Factors Affecting Strategic Marketing Decisions in Agriculture: A Study of Fruit Farmers in Thailand

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Bhawat Chiamjinnawat

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DECLARATION

I, Bhawat Chiamjinnawat, declare that this thesis entitled *"Factors Affecting Strategic Marketing Decisions in Agriculture: A Study of Fruit Farmers in Thailand"* submitted to Massey University for the degree of Doctor of Philosophy is the outcome of my own research work. Acknowledgement is given where material from other resources was used. I also certify that the thesis has not been presented, in whole or partly, for any degrees or diplomas.

Signed..

Student ID: 11171761

Full Name: Bhawat Chiamjinnawat

ABSTRACT

The transformation of agri-food marketing systems worldwide has implications for small-scale fruit farmers in Thailand. Effective strategic marketing decisions (SMDs) of farmers are essential elements in response to market transformation. Based on the theory of strategic decision making, SMDs are made in regards to the availability of internal resources, the dynamics of the external environment and the goals that need to be accomplished. Previous literature mostly explains the SMDs of individual farmers in developed countries. Research work in developing countries generally concentrates on SMDs, in order to link small-scale farmers to markets. Characterised by small-scale operations farmers in Thailand were not considered as being leading actors in agri-food value chains. As a result, available research on SMDs, which reflect farmers' strategic capability, was scarce within a Thailand context.

This study employed a quantitative survey-based approach to determine key factors that affect the SMDs of fruit farmers in Chanthaburi province of Thailand. Qualitative data was also collected in a pilot study, in order to develop the conceptual model and the foundation of the questionnaire. The survey data was collected from 216 fruit farmers, through the use of face-to-face interviews with structured questionnaires. Descriptive statistics and chi-square tests were employed to describe and compare the fruit farmers who used traditional marketing channels (TM users) with those who used high-value marketing channels (HM users). Furthermore, factor analysis was employed to identify factors included in the conceptual model, and logistic regression was employed to test the hypotheses.

This study found that SMDs towards high-value market participation were positively related to business size, experience in fruit farming, perceived importance of market requirements, and farmers' goals in regards to effectiveness. The results suggest that small business sized farms need to improve their productivity and increase their business capacity, via collective actions that would allow them to benefit from collective learning with experienced farmers, which could lead to updated market information. It was also noted that some farmers aimed to achieve their production goals by focusing on efficiency, while others desired a simple lifestyle by focusing their lives on self-sufficiency. This implied that different types of farmers needed to be encouraged in different ways, in order to develop their strategic capabilities as important stakeholders in the fruit industry of Thailand.

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Bhawat Chiamjinnawat

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LIST OF ABBREVIATIONS

ACFS	Thailand National Bureau of Agricultural Commodity and Food Standards
ASEAN	the Association of Southeast Asian Nations
CIA	Central Intelligence Agency, United States of America
EFA	Exploratory Factor Analysis
EU	European Union
FAO	Food and Agriculture Organisation
FAOSTAT	Statistics Division, Food and Agriculture Organisation of the United Nations
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
HM	High-value Market
I/O	Industrial Organisation
KMO	Kaiser-Meyer-Olkin's measure of sampling adequacy
NESDP	Thailand National Economic and Social Development Plan
NZD	New Zealand Dollar
OAE	Office of Agricultural Economics, Thailand
PAEO	Provincial Agricultural Extension Office, Thailand
PCA	Principal Components Analysis
PCO	Provincial Cooperative Office, Thailand
Q-GAP	Thailand National Good Agricultural Practices
RBV	Resource-Based View
SEU	Subjective Expected Utility Theory
SMD	Strategic Marketing Decision
TDRI	Thailand Development Research Institute
TM	Traditional Market
UK	United Kingdom
US	United States of America

CHAPTER ONE

1 Introduction

1.1 Introduction

This first chapter introduces the thesis and it is organised into four sections. Following this introduction, section two identifies the research problem. Section three provides the research aim and objectives that are related to the research problem. The last section outlines the structure of the thesis.

1.2 Problem identification

The transformation of agri-food marketing systems worldwide has implications for small-scale farmers in developing countries (McCullough, Pingali, & Stamoulis, 2008; Motiram, 2013; Reardon, Barrett, Berdegué, & Swinnen, 2009; Reardon, Timmer, & Minten, 2012). As with most developing countries, Thailand has witnessed a rapid growth of high-value markets, i.e. modern retail chains and high standard export markets, especially after the Asian financial crisis in 1997-98 (Poapongsakorn, 2011; Tokrisna, 2006). According to Lippe, Seebens, and Isvilanonda (2010), Poapongsakorn (2011) and Uathaveekul (2010) this transformation presented market opportunities for Thailand's agriculture sector. However, Kersting and Wollni (2012), Sardsud (2007) and Schipmann and Qaim (2011b) argue that, similar to most developing countries, the agriculture sector in Thailand is characterised by small-scale farmers who struggle to take advantage of such opportunities. This is because selling to high-value markets usually requires standard certification in good farming practices and in particular for fresh produce such as fruit and vegetables (Gulati, Minot, Delgado, & Bora, 2005; Shukla & Jharkharia, 2013). Consequently, making decisions in response to the transformation of marketing systems and high-value market participation is an important task for Thai small-scale farmers, in order that they can deal with this global strategic issue.

The literature describes strategic decision making as a key process in management and a foundation for business success that usually occurs within a wide range of industries (David, 2013; Jeffs, 2008; Rothaermel, 2013). However, the application of this normative literature to small-scale farmers might not be simple and straightforward, since studies in strategic decision making have generally developed their theories from the perspective of large established business corporations (Carpenter & Sanders, 2007; Hart, 1992; Papadakis, Lioukas, & Chambers, 1998). There are numerous studies analysing how farmers make strategic decisions, thus implying how to develop strategic capability among farmers (Brodt, Klonsky, & Tourte, 2006; Duesberg, O'Connor, & Dhubháin, 2013; Fairweather & Keating, 1994; Farmar-Bowers & Lane, 2009; Hansson & Ferguson, 2011; Inderhees & Theuvsen, 2009; Nuthall, 2012; Ohlmer, Olson, & Brehmer, 1998). These previous studies indicate that farmers' strategic decisions are usually based on individual needs and motives, rather than the rational well-structured process found in large firms. Long (2013) and Nuthall (2009, 2012) point out that the quality of farmers' strategic decisions relies on knowledge, experience and farmers' goals. Some authors, such as Fairweather and Keating (1994), Ondersteijn, Giesen, and Huirne (2003) and Brodt et al. (2006), also studied strategic decision making based on farmers' goals and indicated the types of strategies farmers used.

However, this available research mostly explains strategic decisions made by individual farmers in developed countries, such as USA (Brodt et al., 2006; Park, Mishra, & Wozniak, 2013), Sweden (Hansson & Ferguson, 2011; Ohlmer et al., 1998), Ireland (Duesberg et al., 2013), the Netherlands (Ondersteijn et al., 2003), Germany (Inderhees & Theuvsen, 2009), Australia (Farmar-Bowers & Lane, 2009) and New Zealand (Fairweather & Keating, 1994; Nuthall, 2009). A large amount of research work emphasises the impacts of agri-food market transformation on small-scale farmers, implying strategies for high-value market access in developing countries, such as India (Roy & Thorat, 2008), Thailand (Kersting & Wollni, 2012), Kenya (Narrod, Roy, Okello, Avendaño, & Rich, 2009), Mexico and Central America (Hellin, Lundy, & Meijer, 2009) and other countries in Asia (Reardon et al., 2012). However, both strands of research rarely address strategic decisions from farmers' perspectives, in response to market transformation in developing countries. Although a small number of studies have already investigated the marketing preferences of small-scale farmers in developing countries, such as Honduras (Blandon, Henson, & Islam, 2009), Thailand (Schipmann & Qaim, 2011b) and Indonesia (Umberger, Reardon, Stringer, & Mueller Loose, 2015), research on the strategic marketing decisions of small-scale farmers in developing countries, based on their goals and the business environment, is especially scarce. This situation could lead to an underestimating of the capability of small-scale farmers in developing countries to deal with strategic marketing issues.

This study addresses these research gaps by analysing factors affecting the strategic marketing decisions of fruit farmers in Chanthaburi province of Thailand, including the business environment and farmers' goals. Fruit is one of the key high-value agricultural products produced in Thailand and it has been promoted over the past three decades, in order to encourage diversification from traditional crops such as maize and tapioca. Specifically, Chanthaburi is the most important fruit producing province of the country, as it dedicates 72% of its agricultural area for growing major tropical fruit crops yielding nearly half of the overall production in Thailand. This means that the transformation of the market has particularly occurred in Chanthaburi province, thus providing valuable information for this study. The results of this study can contribute to the literature regarding strategic decisions in agriculture from the perspective of the developing world. Understanding the effects of the business environment and farmers' goals, on the strategic marketing decisions of farmers, can help to reveal the important components of farmers' decision behaviour. This knowledge can serve as input when formulating policies and strategies for developing farmers' strategic capability. In addition, the knowledge can also help individual farmers and farmers' organisations to set the right goals, make the right decisions and think strategically.

1.3 Research aims and objectives

This study aims to understand the strategic marketing decisions of fruit farmers in Chanthaburi province of Thailand. The aim of this study is achieved by the following objectives:

1) To review the agriculture sector and the fruit industry in Thailand and in Chanthaburi province in particular.
2) To describe and compare fruit farms and farmer characteristics between farmers who participate in traditional markets and high-value markets in Chanthaburi province of Thailand.
3) To determine factors which affect the strategic marketing decisions of fruit farmers in Chanthaburi province of Thailand.

1.4 Structure of this thesis

Following an identification of the research problem, this study begins with a study on the agriculture sector and fruit industry in Thailand and in Chanthaburi province in particular. This background information provides a better understanding of the transformation of agri-food marketing systems in the Thai context and particularly in Chanthaburi province. Since the research problem indicates the research area of strategic decisions of farmers, this study has a comprehensive review on decision making theory and strategic decision making in general, followed by strategic decision making that particularly applies to agriculture. The literature review helps the development of the conceptual model used in this research. The conceptual model was piloted with some fruit farmers in Chanthaburi province, and the results were used to revise the questionnaire: this being the research instrument. The main survey was conducted using face-to-face interviews with structured questionnaires, in order to ensure all the required data was collected from small-scale farmers. This study primarily analyses the survey data, in order to describe the sample regarding fruit farms and farmer characteristics in Chanthaburi province. It also compares the characteristics between farmers who use traditional and those using high-value markets. Moreover, this study analyses and discusses factors which affect the strategic marketing decisions of the fruit farmers, including the internal and external environments and the farmers' goals, in order to test the conceptual model developed in this study. The study ends with the conclusions and provides recommendations and suggestions for future research. This thesis is divided into nine chapters:

Chapter One introduces the thesis and identifies the research problem, together with some discussion about previous research and the research gaps that would be addressed in the study. It also states the research aim and objectives, followed by the thesis structure.

Chapter Two provides background information on the study. It is divided into two main sections. The first section provides an overview of Thailand's agriculture sector and the contribution of the agriculture sector to the Thai economy, the transformation of Thai agriculture towards being more modernised and internationalised, and the role of good agricultural practices in Thailand. The second section provides a review of Thailand's fruit industry, highlighting major fruit production and trade and marketing channels, in addition to an overview of Chanthaburi province, Thailand.

Chapter Three reviews the literature on decision making theory and strategic decision making. The review of decision making theory includes the differences between formative and descriptive approaches of the theory. This chapter also explains decision making within general management that links the decision making theory and strategic decision making within organisations. Moreover, it includes definitions of strategy, strategic management process, strategic planning and thinking and factors affecting strategic decisions.

Chapter Four evaluates the decision making theory and strategic decision making applied in agriculture. It explains the discrepancies of viewpoints between decision making in common management discipline and that in agriculture. This chapter also discusses the strategic marketing decisions, made in response to the transformation of agri-food marketing systems, which are viewed from different perspectives. In addition, it links knowledge gained from the literature to support the research assumption and establish the conceptual framework applied within the thesis.

Chapter Five reviews and discusses the research methodology employed in the study. This chapter begins with a discussion on research philosophy and the research approaches that explain the qualitative and quantitative methodologies applied in the study. It also provides details about research process, sampling, research strategies, questionnaire design, data collection and the data analysis of this study. The chapter finishes with a discussion on the validity and reliability of this research.

Chapter Six provides details about the pilot study, using a qualitative approach and it discusses the qualitative results. The details of the pilot study cover planning, organising, and implementation of qualitative research. This chapter also discusses the pilot study results that identify the related variables included in the study. It further discusses the results of the questionnaire pre-tests and the lessons learned from the pilot study.

Chapter Seven describes the sample divided into two groups: traditional market users and high-value market users. The information presented came from descriptive analyses, together with a number of statistical tests for comparisons of farms and farmer characteristics, such as age, education, fruit farming experience, farm size, membership of agricultural cooperatives, fruit production and sales, between the two groups of the sample. The information also includes the current markets used by the farmers in the sample, together with market attributes and the farmers' strategic intentions regarding the fruit crop grown and the markets they will use during the next five years. This chapter also provides some discussion on these results.

Chapter Eight focuses on assessing factors that affect strategic marketing decisions of the fruit farmers. This chapter begins with an explanation about the establishment of factors and outcomes resulting from the factor analysis, where the variables resulting from the pilot study are analysed. It then presents the conceptual model by describing the associations between the independent and dependent variables, together with the hypotheses. Following the conceptual model, it explains the logistic regression analysis used for testing the model, together with its results. Moreover, this chapter profiles the two market user types: traditional and high-value market users.

Chapter Nine summarises the research results and concludes the overall thesis. It provides a summary of the research outcomes that correspond to the research objectives. This chapter also discusses the key factors that affect strategic marketing decisions. The conclusions of this study lead towards implications for academics and stakeholders in the Thai fruit industry. This chapter further draws the limitations of this study that suggest areas for future research, and it comes to an end with a final conclusion.

CHAPTER TWO

2 Background

2.1 Introduction

The purpose of this chapter is to provide background to the study. This chapter is divided into two main sections: the agriculture sector and the fruit industry in Thailand. The first section presents basic information about Thailand's agriculture sector, the contribution of the agriculture sector to the country's economy, the transformation of the agriculture sector towards being more modernised and internationalised, and the role of national Good Agricultural Practices (Q-GAP). The second section provides a review of Thailand's fruit industry, its major fruit production and exportation and the fruit marketing chain in Thailand. It also provides an overview of the Chanthaburi province of Thailand.

2.2 Thailand's agriculture sector

2.2.1 Overview of the agriculture sector in Thailand

Thailand is located in the centre of mainland Southeast Asia (Figure 2.1). It is bordered by the Andaman Sea, the Gulf of Thailand, and the countries of Myanmar, Laos, Cambodia and Malaysia. The climate ranges from tropical to sub-tropical zones, and temperatures typically range from 19 to 38 ^{o}C. It has three seasons: hot and dry season (February to May), monsoon season (June to October), and cool and dry season (November to January). Thailand's geography and climate is suitable for agriculture and the agriculture sector has been the foundation of the Thai economy and society for many centuries. In 2015, approximately half of the Thai population (68 million) live in rural areas, where agricultural employment is dominant (FAOSTAT). The agriculture sector is still an important source of employment for approximately 32% (13 million) of the Thai labour force (39 million). Thailand has abundant natural resources, such as arable lands and tropical forests. Approximately 43% (22 million ha) of the total land area of the country (51 million ha) is used for agricultural production, and the other is under forest (32%) and other land (25%), as presented in Table 1 (FAOSTAT).

According to the OAE (2014a), almost half of farm holding land (47%) is used for growing rice, 23% for upland field crops, 23% for fruit and perennial crops and 8% for other purposes, such as pasture land (Table 2.1).

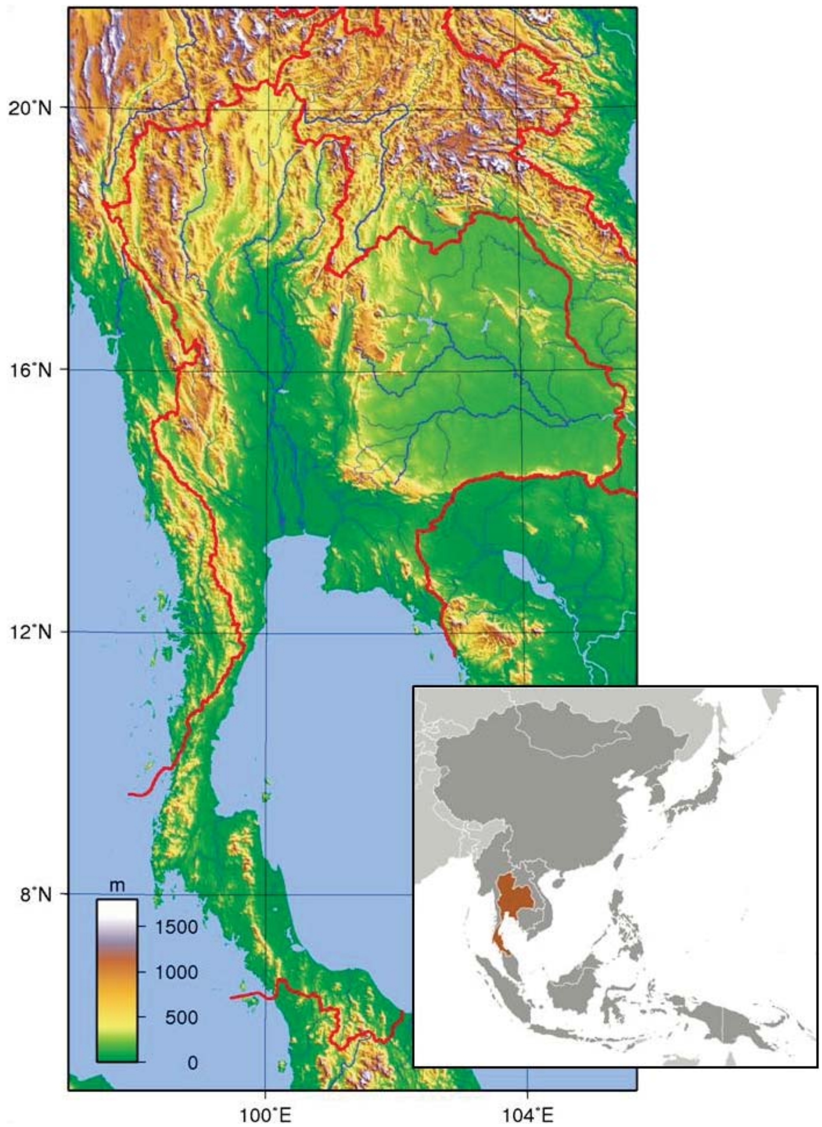
Table 2.1: Population, agriculture and land utilisation in Thailand

	Value	% of total
Total population (Million)[a]	**68**	**100%**
Rural population	33	49%
Urban population	34	50%
Not identified	1	1%
Total labour force (Million)[b]	**39**	**100%**
Agriculture	12	32%
Industry	7	17%
Services	20	51%
Total land area (1,000 ha)[c]	**51,089**	**100%**
Agricultural area	22,110	43%
Forest	16,339	32%
Other land	12,640	25%
Total farm holding land (1,000 ha)[d]	**23,878**	**100%**
Paddy land	11,194	47%
Upland field crops	5,498	23%
Fruit and perennial crops	5,586	23%
Vegetable and ornamental plants	223	1%
Others	1,889	8%

Source: [a] data in 2015 from FAOSTAT
[b] data in 2015 from CIA FACTBOOK
[c] data in 2013 from FAOSTAT
[d] data in 2013, calculated from OAE (2014a)

Figure 2.1 presents a geographical map and location of Thailand that contribute to agricultural production. Thailand’s climate and soil conditions contribute to a wide range of agricultural production. Rice is the dominant cultivated crop, in terms of it having the largest share of agricultural land and farmer involvement. Rice is grown in every region of the country. The northeast has the largest rice area, and most of this is rain-fed. Most of the irrigated areas are located in the central region and the north, which are used for rice and vegetable production. Most upland areas in all regions are commonly used for field crops, particularly sugar cane and cassava. In comparison, the southern region is dominated by rubber trees, oil palm and fruit trees. Recently, north eastern farmers were introduced to growing rubber trees, due to their higher price and government policy (Poapongsakorn, 2011). The eastern region specialises in tropical fruit production.

