology has improved significantly in swine industry in China. The traditional model was "one knife to kill pig, one cauldron to remove hair and one market to sell meat", which was developed to "large-scale rearing, mechanization slaughter, fine cut, chilled-chain delivery and chained sell. The large scale pork processors are adapting their slaughtering procedure by using modern technologies like stunning, scalding, vacuumed blood collection, fast cooling, grading system and chilled logistics under traceability and HACCP system". Han (2009) and Zhou et al. (2012) (Han, 2009; Zhou et al., 2012) described that pig slaughtering operations can be put into 3 categories based on their marketing targets. The first group includes individual butchers and town/county owned slaughterhouses, non-grading fresh pork is offered on wet market in rural areas. The second group comprise medium scale slaughterhouses that service middle-class market. Part of the output is sold on the wet market as well. The third group offers carcass with premium quality on the market, the rest are sold to middle class customers and customers on wet market. The Chinese slaughterhouses vary by size, location, source of hogs, market segment and ownership. For size, slaughtering firms can be classified into 3 groups: small scale, medium scale and large scale. In terms of ownership, the previous dominant state-owned slaughterhouses are forced to restructure into a variety of ownership structure (Han, 2009). Thus, Monnikhof and Kranenberg (2000) stated that pig in China can be delivered to slaughtering houses through a few channels. For backyard pig farms, pigs are sold to individual butchers or slaughterhouses. Pigs raised by household specialized farms in some areas are slaughtered in the commercial farms after delivery. Normally there are supply contracts between the two. Because of the large number of individual butchers with their dominance of their capacity especially in rural areas, machinery slaughtering and cold storage of the large scale pork processors are normally below production capacity.

Table 2.3 pig slaughtering operations and its marketing target

Pig slaughtering operations		**Marketing Target**
Category 1	Local butchers and town owned slaughterhouse	Non-grading fresh pork on wet market
Category 2	Medium scale slaughterhouse	Both middle class market and wet market
Category 3	Large scale slaughterhouse	Market for premium quality carcass. Rest of product for middle class and wet market

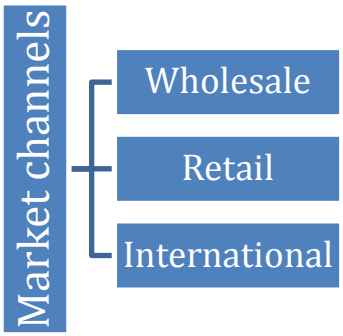
e. The level and trend of pork consumption

Zhou et al. (2012) argued that the annual consumption of meat per capita was '36.7 kg of pork, 12.0 kg of poultry, 4.8 kg of beef and 3.0 kg of mutton in 2009'. The development policy for fresh meat in China was "stable development of the swine industry, active development of the poultry industry and fast development of the cattle and sheep industry'. The goal of the policy is to make the balance for varies meat consumption in China. (Han, 2009) stated that pork consumption has three features. The first one is that pork consumption is positively related to income increase. People with more income consume more pork than those with less income. The second is that the areas with large pork consumption quantity are also the main pork production ones. The third feature is that the gap of pork consumption between cities and rural areas is becoming smaller. The per capita pork consumption in rural areas is less than the national average figure due to lower purchasing power. The consumers in rural areas prefer fresh meat due to the lack of cold storage and fatter pork because of low prices, while the urban residents are demanding high quality and safe pork like lean meat. Monnikhof and Kranenberg (2000) also argued that the Chinese pork processing sector is developing. Fresh pork meat is the main product in retailing and cooked pork accounts for only little market share. There are three types of raw meats in the market including fresh, frozen and chilled pork. Among which fresh meat is most popular, they are sold in wet markets and supermarkets. Thus, chilled meat is capturing increasingly market share. Nevertheless, the cooked pork product is growing credibly because of product diversification and technology development. Sausage product is the most popular product among cooked pork sector, meanwhile, it also faces the most intensive competition. Wang and Xiao (2007) argued that the live pigs farming are at the new stage of growth that complies with market-oriented approach. In other words, they must meet the consumers' increasing requirement on product quality and safety.

f. Pork distribution channels

(Liu & Sun, 2010) pointed out that trend of fresh meat distribution has shifted from ambient fresh meat to froze meat and then to chilled fresh meat delivery. In rural areas, ambient fresh meat are most popular to be sold on the local market and fairs. Based on the customers' requirement, the meat are cut from the whole carcass which may stay in open air for hours. Yet, in big cities, chilled fresh meat accounts for 30% of the total pork sales which is much higher than 10% in the medium cities. (Han, 2009) stated that more than 600 million head of hogs were slaughtered in 2006 in China, most of them are for domestic market, 1% of the total output are for export. Current pork market in China comprises three major parties, which include wholesale market, retail market and international market. Among these three markets, retail market consists of super market and wet market. According to the author's findings, most of the meat is delivered to the wet market within local distribution channels. However, since the pork meat sold in supermarket generally has better quality than that sold in wet market, experts expect that the market share of pork sold through retailing market will rise 15% to 40% in the next decade (Zhou, 2006). Figure 2.4 is created to show the three types of pork markets in China.

Figure 2.2 Three market channels for pork distribution in China



g. Impact of pork import on the Chinese market

In the beginning of the 21st century, pork was not an important trading product for the livestock industry in China (Monnikhof & Kranenberg, 2000). The lower pork prices in domestic market defended its market share against imported pork products, although, the imported tariff was reduced because of the accession to the WTO. Yet, Zhou et al. (2012) stated that the import of pork was not stable because of the price fluctuation in the last decade. Pork import increased suddenly due to price rise in the second half of 2007. In 2008, China imported 373 thousand tons of fresh pork that accounts for little of total domestic pork consumption but 3.4% increase compared with 2007. Yet, in 2009, due to the pork price decrease, the imported pork quantity dropped by 63.8% than that of previous year. In conclusion, the figures above suggest that the import of fresh pork meat was largely depending on the price of the domestic fresh pork prices.

2.4 Conclusion of chapter 2: Impact of international and domestic pig farming development on specialized household pig farming in China

After conducting literature review, it is concluded that with urbanization and production efficiency, the pork production dominance in China has shifted from backyards farms to specialized household and huge commercial farms. This is especially the case in the urban areas around the metropolitan cities with high population dense like Beijing, Shanghai and Guangzhou. The Chinese household pig farming will be further developed, even though there are some disadvantages compared with the big commercial pig farmers with regard to pig breeding, management, facilities, investment, international competition. pork production efficiency has risen to keep feeding the consumers. Thus, (Hoste, 2010) concluded that production efficiency, feeding efficiency, chain integration, production cost saving and customer intimacy are opportunities for future development in the Western pig farming industry. These opportunities can also influence the pig farming sector in China, in other

words, they can also be the benchmark for the Chinese pig farming industry, because of the considerable gap in terms of pork production between the Chinese and Western pig farming. This study will recommend the Chinese household pig farming to catch up with the advanced operation and management level in the developed countries when it is applicable. Meanwhile, its own situation in China must be considered. For instance, production efficiency can be improved by importing high productive piglet, however, the cost is not acceptable for a single household pig farmer. But he can use other methods like raising domestic high productive piglets for substitution. And for the lean pork, although the trend is that increasing number of consumers would prefer lean meat for the sake of health consideration, people living in rural area have been used to consuming pork with more fat, this is also the issue for the household pig farmers to put into consideration.