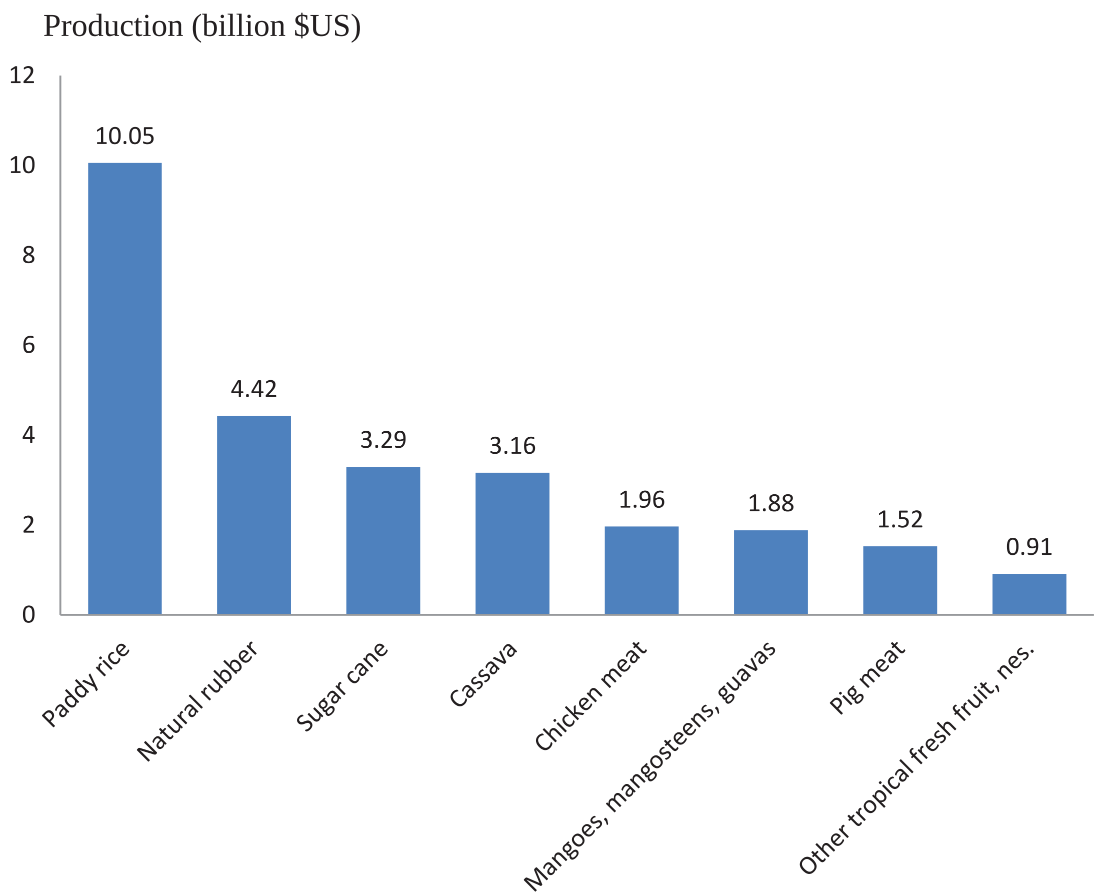
Figure 2.1: Geography and location of Thailand



Source: https://commons.wikimedia.org/wiki/File:Thailand_Topography.png
https://www.cia.gov/library/publications/the-world-factbook/geos/th.html

In 2013, the most important crop (in terms of value) produced in Thailand was paddy rice (US$10.05 billion), followed by natural rubber (US$4.42 billion), sugar cane (US$3.29 billion) and cassava (US$3.16 billion), as presented in Figure 2.2.

Figure 2.2: Top commodities produced in Thailand by value in 2013



Source: FAOSTAT

2.2.2 Contribution of the agriculture sector to Thailand's economy

Over the last three decades, the importance of agriculture has declined, due to the expansion of industry and service sectors, such as food processing, construction and tourism. The GDP share of the agriculture sector dropped from 18% in 1984 to 9% from 1994 to 2004, but over the past five years (2009 to 2014) it rebounded to 10 - 11% (World Bank, 2015) (see Table 2.2). However, the contribution of agriculture was still important to the Thai rural economy, since half the population live in rural areas, covering 32% of employment, as mentioned previously.

Table 2.2: Contribution of the agriculture sector to Thailand's economy, 1984-2014

Year	Total GDP (billion US$)	Share of agriculture in GDP	Value of agriculture (billion US$)
1984	48	18	8
1989	72	15	11
1994	147	9	13
1999	127	9	11
2004	173	9	16
2009	282	10	28
2014	405	11	43

Source: World Bank (2015)

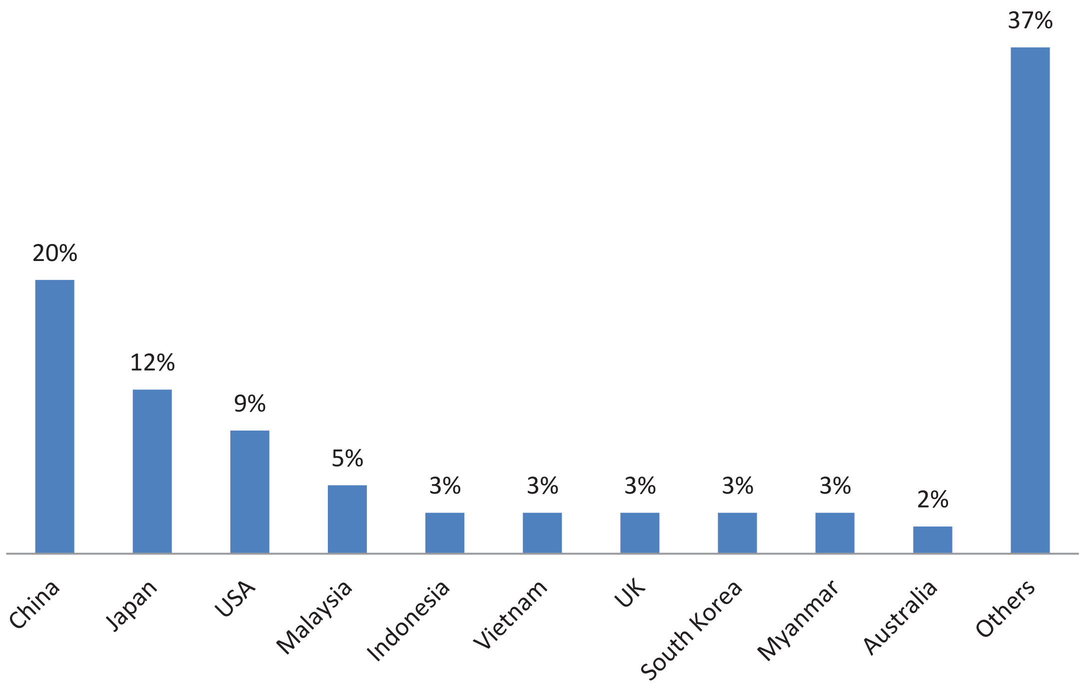
Thailand's agricultural production does not only contribute to domestic consumption, it also plays an important role in export earnings. The most important agricultural exports are rice, natural rubber, cassava, sugar, fruits, vegetables, chicken meat and fishery products. In 2013, in terms of export values, Thailand was ranked as the world largest exporter of several products, such as natural rubber, cassava, sugar, tropical fresh fruit, canned pineapple, and canned chicken meat (FAOSTAT). According to OAE (2015), in 2014 the value of agricultural exports was approximately 18% (1,309 billion baht) of total exports (7,307 billion baht). Table 2.3 presents the main product export values in 2014. Almost half of these agricultural products are exported to four key countries: China (20%), Japan (12%), United States of America (9%) and Malaysia (5%), respectively (Figure 2.3).

Table 2.3: Volumes, value and share of agricultural exports in 2014

Items	Volume (thousand tonnes)	Value (billion baht)	% of total value
Value of agricultural exports	**-**	**1,309**	**100%**
Natural rubber	3,792	245	19%
Rice and rice products	11,245	191	15%
Fish and fish products	1,145	120	9%
Cassava and cassava products	9,840	114	9%
Fruits and fruit products	2,749	96	7%
Sugar and sugar products	6,806	95	7%
Chicken meat and chicken meat products	546	74	6%
Shrimps and shrimp products	167	65	5%
Vegetables and vegetable products	499	23	2%
Residues and waste, prepared animal fodder	921	18	1%
Other agricultural exports	-	267	20%

Source: OAE (2015)

Figure 2.3: Share of agricultural exports to major countries, 2014



Source: OAE (2015)

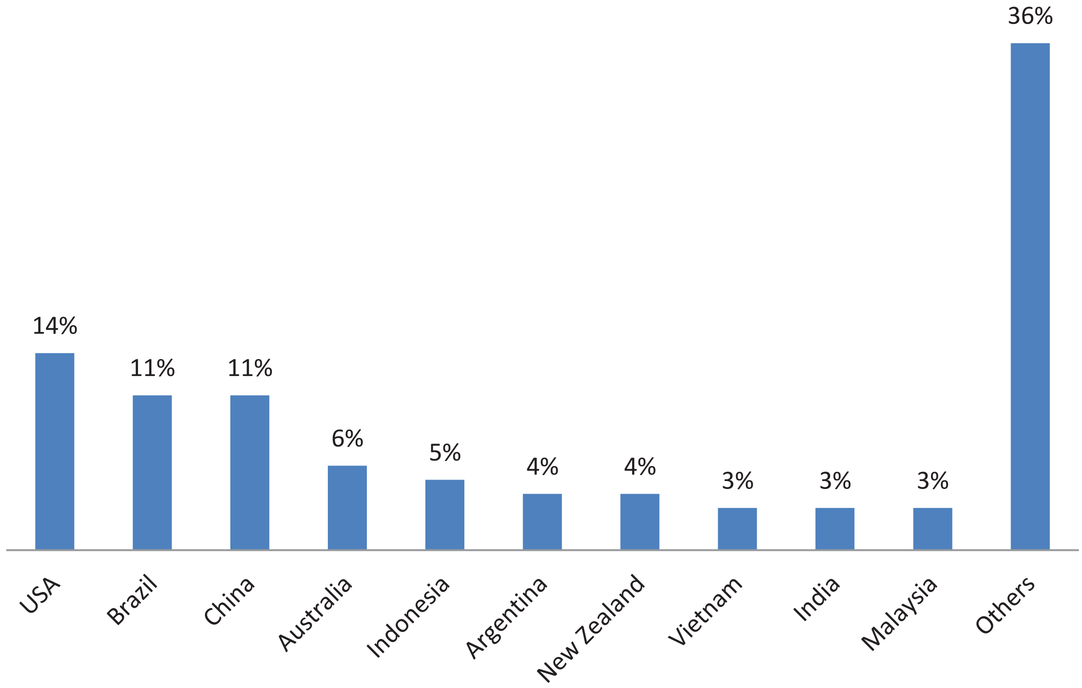
Although Thailand is almost self-sufficient in food production, some agricultural products are imported from overseas, especially animal feed for the livestock industry. In 2014, the value of agricultural imports was 447 billion baht (OAE, 2015). The main agricultural imports are animal feed and products (such as soybean cake), fish (frozen and fillets), food crops (such as wheat and maize), oil crops (such as soybean), fruits and fruit products (such as fresh apple), milk and milk products, cotton, other food products (such as seasonings) and beverages (such as wine) (Table 2.4). These products are imported from the United States of America (14%), Brazil (11%), China (11%), Australia (6%), Indonesia (5%), Argentina (4%), and New Zealand (4%), respectively (Figure 2.4).

Table 2.4: Value and share of agricultural imports in 2014

Items	**Volume (thousand tonnes)**	**Value (billion baht)**	**% of total**
Value of agricultural imports	**-**	**447**	**100%**
Residues and waste, prepared animal fodder	4,113	75	17%
Fish and fish products	1,334	71	16%
Food crops	2,294	47	11%
Oil crops	1,986	38	9%
Fruits and fruit products	699	26	6%
Milk and milk products	214	26	6%
Cotton, not carded or combed	322	22	5%
Other food products	118	20	4%
Vegetables and vegetable products	564	14	3%
Beverages	100	13	3%
Other agricultural imports	-	95	21%

Source: OAE (2015)

Figure 2.4: Share of agricultural imports from major countries, 2014



Source: OAE (2015)

2.2.3 Transformation of the agricultural sector in Thailand

In Thailand, the agriculture sector has undergone rapid transformation in the past three decades, due to the economic boom during 1986 to 1996 and the modernisation of the sector that took place after the Asian financial crisis in 1997/98 (Poapongsakorn, 2011). As with most developing countries, Thailand has witnessed a shift in food consumption and the liberalisation of foreign direct investment. This has brought about the expansion of high-value markets, which have changed the market characteristics of traditional markets. Similar to most developing countries, agri-food products in Thailand are increasingly distributed through high-value markets, i.e. modern domestic markets and high-standard export markets. However, traditional markets are still more dominant (McCullough et al., 2008; World Bank, 2006). The differences between these two types of markets are as follows:

- *Traditional markets* (TMs), characterised by supply-driven production, low prices, low awareness of food safety issues, reliance on low cost for competitiveness, and no constraints for participation of small-scale farmers

- *High-value markets* (HMs), characterised by demand-driven production, high prices, high sensitivity to food safety, reliance on quality, volume, flexibility and innovation for competitiveness, and well-organised farmer inclusion, such as high-standard export markets and modern retail chains (World Bank, 2006).

TMs in Thailand are comprised of many players. Agricultural produce is usually collected by local collectors and then supplied to several types of market intermediaries, i.e. provincial wholesalers and central wholesalers. The produce is sold to Thai consumers by traditional retailers at fresh (or wet) markets. The transformation of the agriculture sector in Thailand has spurred on an increase of HMs, i.e. high-standard export markets and modern retail chains such as supermarkets. Nowadays, the agriculture sector in Thailand has become more modernised and internationalised towards producing high-value products to meet changing consumption patterns, both in domestic and global markets, focusing on quality, safety and convenience (Lippe et al., 2010).

Modernisation of Thailand's agriculture

Prior to early 1960, the dominant form of agricultural production in Thailand was a rice monoculture. As noted by Goss and Burch (2001), this monoculture production system was well developed and connected to international trade and investment, especially by Chinese merchants who dominated rice milling and trade. According to Poapongsakorn (2011), Thailand's agricultural modernisation could be divided into four periods:

- *The golden growth period*— 1960 to 1985

In this period, the modernisation of agriculture was spurred on by state industrialisation policies and public investment in infrastructure, such as irrigation systems and rural electrification (Poapongsakorn, 2011). Agricultural production was diversified and included more commercial, high-value agricultural products, such as fruit and vegetables (Srimanee & Routray, 2012). Despite the development towards modern agriculture, the share of GDP declined throughout this period, from 38.1% in 1960 to 30.5% and 23% in 1969 and 1980, respectively, due to rapid growth in the industry sector (Goss & Burch, 2001; World Bank, 2015).

- *The declining comparative advantage period*— 1986 to 1996

During this period, agricultural production in Thailand faced declining competitive advantage, due to some major challenges. The first challenge was scarcity of land for increasing agricultural production, leading to the need to use agricultural technologies for increasing productivity on the existing land used. Another challenge was an increase in wages due to industrialisation and urbanisation (Poapongsakorn, 2011). This led to a shortage of farm labour because people came to urban areas to work for the real estate and industry sectors.

- *The financial crisis period*— 1997 to 1999

The contribution of agriculture to Thailand's economy had been declining until the period of the Asian financial crisis in 1997/98, continuing on to 1999. According to the World Bank (2015), agriculture's share of GDP continually decreased from 21% in 1981 to a bottom of 9% in 1997. As a result of the financial crisis, a huge number of workers from real estate and industry sectors suffered layoffs and returned to their villages in the countryside and started farming. During this transition period, the agriculture sector was able to play a vital role in supporting these unemployed workers, thus turning the crisis into opportunities for agriculture.

- *The growth revival period*— 2000 to the present time.

Following the financial crisis, agricultural growth rebounded, as a result of depreciation of the Thai currency (baht) and increasing opportunities for exports. Another reason for growth, during this period, was joint responses from the government and private sector in regards to tackling food safety problems within the agri-food supply chain for exports, together with increases in agri-food prices that began in 2006 (Poapongsakorn, 2011; Srimanee & Routray, 2012).

Internationalisation of Thailand's agriculture

The agriculture sector in Thailand has become more internationalised towards producing high-value agricultural products for high-value markets, i.e. export markets and modern retail chains.

- *The increase of export markets*

The modernisation of Thai agriculture has helped the development of agri-food supply chains that are producing and exporting higher quality towards more value-added products. From 1992 to 2012, the export value of agri-food products increased by 376%, or 19% per annum (Table 2.5). The export value of value-added products has grown rapidly. For example, the export value of chilled and frozen fruits, rubber products, sugar, canned and processed seafood increased greatly by 1,771%, 834%, 546% and 453% , respectively, during this period.

Table 2.5: Export value of agri-food products from 1992 to 2012

Unit: billion baht

Products	**Year**					**Increase compared to 1992**	**Increase per annum**
	1992	**1997**	**2002**	**2007**	**2012**		
Natural rubber	29	57	75	194	270	834%	42%
Rice	36	65	70	119	143	295%	15%
Cassava	30	22	23	49	87	192%	10%
Chilled and frozen fruits	2	8	9	13	37	1772%	89%
Chilled and frozen vegetables	2	3	5	7	7	304%	15%
Chilled and frozen chicken	10	11	23	1	6	-43%	-2%
Processed chicken*	0	0	13	32	62	371%	37%
Chilled and frozen shrimps	32	47	34	42	45	42%	2%
Chilled and frozen fish fillets	6	8	13	11	13	132%	7%
Rice products	2	4	6	5	10	339%	17%
Sugar	19	31	29	44	122	546%	27%
Canned and processed fruits	14	15	26	38	48	235%	12%
Canned and processed vegetables	3	6	7	10	10	203%	10%
Canned and processed seafood	29	58	87	109	162	453%	23%
Total	215	336	418	676	1022	376%	19%

*Calculated for ten years from 2002 to 2012

Source: Ministry of Commerce (2013)

According to Poapongsakorn (2011), Thailand successfully expanded its export markets, due to more capacity in production for value-added agri-food products. This is because the agri-food industry in Thailand changed from resource- and labour-intensive towards skill- and knowledge-intensive and this resulted in higher productivity and quality for agri-food products successfully exported. This development included improved logistics for the transportation of raw materials, in order to gain a high yield from each ton of raw materials used. The development of the chicken industry in Thailand is a lucid example. From 2002 to 2012, the chicken industry changed their production from labour-intensive (chilled and frozen chicken breasts) to more value-added products (processed chicken, such as ready-to-eat chicken) (see Table 2.5).

- *The increase of modern retail chains*

Rapid economic development in the 1980s and 1990s resulted in higher per capita incomes and urbanisation especially in Bangkok and surrounding suburbs, as well as in other large cities. Incorporated with this higher income and urbanisation, female labour force participation and modern lifestyles spurred the development of modern retail structures in Thailand, such as department stores, supermarkets, and convenience stores (Schipmann & Qaim, 2011a; Tokrisna, 2006). The value of modern retail sales have comprised over half the overall retail sales since 2001 (TDRI, 2002). According to the Thailand Development Research Institute (TDRI), following the Asian financial crisis, total retail sales in Thailand increased by 25% in five years (from 958 million baht in 1997 to 1.19 billion baht in 2001). During the same period, modern retail sales sharply increased by 155 %, from 249 million baht to 635 million baht, which gained the share from 26% to 53% (Schipmann & Qaim, 2011a; Tokrisna, 2006), as shown in Table 2.6. This indicates that only three years after the financial crisis, from 1997 to 1998, the modern retail trade had more than a 50% share of the total retail sales in Thailand.