The domestic pig farming development in China is affecting specialized household pig farmers obviously. As introduced in the beginning of this chapter, the household pig farming has been growing significantly due to the rapid economic development in China. However, they must be conscious for the fierce competition inside and outside of this business sector. With the decrease of small backyard pig farming, the number of household pig farmers is growing accordingly. They will not only compete with the other household farmers but also face the greater challenge from the giant commercial pig farming firms, who are gaining support, who are gaining support from the local government such as tax reduction and financial allowance. Moreover, as stated by Han (2009), the pork meat consumers are also consuming more and more other ruminant meat like goat, beef, mutton and poultry. Although, the total consumption of pork is increasing, the share of pork in the whole meat consumption is actually decreasing in 2000-2009. There are also some disadvantages of the Chinese pig farming that challenge the development of the household pig farming in China. Their disadvantages include pig farming productivity, pig breeding, pig fattening, pig slaughtering and consumer preference. Household pig farmers need to adjust themselves to operate more efficiently so that they can cope with the market.

3 How does cooperatives system influence the specialized household hog farmers in China

3.1 Introduction of cooperatives in pork chain

This chapter will initially introduce the cooperatives development in pork value chain in different countries. Five basic functions for the cooperative activities are introduced at the beginning. And then it describes how the cooperatives are operated in five Western pig farming countries including the UK, France, Denmark and the Netherlands. At the end, it concludes what can be learned by the Chinese pig household farmers and makes suggestions on how the advanced cooperative system can be applied in the Chinese household pig farming industry .

(Schrader & Boehlje, 2006) described that cooperative activities can be conducted by all the members along the swine sector. The authors defined five basic functions for the cooperative activities. The first one is ' Producing parent stock with known genetics for feeder pig production (the Multiplier stage)', the second function is 'Producing high quality feeder pigs for finishing farms. This activity usually includes the stages identified as farrowing and nursery earlier in the paper. The products are single source, disease free pigs.' The third one is ' Coordinate, sort, and sell fattened hogs for finisher farms.' The fourth one is to 'provide slaughter and perhaps processing services. This can extend to wholesaling of branded consumer products.' And the last function defines 'Cooperative hog production operated as a means to market feed grain produced on grain farms. This recent phenomenon usually includes a combination of 1-3 above.' The authors stated that these cooperative systems can cover one or combination of the above mentioned functions. The relationship between pig farmers and cooperatives can differ significantly due to the decision making scope of the farmers. Nevertheless, for some countries like Denmark, the farmers make use of all the functions of the cooperative system in their swine sector.

3.2 Cooperatives system application world wide

To analyse how the cooperatives work in the swine sector world widely, this study introduces the development of cooperatives system in several EU countries including UK, France, Denmark, and the Netherlands. These countries are selected because they can represent the current development of cooperatives in the pig farming sector in the Western countries.

UK

Schrader & Boehlje (2006) elaborated that cooperatives has limited influence in the British pork sector, with regard to either feed and other input supply or marketing actives coordination from farmers to customers. The main function of cooperative is to help pig farmers to make group marketing for their products and improve their quality control, delivery and logistics management system. This allows fluent information flow from retailer

up to processors and to farmers and vice versa. The cooperative activity, traceability of the product information and own logistics system bring the strategic advantage to the cooperatives and individual farmers in terms of better control on the quality and safety of the product. In the past, cooperatives tried to vertically integrate with the upstream of slaughtering and downstream of processing, but failed. (Schrader & Boehlje, 2006) expected that the integration will be getting slowly in the UK. Because of the strong market power of processors and retailers, it will be more possible for them to conducted the vertical collaboration instead of cooperatives and feed suppliers.

France

Schrader & Boehlje (2006)stated that pork industry is developing rapidly in France in the last decades. It is not popular for branded pork products. The pork farming and slaughtering are dominated by cooperatives in France, while processing and retailing are controlled by private firms. The pork production is operated by 14000 pig farms. Most of the farms are members of cooperatives. It is estimated that 130 cooperatives market more than 85 percent of the total pork product. Unlike the UK, the French cooperatives also have about half slaughter capacity in the country. However, the excess slaughter capacity in the plants reduces the profit margin of the sector. Cooperatives have not moved down the value chain to processing, which is mostly operated by small firms. The cooperative system was stimulated by the French government to boost the pork production in 1960s. The support for cooperative members included price assurance, free advice for technical issues, low interest rate loans for modernization and expansion. Thus, the author indicates that competitiveness pressure and power of processors and retailers will limit the possibility for the cooperative to vertical integrate the pork value chain.

Denmark

Schrader & Boehlje (2006) introduced that Danish pork production is very dynamic with 75% of pork production for overseas market. There are only 4 pig farming cooperatives that slaughter over 96 percent of the total hogs raised in Denmark. The cooperative system is market driven. These four cooperatives established a trading company called ESS Food that market their products efficiently on the world market. The cooperatives are made of swine producers and all the members committed to market their hogs production through their cooperatives annually. The hog farmers notify the cooperative before April 1st if they will market their production for that year which starts in October. Swine producers have the right to choose the breeding stocks that are suggested by the cooperatives 'quality committee. Almost all the breeding stock are Danish genetics. More than half of the feed are supplied by cooperatives and independent suppliers purchase the rest. Thus, swine producers can receive advice on breeding and feeding from the advisory system that belongs to Danish Farmers Union. In respects of payment for pig production, it is based on the carcass weight and lean percentage of the carcass. The prices for hogs are paid to the hog producers at the same level by these four cooperatives. In additional, the cooperatives set the pork price for the coming week under the world market pork prices. Nevertheless, cooperatives pay different refund

and bonus to the producers at the end of each year. Thus, specials pigs for particular market are normally paid higher because of production cost. In conclusion, the pork sector is very integrated in Denmark. Producers inform their cooperative the number of hogs to be slaughter in the next week, which helps to assure a steady and planned production in pork production. Advice for breeding and feeding tighter with price settlement structure can help the swine producer to efficiently mitigate the market risks, this system will keep the swine production industry in Denmark competitive and improve the performance in the changing market.