Table 2.6: Values and market share of modern retail trades, 1997-2001

Item	1997	1998	1999	2000	2001	% Change
Value (million baht)						
Modern retail trade	249	225	285	405	635	155%
Traditional retail trade	709	436	581	661	559	-21%
Total	958	661	865	1,067	1,194	25%
Share (%)						
Modern retail trade	26%	34%	33%	38%	53%	27%
Traditional retail trade	74%	66%	67%	62%	47%	-27%

Source: TDRI (2002) and Tokrisna (2006)

Although the share of modern retail sales since 2001 has been over half the total retail trade, in the case of food sales alone the share of modern retailers was approximately 35% during this same period (Wiboonpongse & Sriboonchitta, 2004). This figure implies that the traditional retail sector played an important role in food sales in Thailand. More specifically, wet markets which are the major format in the traditional retail sector) still attracts most Thai consumers for fresh produce (e.g. fruit and vegetables) because they principally perceive that wet markets offer good produce in terms of freshness (M. Gorton, Sauer, & Supatpongkul, 2009). However, due to economic development, Thai shopping behaviour for fresh produce is changing towards an emphasis, not only on the freshness, but also on safety standards and convenience. This tendency results from higher household incomes and levels of education (Lippe et al., 2010). Correspondingly, M. Gorton et al. (2009) noted that the appeal of supermarkets is that they offer safe food, a good atmosphere and convenience, and consumers frequently shopping in supermarkets are younger and characterised by higher incomes and educational achievement. In addition, the expansion of modern food retail outlets has been increased significantly. In Thailand, there are three formats within modern food retail outlets: supermarkets, hypermarkets and convenience stores. Supermarkets are modern retail chains that focus on food products. The hypermarkets and convenience stores also focus on the same categories but they use different selling space sizes. Supermarkets usually use a space of 800 to 1,500 square metres, whereas hypermarkets and convenience stores use 6,000 to 12,000 square metres and 30 to 300 square metres, respectively. Table 2.7 shows that the number of modern retail format outlets increased more than 500%, from 1996 to 2010. As a consequence, modern food retail sales are increasing sharply.

Table 2.7: The number of modern food retail outlets from 1996 to 2010

Modern retail format	1996[a]	2010[b]	Change	
			Number of outlets	%
Supermarkets	26	192	166	638%
Hypermarkets	32	220	188	588%
Convenience stores	920	7,354	6,434	699%

Source: [a]Tokrisna (2006), [b]Srimanee and Routray (2012)

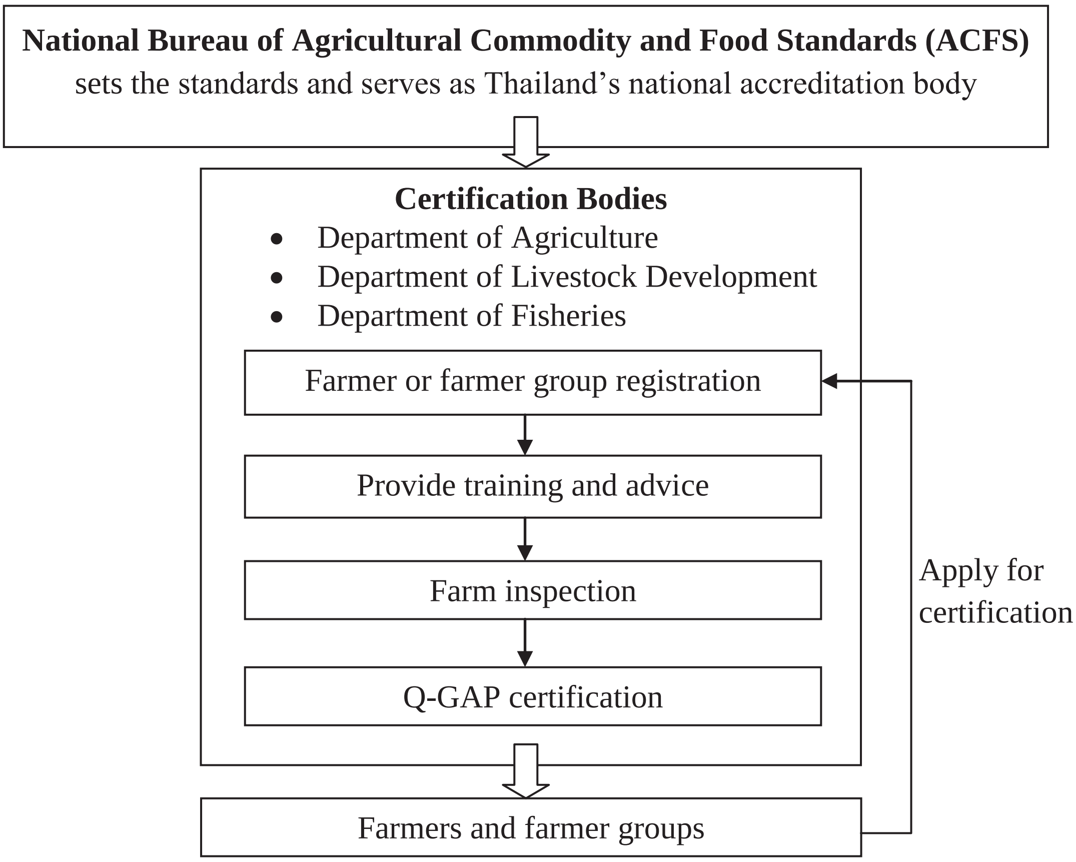
2.2.4 The role of national Good Agricultural Practices (Q-GAP)

In response to the growth of high-value agriculture, Thailand has developed a national Good Agricultural Practices (Q-GAP) standard, in line with the international requirements of the Food and Agriculture Organisation (FAO) and the World Trade Organisation (WTO), i.e. the Technical Barriers to Trade (TBT) Agreement and Sanitary and Phytosanitary Measures (SPS) Agreement. According to FAO (2003), the Good Agricultural Practices (GAP) use "*practices that address environmental, economic and social sustainability for on-farm processes, and result in safe and quality food and non-food agricultural products.*" The objectives of GAP standards are (FAO, 2008): to ensure safety and quality of produce in the food chain, to capture new market advantages by modifying supply chain governance, to improve natural resources use, workers health and working conditions, and/or to create new market opportunities for farmers and exporters in developing countries. Numerous GAP standards have also been developed in many other nations and called in different names, such as SALM (Malaysia), JGAP (Japan) and Green Food (China). At regional level, one of the most common regional GAP standards is the GlobalGAP, initiated by a group of European supermarket chains. The main objective of GlobalGAP is to ensure consumer confidence in regards to the marketing of safe food (GlobalGAP, 2013).

GAP in Thailand, called Q-GAP (Q stands for 'quality'), was established by the Ministry of Agriculture and Cooperatives (MOAC) in 2003. It aims to improve the quality and safety of agricultural products, minimise negative impacts on the environment, and increase consumer confidence in food safety (ACFS, 2012). Q-GAP is a voluntary standard that involves three main government bodies (Figure 2.5):

- The National Bureau of Agricultural Commodity and Food Standards (ACFS) has been designated to be the focal organisation that controls agricultural products, food and processed agricultural products, by enforcing standards along the whole food supply chain. It is also charged with accrediting the certification bodies of agricultural commodities and foods, negotiating with international partners in order to reduce the non-tariff barriers to trade, and improving the competitiveness of Thai agricultural and food standards (ACFS, 2012).
- The Department of Agriculture (DOA) serves as the certification body for crop production. Q-GAP standards have also been developed for livestock and fisheries under the responsibility of the Department of Livestock Development and the Department of Fisheries, respectively.
- The Department of Agricultural Extension (DOAE) provides training and advisory services for farmers. These certification and services are free of charge to the farmers, as the government supports the entire process.

Figure 2.5: Q- GAP accreditation and certification process



Source: Adapted from ACFS, 2012

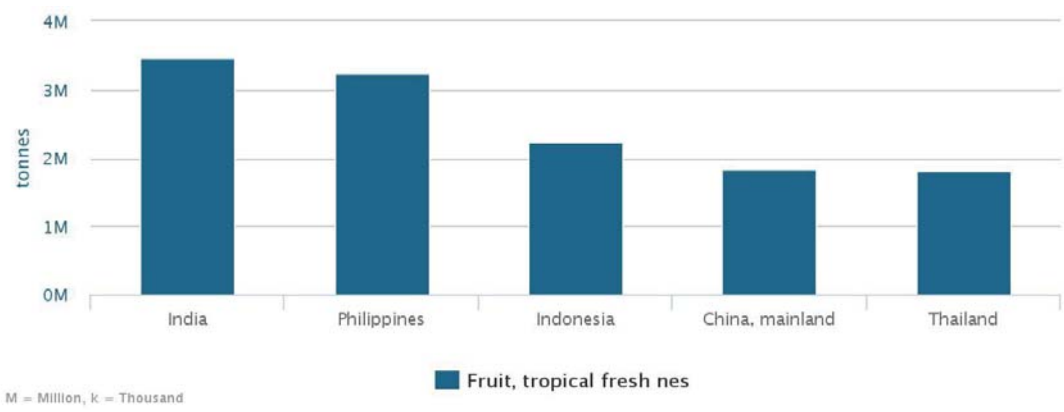
Participation in the programme is voluntary. Farmers who want to participate in the programme must register to become members and to be eligible for Q-GAP training for specific crops. They must implement the Q-GAP code on their farms, follow the guidance provided by crop-specific protocols, and ensure their farm practices meet Q-GAP requirements. Q-GAP implementation tends to be more effective among farmers who produce for export markets (ACFS, 2012). Under the Q-GAP scheme, farmers who apply for certification are assessed at three levels: (i) production processes for safe products, in particular appropriate use of agrochemicals; (ii) production processes for safe and pest-free products; and (iii) production processes for safe, pest free and quality products. The duration the Q-GAP certification is two years for annual crops and three years for perennial crops, so registered farms have to be re-inspected every two to three years. Q-GAP is part of a food safety scheme and it is supported by other Q certifications including Q-Shop (for shops selling quality agricultural inputs such as pesticides), Q-GMP (for pack houses), Q-HACCP (for processing establishments), in addition to Q-Supermarkets.

2.3 Thailand’s fruit industry

2.3.1 Importance of Thailand's fruit industry

Located in the tropical zone in Southeast Asia with 1,200 to 1,600 mm yearly rainfall, Thailand produces a wide range of tropical fruits and it is one of the key fruit producers in the world. In the past 20 years (1994 to 2013), Thailand has been the fifth largest tropical fruit producer after India, the Philippines, Indonesia, and China (Figure 2.6).

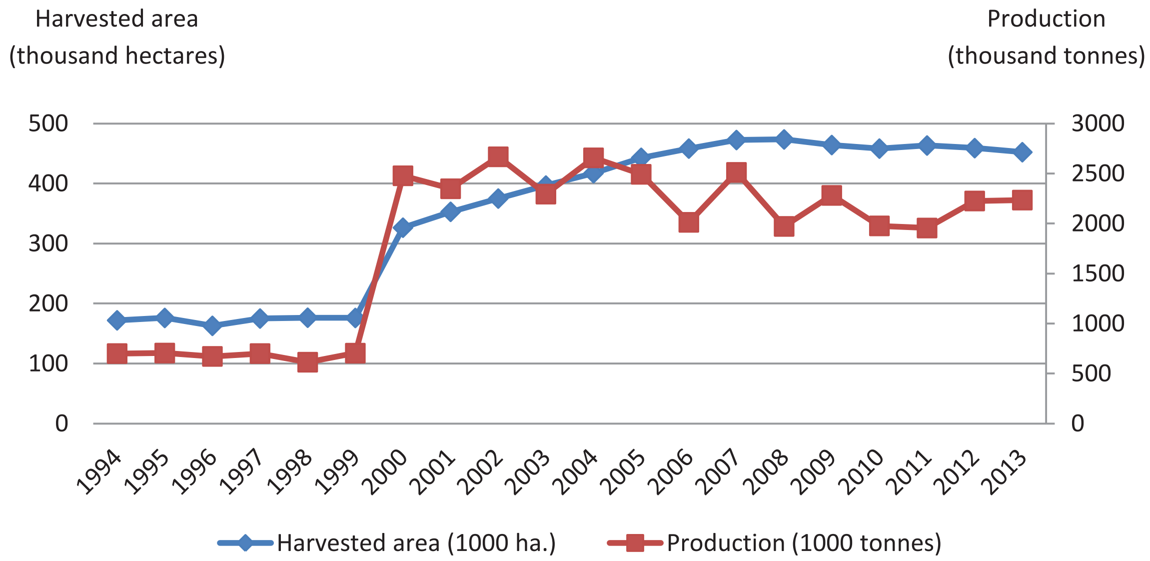
Figure 2.6: Average production of top five tropical fruit producers, from1994 to 2013



Source: FAOSTAT

The fruit industry has been increasing its contribution to the country's economy over the past three decades. As a result, development of the fruit industry has been promoted, in order to diversify from traditional crops, such as rice, maize, sugarcane and tapioca. Despite promotion of the fruit industry, development, productivity and export volumes remained low until the period of the financial crisis in 1997/98. Since 1999, fruit production in Thailand has significantly increased, due to its response to increasing demand for high-quality, safe, fresh fruit for both domestic and international markets. Figure 2.7 depicts a significant increase within fruit area and production in Thailand over the past 20 years, from 1994 to 2013. In particular, from 1999 to 2000, the harvested area and volume of production increased sharply, as a result of expansion within export markets and modern retail chains. In 2013, Thailand's tropical fruits were cultivated in approximately 450 thousand hectares, increasing from 180 thousand hectares in 1999, and the volume of production also increased to 2.2 million tonnes in 2013, from 700 thousand tonnes in 1999.

Figure 2.7: Tropical fruits harvested area and production in Thailand, 1994 to 2013

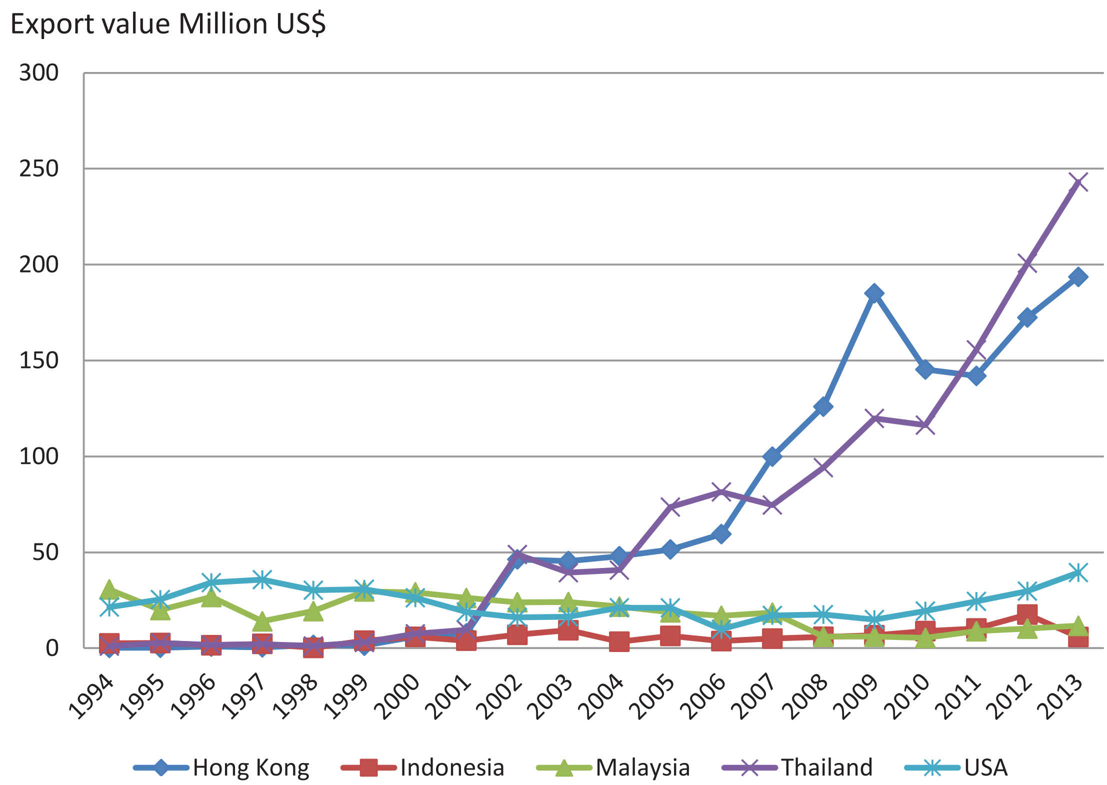


Source: FAOSTAT

The fruit industry is one of the top ten agri-food industries in Thailand, as it brings export income to the country every year. In particular, from 2001 to 2013, the value of fresh tropical fruit exports increased considerably. Figure 2.8 shows that in 2013 Thailand was the world's largest exporter of fresh tropical fruit, followed by Hong

Kong, the US, Indonesia and Malaysia. As presented in Figure 2.8, from 2001 Thailand had an upward trend in export earnings from fresh tropical fruit, following expansion of its production in 2000. Hong Kong was the second largest exporter, although it is not a country which produces fruit.

Figure 2.8: Fresh tropical fruit value exports from top five exporters, 1994 to 2013



Source: FAOSTAT

Apart from fresh fruit, processed fruit such as cooked and dried fruits are also exported. Based on UN Comtrade data, Thailand exported many types of fruit products (including nuts and melons), averaging 889 million US$ annually, from 2009 to 2013 (Table 2.8). During this period, the top five export destinations were China (mainland), ASEAN (mainly to Indonesia, Vietnam and Singapore), China (Hong Kong), the US and Japan, with an average share of 39%, 26%, 15%, 4% and 2%, respectively. Other destinations included the EU, Taiwan, UAE, Canada and Australia.

Table 2.8: Top five destinations and value of Thailand fruit exports, 2009 to 2013

Year	China	ASEAN	Hong Kong	USA	Japan	Others	Total
2009	200	101	108	30	17	100	556
2010	205	117	92	35	18	108	576
2011	463	188	156	37	22	133	998
2012	412	469	131	46	23	119	1228
2013	447	268	172	48	22	130	1087
Average	346	229	132	39	20	118	889
%Share	39%	26%	15%	4%	2%	13%	100%

Note: The figures are in million US$

Source: UN Comtrade

2.3.2 Major fruit production and exportation

Thailand has a wide variety of tropical fruits commercially grown, such as durian, mango, mangosteen, longan, longkong, rambutan, and lychee. Among these types of fruits, durian, mangosteen and rambutan are the main fruit crops (Figure 2.9) grown widely in the eastern and southern regions of Thailand. Due to their economic importance, the government established the Fruit Board (FB) between 2007 and 2011, in order to supervise major fruit growing, in terms of long term production and marketing strategies.