The Netherlands

Bijman et al. (2012) pointed out that cooperatives are very active in the Dutch swine sector, especially in pig breeding and compound feed production. The feed cooperatives offered discounted prices to the farmers and accepted delay payment from them while the cost price increased in 2008. The pig slaughtering are controlled by investing firms. VION is the largest slaughterhouse that owned by ZLTO that is pig farmers' cooperatives. Since the members have no influence on the company's strategies, VION is not a typical cooperatives as those in other countries. Yet, Rabobank is a cooperative bank that allows big swine producers to issue bonds to the market, which brings them the chance to gain a large amount capital investment for development.

Schrader & Boehlje (2006) illustrated the Dutch pig farming has the same structural change as in Denmark and other EU countries, the number of hog farms and slaughterhouses are decreasing while the average number of hogs per farm and the slaughter capacity are increasing in the Dutch pig farming industry. Regulation and coordination are offered by the government organization of Product Board for Livestock and Meat that can improve the performance of the industry. Integrated Quality Control (IKB) was established for tractability of the production from retailing to hog production. Practices including Feedings Medication and others during all stages must be documented and maintained with monitoring throughout. The goal of the system is to react the increasing concern of consumers in terms of health and animal welfare.

3.3 Conclusion on chapter 3

As introduced in the EU pork value chain, each cooperative has its own function in the sector. In the UK, the cooperative bring the strategic advantage to the cooperative and farmers in terms of better controlling the quality of the product. In France, cooperative generally have several advantages including price assurance, free advice for technical issues, low interest rate loans for modernization and expansion. In Denmark, the market driven cooperatives help the swine producer to efficiently mitigate the market risks, this system will keep the swine production industry in Denmark competitive and improve the performance in the changing market. In the Netherlands, Integrated Quality Control (IKB) carries out traceability function on the pork products from retailing back to hog farming. Practices including feedings, veterinary and other related activities during all stages must be documented and maintained

with monitoring throughout. The goal of the system is to react the increasing concern of consumers in terms of health and animal welfare. Table 3.1 is created to show the characteristics of pig farming cooperatives in selected EU countries.

Table 3.1 Characteristics of pig farming cooperatives in five EU countries

Country	Characteristics of cooperatives for pig farming
UK	• Group marketing for pork products • Quality control and logistics management improvement • Limited vertical collaboration
France	• Price assurance • Technical advice and support • Low interest Loans for modernization • Limited vertical collaboration
Denmark	• Group marketing products • Breeding and feeding support • Efficient pricing structure
The Netherlands	• Pig breeding and feeding support • Traceability established by Integrated Quality Control (IKB) • Limited vertical collaboration

From the study of the characteristics in the five EU countries, it is possible for the Chinese household pig farmers to make use of the advanced methodology in order to improve their working efficiency and increase their income. First of all, group marketing products can be a good option for the pig farmers to initialize so as to market their products. Secondly, government support including price assurance, technical support, low interest loans is very important for the development of cooperatives. Thirdly, breeding and feeding support from cooperatives can also be applied in order to have the standard production. Last but not least, traceability system can also be implemented as an efficient way to control and monitor the quality of pig products.

4 Vertical collaboration in the United States and EU Pork Industry

4.1 Introduction of vertical collaboration

This chapter defines two aspects for the vertical collaboration in both Western and Chinese pork industry, which include contracting implementation and information system integration. It will initially identify the development and advantage of Western pork chain including the U.S. and representative EU countries including UK, Germany, the Netherlands, and Spain. And then make the comparison with the Chinese pork chain. After that, it suggests if the advantages can be applied to the specialised household pig farmers to improve their operation. In terms of the contracting, the reason why the American pig farming industry is chosen to study is because contracting has been playing an important role in the industry historically, which bring the American pig farmers the knowledge of "know-how" in their operation. Another advantage is that both countries share some similarities. Both U.S. and China are great country in territory, which can be comparable in terms of supply chain and logistics services. Above all, the advanced contracting and vertical coordination method of American farmers can be applied by household farmers as benchmark to manage and develop their own business in China. After analysing the American contracting system, it is also worth to identify the vertical collaboration in the EU countries with well-developed pig farming industry. Information system is part of vertical collaboration to help monitor the quality and safety of pork in the industry. It is possible for the Chinese household farmers to learn their advanced mechanism and management when it is comparable.

4.2 Contracting definition

Harper (2009) stated that the hog marketing contracts are agreements between a hog producer and a hog buyer on providing a certain quantity and quality of hogs at a pre-determined price. Hog production contact is specially dealing with hog production management. In these contracts, integrators or contractors normally provide breeding pigs, feed, technical and financial support to pig farmers. The pig farmers take the responsibility of raising hogs at their farms until they are ready to be further processed. According to the author's findings on production contracts, most of them mention contract length, renewal and termination conditions, the responsibility and liability with regard to inputs, equipment and services during the contracting period. Harper pointed out that the most used production contract is raising piglets to market weight, which is around 250 pounds. Payment terms for farrow-to-weaned pig contract are based on price for every qualified pig produced plus incentives for each pig produced above a pre-determined level of pigs produced per sow.

(Reimer, 2006) stated that few large hog producers including Seaboard, Premium Standard Farms and Smithfield Foods account for an increasing amount of pork productions. These giant pork producers are normally called integrators or contractors. They contract and outsource their hog productions to individual and independent hog growers. However, some

of their production are finished in their own farms with hired management, which is called full integration. In general, around 44% of marketed hogs by top pork producers are from their own facilities. According to study of Kliebenstein and Lawrence (1995), contracting is implemented to improve the coordination within the pork supply chain. There are a number of contract types that cover production, supply and marketing perspectives. The goal of contracting is to gain competitiveness over the non-coordinated position. (King, 1992) stated that a critical issue in contracting is creating incentive structures to improve the performance for the participants in the system. (Barry, Sonka, & Lajili, 1992) pointed out that principal-agent relationships are formed in coordinated industries. The relationships can have effect on economic performance of the participants. For example, a pig grower who can be the agent is expected to operate according to the requirement of pig owner and packer who can be the principal. Long term contracts between producers and packers are new and the content of the contracts are also different among packers. (Kliebenstein & Lawrence, 1995) pionted out that two types of risk-sharing contracts are offered by the packers in American Midwest. One is cost-plus and the other is price-window. The length is normally five to ten years. Cost-plus is the total price received by the hog farmers based on the cost of hog production via production budget and feed prices plus a certain amount of profit margin. The price-window ties with a price range of upper and lower price boundaries, which are also called a window. When the price is within the boundaries, the hog farmer will have the market price. When the prices exceeded the boundaries, both the hog farmer and packer will share the risk. However, according to the Kliebenstein & Lawrence's findings (1995), the long term contracts are less favored due to the increasing price volatility.