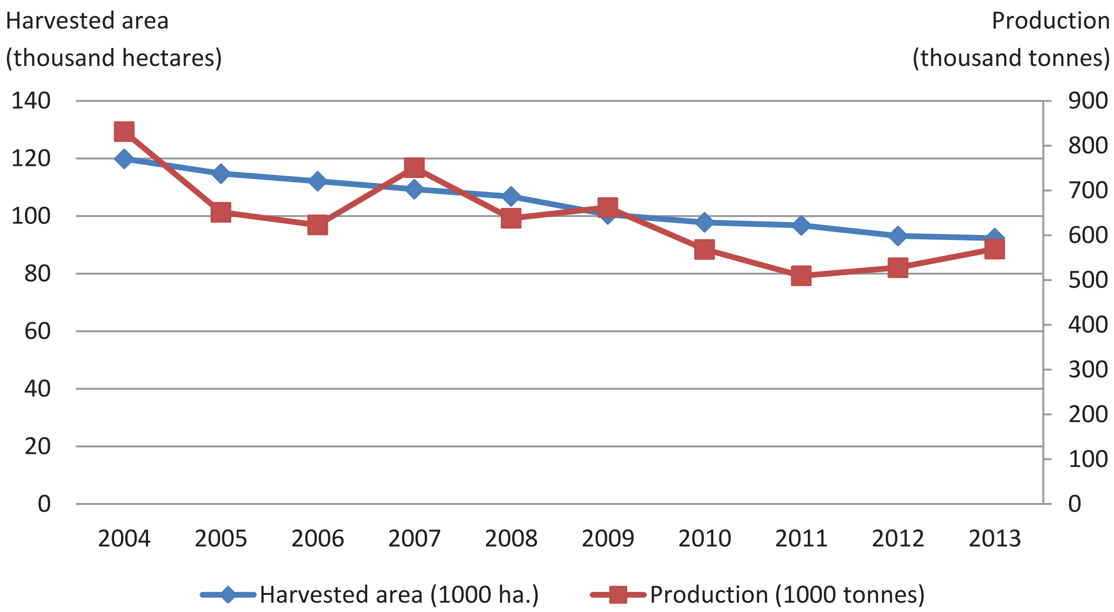
Figure 2.9: Three major tropical fruits produced in Thailand

Over the past ten years (2004 to 2013), although the trends of harvested areas and productions of these major fruit crops have been slightly downwards, export volumes and value have increased. The key fruits are presented as follows:

- *Durian*

Durian is a tropical fruit with a sweet and creamy taste and specifically a strong aroma. It is very popular among Thai people and it is becoming well-known in foreign markets. Durian produced in Thailand is mainly for export. In 2013, durian production in Thailand was approximately 570 thousand tonnes of which about 370 tonnes (65%) was exported. The harvested area and the production quantity of durian have gradually decreased over the last ten years (Figure 2.10). The harvested area decreased by 23% (from 120 thousand hectares in 2004 to 92 thousand hectares in 2013), while production decreased by 31% (from 830 thousand tonnes to 570 tonnes during the same period), due a shortage of particularly skilled labour needed for harvesting.

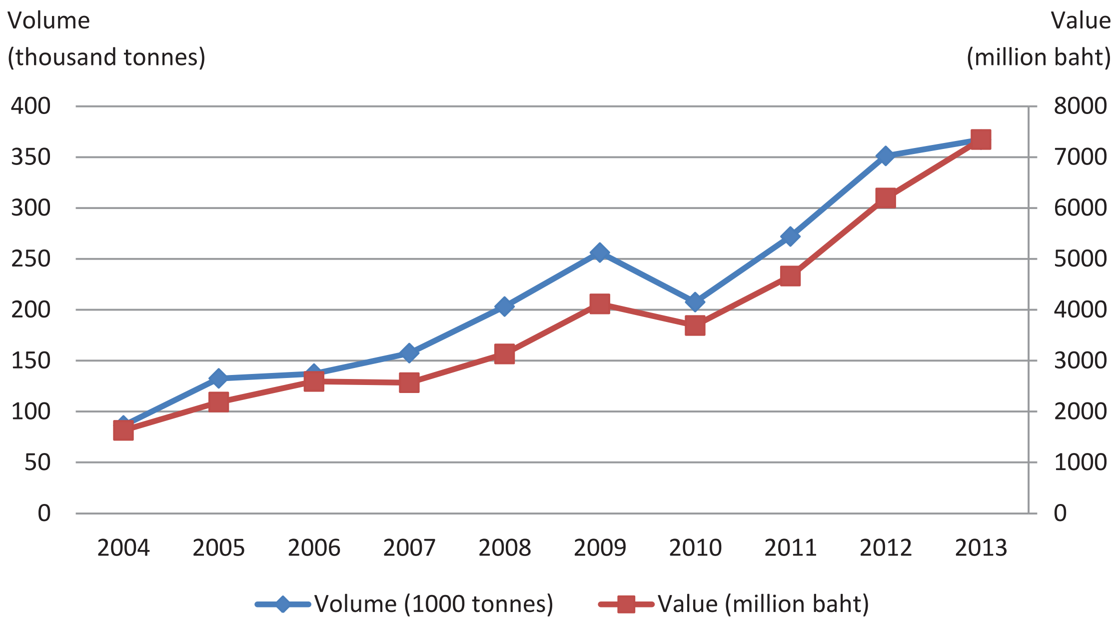
Figure 2.10: Durian harvested area and production in Thailand, 2004 to 2013



Source: OAE (2014a)

Currently, durian is a very high value fruit crop. Despite a decrease in its production, Thailand has exported more durian almost every year during the last ten years (2004 to 2013). Figure 2.11 depicts durian export volume and value continually increasing from 2004 to 2009 and slightly decreasing in 2010, due to a decrease in production, before rebounding in 2011. In 2013, Thailand exported 370 thousand tonnes of durian, valued at 7.3 billion baht. Over the past ten years, the export volume of durian has increased by 311%, from 90 thousand tonnes, and its value has increased by 356%, from 1.6 billion baht in 2004.

Figure 2.11: Thailand's durian export volume and value, 2004 to 2013



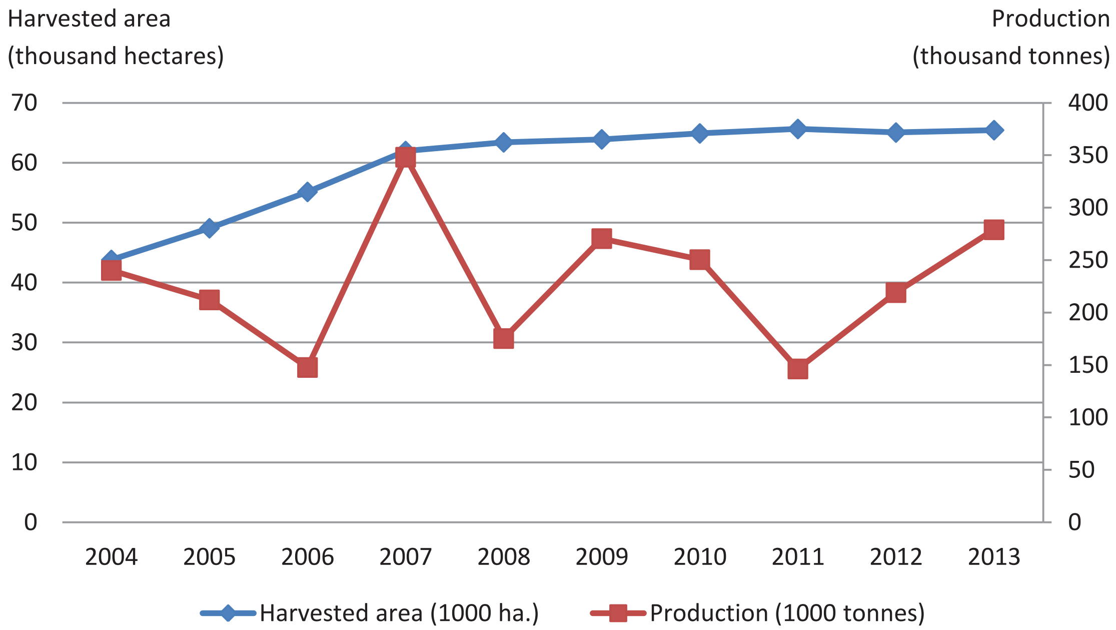
Source: Fruit Information Centre (OAE, 2014b)

Thailand mostly exports durian in the form of fresh produce. The major export destinations are Chinese markets including mainland China, Hong Kong, and Taiwan. Another form of the product is frozen durian which markets mainly in China, the US and Canada (OAE, 2014b).

- *Mangosteen*

Mangosteen is also a tropical fruit grown widely in Southeast Asia. It has a very pleasant flavour with a mild sweet taste and juicy texture. Thailand is one of the key producers and exporters of mangosteen. In 2013, mangosteen production in Thailand was approximately 280 thousand tonnes of which 220 thousand tonnes (79%) were exported. From 2004 to 2013, there was an increase in the harvested area from 44 thousand hectares in 2004 to 62 thousand hectares in 2007, but after that time the harvested area levelled off (Figure 2.12). Production of mangosteen fluctuated over this time with its highest peak in 2007, which amounted to approximately 350 thousand tonnes. This was due to fluctuations in farm prices. The peak of production in 2007 was affected by a price increase in 2006 to 19 baht, from 11 baht in 2005, and then production fell sharply in 2008 from the 10 baht price in 2007. The trend from 2011 to 2013 was upwards, due to farm prices being retained at a high level between 17 and19 baht (OAE, 2014a).

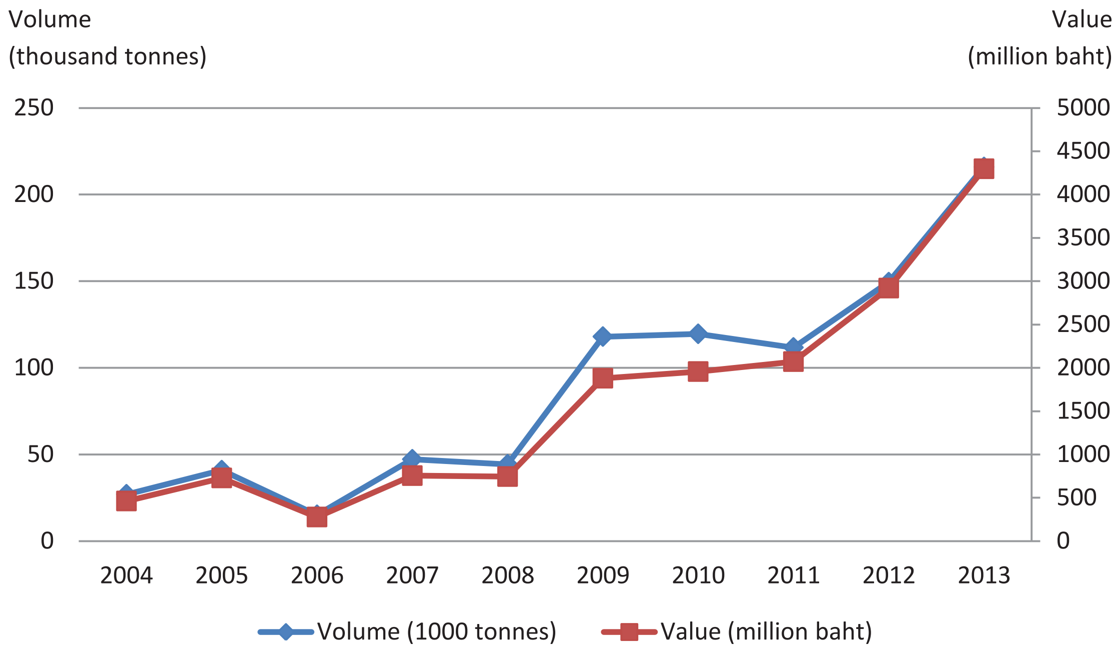
Figure 2.12: Mangosteen harvested area and production in Thailand, 2004 to 2013



Source: OAE (2014a)

Fresh mangosteen is exported mainly to China, Hong Kong and Vietnam, and frozen mangosteen is also exported to South Korea, Taiwan and Japan (OAE, 2014b). Figure 2.13 shows that, over the ten years from 2004 to 2013, total mangosteen exports from Thailand increased considerably, especially during the second half of the period (2008 to 2013). In 2013, the export of mangosteen amounted to 220 thousand tonnes, with 4.3 billion baht in value. Over this ten-year period, the export volume and value of mangosteen expanded to approximately 630% and 830%, respectively, from approximately 30 thousand tonnes, valued at 460 million baht in 2004.

Figure 2.13: Thailand's mangosteen export volume and value, 2004 to 2013

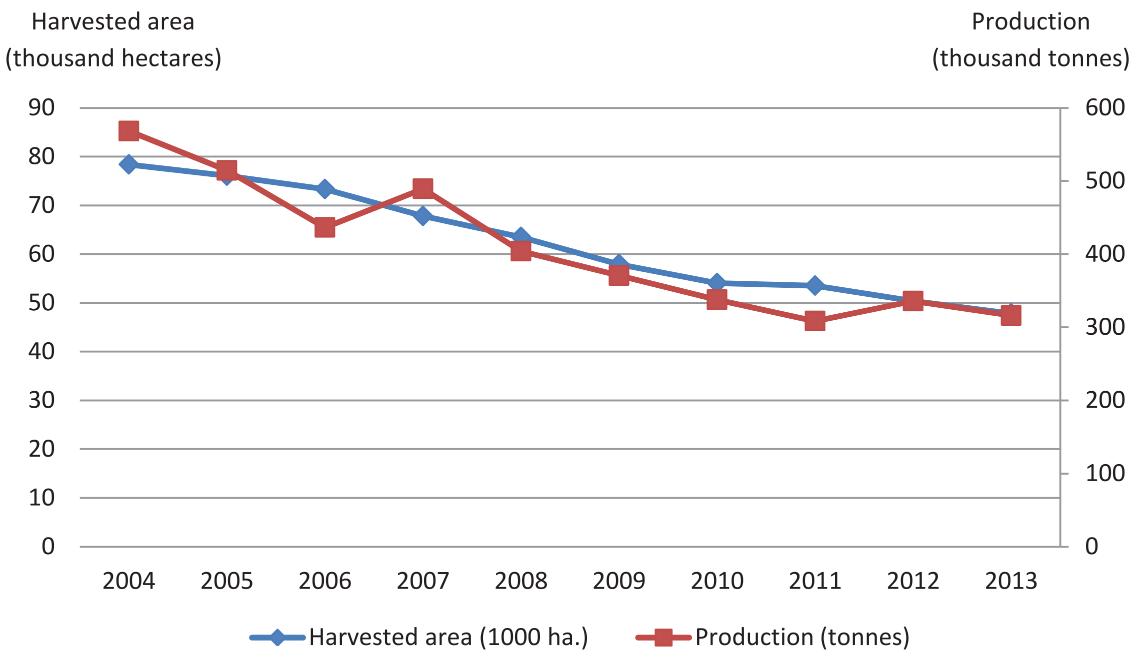


Source: Fruit Information Centre (OAE, 2014b)

- *Rambutan*

Rambutan is another tropical fruit crop usually grown in the same planting area with durian and mangosteen. Unlike durian and mangosteen, rambutan is mainly marketed to domestic markets. In 2013, rambutan production in Thailand was approximately 320 thousand tonnes of which only 11 thousand tonnes (3%) were exported, because the fruit appears unusual for consumers in most countries, except some neighbouring countries. Over ten years from 2004 to 2013, the harvested area of rambutan steadily decreased from approximately 80 thousand hectares to 50 thousand hectares, and the trend of production was also downwards (Figure 2.14). This situation was due to a decline in the rate of domestic consumption from 9% to 7% per annum.

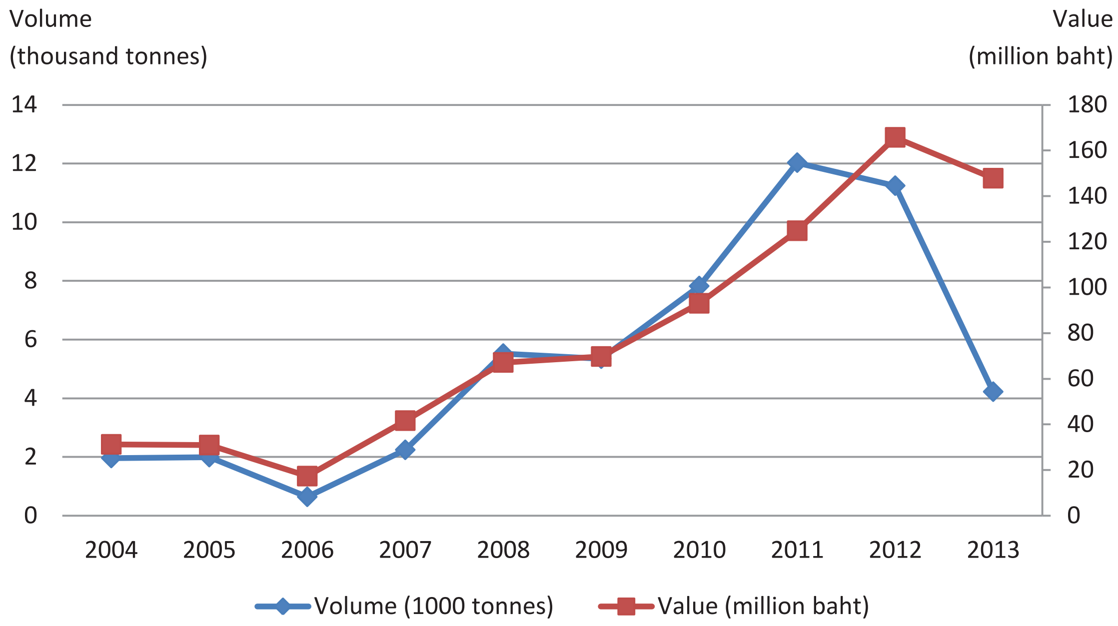
Figure 2.14: Rambutan harvested area and production in Thailand, 2004 to 2013



Source: OAE (2014a)

There was a slight decrease of both volume and value of fresh rambutan exports from 2004 to 2006, and then they stabilised and increased at the end of 2011 (Figure 2.15). In 2012 to 2013, the volume of fresh rambutan exports fell to approximately 11 thousand tonnes and four thousand tonnes, valued at 166 million baht and 148 million baht, respectively. Fresh rambutan export volume decreased in these latter years because Thailand turned instead to exporting more value-added rambutan, such as rambutan with pineapple in syrup and rambutan in airtight containers. This helped to increase the total export value of rambutan from 234 million baht in 2011 to 626 million baht in 2013 (OAE, 2015). The main importers for Thai fresh rambutan were UAE, Saudi Arabia, and Vietnam (OAE, 2014b). Fresh rambutan is not a generally well known product in foreign markets. However, many foreign markets, such as the US and Germany are now familiar with rambutan stuffed with pineapple in syrup (OAE, 2014b).