4.3 Contracting and vertical collaboration development in U.S. pork chain

(Kliebenstein & Lawrence, 1995) concluded that coordination activities in the pork industry are developing rapidly in the U.S., which helps accelerate concentration of the pork chain. The coordination starts from the asset ownership to less formal arrangements between 2 or more independent actors along the chain. The coordination can help the individual participant improve their competition position and enhance long term success possibilities. Additionally, the authors have argued that access to information and genetics are key success factors for future success. They raised an example of over 20% growth rate in North Carolina over the past five years, which came mainly from deeply coordinated, large size producers with contract production. Since the risk level can be significant different among contracts, all actors along the pork chain must measure the risks and calculate the expected return cautiously. In conclusion, they stated that the contracts reduce both risks and expected returns over sole proprietorship alternative (Kliebenstein & Lawrence, 1995).

Another article written by Reimer (2006) is about analyzing vertical collaboration in the pork chain in the United States. The article explains the reasons why the integration in U.S. pork farming industry is further developed relative to independently operated contract farmers. In other words, the hired management (integration) is having more prosperous future compare

with contract growers (contracting). Because the production and supply contract has some drawbacks that cannot transfer sufficient control on the production from the farmers to the intermediaries. Integration brings the results of high cost on the company production while removes the farmer incentives. According to the statement of Reimer (2006), the independently owned and operated pig farms with contracting production are likely to be superseded by the fully integrated firms. Reimer examined two types of business model including a large pork processor that contracts out hog production to independent hog farmers (contracting), versus use hired management to produce in own facilities (integration). According to the author's findings (2006), the essential reason underlying the trend to integration versus contract is incompleteness of the production and supply contract. The study shows that integration can help reduce the large pork producers' increasing burden with the growth of environmental liability, value added products and traceability system by reducing the delay in implementing new genetic traits, like writing complicated contracts for handling animal waste management.

4.4 The vertical collaboration of market channel for British pork chain

The pig farmers and processors in the UK are uneasy with the power of big retailers because large supermarkets can be difficult customers for them and unwilling to enter into supply contracts. However, large retailers are increasingly to reach "preferred supplier status" with processors, to be more close to them and commit to a more lasting partnership. In recent years, the integration of pork chain has developed steadily. The partnership between breeders, feed processors, pig farms, abattoirs and supermarkets is extending slowly. In the UK, top 5 supermarkets account for over 70 percent of retail consumer expenditure on food. As shown in the graph below, multiple retailers (supermarkets for example) buy directly from category manager of super-middleman (pork processors) by using centralized procurement system and have them delivered to the central warehouse, from where the meat are distributed to individual retail stores. Therefore, the role of the meat wholesalers and distributors has been diminished in importance (Kliebenstein & Lawrence, 1995).

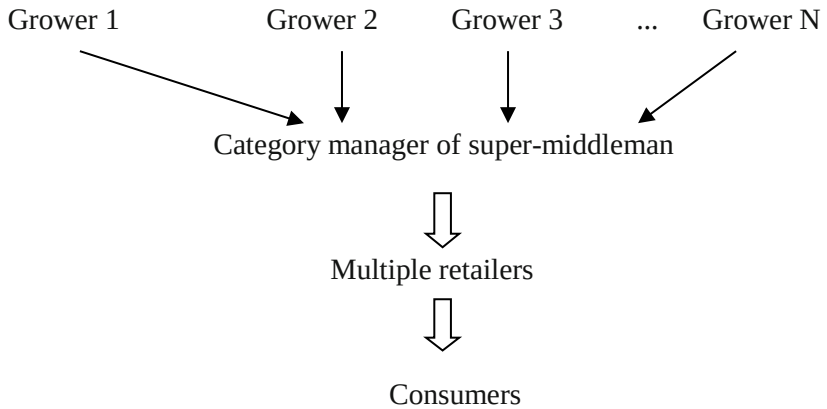


Figure 4.1

4.5 Information systems application in the EU pork chain

Since this chapter is illustrating the concept of vertical collaboration along the pork chain, information system should be introduced as part of the integration. (Wigand, 2003) defined that information system is dealing 'conceptualisation, development, introduction, maintenance and utilisation of systems for computer-assisted information processing within companies and enterprise-wide networks'. (Trienekens et al., 2009) have introduced how information systems are launched in the EU pork chain, they stated that the information infrastructure is becoming increasingly important for the quality and safety of pork products. Thus, the development is also due to the fact that it is legally requested by the authorities(Schiefer, 2006).In their book, (Trienekens et al., 2009) have also given an overview of the information systems in different pork chains in Europe including the Netherlands, Germany, Greece, Spain and Hungary. This study will focus on the countries including Germany, the Netherlands, and Spain. That is because Germany is one of the biggest pork producers on the EU market, and the Netherlands is an important pork exporter among the EU countries, while Spain is famous for its new and regional product development (Trienekens et al., 2009).

Germany

According to their findings on the German pork chain, there are mainly two types of pork chains. The first one is launched by pig farmer cooperatives with their own slaughterhouses and processing facilities. The product quality and safety system has to be met according to requirement, in other words, all actors are obliged to meet the joint quality requirement by contracting. While the second type of chain is applied by independent enterprises of pig producers, slaughterhouses and pork product processors, the pig producers are also under the cooperatives frame though. At the stage of production, the chain meets the requirement of the brand owners. Both chains apply QS-membership that is German quality assurance system.

The Netherlands

Trienekens et al. (2009) stated that information system is widely applied by the chain members in the Netherlands. Among these chain actors, the more powerful ones like feed processors and large slaughterhouse make use of more advanced and automated IT system for daily operation than those smaller actors like individual pig farmers. The authors introduced that the Dutch fresh pork chain is of direct transaction relation among the actors that is also named 'link-to-link'. Upstream information flow contains mainly planning and demand information, while downstream information flow contains product information and

traceability requirement. Although this information structure seems suitable for the decentralised form of Dutch fresh pork chain, it has some shortages like loss of information among the actors and bottlenecks in the upstream and downstream information flow. Especially the slaughterhouses are having problems about meat and feed traceability, which is common in pig farming industry world widely. Traceability can only be conducted for batches from several pig farms. It is hard for slaughterhouses to trace back the original farm, which leads to excessive recalls. Thus, slaughterhouses fail to interpret retailer requirement up in the chain due to lack of consumer requirement insight.

Spain

Trienekens et al. (2009) pointed out that both pig breeders and feed producers make use of an automated information system, which contains product and process information. It starts from inspecting the samples of raw materials in every lorry. Compare them to the product information given by the suppliers. The information system contains all the information of raw materials, place of origin, protein, fiber and fat content, production date and batch number. Like other well-developed pig farming industries in Europe i.e. the Netherlands, the Spanish pig farms apply automatic feeding systems to manage feed quantity intake of the animals coping with its growth stage. Pig farmers can use the software to identify batch of pigs and when and from which sow the piglets are born from. In terms of slaughterhouses, they use microbiological analyses to certify the meat quality and safety. The data that include traceability information can be applied to each batch of pigs. Automatic probe measures the quality of meat like percentage of lean meat and classify the carcass into six categories. In respects of retailing sector, large retailers normally use radiofrequency on electronic product labels to monitor safety and quality of pork meat. The pig farms and slaughterhouses exchange information related to carcass categories, weight and traceability information when the batches of animals are delivered to the slaughterhouse. In addition, delivery document must show the slaughterhouse lot, number of carcass delivered, and sanitary register number of the slaughterhouse.

4.6 Conclusion on chapter 4

In an attempt to clearly show the vertical collaboration in US and EU pork chain, table 4.2 is created as below.

Table 4.2 An overview for vertical collaboration in US and EU pork chain

Country	Vertical collaboration in US and EU pork chain
US	• Contracting is popular between packers and pork producers • Integration is more prosperous in the future
UK	• Vertical collaboration runs slowly • Supermarket has most power by central warehousing
Germany	• A number of small cooperatives • German QS-Membership system along the pork value chain
The Netherlands	• Large concentration of slaughtering • Link to link IT system with direct transaction relation among the chain actors • Quality control and traceability system (IKB)
Spain	• Specific and regional product development • Automated information system include automatic feeding, probe quality measurement and traceability system

As launched in the U.S., contracts of production, supply and marketing perspectives can be very helpful for the household farmers to gain competitiveness along the chain. It can help the pig farmers to manage their price risk by implementing long term contracts including cost plus and price window. In terms of IT system application, it is growing rapidly along the pork chain in the Western countries. It has been playing increasing important role in respects of productivity, quality control, firm profitability and customer preference. (Han, 2009) stated that the integrated IT and Supply Chain Management (SCM) implementation has not shown as much influence on pork quality management in Chinese pork chain as in the Western countries. The findings can be explained by low implementation of IT and SCM in the Chinese pork production chain. In other words, lack of IT professionals for pig farming, the integrated

IT system is very much complicated for low educated farmers. Thus, the cost of ERP system is also too high to be afforded by the household pig farmers. Moreover, development of logistics service is constrained by logistics barriers like underdeveloped road, infrastructure. According to Han (2009), the integration implementation is limited because of 6 barriers including: 'purchasing', 'order and documentation', 'transportation', 'warehousing', 'import/export service', and 'inventory'. Among these barriers, transportation, purchasing, warehousing services, documentation/order processing, and import/export were classified as very critical. In short, inefficient logistics services are caused by lacking of quality transportation infrastructure and communication infrastructure. Thus, the imported pork that are market-oriented can bring more competition on the pork chain. Han (2009) concluded that the implementation of IT system and integration can increasingly improve business performance with regard to better quality control, higher production effectiveness and higher customer satisfaction. Nevertheless, this study concludes that due to limited capital investment capability, it is not possible for the specialized household pig farmers to implement expensive IT systems, like ERP and other commercial integrated IT system. However, with the rapid development of World Wide Web and telecommunication technologies, personal computers and smart phones can be used as information system to transfer data along the chain. They will help the Chinese specialized household pig farmers to exchange information more smoothly along the chain and increase their working efficiency eventually.

5 To identify the key success factors for household pig farmers by evaluating strategic models

This chapter identifies the key success factors for specialized household pig farming in China, taking the advantages in the western developed countries' pork value chain as benchmarks for growth. Three models including PESTEL, SWOT analysis and Treacy & Wiersema's value discipline are applied to identify the key success factors. Among the models, PESTEL analysis is implemented to analyze the impact of dynamic macro environment factors on the household pig farming in China. While SWOT analysis is adopted to identify the competitive advantage and make recommendations for further development, it is conducted to achieve competitive both inside and outside the company. Last but not least, Treacy & Wiersema's value discipline model is used to help the small specialize household pig farmers to position themselves on the market and establish the competitive advantage that customers value for.

5.1 Macro environmental analysis- PESTEL Model

Figure 5.1 PESTEL Analysis

PESTEL ANALYSIS

PESTEL model is designed to analyze different factors that can affect business performance at macro-environmental level. The framework has six aspects: political, economic, social, technological, environmental, and legal. These six aspects can influence business (pork farming) operation and strategy planning.

a. Political

For the political factors, (Xu, 2004) stated that both domestic animal husbandry policy and international trade policy play an important role in the development of Chinese pig farming

industry. After China entered WTO, tariffs on frozen pork carcass, processed pork products and variety meats will be reduced substantially. Meanwhile, food policies will get increasingly strict in the future. Chinese government on the one hand launches policies and regulations to enhance pork quality control, on the other hand, as introduced in chapter2, the government is supporting pig breeding by provide insurance, financial allowance and subsidies for farm breeders and pig breeding programs, free CSF and killed PRRS injections, exemptions for farm taxation. For backyard and specialized household pig farmers in some areas in China, the government support is limited (Jian, 2010).

b. Economic

In terms of economic factors, although the low return on investment and labor shortage can influence the growth of Chinese pig farming industry as argued by Jian (2010). Yet, income of Chinese citizens are increasing as a result of the fast growing economic development. (Xu, 2004) claimed that economic growth accelerates consolidation of Chinese pork production. Pork consumption in China has reached twice the world average level. With the development of economy leads to the average salary increase, the pork consumption will continue to increase. Thus, Chinese consumers are sensitive to food prices, suggesting pork prices can have important role on its demand. As introduced in chapter 2, (Zhou, 2006) argued that an emerging middle class consumers in China are demanding better quality pork. The market share of pork sold through retailing market is expected to rise 15% to 40% in the next decade. This argument is also supported by (Xu, 2004), who stated that the pork sold in the supermarket will gain more and more market share in the future, which is expected to increase 15% to 40% in the next decade..

c. Social

For social factor, the overall population in China is more than 1.3 billion, which include 56 ancient peoples. (Brubaker, 2004) pointed out that there are approximately 20 million Muslim citizens in China. They are living in the Northwest of China, particularly in Ningxia, Gansu, Qinghai, Shaanxi, and Xinjiang provinces. Pork and the flesh of other animals without being ritually slaughtered are prohibited for their diet. However, people who live in the rest of China are consuming more and more pork with their wealth increase. However, as stated in Chapter 2, it is worth to notice that the total quantity of pork is increasing, the share of pork meat in the overall meat consumption is decreasing from 90% in the 1980s to 65% in 1998. This is due to the changes of lifestyle and consciousness for health issue. Consumers are consuming less pork but more and more beef, mutton, and fish etc.