Figure 2.15: Thailand's rambutan export volume and value, 2004 to 2013



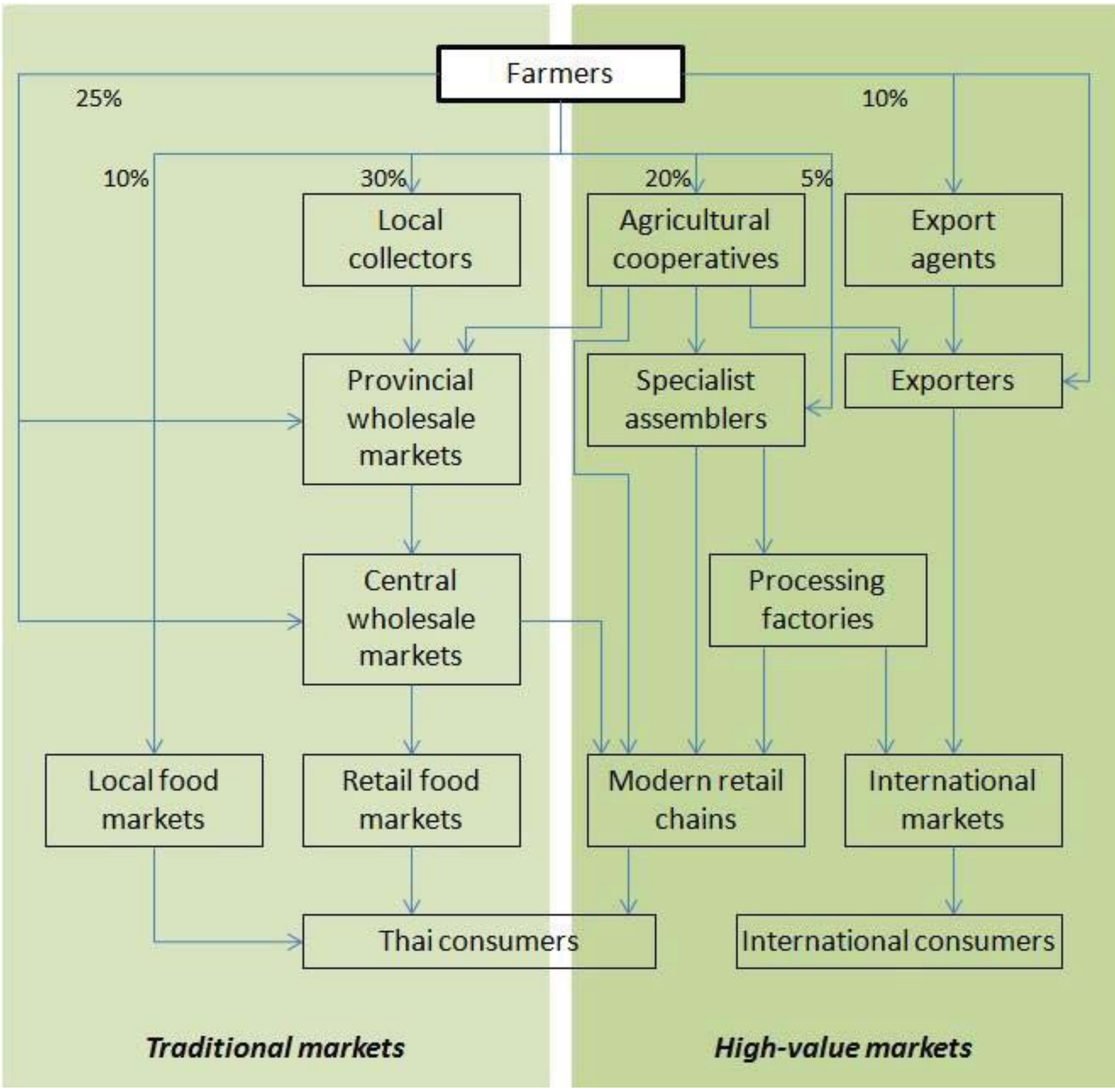
Source: Fruit Information Centre (OAE, 2014b)

2.3.3 Market channels for Thai fruit

Current market channels for Thai fruit not only include TMs, but also many choices of HMs. Despite the rapid growth of HMs, TMs are still important channels in the domestic fruit trade in Thailand. Thai fruit farmers historically sell their produce through TMs, usually through local collectors. The collectors then send the fruit produce to provincial wholesale markets and/or central wholesale markets (near Bangkok and metropolitan areas). Finally, the fruit produce is distributed to retail food markets that are usually called 'fresh markets' (wet markets). According to Wongprawmas, Canavari, and Waisarayutt (2015), Thai fruit farmers also sell their produce at HMs, which do not focus only on the domestic market, but also on export markets. Leading players in HMs are modern retail chains (e.g. supermarkets and hypermarkets) for domestic markets and exporters for international markets. Other players include specialist assemblers and agricultural cooperatives. Specialist assemblers (including professional companies) work as dedicated suppliers, who purchase fruit for meeting the demands and requirements of HM buyers. Agricultural cooperatives are also identified as HM buyers because they play an important role in collecting fruit from members and sell the produce at HMs (Wongprawmas, Canavari, and Waisarayutt, 2015).

Based on the general framework of the fruit marketing chain in Thailand presented by Srimanee and Routray (2012), approximately 30% of produce was sold from farmers via local collectors. Farmers sold their produce directly to provincial or central wholesale markets at approximately 25% of produce. Other intermediaries comprise cooperatives, local markets, export agents and specialist assemblers, with an estimated share of approximately 20%, 10%, 10% and 5%, respectively. Figure 2.16 presents the fruit marketing chain in Thailand based on Srimanee and Routray (2012) and Wongprawmas, Canavari, and Waisarayutt (2015).

Figure 2.16: Fruit marketing chain in Thailand



Source: Adapted from Srimanee and Routray (2012) and Wongprawmas et al. (2015)

There are several market options for Thai fruit farmers, which can be categorised into two broad types: 1) traditional markets (TMs), i.e. collectors, street markets, local markets and wholesale markets; and 2) high-value markets (HMs), i.e. cooperatives, exporter buying agents, modern trade buying agents, exporters and processors (PCO, 2014).

1) Traditional markets (TMs)

- *Local collectors* — Local collectors usually interact with farmers on a one-to one basis, either buying from them at the farm gate or at roadsides near villages where many fruit farms are located. Local collectors provide the most convenient way for farmers to sell their produce. Many collectors also provide harvesting services, especially for durian. These buyers usually supply fruit to larger marketing intermediaries or those in other provinces.
- *Provincial wholesale markets* — Many fruit wholesalers operate their business in well-known locations within fruit producing provinces called provincial wholesale markets. Most of them have long experience in the fruit trade, so they have long standing relations with local collectors and farmers. They usually buy large volumes of fruit either from local collectors or directly from farmers at their own locations, in order to achieve economies of scale and efficient transaction costs.
- *Central wholesale markets* — Some large-scale wholesalers are located in Bangkok (the capital city) and its neighbouring provinces. In order to sell fruit in these markets, farmers need to transport their fruit to the market places, where many buyers come to buy. Although most farmers prefer to sell their produce to buyers at the farm gate, their villages, or other locations within their provinces, some farmers transport their produce to sell at central wholesale markets since road conditions have improved drastically over the past two decades.
- *Retail food markets and local food markets* — These food markets are usually comprised of food retailers, such as green grocers and mobile vendors. Selling fruit to these buyers is a direct marketing option for farmers used to traditional retailers. These buyers buy fruit either at main roadsides in the provinces or at local food markets. Most of these retailers usually buy fruit from wholesale markets, but some of them alternatively buy fruit directly from farmers. However, they usually buy limited quantities.

2) High-value markets (HMs)

- *Agricultural cooperatives* — Located in most districts of fruit producer provinces, agricultural cooperatives play an important role in fruit marketing for farmers. They usually buy fruit from member farmers who produce high quality fruit and meet market requirements. They also focus on value added activities by grading, crating, packaging and sometimes processing the fruit, in order to sell to various markets, such as modern retail chains, exporters, and processing factories.
- *Export buying agents* — Export buying agents usually source quality fruit and supply exporters. They also work with groups of farmers in order to specify fruit quality, safety, grading, packaging and logistical standards set by exporters. In addition they also offer better prices to farmers if quality can be achieved.
- *Specialist assemblers* — As dedicated suppliers, specialist assemblers are usually involved in sourcing, grading and packaging, and they supply to modern retail chains such as supermarkets and hypermarkets. They often work with groups of farmers approved by these modern retail chains. They usually offer better prices to farmers for fruit produce that meets the quality specifications set by modern retail chains.
- *Exporters* — Some exporters locate their operation sites in local areas for crating, grading and packaging. They also buy fruit from agricultural cooperatives, export buying agents and farmers.
- *Processing factories* — Processing factories usually buy large quantities of fruit at an agreed price for fully utilising their production capacities. Thus, they prefer buying fruit from agricultural cooperatives and larger-scale farmers with specifications for fruit quality.
- *Modern retail chains* — These retailers are comprised of supermarkets and hypermarkets that do not directly buy fruit from farmers. They usually sort fruit via specialist assemblers and agricultural cooperatives, and sometimes they buy produce from central wholesale markets.

An interesting characteristic making these markets different from each other is their value added activities. Some markets do not focus on value creation, whereas others add some value activities, such as grading, packaging and processing.

2.3.4 The importance of Chanthaburi province in fruit production

Chanthaburi is a province located in the Eastern Region of Thailand, comprised of 10 districts (Figure 2.17). It covers 633,800 hectares of land area of which 347,400 hectares (55% of total area) are used for agriculture. In 2013, the total number of farms in Chanthaburi was 74,625, with an average farm size of 4.6 hectares. Approximately 72% of the agricultural area is used for growing fruits and other perennial crops, including several types of tropical fruit such as durian, mangosteen, rambutan, longan, longkong, and rubber trees. The remaining (27%) agricultural area is used for field crops, e.g. cassava, rice and maize (16%), and other farming, e.g. livestock and aquaculture (11%).

Figure 2.17: Location of Chanthaburi province and its 10 districts

Source: https://commons.wikimedia.org/wiki/File:BlankMap_Thailand.png
https://commons.wikimedia.org/wiki/File:Amphoe_Chanthaburi.svg

Chanthaburi is the most important province in terms of tropical fruit production in Thailand. Based on statistics recorded by the Provincial Agricultural Extension Office

(PAEO), in 2013 it produced 166,584 tonnes of durian, 91,845 tonnes of mangosteen and 137,634 tonnes of rambutan. These fruit crops are grown in all 10 districts of the province, but the main concentration is in Makham, Khlung, Khao Khitchakut, and Tha Mai districts. Table 2.9 shows the number of farms and quantities of the three main fruit crops produced in each district of Chanthaburi.

Table 2.9: Main fruit production in districts of Chanthaburi in 2013

District	Durian			Mangosteen			Rambutan		
	Number of farms	Area (ha.)	Quantity (ton)	Number of farms	Area (ha.)	Quantity (ton)	Number of farms	Area (ha.)	Quantity (ton)
Tha Mai	8,820	10,308	85,071	4,968	3,491	14,260	6,259	4,220	42,515
Khlung	3,073	5,946	38,549	4,054	3,827	17,196	2,855	2,236	20,643
Khao Khitchakut	1,998	4,754	35,369	1,924	3,493	14,188	3,116	3,191	32,325
Makham	2,652	3,417	27,717	4,816	5,252	23,083	3,789	2,408	23,170
Mueang	844	1,209	8,379	3,504	3,079	12,082	805	732	6,740
Na Yai Am	1,558	1,186	7,960	1,609	1,004	3,983	1,300	726	6,118
Other districts	1944	2889	20844	2235	1815	7053	1197	818	6123
Total	**20,889**	**29,709**	**223,889**	**23,110**	**21,961**	**91,845**	**19,321**	**14,331**	**137,634**

Source: Chanthaburi PAEO

In 2013, Chanthaburi produced durian, mangoteen, and rambutan approximately 44%, 38% and 44% respectively, of Thailand's overall production and 69%, 73% and 61% of the Eastern Region, respectively (Table 2.10). Durian and mangosteen were mainly distributed to export markets. In 2013, approximately 73% of durian produced in Chanthaburi was distributed to export markets, while approximately 79% of mangosteen was exported. The domestic market was the main market for rambutan and this accounted for 93% of its production. Table 2.10 presents the percentages of production and markets for the three main fruit crops.

Table 2.10: Major fruit production and markets for Chanthaburi in 2013

Fruit crop	Quantity (tonnes)	Production		Market		
		% of Thailand	% of the Eastern region	Domestic market	Export market	Processing
Durian	166,584	44%	69%	20%	73%	7%
Mangosteen	91,845	38%	73%	18%	79%	3%
Rambutan	137,634	44%	61%	93%	5%	2%

Source: Chanthaburi PAEO

In 2014, the PAEO forecasted the quantities of durian, mangosteen and rambutan produced in this province at 242,686 tonnes, 102,908 tonnes, and 138,520, respectively. Based on this prediction, there would be an increase of durian and mangosteen production by 46% and 12% from 2013, whereas rambutan production would be steady. Fruit produce in Chanthaburi province is mainly distributed by collectors, exporters, cooperatives and processors. Farms that sell their produce to exporters and cooperatives need to be certified as having Q-GAP standards, whereas other markets may not require this certification. As forecast in 2014, exporters were the largest buyers for durian and mangosteen, while rambutan was mainly distributed in domestic markets, where collectors were the leading suppliers. Cooperatives were the next largest buyers, as they have been developing their purchasing business for mangosteen and rambutan over the past ten years. Processors have a low percent share in the fruit supply from Chanthaburi, whereas other markets were not consistent buyers. Table 2.11 presents the number of fruit buyers and quantities of durian, mangosteen and rambutan purchased by each type of buyer that was forecasted in 2014.

Table 2.11: Number of buyers and quantities of purchasing, forecasted in 2014

	Durian		**Mangosteen**		**Rambutan**	
Buyers	Number of buyers	Volume (tonnes)	Number of buyers	Volume (tonnes)	Number of buyers	Volume (tonnes)
Collectors	61	45,066	74	21,030	10	104,900
Exporters	22	176,543	15	61,410	6	8,756
Cooperatives	11	750	11	11,236	11	4,630
Processors	11	16,908	11	5,000	3	3,229
Other		1,588		4,232		17,005
Total		242,686		102,908		138,520

Source: Chanthaburi PAEO

2.4 Summary

The agriculture sector has been the foundation of the Thai economy and society for centuries. Approximately 43% (22 million ha) of the total land area of the country (51 million ha) is used for agricultural production. Rice is the dominant crop cultivated, in terms of its largest share of agricultural land (47%) and farmer involvement. It is also the most important crop in terms of value of production, followed by natural rubber, sugar cane, and cassava. In the past five years (2009 to 2014), the GDP share of the agricultural sector was 10-11%, contributed from domestic consumption and exportation. In 2014, the most important agricultural exports were rice, natural rubber, cassava, sugar, fruits, vegetables, chicken meat and fishery products. The key export destinations were China (20%), Japan (12%), United States of America (9%) and Malaysia (5%), respectively. Thailand's agricultural sector has undergone rapid transformation over the past three decades, due to a shift in food consumption and the liberalisation of foreign direct investment. This situation has brought about the expansion of high-value markets, e.g. modern retail chains and high-standard export markets, thus changing market characteristics from traditional markets, e.g. traditional food wholesaler markets and wet markets. In response to the growth of high-value markets, Thailand has developed national Good Agricultural Practices (Q-GAP), which are standards used to improve the quality and safety of agricultural products, minimise negative impacts on the environment, and increase consumer confidence in food safety.

Fruit is one of the key high-value agricultural products produced in Thailand. It has been promoted, in order to encourage diversification from traditional crops, such as rice, maize, sugarcane and cassava. Thailand has a wide variety of tropical fruits commercially grown, such as durian, mango, mangosteen, longan, longkong, rambutan, and lychee. Among these types of fruit, durian, mangosteen and rambutan are the main fruit crops, largely produced in Chanthaburi province. In the past 20 years (1994 to 2013), Thailand has been the fifth largest tropical fruit producer after India, the Philippines, Indonesia and China. In particular, from 1999 to 2000, the harvested area and the volume of production increased sharply as a result of the expansion of export markets and modern retail chains. In 2013, the cultivation of Thailand's tropical fruits reached approximately 2.2 million tonnes, which was an increase from 700 thousand tonnes in 1999. The fruit industry also brings export income into the country. In 2013, Thailand was the world's largest exporter of fresh tropical fruit, followed by Hong Kong, the US, Indonesia and Malaysia. The key export destinations for Thai fruit were China, ASEAN countries, Hong Kong, the US and Japan, averaging 890 million US$ annually from 2009 to 2013.

CHAPTER THREE

3 Decision making theory and strategic decision making

3.1 Introduction

The purpose of this chapter is to review the general decision making theory and strategic decision making in particular. It is divided into three main sections. The first section provides a review of the general decision making theory, starting from its concepts of both formative and descriptive approaches. The second section explains decision making within general management, which links to strategic decision making within organisations. The third section specifies the strategic decision making theory. This includes definitions, strategic management process, strategic planning and thinking, the strategic decision making process, and factors affecting strategic decisions comprising goals and the business environment.

3.2 Decision making theory

The origin of formal studies on decision making occurred during the seventeenth century. These studies had been built upon rationality with solid mathematical foundations and practical quantitative methods, and the results of this development have been widely used in many fields of practice including finance, public policy, medicine and automated device diagnosis (Doyle & Thomason, 1999; Fitzgerald, 2002).

Despite the achievements of rational decision making theory, a different notion appeared to criticise rational decision making theory on human behaviour (Bouyssou, 2009). The evolution of decision making regarding human behaviour has included the areas of psychology and sociology (Fitzgerald, 2002). As a result, work on decision making has been based on two approaches: formative and descriptive. The formative approach has its basic assumption in rationality and it focuses on an optimal solution. This approach reached its maturity, with the expected utility theory continuing to be applied in the field of rational decision making. This is because the basic assumptions and methodologies of the formative approach have remained unchanged for centuries (Secchi, 2011). Alternatively, the descriptive approach is based on decision behaviour that focuses on satisfactory solutions and it provides a description of how individuals act in real-life decision making. Decision making theories classified into these two approaches are summarised in Table 3.1

Table 3.1: Summary of decision making theories

Theory	Year	Focus	Proposed by
Formative approach			
Expected utility theory (Game theory)	1947	Mathematical analysis and description of rational choice based on probability	John von Neumann and Oskar Morgenstern
Subjective expected utility theory (SEU)	1954	Rational decision making under uncertainty based on subjective values of utilities and probabilities	Leonard Savage
Descriptive approach			
Bounded rationality theory	1957	Cognitive process of individuals	Herbert Simon
Prospect theory	1979	Human decision behaviours and judgements	Daniel Kahneman and Amos Tversky

3.2.1 Formative approach

Rationality is the basic assumption of the formative approach. There are three important elements involved in rational decision making: the goal, alternatives and outcomes (Bouyssou, 2009). Based on these elements, a single and well-defined *goal*, which is relevant to the clearly identified problem, has to be set and all *alternatives* including their *outcomes* are assumed to be known, in order to make the best choice. In other words, rational decision making requires complete knowledge about all possible alternatives and total expectation of the future outcomes of these alternatives (Pomerol, 2009). Thus, the decision maker is expected to have full access to complete and unambiguous information and also perfect computational capabilities (Secchi, 2011). Accordingly, achieving rationality requires effective resources and sufficient related information, in order to analyse the goal, alternatives and outcomes (Fitzgerald, 2002).

The most influential theory of rational decision making, called the *expected utility theory*, was introduced in 1947 by mathematician John von Neumann and economist

Oskar Morgenstern in their book entitled *Theory of Games and Economic Behavior*. The expected utility theory, an axiomatic approach, is solely mathematical and very common in its description of rational choice. This theory provides the principle of maximising expected utility, which guides decision makers to choose the option that has its expected utility being greater than that of other options, based on probabilistic consequences (Hastie & Dawes, 2010).

Later on, in 1954, Leonard Savage introduced his subjective expected utility theory (SEU), as a method to use in rational decision making under uncertainty. Savage's analytical framework, based on axioms of rationality, includes the concept in which utilities and probabilities are subjective. In addition, as noted by Pomerol (2009), the SEU framework also focuses on a set of uncontrollable events E and a set of alternatives A that decision makers can choose, and then a set of consequences C is defined by the function of $A \times E$. According to Savage's model, the quality of decisions depends on the decision maker's intelligence, because s/he has to be able to distinguish between the alternatives, the consequences and the events. The decision maker who knows the precise probability will smartly choose the best option, as a result of the greater expected utility (Pomerol, 2009).

3.2.2 Descriptive approach

The basic assumption of the descriptive approach lays in human decision behaviour. Based on this approach, a decision will not come from the results of analysis of all alternatives and the expected outcomes, but it is influenced by the decision makers' judgements and experiences (Beach & Connolly, 2005; Hastie & Dawes, 2010). It is considered that substantive rationality is too divergent from reality because human behaviour is not always rational (Beach & Connolly, 2005). The term 'rationality', in the case of humans, usually refers to the process of thinking or reasoning. This brought about the idea of *bounded rationality*, which Herbert Simon introduced in his *Models of Man*, published in 1957. Simon pointed out that rationality is bounded because of limited cognitive capacity and it is based on cognitive processes. Prior to the proposition of bounded rationality, the character of decision making focused only on the optimal outcome. However, Simon argued that not only is the outcome the focus, but also the process by which individuals make decisions has to be taken into account. As far as the classical model SEU is concerned, the outcome and the goal are identical. In other words, there is only one optimal solution to achieve the goal. As noted by Secchi

(2011), the optimal solution indicates the way in which resources are allocated to the only solution providing the outcome that is the goal. Accordingly, allocating resources, in order to achieve the goal, implies that efficiency is the focus. Nevertheless, in human beings, cognitive processes can vary the outcome far away from the goal, as in the case of bounded rationality. The process is the concern in bounded rationality, since it is consistent with effectiveness within the field of management.