d. Technical

(Xu, 2004) stated that standardization of pork products is becoming more and more important with globalization. Standardized marketing can also reduce cost with regard to production. Chinese traditional pork production has low investment on facility, feed costs and low family labor cost. However the quality of products and production efficiency are also low consequently. The large scale commercial pork producers are catching up with the most

advanced equipment and technology at the developed countries' level. As introduced in the previous chapter, the traceability system in the Netherlands can be an option for the Chinese pig farming industry to consider so that product quality and safety can be well measured and traced. In general, the Chinese pig farming industry needs to upgrade their technologies and equipment since more and more quality pork are being requested by consumers especial those who live in cities. As compared the pig farming industry in the Netherlands and China in chapter 2, pig farming productivity in the Netherlands is much higher than that in China. China is also developing pig breeding by importing quality breeds from western countries.

e. Environmental

For environmental factors, there are environmental protection laws and waste disposal laws that are generally not very strictly obeyed due to lack of capital investment, awareness to the environment protection and weak government monitoring. China is now facing the risk of farmland reduction by urbanization and land degradation by intensive fertilizer, chemicals and pesticides usage. The increasing productivity of swine farms bring pollution to the environment such as manure waste, soil and water contamination and lower air quality (Brubaker, 2004). Thus, veterinary services shortage and manure disuse bring problems to the environment (Jian, 2010). Modern and large scale swine farms are growing rapidly in the provinces with arable land and sufficient feed supply because of logistics cost reduction and feed supply security (Brubaker, 2004). However, Brubaker also argued that the environmental issue appears accordingly is that the modern swine farms are located in the regions with high human population density and insufficient water resources.

f. Legal

The Chinese government has been supporting the development of modern swine farms. In 2007, the Stated Council announced 'Regulation on Implementing the Law of the People's Republic of China on Corporate Income Tax', which reduces the corporate income tax by 8% from 33% to 25% (Cheng et al., 2011). (Pan & Nelson, 2012) argued that the Chinese government is attempting to conduct a market-driven system with control along the pork supply chain. The major policies include subsidy policies, pork price monitoring system and pork reserve system. For subsidy policies, they are provided directly to farmers and slaughterers. These subsidies include tax exemption for pig farming, fertile sow insurance, and VAT exemptions for feed production etc. In terms of pork price monitoring system, the government uses 6 for hog- to- corn price ratio as the break-even point. The ratio resulted from 1 kilo pork price over one kilo corn price. When the ratio is lower than 5 or higher than 9, the government will buy frozen pork for stock or release pork reserve to adapt the market prices. Last but not least, the live hog and frozen pork reserve system was initialized in 2007 because China authorities regard pork as a strategic food. The live hog are rotated every four months in 200 to 300 large scale hog farms, while 200,000 tons of frozen pork are also rotated every four months to assure its quality. Moreover, the pork import are under bilateral agreement between China and the export country, General Administration of Quality

Supervision, Inspection and Quarantine(AQSIQ) must be fulfilled before exporting though. Nevertheless, there is no quota restriction for pork import.

Conclusion on the PESTEL model

The political factor is supporting the Chinese pig farming industry by improving the productivity of pig farming to meet the increasing consumers 'demand, meanwhile, the government is also provide financial support on the tax deduction and cost of production. For the economical factor, the pork consumption is still on the growing stage with the development of Chinese economy. Market share of supermarket retailing is expected to increase in the future due to the better quality standardization and consumers' income increase. For the social factor, it is worth to noticing that the consumption of other meat products like beef, mutton, and fish is increasing more rapidly in China. Moreover, there are 20 million Muslims in China who are prohibited to consume pork. For the technical factor, **t**he traditional pig farming in China has low production efficiency due to limited resources and drawbacks such as technology disadvantage, insufficient capital investment on labor, facility and equipment. In order to cope with the market demand, China has been importing quality breeds to produce more standalized and quality pork. As for the environmental factor, the production of swine farming industry causes environmental pollution such as soil and water contamination, manure waste, and bad air quality. Large scale modern swine farms also confronted with high population density and limited water resource in the farming areas. Last but not least for the legal factor, the Chinese government is supporting the pig farming industry by launching subsidy policies directly to the pig farmers and slaughterers. New regulation have been released to reduce the corporate income tax by 8% from 33% to 25% (Cheng et al., 2011), Thus, the government manages the pig farming industry by using a market-driven system with control on the pork supply chain. It can protect the pig farmers income against severe price volatility.

5.2 SWOT analysis of the household pig farming in China

a. Strength of household pig farming

As stated in the introduction, China is the largest pork production and consumption country in the world. With the development of economy, pork consumption will grow steadily in both rural and urban areas in China. Due to the fact that pork industry is increasingly emphasizing on quality, sanitation, and convenience in China, household pig farmers are coping with market trend in their production (Hu, 2004). In additional, labor and capital investment shortage leads to less development potential of backyard pig farming. This gives the space for specialized household and large scale commercial farms to develop. Currently, specialized household pig farming is developing significantly and obtaining increasing market share by far. Xiao et al. (2012) pointed out that the share of backyard hog production is decreasing significantly from 90% in 1980s to 71% in 2001 due to the structural change in the industry. Apart from the strength mentioned above, Xiao et al. (2012) launched a study about the analysis of the feed conversion coefficients (FCE) during hog production in China. The authors

stated that for the backyard hog producer, the FCE is approximate 2.0 while the specialized household and large commercial hog producers can reach to 2.5. In conclusion, the strengths of specialized household pig farmers generally cover two aspects. One is coping with market and know-how, which include capability to provide the product meet the market requirement of quality, sanitation and convenience. The other is high feed conversion coefficients (FCE) that can bring high production efficiency during pig farming.

b. Weakness of household pig farming

Problems of household pig farming in China can be classified into 4 aspects, the first aspect is low productivity. As introduced in Chapter 2, the Chinese pig farming has lower productivities than the Dutch pork chain for four perspectives including longer weaning days, lower lean meat yield, lower feed conversion ratio and less carcass weight. The second is weak further processing capacity for the household pig farmers. Although large commercial pig farming is developing rapidly these years, the household pig farmers are still underdeveloped in terms of further processing. The third weakness is lack of government control and support. Authorities are mainly supporting large commercial pork processors in order to achieve economy of scale and modernize the pork farming business sector. Limited efforts are put on the household pig farmers in terms of technical support, information sharing and regulation support. The last aspect is short of investment for the pig farming. Compare with the giant commercial pork processors, household pig farmers has much less capital to invest. It is also difficult for the farmers to obtain loans from the banks because of the regulations. Thus, (Cheng et al., 2011) also pointed out that the traditional farms are also facing animal welfare issues including uncontrollable climate conditional change in the pigpen, high stock densities, unbalanced feeding, and less sanitation facilities.