In the case of individuals, large amounts of data may not relate to the actual decision making, even though the data is possible and related to a given problem. This is because individuals have limits in their computational ability for finding the optimal choice, and they usually use their prior experience for making decisions that are satisfying (Fitzgerald, 2002; Pomerol, 2009; Secchi, 2011). A satisfying choice is the one that meets a certain level of expectancy. In addition, the level of expectancy is changeable during the search for solutions, depending on searching difficulty. Therefore, a solution, which is just sufficient to solve the problem, would be chosen during the actual behaviour of decision making (Secchi, 2011). Daniel Kahneman and Amos Tversky (1979) also proposed the *prospect theory*—the decision making theory based on human decision behaviour, in order to falsify the assumptions of expected utility theory. Through a series of experiments, it has been repeatedly proven that expected utility theory is not compatible, when describing human decision behaviour. This is because, in the case of individual thought, subjective values of outcomes are not static, due to a reference level called the status quo (Hastie & Dawes, 2010).

Topics related to human decision behaviour normally have a focus on cognitive processes, which appear to be not compatible with rational decision making. Typically, cognitive processes are insufficient to solve a problem in rational decision making, since it requires computational mathematics such as linear programming and this always needs time and effort to do so. In many decision making situations, it is better to have imperfect decisions that can immediately react to the problem, by using a second form of rationality, so-called *ecological rationality* (Raufaste & Hilton, 2009). This idea is similar to an evolutionary study that analyses the adaptation of the cognitive system to the external situation (Gazzaniga, 2008). In such a situation, individuals normally use the mental mechanism that allows them to jump to conclusions, so that they can reduce time and effort in making a decision. As stated by (Gigerenzer, 2001),

"..., intelligent behaviour is the product of "adaptive toolbox" of a species, which hosts a collection of heuristics..." (p. 113)

Many definitions of heuristics have been proposed that they are basically related to mental shortcuts relying on effort reduction (Kahneman & Frederick, 2002; Secchi, 2011; Shah & Oppenheimer, 2008). The goal of using heuristics is to make decisions fast and frugal by reducing time and effort in examining fewer cues, values and weights, as well as alternatives (Shah & Oppenheimer, 2008). Gigerenzer and Gaissmaier (2011) pointed out that heuristics are a subset of strategies used in decision making and they proposed a definition as follows:

> *"A heuristic is a strategy that ignores part of the information, with the goal of making decisions more quickly, frugally, and/or accurately than more complex methods"* (Gigerenzer & Gaissmaier, 2011, p. 454)

This definition indicates that heuristic decision making is efficient and it can be more accurate than mathematical methods. This notion conflicts with the classical explanation that always requires complete information, in order to provide accurate decisions. In the classical explanation, a heuristic decision should trade off some accuracy, as it is a strategy that ignores part of the information (Shah & Oppenheimer, 2008). Gigerenzer and Gaissmaier (2011) argue that spending time and effort to find perfect information, in order to obtain the best course of action, may be important for some but not all decisions. In addition to their effectiveness, heuristics are usually applied in human decision making, due to the limitations of computational ability. Gigerenzer and Gaissmaier (2011, p. 474) further noted that:

> *"a heuristic is not good or bad, rational or irrational; its accuracy depends on the structure of the environment (ecological rationality)... and exploitation of core capacities of the brain"*.

As mentioned previously, the metaphor adaptive toolbox contains a large number of heuristics, and how to apply them effectively depends on two major factors: the structure of the environment and the core mental capacity. Since the environment is dynamic, human decision making is likely to be ecologically rational. In other words, strategies used in decision making would be adapted to the dynamic environment within the real world situation. The other factor leading to effective decisions is the core mental capacity. This is because heuristics will be accurate (fast and frugal) when the core capacities are already in place (Secchi, 2011).

In the field of management, the mental processes in decision making refer to intuitions. Intuitive decision making is defined as *"a subconscious process of making decisions on the basis of experience and accumulated judgement"* (Robbins, 2011, p. 271). Intuitions allow shortcut decisions because it leaves out rational processes. Khatri and Ng (2000) argued that intuition is neither something contrary to rationality, nor guessing by random. They also noted that intuition is subconscious, complex and quick, but is not biased. Similarly, a study conducted by Seo and Barrett (2007) reported that people, who encounter intense feelings and emotions, when making decisions, actually achieve a high performance of decision making, particularly when they understand their feelings at that moment.

Robbins (2011) presented intuitive decision making based on five aspects: experiences, feelings or emotions, values or ethics, subconscious mind, and cognition. Lewis (2006) indicated that decision makers use their intuition to understand a situation very quickly and to find solutions, without using extensive analysis. Intuitions are often used to complement rational analysis in a situation where complete information is not available. Although they obtain only limited information, decision makers, who have had experience with a similar situation, are likely to respond quickly and with more effectiveness (Lewis, 2006; Robbins, 2011).

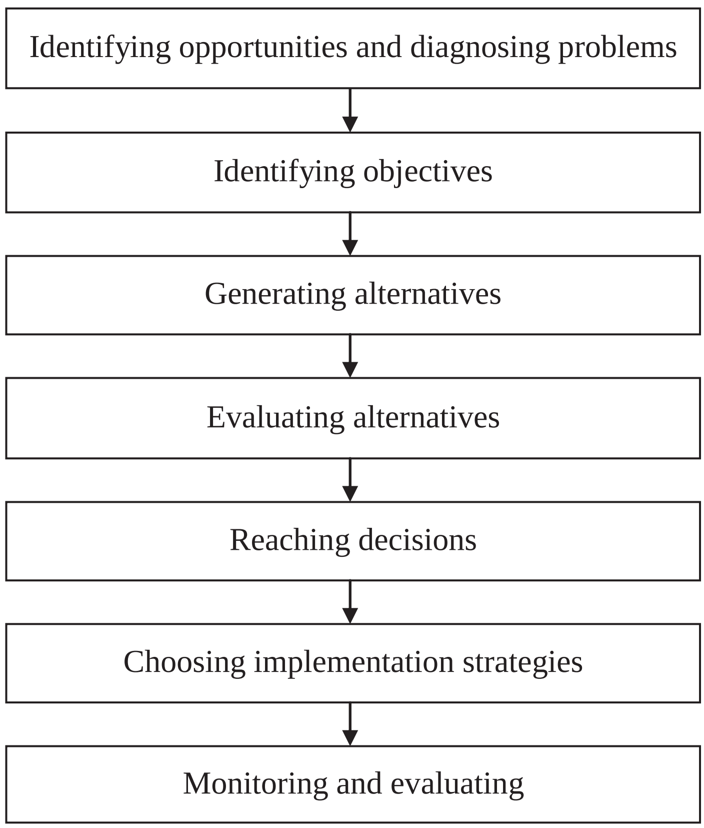
3.3 Decision making in management

3.3.1 Decision making process

Decision making is commonly found in most contemporary texts in the area of management, because it is generally considered an important key element of the management process, since it relates to all levels in organisations (Kinicki & Williams, 2013; Lewis, 2006; Robbins, 2011; Schermerhorn, 2013). Decision making comprises of a series of linked stages of activity, in relation to the point of decision, is termed the *decision making process* (Drummond, 1996). In the area of management, Lewis (2006) defined the decision making process as *"the process through which managers identify and resolve problems and capitalise on opportunities"* (p. 182).

The decision making process usually comprises identification of the problem, specification of goals, developing and evaluating a set of options, and selection of an action. These steps in the decision making process are commonly found in most contemporary texts in the area of management, since decision making is the process that importantly relates to all levels in organisations (Kinicki & Williams, 2013; Lewis, 2006; Robbins, 2011; Schermerhorn, 2013). The decision making process is usually presented as a logical, sequential order (Robbins, 2011). Most management texts include the steps needed to identify problems (or opportunities) and objectives, working with alternatives, making a decision, implementation, and evaluation in the decision making process, for example Kinicki and Williams (2013); Lewis (2006); Robbins (2011); Schermerhorn (2013). Lewis (2006) proposed a comprehensive sequential order for the decision making process that included seven steps (Figure 3.1). These steps are as follows:

Figure 3.1: Seven steps in decision making process



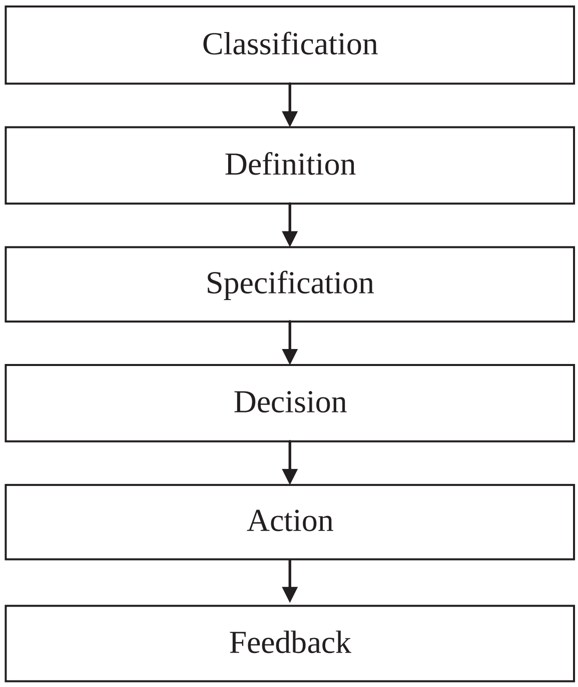
Source: Lewis (2006, p. 184)

- *Identifying opportunities and diagnosing problems*—a decision making process begins with recognition of where action is required. The decision maker has to know the clear definition of opportunities or the diagnosis of problems and ensure accurate assessment of them. This step needs accurate information and correct interpretation, which then leads to good decisions.
- *Identifying objectives*—in order to guide the decision maker to choose the appropriate course of action, objectives (desired results) need to be specified. Objectives can be determined, whether short or long spans of time, depending on the level of decision making (strategic or operational decision making).
- *Generating alternatives*—various ways to obtain the opportunity or to solve the problem are developed, in order to achieve objectives. Generating many good alternatives relies on knowledge and experience of the situation.
- *Evaluating alternatives*—this step involves the valuation or comparison of the relative advantages and disadvantages among the alternatives generated. Furthermore, decision criteria, including tools of analysis, may be used to evaluate alternatives.
- *Reaching a decision*—a final choice needs to be made in this step. In some cases, selecting the best choice is not straightforward because the alternatives considered are not clear-cut. Therefore, the final decision is often based on careful judgements.
- *Choosing implementation strategies*—after a decision is made, steps in the decision making process will go further, in order to choose ways to put the selected course of action for effective implementation. This requires (i) acceptance and support by those who are responsible for the implementation; and (ii) appropriate planning and consideration of the resources necessary to implement the decision.
- *Monitoring and evaluating*—the decision making process finishes with the effect that the decision has been evaluated. Monitoring and evaluating creates ongoing decision making feedback, so the decision maker knows whether further corrective action needs to be undertaken, in order to achieve the objectives (Lewis, 2006).

Although there are some different viewpoints on the decision making process, most common management texts have many similarities and may include steps for the decision making process, as presented above. This common decision making process corresponds with the rational model used in formative decision making. As reviewed earlier, the rational decision model always involves three important elements: goals (or objectives), options (solutions or alternatives) and outcomes (or consequences). In the decision making process, following identification of objectives, the decision maker is involved in finding alternatives and assessing the outcome of each alternative, in order to reach the best choice.

However, P. Drucker (2003) proposed a different sequential order for the decision making process that excludes steps related to analysis of options and outcomes. Drucker's decision making process consists of six steps (Figure 3.2):

Figure 3.2: Drucker's decision making process



Source: P. Drucker (2003)

- *Classification*—the decision maker captures a symptom of a problem and classifies the problem, whether it is generic or exceptional. The generic problem can always be answered by a rule or a principle, while the exceptional problem has to be handled as it occurs.
- *Definition*—a problem is defined by what it is all about and this is the key to the situation. The decision maker considers a correct and complete definition.

- *Specification*—the objectives that the decision has to reach are set. Drucker calls these objectives "boundary conditions" because a decision has to satisfy the condition that is bounded. These boundary conditions are necessary to be set, in order to know when a decision should be abandoned.
- *Decision*—the decision maker makes a correct decision (which satisfies the boundary conditions), rather than a precisely acceptable decision.
- *Action*—this step converts the decision into action. This action also needs planning in regards to work assignments and people who are available to carry out the plan.
- *Feedback*—the final step is concerned with monitoring and reporting information, in order to provide ongoing testing of the expectations that underlie the decision (Drucker, 2003).

The decision making process proposed by P. Drucker (2003) is different from many formal management texts for several reasons. Firstly, Drucker focused on effective, satisfactory decision making that is consistent with the idea of descriptive decision making. Secondly, he aimed to apply his decision making process to executives, and indicated that executives make decisions that are sound (effective) rather than clever (efficient). Thirdly, he also noted that executives normally distinguish the problem, whether it is strategic or generic, rather than being specific to problem solving. Thus, the analysis technique, in accordance with alternatives and the expected outcomes, is not included in his decision making process. Finally, how a decision is made depends on the type of problem that needs to be answered, by principle or by practice.

3.3.2 Managerial decision conditions

Information concerning the environment surrounding a decision is not always known. In some situations, decisions have to be made with limited information. There are three conditions that decision makers may face when making a decision:

- *Certainty* refers to a situation in which decision makers can make a decision accurately because the outcome of every alternative is known. Thus, decision makers can choose the alternative that provides a maximised outcome.
- *Risk* involves a situation in which decision makers can estimate the likelihood (probability) of alternative outcomes. The ability to assign probabilities to alternative outcomes may come from secondary information or personal

experiences. A decision is made based on consideration of expected value (outcomes) of each alternative.

- *Uncertainty* exists when the probabilities of alternative outcomes are unknown. Under uncertainty conditions, alternative outcomes can be estimated, but the probabilities cannot be assigned. Thus, the decision relies on the limited amount of information (Robbins, 2011).

Within organisations, most decisions are of a routine nature and usually involve certainty or risk, while important decisions are normally made under uncertainty (Miles, 2012). In other words, lower-level decisions, such as operational decisions, involve certainty or risk, whereas top management faces uncertainty in which a limited amount of information is available.

3.3.3 Levels of managerial decision making

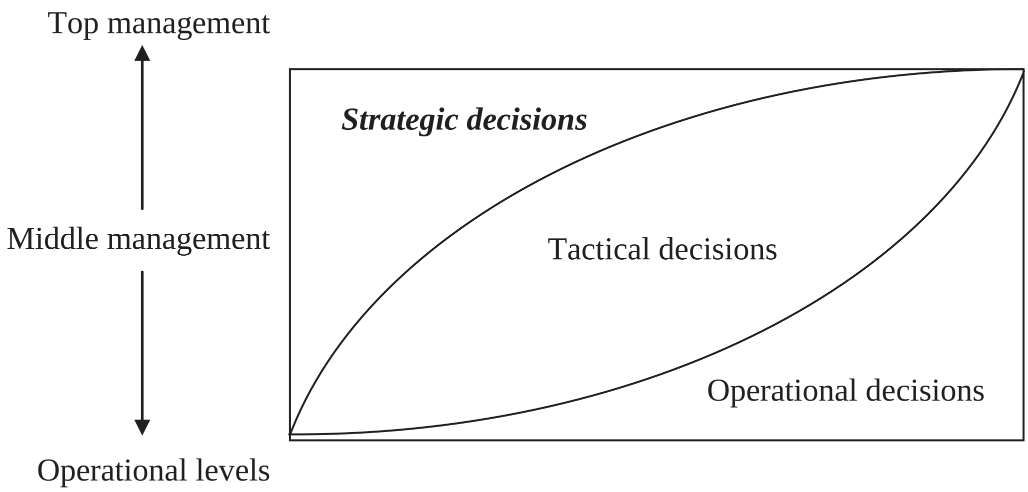
Decision making is part of the nature of managerial work. In an organisation, decisions that need to be made range widely. Decisions are also made at different levels in the hierarchy of an organisation. There are three levels of managerial decision making:

- *Strategic decisions* need to be made at the highest level. Affecting and shaping the direction of the organisation, strategic decisions involve the selection of the organisations' objectives or goals and the organisation's new strategies, such as decisions concerning the development of a new product, the positioning of the new product, and investment in a new production process. Although these decisions are generally made by top management, lower management and employees serve as an information source within this decision making.
- *Tactical decisions* are usually made by middle management and include how to implement the chosen strategies, such as marketing strategies. Sometimes, tactical decisions are called administrative or organisational decisions. They relate to the organisational structure design and the allocation of the organisation's resources. Since organisational decisions are placed in the middle of the organisation hierarchy, they need to be made as a consequence of strategic decisions, or as a result of problems arising from operational tasks.
- *Operational decisions* are usually made at lower levels and they relate to the routine implementation and optimisation of resources within the organisation. These decisions include repetitive operational problems in regards to the daily

regulation and control elements, such as inventory levels, cost budgets, and sale figures (Keuning, Bossink, & Tjemkes, 2010).

As mentioned previously, decisions at these three levels have to be consistent with each other. Keuning et al. (2010) further described that a manager does not just make decisions within the level for which s/he is responsible. These decisions are part of other level decisions. Figure 3.3 illustrates the time and attention allocated by managers that are related to different levels of managerial decision making.

Figure 3.3: Time and attention allocated by managers that are related to different levels of managerial decision making



Source: Keuning et al. (2010, p. 37)

3.3.4 Types of managerial decisions

In the decision making process, decision makers firstly have to undertake specific actions, in order to understand the problem, such as classifying, diagnosing and defining the problem. Robbins (2011) noted that some problems are familiar and straightforward, because information about them is available, complete and easily defined. Such events are called *structured problems*. Conversely, in some cases, problems are unusual, due to incomplete and ambiguous information, namely *unstructured problems*. The discrepancy of such problems creates two types of decisions: programmed and non-programmed decisions.

- *Programmed decisions*—this decision type is defined as a repetitive decision that is made, in order to handle a routine situation (Lewis, 2006; Robbins, 2011).

Involving structured problems, programmed decision making is relatively simple and refers to past experience or previous solutions. The alternatives are very few and commonly familiar to the decision makers because they have proved successful in the past. Decision makers, who rely on programmed decisions, will make their decision by following a procedure, rule or policy (Robbins, 2011).

- *Non-programmed decisions*—this decision type refers to unique decisions that are made to tackle poorly defined or unstructured problems (Lewis, 2006; Robbins, 2011). Decision makers, who rely on non-programmed decisions, require considerable creativity and innovation, in order to elicit a list of reasonable alternatives and develop unique solutions. Strategic management commonly faces these types of decisions in which predetermined methods (i.e. procedures, rules or policies) cannot be applied (Mintzberg, 1980).

Other different characteristics of the two types of managerial decisions are goals and a time frame for solution. The goals of the programmed decision are clear and specific, whereas the goals of the non-programmed decision are vague. The solution for non-programmed decisions is relatively longer than that of programmed decisions. Table 3.2 shows all the different characteristics of these two decision types.

Table 3.2: Programmed and non-programmed decision characteristics

Characteristics	**Programmed decisions**	**Non-programmed decisions**
Type of problem	Structured	Unstructured
Managerial level	Lower levels	Upper levels
Frequency	Repetitive, routine	New, unusual
Information	Ready available	Ambiguous or incomplete
Goals	Clear, specific	Vague
Time frame for solution	Short	Relatively long
Solution relies on -	Procedures, rules, policies	Judgement and creativity

Source: Robbins (2011, p. 273)

3.4 Strategic decision making

3.4.1 Definition of strategy

The term 'strategy' was originally used in a military sense, but it has been applied in a business context since the 1960s (Kiechel, 2010). Peter Drucker (1954) was the first management theorist who addressed this strategic issue. To him, strategy was the answer to the two questions: "What is our business?” and “What should it be?". In strategic management literature, a number of definitions for the term 'strategy' have been proposed. One of the most classical definitions was proposed by Alfred Chandler (1962) in his ground breaking work *Strategy and Structure: Chapters in the History of American Industrial Enterprise*. He defined strategy as:

"... the determination of the basic long-term goals of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals" (Chandler, 1962, p. 13)

Hofer and Schendel (1978) argued that strategies are major tools for coping with both external and internal changes. They proposed the definition of strategy as:

"The basis characteristics of the match an organization achieves with its environment" (Hofer & Schendel, 1978, p. 4)

Similarly, Mintzberg (1987) explained that strategies are determined, in order to set direction, focus effort, define the organisation, and provide consistency in response to the business environment. These definitions include the authors' views about the *goal* and the *environment* related to the term of strategy. It is generally accepted that strategy relates to achieving goals by matching the firm's resources and competence with threats and opportunities in the environment (Hitt, Ireland, & Hoskisson, 2011; Jeffs, 2008; Rothaermel, 2013).