c. Opportunities for household pig farming

As the development trend of Western pork value chain, production efficiency, feeding efficiency, chain integration and collaboration, and production cost saving can be opportunities for future development in the Chinese pig farming industry. Thus, the Safety and Quality control -traceability system can be implemented to assure product quality and safety. Chinese government has been operating food safety project and building traceable system of production, strictly prohibit to add any toxic and harmful substances in the production process (Yao, 2009). In additional, one particular challenge to the pig farmer s in China is lack of a distinctive voice in terms of a national and independent farmer-led socio-economic organization such as a National Pork Producers' Council or a National Farmers' Union (McOrist et al., 2011). Cooperatives can then be formed to manage the market risk for farmers' operations.

d. Threat of pig farming in China

- ***Swine Disease***

Household/backyard farming lacks of bio-security control in pig breeding. Because of low level senator facility and limited advice from the veterinary station during pig farming, the swine disease is possible to spread quickly in all pigpens in the whole area, which can lead to severe losses for the farmer's income(Yao, 2009).

- ***Competition with imported foreign pork in China***

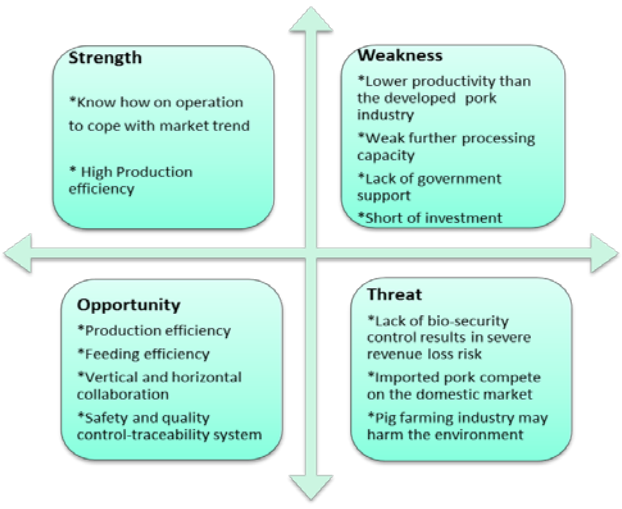
In the first half year of 2008, large quantity of imported cheap pork affected domestic market. Demand in China for pork products derived from lean western breeds has been growing steadily in this century and is predicted to continue to grow at a rate of between 4% and 7% per year. This is due to the steady rise in China's population and the urbanization of much of this population; urban residents regularly eat more meat products, including frozen or processed pork (McOrist et al., 2011).

- ***Environmental protection***

(McOrist et al., 2011) state that In China, waste treatment, materials reproduce for fertilizer and biogas caused by pig farming is not strictly controlled and well developed. However, Hog farmers are facing increasing government monitoring and costs related to slurry disposal and environmental protection issues. Researches illustrate that large swine processing companies currently have neither technical capacities nor incentives to control and reduce the pollution they discharged to the environment. Because of the production quantity, location and company policy loopholes, over 80 percent of large commercial swine processors cannot proceed their pig wastes safely in China (Fu & Li, 2004). Since the commercial pig farmers in china are normally not involved in crop farming, few of them have the incentive to convert pig wastes into fertilizer for the crops field. For example, the study from Wand, Pu and Su stated that 65 large commercial swine processors in Sichuan Province discharge their foul water into rivers directly and few of them of adequate lagoons (L. Wang, Pu, & Su, 2000). Thus, pig production in Guangdong Province account for 90 percent of phosphorus and 42 percent of nitrogen in the Pearl River which flow into the South China Sea (FAO, 2006).

Conclusion on SWOT analysis

Table 5 .2 SWOT analysis on small specialised household pig farmers



The strength of the specialized household pig farming is that the market potential is huge in China. Both household pig farmers and modern pork processors are developing significantly and obtaining increasing market share while the backyard pig farming is decreasing. The specialized pig farmers are coping with the market by providing the products that meet the customer increasing demand such as quality, sanitation and convenience. Thus, compared with backyard pig farming, the high feed conversion coefficients (FCE) reflects the higher production efficiency in the specialize household pig farming in China. In respects of weakness, although the productivity is rather high in comparison with the Chinese backyard pig farmers, the Chinese household pig farming has several drawbacks compare to the developed country like the Netherlands. They include longer weaning days, lower lean meat yield, lower feed conversion ratio and less carcass weight. Meanwhile, weak further processing capacity is also a critical issue for household pig farmers. the household pig farmers are still underdeveloped in terms of further pork processing. The third weakness is lack of government support on technical support and regulation support. The last weakness is short of capital investment for future development. In terms of opportunity for household pig farmers in China, with the development of global economy, the Western modern technology and management on pig farming can be learned and adopted to improve the shortages of the household pig farmer. The Traceability system that are conducted by Chinese government can be implemented to control product safety and quality. Moreover, cooperatives can be formed to group market their products and gain more competitive advantage on the market. Last but not least, threat for household pig farming in china can cover three aspect, one is possible swine disease spreading because the household pig farmers lack of bio-security control in pig breeding, low level senator facility and limited advice from the veterinary station during pig farming. The second aspect is lean western pork import has been growing steadily in China, which brings stiffer competition on the market. The last aspect is the damage to the environment during production. This allies all three types of pig farmers in China. Waste treatment like manure disposal and biogas caused by pig farming is not strictly controlled and managed due to lacking of technical capabilities and incentives to reduce the pollution they discharged to the environment. In conclusion, the household pig farmers can have the prosperous development in the future but the weakness and threats must not be neglected.

5.3 Treacy & Wiersema's Value-Discipline Model

This model was initially published in the article "Customer Intimacy and Other Value Disciplines" in Havard Business Review by Treacy and Wiersma, then it was further expanded in the book " The Discipline of Market Leaders" (Treacy & Wiersema, 1995). This model is a strategic instrument that helps enterprises to position themselves on the market and establish the competitive advantage that customers value for. This model has 3 different value disciplines that the enterprise can concentrate, by which the customers value the company. These three disciplines are:

- Operating Excellence;
- Product Leadership;
- Customer Intimacy;

According to the authors, the three disciplines are illustrated as following,
1: “Operational excellence: superb operations and execution, providing reasonable quality at a very low price by efficiency, streamlining and high volume;”
2.”Product leadership: very strong in innovation and brand marketing, operating in dynamic markets, fast realizing high margins by a short time-to-market;”
3.”Customer intimacy: excel in tailored customer attention and customer service by using lifetime value concepts and CRM.”