Strategies are also about decision making. Within an organisation, strategy is a part of the management process concerned with the need to make decisions (Wilson & Gilligan, 2004) . Some strategic scholars also defined strategy as being about decisions for strategic issues and include:

"... the pattern of decisions in a company that determines and reveals its objectives, purposes or goals, produces the principal policies and plans for achieving those goals,

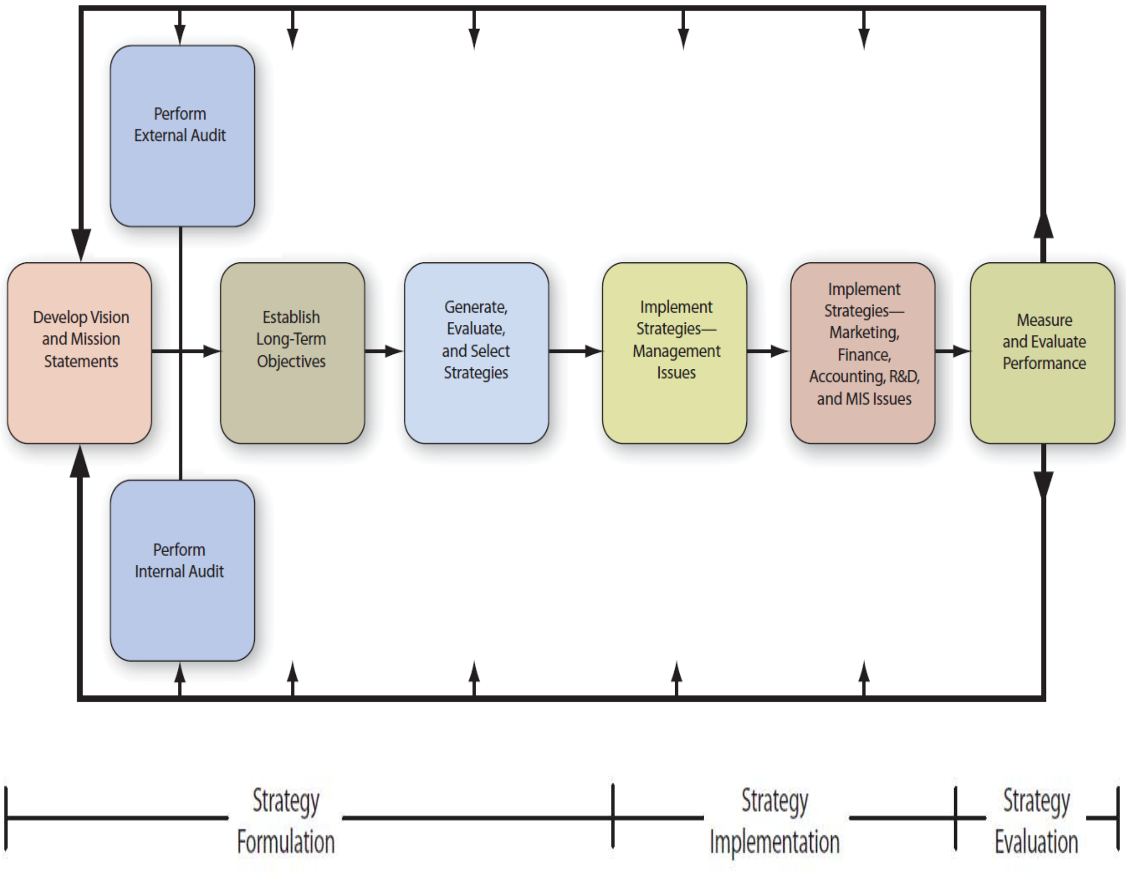
and defines the range of business the company is to pursue, the kind of economic and human organization it is or intends to be" (Andrews, 1987, p. 13).

From these definitions, strategic decision making plays a key roles in strategic management processes within organisations.

3.4.2 Strategic management

Strategic management is typically defined as the management process of formulating and implementing strategies, in order to meet organisational goals (David, 2011; Jeffs, 2008; Mintzberg, 2002). From this typical definition, formulating strategies involves understanding the business environment and choosing the strategy or strategies, and implementing strategies involved with setting organisational structure, allocating resources and evaluating strategies. According to David (2011), the strategic management process consists of three stages (Figure 3.4):

Figure 3.4: Comprehensive strategic management model



Source: David (2011, p. 15)

- *Strategy formulation*— this stage includes developing vision and mission, identifying opportunities and threats from the external environment, determining strengths and weaknesses of the firm's resources or the internal environment, establishing long-term objectives, generating and evaluating alternative strategies, and selecting particular strategies to pursue;
- *Strategy implementation*— or action stage that requires the firm to implement the formulated strategies by establishing short-term objectives, devising policies, motivating employees, and allocating resources. It also requires effective organisational structure, marketing efforts, information systems, interpersonal skills of all managers and employees, and the link between compensation to the organisation's performance;
- *Strategy evaluation*— this final stage reviews the environmental factors that are related to current strategies, measures performance and takes actions in regards to correcting strategies (David, 2011).

In strategic management, a firm has to make decisions on how to formulate its strategies and also allocate finance and other resources that are required for implementing the strategies (Morden, 2007). Although decision making involves the entire process of strategic management, strategic decisions largely focus on the stage of *strategy formulation*. This is because strategic decisions determine the scope of the firm (Mintzberg, 2002; Shivakumar, 2014) that contributes to competitive advantage (Porter, 1998). Similarly, Drucker (2007) pointed out that the prime responsibility in strategic management is to think through the overall *mission* that addresses the basic question "What is our business?". This brings about the establishment of goals and objectives for selecting particular strategies, and it subsequently brings about strategic direction and resource allocation to key results.

A mission is a general expression of *purpose* that distinguishes the scope and boundaries of a firm (David, 2011; Johnson & Scholes, 2002). Many business firms usually develop a mission statement, in order to address their main aspirations: a so called *vision* or *strategic intent*. A clear mission statement provides the foundation for establishing *goals* or long-term *objectives*. Johnson and Scholes (2002) explained that goals are general statements of purpose in line with the mission, whereas objectives are more likely to be quantified or have a more precise purpose in line with the goals. Together with the mission, goals, or objectives, strategic decision making is based on information gathered from the business environment. David (2011) classified the business environment as following:

- *External opportunities and threats*— factors that are uncontrollable for a single firm, including demographic, political, economic, social, technological, environmental, and competitive trends and events that could significantly benefit or harm the firm in the future;
- *Internal strengths and weaknesses*— factors that a firm can control, referring to the firm's resources and competences that are determined, relative to competitors, and they arise in management, marketing, operations, finance and other activities of a business.

Strategic decisions within the strategy formulation process are also involved with generating, evaluating and selecting strategies which are shaped by the mission, goals or objectives, together with the external and internal environments described above.

3.4.3 Strategic planning and strategic thinking

David (2011) stated that the term *strategic management* (often used in academia) and the term ***strategic planning*** (often used in the business world) may be used synonymously. According to him, both terms are not completely similar to each other, since the former refers to strategy formulation, implementation and evaluation, whereas the latter refers only to strategy formulation. As mentioned earlier, strategic decisions largely focus on strategic formulation, so they should also be closely related to strategic planning. Strategic planning is about *analysis*:

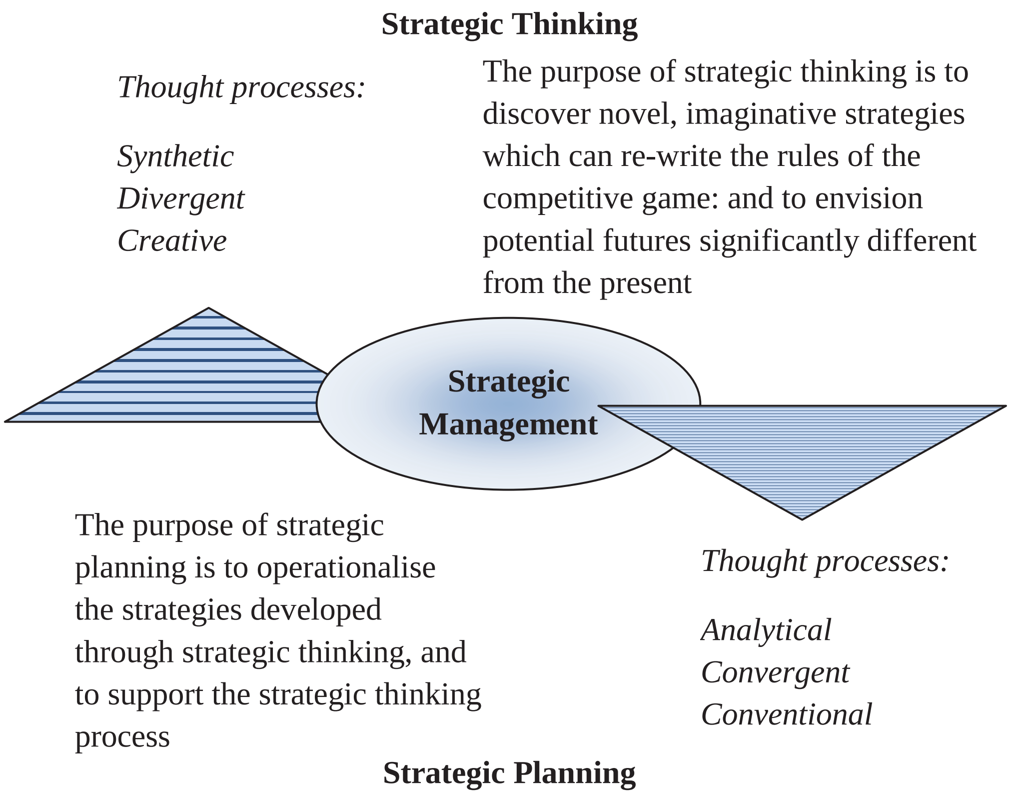
"*about breaking down a goal or set of intentions into steps, formalizing those steps so that they can be implemented almost automatically, and articulating the anticipated consequences or results of each step*" (Mintzberg, 1994, p. 108)

Strategic planning concerns a formal process focusing on quantitative information, and it also refers to intended strategic development, resulting from rational decision making that is a highly systematic approach or step-by-step analysis (Jeffs, 2008; Johnson & Scholes, 2002). However, strategic decisions are not solely analytical or systematic, because the strategy formulation partly depends on another form of thought related to vision and creativity, called ***strategic thinking*** (Bonn, 2005; Thompson & Strickland, 2003). Mintzberg (1994) argued that strategic thinking is about *synthesis*:

"*It involves intuition and creativity. The outcome of strategic thinking is an integrated perspective of the enterprise, a not-too-precisely articulated vision of direction*" (Mintzberg, 1994, p. 108)

Strategic thinking sometimes refers to emergent strategic development, because strategic formulation is more experimental in nature and it is unstructured in form (Jeffs, 2008). Heracleous (1998, p. 482) argued that "*strategic thinking and strategic planning are two distinct thought processes, where strategic planning is analytical and convergent, whereas strategic thinking is synthetic and divergent*". He further indicated that these two thought processes are interrelated, and they need to be complementary to each other for effective strategic management. Figure 3.5 illustrates the distinction and interrelationship between strategic thinking and strategic planning in strategic management.

Figure 3.5: Strategic thinking and strategic planning



Source: Heracleous (1998, p. 485)

Graetz (2002) confirmed that strategic decisions requires both left- and right-brain thinking styles that reflect planning and thinking components, thus providing a powerful driving force within strategic decision making. Similarly, David (2011) commented that strategic thinking and planning are not either/or choices for strategic decisions that require intuitive people who know the business and integrate it with analysis.

3.4.4 Concept of strategic decision making

As mentioned earlier, *strategic decisions* are non-programmed decisions that affect the direction of a firm and they are the responsibility of top management in dealing with unstructured problems or new and unusual situations. Furthermore, strategic decision making largely focuses on strategic formulation involved with strategic planning and thinking. According to Shivakumar (2014), strategic decisions significantly change the *degree of commitment* and the *scope of the firm*. The degree of commitment refers to whether it is difficult to reverse the decisions, such as investments, relationships and business policies, whereas the scope of the firm refers to the firm's market creation (such as choice of products and markets) and organisational activities (such as people and culture of the firm). He further indicated that the modern definition of strategic decisions only covers significant change of the scope of a firm, because the business environment change rapidly, the product life cycle is compressing, and there is a need for flexibility and agility within a business.

According to Mintzberg (2002), strategic decisions are based on insight that comes from the evaluation of the business environment, and they are responses to various strategic questions, including “What is the scope of the firm?”, “Who is the target customer for the firm's products and services?”, “What differentiates the firm from its competitors in the eyes of customers?” and also several other questions about competitive perspectives. Although different authors have placed different focuses on *competitive strategy*, there seems to be a movement towards viewing the firm's strategic decisions as actions in dealing with the influence from competitors' strategies. Porter (1996) pointed out that strategic decisions involve the firm’s strategic positioning, by "*choosing activities that are different from rivals*" (p.55). Competitive strategy is the bases on which a firm might create and sustain *competitive advantage* in its market (Johnson & Scholes, 2002). From this point of view, strategic decisions are taken in regard to the firm's longevity, as competitive advantage is the key to long-term survival and profitability (Heene, 1997). Competitive advantage is a significant advantage that allows a firm to outperform its competitors and it is achieved by offering customers greater benefits through a lower price or added value (Jeffs, 2008). According to

Porter's generic theory, a firm can achieve its competitive advantage through one of three generic strategies (Porter, 1998). These strategies are as follows:

- *Cost leadership strategy*—this strategy focuses on reducing costs for a firm, in order to become the lowest-cost producer in its market or industry, thus leading to increasing profits (when offering market prices) or achieving a large market share (when offering lower prices);
- *Differentiation strategy*—this strategy involves making products or services that are different from those of competitors and having a superior performance that benefits customers over a large part of the market;
- *Focus strategy*—this strategy concentrates on one or more narrow market segments or niche markets, and within these particular markets the firm attempts to achieve either a cost advantage or differentiation.

The concept of this generic theory is closely related to the concept of *marketing strategy,* since both concepts have a competitive implication. As noted by Wind and Robertson (1983), marketing strategy focuses on the quest for long-term competitive advantage, and it can be viewed as an integral part of and perspective for business strategy. This is because the paradigm of business competition, for several decades, has been shifted from production orientation to market orientation. Theodore Levitt wrote in the *Harvard Business Review* in 1960 referring to production orientation as 'marketing myopia,' which business firms should avoid by focusing on customers (Levitt, 2008). He further pointed out that, in order to be successful, the competitive strategy has to be consistent with customer needs and preferences.

Kotler (1997) defined marketing strategy as *"the broad principle by which the business unit expects to achieve its marketing objectives"*. In his mind, marketing strategy comprises basic decisions on market segmentation, marketing program, marketing expenditure and allocation. Market issues are the key driving force behind all strategic decisions of a business firm, because marketing strategies are not only determined by the marketing department, but also other related functions (Kotler & Keller, 2012). Similar to business strategic decisions, marketing strategy decisions deal with the analysis of market opportunities and strategic situations within the environment, developing marketing strategies, and allocating a firm's resources to a marketing mix, in order to meet marketing objectives and contribute to the goals of the firm (Homburg, Kuester, & Krohmer, 2009). From this viewpoint, decision making can be divided into two levels: (i) strategic decisions that are involved with marketing opportunities and strategic situations and (ii) tactical decisions that are involved with developing marketing strategies (as reviewed in 3.3.3). According to Kotler (1997), developing marketing strategies consists of two main parts, as follows:

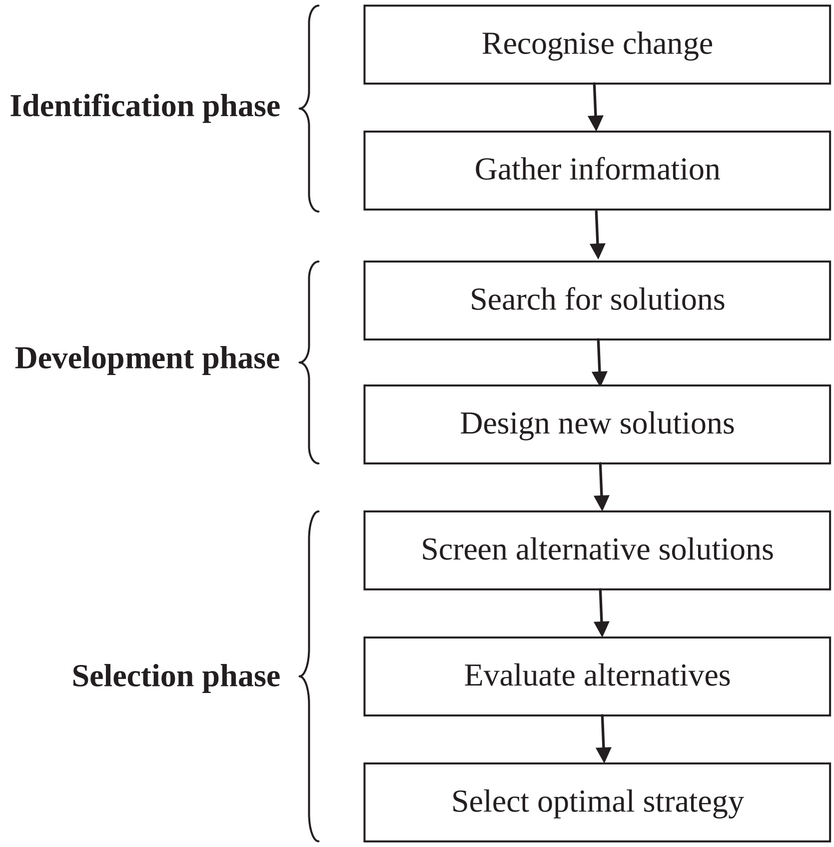
- *STP marketing* (Segmentation, Targeting, and Positioning)—the process of defining and dividing a broad market into identifiable segments, selecting which potential segments the firm will focus on, and differentiating the product offered by choosing one or two features to be emphasised in communications to potential customers
- *Marketing mix* or four Ps of marketing (Product, Price, Place and Promotion)—a set of marketing tools that the firm uses to pursue its marketing objectives in the target market. The product is related to quality, design, packaging and branding; the price includes commissions to marketing intermediaries, discounts and credit terms; the place means marketing channels and physical distribution; and promotion consists of advertising, personal selling, public relation, sales promotion, and direct marketing.

In short, strategic decisions, in term of business, are important decisions that affect the entire direction of the firm, and they are the responsibility of top management when dealing with strategic problems. Strategic decisions relate to achieving goals by matching the firm's resources with the external environment, and they focus largely on strategic formulation within strategic management process. Moreover, these decisions are made by taking into account the firm's competitive advantage which is marketing-oriented.

3.4.5 Strategic decision-making process

Since strategic decisions are made by integrating intuition and analysis, the model of the strategic decision making process may vary from that presented in Section 3.3.1. In 1976 Henry Mintzberg, an early strategic theorist, explored the process of strategic decisions by examining decisions made in 25 organisations. The results suggest that the strategic decision-making process consists of seven steps divided into three phases (Figure 3.6).

Figure 3.6: Strategic decision-making process



Source: Brouthers, Andriessen, and Nicolaes (1998, p. 132)

- *Identification phase* comprises two steps: firstly, the management recognise changes in the environment that will lead to a problem or opportunity, and secondly, the information related to the changes is collected for a better understanding the event;
- *Development phase* includes the two following steps: firstly, alternative solutions addressing the event are investigated, both internally and externally, and secondly, potential solutions are designed (including existing strategies that are modified to fit the new environment);
- *Selection phase* is divided into three steps: firstly alternative solutions are screened so that a few of them are selected to be examined in detail, secondly, after screening, the alternatives are evaluated by analysis and judgement, and thirdly, a final decision is made about which strategy to pursue (Brouthers et al., 1998).