The authors argued in order to become a market leader, firms must focus on one discipline because “ company structure, culture, staff, processes, facilities and business models can only bring excellence in one discipline. Based on the concept of Treacy and Wiersma, it is to conduct the main research question, which is to identify how the Chinese households pig farming can gain competitive advantages on the market. As there are three disciplines for them to consider for positioning on the market. With the stiff competition within the sector, It is necessary to make the decision soon enough.

In terms of the operation excellence, it can be difficult for the household swine farmers to achieve. Their operations and execution can be at high level, quality of products can be reasonable, but price will not be very low due to the lack of economy of scale for large production volume. For the product leadership, the households pig farmers are difficult to achieve. Because they lack of strong innovation capability due to limited resources like R&D, yet, branding marketing can be carried out by cooperatives. In additional, fast realizing high profit margins by short time to market could be a big issue for the specialized households company because of same capability for them to shift their production to realize high profit margin. In respects of customer intimacy, it is the most possible discipline for the household pig farmers to develop. As demonstrated in the previous chapters, people who live in rural areas like more fatty meat, which can be used as a source of cooking oil. While in big cities, people prefer leaner meat for the consideration of health. With the rapid economic development In China, the trend for pork consumption is that people will consume more leaner meat. Yet, the local specialized pig farmers have the know-how on their operations, the productivity and feeding efficiency are also rather high. Hence, the local specialized household pig farmers can adapt their production to satisfy the consumers’ requirements.

Conclusion on Treacy & Wiersema’s Value-Discipline Model

The specialized household pig farming is under a rapid development stage with the economy booming in China. While backyard pig farming is diminishing on the market, specialized household pig farmers must seize the chance to compete with the big commercial firms so that their market share can be increased. The Competition will be focused on production cost and efficiency, product quality and safety. The large commercial firms possess advance

equipment and technology, they can easily achieve economy of scale, which leads to lower production cost on average. The standardization on production can also be implemented. However, the household pig farmer can establish cooperatives so that they can also reduce their production cost by having lower feed cost and group marketing their products. Meanwhile, quality control and measurement like the traceability of IKB in the Netherlands can also be applied to assure product quality and safety that consumers are becoming more and more conscious. In conclusion, the competitive advantage of household pig farming can be achieved by three aspects, the first one is reducing cost of production by increasing production efficiency. The second is adding value to the product. As introduced before, the high quality with premium grade pork is sold with higher prices. The household pig farmers have to adjust their production to cope with market opportunity. The last one is that the Chinese household pig farmers can implement efficient quality control and IT system that can only help produce high quality and safety pork products, but also keep track and trace record for the product flow. Moreover, after conducting the marketing strategy model of Treacy and Wiersma, this thesis concluded that customer intimacy can be the most appropriate discipline for specialized household pig farmers to gain competitiveness on the market, especially in rural areas in China.

6 Conclusion and discussion

Chapter 2 conducted the study on research sub-question 1. It analyzed the impact of international and domestic pig farming development on specialized household pig farming in China. Compared with the modern commercial pig farms, the specialized household pig farmers are not competitive on pig breeding, management, investment on labor and facilities. On the one hand, compared with the Western pig farming industries, the Chinese specialized household pig farmers are lack of production efficiency, chain integration and cooperation, production cost saving, and customer intimacy. On the other hand, these factors can also be the benchmarks for the Chinese household pig farmers to develop.

Chapter 3 answered the research sub-question 2. It described the development of horizontal collaboration in the EU counties including UK, France, Denmark, and the Netherlands. The advantages from the developed pig farming cooperatives consist of group marketing for pork products, quality control and logistics management improvement, price assurance, support on breeding and feeding, traceability on quality control. After identifying these advantages, the study concluded that the specialized household pig farmers can set up cooperatives to learn and benefit these advantages from the developed countries, under the condition that they are comparable to the Chinese pig farming industry.

Chapter 4 was about answering research sub-question 3. It illustrated the current development of vertical collaboration in the developed countries that include US and representative EU countries such as UK, Germany, the Netherlands, and Spain. The integration in U.S. pork farming industry is further developed relative to independently operated contract farmers. In other words, the hired management (integration) is having more prosperous future compared with contract growers (contracting). In UK, the vertical collaboration runs slowly with supermarket gain most power by central warehousing system. In Germany, there are a number of cooperatives that use QS-membership system for quality control. As the Netherlands has large concentration of slaughtering by cooperatives. The IT system and quality control and traceability system (IKB) also play an important role in its vertical collaboration. Last but not least, Spain is famous for its specific and regional product development. Its IT system assures its productivity, product quality control and traceability. After identifying the vertical collaboration in the pig farming industries in the Western countries, its application in Chinese pig farming industry is assessed. This study concluded that there is low implementation of IT and SCM in the Chinese pork production chain. This is resulted from the reasons including lack of IT professionals for pig farming, costly of software system and logistics barriers. Although it is not feasible for the specialized household pig farmers to implement expensive IT systems, like ERP and other commercial integrated IT system. The farmers can make use of World Wide Web and telecommunication technologies, personal computers and smart phones to transfer data and communicate along the chain. They will help the Chinese specialized household pig farmers to exchange information more smoothly and quickly along the chain and increase their working efficiency eventually.

Chapter 5 identified the key success factors for the development of small household pig farmers in China. Three models including PESTEL, SWOT analysis and Treacy & Wiersema's value discipline were used to identify the key success factors. PESTEL model accessed the pig farming industry by analyzing different factors that can affect business performance at macro-environmental level. After SWOT analysis, it was concluded that household pig farmers can have the prosperous development in the future but the weakness and threats must not be neglected. In the end, based on the Treacy & Wiersema's Value-Discipline Model, this study suggested that customer intimacy is the most proper discipline for the specialized household pig farmers to gain competitiveness on the market, especially in rural areas in China.

Even though this study stated customer intimacy as the most appropriate discipline for the development of Chinese household pig farming especially in rural areas. Due to the unbalanced economic development in China, some other areas may have different value disciplines for their development.

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8 Appendix

Appendix: PESTEL Model

Political	· Tax policies · Govt laws · Employment laws · Trade/Tariff regulations · Industry affecting environment. · Regulations.
Economic	· Economic growth/decline · Commerce · Competition · Trade deficits · Wage rates, working hours · Cost of living
Sociological	· Work ethics/ Career attitude · Culture · Gender bias
Technological	· Suppliers, vendors, raw material, infrastructure. · Information technology · Industry specific technology breakthroughs, researches.
Environmental·	· Global warming · Climate change
Legal	· Legislations · Imports/exports · Recycling/disposal laws · Employment laws · Intellectual property