This strategic decision making process integrates both concepts of strategic thinking and planning, since it includes formal steps of analysis for the optimal strategy, together with the decision maker's thinking, recognition, and judgement. Luffman (1991) proposed a strategic decision making process in a different way, focusing more on strategy analysis and including steps of implementing and monitoring strategy. His model comprises five steps:

- *Identification of strategic problem*— the decision maker firstly considers whether the existing strategy can satisfy long-term objectives. Strategic problems can be identified via both internal and external environments;
- *Analysing strategy*— information related to the strategic problem is collected, in order to analyse the strategic position and includes internal appraisal and external environment analysis;
- *Formulating strategy*— this step involves determining strategic direction for the products and markets that can meet the long-term objectives, developing strategies, and selecting an optimal choice;
- *Implementing strategy*— this step requires effective organisational structure, and leadership and interpersonal skills among people in the organisation for successful implementation;
- *Monitoring strategy*— this step involves setting standards and measures for monitoring the progress of strategic implementation, to see whether it meets the desired performance, and some modifications may be undertaken (Luffman, 1991).

Unlike those presented in Section 3.3.1, these strategic decision making processes are specific to strategic problems, and they do not include the process of setting goals (or objectives). It is generally assumed that long-term goals, objectives, and others related to the purpose of the organisation, such as its vision and mission, have been set prior to the process of strategic decision making, which is always taken to achieve these goals.

3.5 Factors affecting strategic decisions

The concept of strategic decisions, strategic management, and the strategic decision making process clearly confirm that strategic decisions are made in order to achieve *goals* at the organisation-level by matching the *internal environment* with the *external* *environment*. Therefore, factors that affect strategic decisions are generally related to internal environment (internal business capabilities and constraints), external environment (external conditions the firm faces), and the goals (Carroll, Lewis, & Thomas, 1992).

3.5.1 The internal environment

The internal environment leads to strengths and weaknesses within a business firm and it also impacts on its strategic decisions and competencies. Key internal forces comprise the firm's functions, such as marketing, production/operations, finance, accounting, management and information systems (David, 2011). This viewpoint is called Resource-Based View (RBV) which business firms may employ in order to achieve competitive advantage, by focusing on internal resources. Based on the RBV perspective, organisational performance is determined by internal resources consisting of three categories:

- *Physical resources*— including plant and equipment, location, technology, machines and raw materials;
- *Human resources*— including employees, knowledge, skills, abilities, experience and intelligence;
- *Organisational resources*— including the firm's structure, planning processes, information systems, trademarks, patents and so forth (Barney, 1991; David, 2011)

Research on the association between internal resources and strategic decisions has demonstrated that many firms' characteristics (e.g. organisational structure, size and performance) and management team characteristics (e.g. age, education, cognitive style and personality) are relevant (Brouthers et al., 1998; Hitt & Tyler, 1991; Papadakis et al., 1998; Rajagopalan, Rasheed, & Datta, 1993; Shepherd & Rudd, 2014). For example, Papadakis et al. (1998) pointed out that, within a large firm, strategic decisions relate to the characteristics of the top management team, such as personality (e.g. the need for achievement, attitude towards risk and degree of aggressiveness) and some demographic characteristics (e.g. number of year with the company and level of education). Bowmar (2008) reported that managers who are older tend to be risk averters, whereas younger managers are likely to choose higher risk strategies. Shepherd and Rudd (2014) also included internal environment factors such as the firm structure, size, performance, and planning systems into the model of analysis in strategic decision making.

3.5.2 The external environment

Business firms are normally impacted by external opportunities and threats. The external environment brings about various resources, legitimacy and places for selling products which firms depend upon (Pfeffer & Salancik, 2003). Due to this dependency, strategic decisions may be altered or demanded by the external environment, such as suppliers, government, and customers. Business firms may focus on understanding the external environment, in order to gain competitive advantage. This viewpoint for gaining competitive advantage is called the Industrial Organisation (I/O) approach (David, 2011). Porter confirmed that a firm's performance is primarily determined by external factors or industry forces. He proposed a widely used framework for competitive analysis, namely *Porter's Five-Forces Model*. According to Porter, within a given industry the nature of competitiveness comprises five forces:

- Rivalry among competing firms;
- Potential entry of new competitors;
- Potential development of substitute products;
- Bargaining power of suppliers;
- Bargaining power of consumers.

Based on the I/O perspective, these competitive forces largely influence a firm's performance, rather than internal functions such as marketing, production or finance departments. These competitive forces may sometimes be called a *micro-environment* (Kotler, 1997). Apart from a micro environment, other key external forces, which are classified as a *macro-environment*, consist of economic forces, social (including cultural, demographic, and natural environment) forces, political (including legal and governmental) forces, and technological forces.

Much research work on strategy has confirmed that strategic decisions are largely determined by characteristics of the external environment, such as uncertainty and complexity (Elbanna & Child, 2007; Fredrickson & Mitchell, 1984; Papadakis et al., 1998; Vermeulen & Curseu, 2010). For example, Elbanna and Child's (2007) study developed an integrated model, in order to identify the rationality of strategic decision making and they reported that important environmental characteristics are comprised of uncertainty and munificence/hostility. Vermeulen and Curseu (2010) also pointed out that entrepreneurial strategic decision making was shaped by many factors including the external environment, i.e. risk propensity, and information processing.

3.5.3 The goals

The goals that strategic decisions aim to achieve are the general purposes of organisations. Johnson and Scholes (2002) pointed out that the terms ‘goal’ and ‘long-term objective’ may be used interchangeably: however, they have specific meanings’ since the goal is qualitative and in line with the firm’s basic mission, but the long-term objective is likely to be quantified or more precise and directly supports the goal. Long-term means more than one year, and it is usually two to five years (David, 2011). According to the strategic management process (Figure 3.4), goal setting may lie in between the processes of developing vision and mission statements and establishing long-term objectives, and it is undertaken prior to generating, evaluating and selecting strategies at the stage of strategy formulation. That is, the goals (and others related to goal setting, i.e. vision, mission, and long-term objectives) affect strategic decisions, and they may be not simply set by only top management or strategic-decision makers.

Johnson and Scholes (2002) argued that strategic decisions are also affected by values, attitudes and the expectations of those who influence strategy. This viewpoint is considered as organisational politics, because organisations are comprised of people who often have conflicting goals and preferences, and strategic decisions are the consequence of a process in which those who have power in the organisation have different goals (Eisenhardt & Zbaracki, 1992; Elbanna, 2006). Apart from the power structure, past performance and past strategies have also had a significant impact on goal setting and strategic decisions (Rajagopalan et al., 1993).

Different business firms usually have different types of goals reflecting the types of strategies they focus upon. Types of strategies can be referred to as a strategic group or management styles that firms undertake in their attempts to achieve goals or gain competitive advantage (Carroll et al., 1992). As reviewed earlier, Michael Porter proposed three generic strategies called cost leadership, differentiation and focus strategies, and these strategies were developed from different goals. For example, firms that employ the cost leadership strategy aim to be a market share leader and exploit the advantages of economies of scale. Miles, Snow, Meyer, and Coleman (1978) classify firms into four broad types based on their general strategic orientation. They are as follows:

- *Defenders*— firms that focus on cost efficiency of their existing operations for a stable, limited set of products to serve well defined markets. Defenders give little attention to developing new products or markets;
- *Prospectors*— firms that put value on creativity over efficiency, so they normally focus on product innovation and find new market opportunities;
- *Analysers*— they have both stable and new products. Their strategy is to maintain their existing products and find out more about innovative products by balancing cost efficiency and innovation;
- *Reactors*— do not have a consistent strategy and are perceived to be a failure.

The typology of these strategic groups implies that strategies employed by business firms are the result of different focus attention. Accordingly, a firm may have a goal that focuses on production efficiency, product-market innovation, or a combination of both.

3.7 Summary

This chapter provides a literature review on decision making theory, decision making in management and strategic decision making. The evolution of decision making theory brought about two distinct approaches to decision making: formative and descriptive. The formative approach focuses on rationality and mathematical analysis, while the descriptive approach focuses on the cognitive process of the individual. Decision making is a key part of managerial work nature. The decision making process within an organisation usually applies the formative approach. Different viewpoints on the decision making process have focussed on satisfactory solutions consistent with the descriptive approach. Decision making generally occurs at all levels within organisations, and it is always involved with both structured and unstructured problems. The differences between these types of problems create two types of decisions, i.e. programmed and non-programmed decisions. The programmed decisions are simple and repetitive, and they are generally made to handle structured problems. The non-programmed decisions are complex and unique, and they are generally made to tackle unstructured problems.

Strategic decisions are non-programmed decisions that affect the direction of a firm, and they are the prime responsibility of the top management in dealing with unstructured problems or new and unusual situations. Strategic decisions play a key role in the strategic management process and consist of three stages: strategy formulation, strategy implementation and strategy evaluation. Effective strategic management typically relies on strategic decisions that integrate two distinct thought processes, namely strategic planning and strategic thinking. Strategic planning is about analysis, referring to intended strategic development, while strategic thinking is about synthesis or intuition, referring to emergent strategic development. Since strategic decisions are usually made by integrating intuition and analysis, the model of strategic decision making process includes formal steps of analysis for the optimal strategy, together with the decision maker's judgement. Strategic decisions are generally made in order to achieve the goals of an organisation by matching the internal environment with the external environment. Therefore, factors that affect strategic decisions are related to goals, internal business capabilities and constraints, in addition to the external conditions of the firm. The following chapter presents strategic decisions in agriculture and the conceptual framework based on the farmers' goals and the business environment in agriculture.

CHAPTER FOUR

4 Strategic decisions in agriculture and conceptual framework

4.1 Introduction

The purpose of this chapter is to: review the relevance of strategic decision making in agriculture, link knowledge gained from the literature that support the research assumption and research gap addressed by this study, and explains the establishment of the conceptual framework. After this introduction, section two provide a review of decision making in agriculture describing the nature of decision making in agriculture, followed by decision making models and the decision making process found in agriculture. Section three provides a review of strategic decision making in agriculture, including strategic management and strategic planning processes, followed by section four, describing factors that affect strategic decisions in agriculture. Section five discusses strategic marketing decisions in response to market transformation that can be viewed from different perspectives. Section six explains strategic marketing decisions of farmers and reasons for the research assumption. The last section explains the conceptual framework with key conceptual categories.

4.2 Decision making in agriculture

4.2.1 The nature of decision making in agriculture

The Chapter 3 has presented that application of decision making theory is commonly found in the area of management, since it is a critical function of managerial work. In agriculture, managerial work is involved in every component of the agri-food system, including agricultural firms and farm businesses (Beierlein, Schneeberger, & Osburn Donald, 2008). The nature of agriculture is different from that found in other industries, due to several special conditions:

- Biological and physical rules of nature the decision maker cannot control (e.g. biological risks and weather variations);
- Fixed supply of land that limits capability to replicate production in order to speedily respond to increasing demand;

- Homogeneity of most agricultural commodities that an individual farm cannot affect produce prices;
- Small-scale operations with limited knowledge of management usually characterise agricultural business;
- A complex set of goals involved in decision making, due to the interrelationship between the farm and family economy and the way of family life (Farmar-Bowers & Lane, 2009; Kay, Edwards, & Duffy, 2012).

These special conditions bring different aspects of decision making to agriculture that set it apart from other industries.

4.2.2 Decision making models in agriculture

As found in the general theory, the work on decision making has been based on two distinct approaches: formative and descriptive. These two approaches are also applied in agriculture.

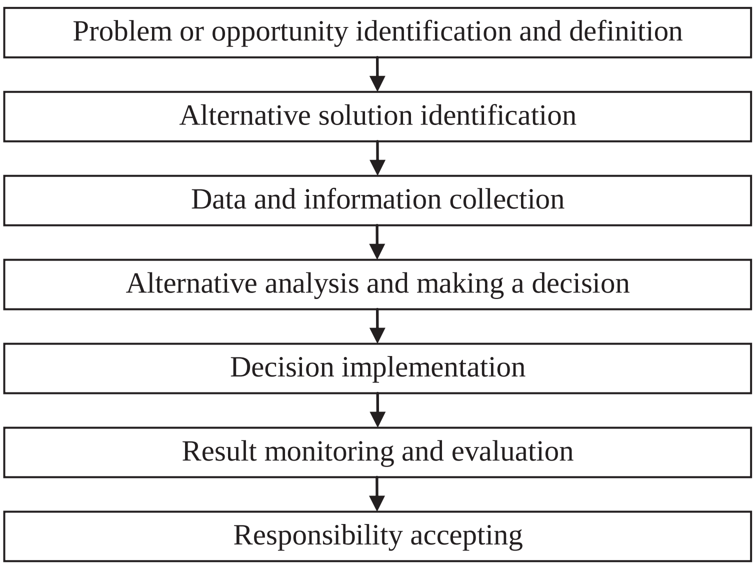
- ***Formative decision-making models***—the academic approach in decision making in agriculture is typically based on formative decision-making models. Dealing with risk and uncertainty, farmers are advised to use quantitative methods, which focus on the use of probabilities, in order to calculate expected utility values and the use of a decision tree diagram to guide farmers to make the right decision (Hardaker, Huirne, Anderson, & Lien, 2004; Kay et al., 2012). The aim of using formative decision-making models is to seek patterns or regularity in which rational farmers can make their decisions within given situations. For example, under the variation of weather or market, expected returns from many alternative levels in livestock investments, or alternative cropping systems, will be calculated, thus guiding the farmer to a decision choice (Beierlein et al., 2008).
- ***Descriptive decision-making models***—Long (2013) argued that, although sound logical reasoning methods leading to economic achievement are vital, personal and family ambitions drive farmers' decision behaviour. The notion of farmers' decision behaviour serves as the basic concept of descriptive decision making, and it has been discussed over several decades. As explained by OECD (2012) and Willock et al. (1999), farmer's decision behaviour is shaped by many individual factors, such as age, education, socio-economic background, experience of the world outside farming,

personal ambitions and other related factors. In decision making, farmers have a complex set of goals that are related to many aspects of their personal and family life, such as ambitions, values and beliefs (Long, 2013). According to Nuthall (1999), farmers' goals are formed by environmental influences interacting with personal and family motivation. In addition, Farmar-Bowers and Lane (2009) indicate that such motivations are seen as ultimate goals that are called the 'ends', such as health, wealth, knowledge, enlightenment, fulfilment, harmony and happiness, which affect their general goals in farming that are called the 'means', such as money, materials and other economic capitals. These viewpoints correspond to the nature of decision making in agriculture that needs to take into account the special conditions in agriculture.

4.2.3 Decision making process in agriculture

The decision making process can be found in most farm management texts published over the past five decades. Generally, there are six steps for decision making: (i) problem definition, (ii) observation, (iii) analysis, (iv) decision, (v) action and (vi) responsibility bearing. The number of steps may vary between five and eight, because some authors may merge the steps, or they do not list some steps explicitly, while others may add or distinguish some activities into separate steps, such as information gathering, analysing alternatives and evaluating results. For example, Kay et al. (2012) proposed seven sequential steps (Figure 4.1).

Figure 4.1: A decision making process in agriculture



Source: Kay et al. (2012)

Table 4.1 also provides descriptions of each step of the decision making process based on Kay et al (2012). Similar descriptions are often found in many farm management textbooks, while some models and their explanations may differ slightly, though not significantly.

Table 4.1: Steps in the decision making process in agriculture and descriptions

Steps	Descriptions
Step 1: Problem or opportunity identification and definition	Farmers or farm managers monitor problems or opportunities, identify and define details of these occurrences. Some problems may be identified by their symptoms. For example, low yield is a symptom that may indicate soil problems.
Step 2: Alternative solution identification	A number of potential solutions to the problem are listed as alternatives.
Step 3: Data and information collection	Data and information about the alternatives is gathered from many sources, such as agricultural extension services, agricultural experiment stations, farm magazines, and farm neighbours. Accurate and reliable data is essential so it can be transformed into useful information.
Step 4: Alternative analysis and making a decision	Each alternative is logically analysed and normally the results will determine the solution that will best meet the established goals.
Step 5: Decision implementation	The decision is carried out with planning and allocation of farm resources, in addition to communication with farm employees.
Step 6: Result monitoring and evaluation	The results from the implementation are monitored and evaluated so that any deviation from the goals can be detected. Some decisions may need modification or correction.
Step 7: Responsibility accepting	Farm decision makers are responsible for the outcomes of the decision because sometimes a good decision may result in bad results. Good decision makers always place their attention towards the future.

Source: Kay et al. (2012)

The formative decision making process, as presented above, exhibits a strong tendency to explain that the decision making process comprises sequentially concrete steps that usually start from a problem and lead to analysis and solution. Similar to the strategic decision making process in small businesses found by Hang and Wang (2012), farmer decision making processes may not be based on this formal way, which is a one-stage phenomenon. Ohlmer et al. (1998) worked on a number of case studies, in order to understand farmers' decision processes and to improve managerial assistance for farmers. They explored that the decision process should be described as a matrix process combining four phases (i.e. problem detection, problem definition, analysis and choice, and implementation) with four sub-processes (i.e. searching and paying attention, planning, evaluating and choosing, and bearing responsibility). While the four phases work as functions in decision making, the sub-processes occur in each phase in the decision making process, as shown in Figure 4.2.

Figure 4.2: A matrix model of the decision making process in agriculture

	Subprocess			
Phase	**Searching & Paying Attention**	**Planning**	**Evaluation & Choosing**	**Bearing Responsibility**
Problem Detection	Information scanning Paying attention	________	Consequence evaluation, Problem?	Checking the choice
Problem Definition	Information search Finding options	________	Consequence evaluation, Choose option to study	Checking the choice
Analysis & Choice	Information search	Planning	Consequence evaluation, Choice of option	Checking the choice
Implementation	Information search Clues to outcomes	________	Consequence evaluation, Choice of corrective action(s)	Bearing responsibility for final outcome, Feed forward information

Source: (Ohlmer et al., 1998)

Furthermore, farmers' strategic decision making may not follow the problem-analysis-solution process. For example, after they have found a solution, some farmers continually update ideas of other solutions, regarding the new information they have obtained, by using a 'quick' and 'simple' decision approach to estimate (analyse) the solutions and their consequences. Similarly, McLeay, Martin, and Zwart (1996) indicate that strategic decision making of farmers is likely to follow that used in small businesses, this being informal, unstructured and intuitive rather than a formal hierarchical process as used in large businesses.

4.3 Strategic decision making in agriculture

In agriculture, decisions made by farmers range from detailed operational decisions during day-to-day farming, such as timing of fertiliser application, to higher important decisions that affect and shape the direction of the farm enterprise, i.e. ***strategic decisions*** (Guillaume, Bruzeau, Justes, Lacroix, & Bergez, 2016). Keshavarz and Karami (2014) discuss that farmers' decisions are made in response to the changing environment from short-term adjustment to long-term adaptation. Farmers' strategic decisions usually result in long-term effects (more than one year or one season) in regards to whole-farm organisation, such as decisions about farm equipment investment, constructing reservoirs and changing farming practices (Keshavarz & Karami, 2014; Robert et al., 2016). According to Kay et al. (2012) farm enterprises need to make decisions based on these basic questions: What commodities to produce, how to produce them, what inputs to use, how much of each input to use, how to finance the farm business, and how, where and when to market their products? Especially in the case of perennial crops, making strategic decisions in selecting crop species, farm design and cropping technologies is complex because farmers must consider both economic and biological relationships (Cittadini, Lubbers, de Ridder, van Keulen, & Claassen, 2008).

As reviewed in Chapter 3, decision making relates to any form of management, including ***strategic management.*** Olson (2001) suggests that the process of strategic management in agriculture involves:

- Developing a vision and mission for the farm;
- Setting objectives;
- Understanding the industry and the farm's place within that industry;

- Identifying major advances of building and maintaining the farm's strategic advantage;
- Testing strategies for the farm;
- Evaluating performance;
- Reviewing new developments;
- Making adjustments if needed.

This process is consistent with the general theory of the strategic management model, which comprises strategy formulation, strategy implementation and strategy evaluation. Many authors have pointed out that farmers' strategic decision making largely focuses on the stage of strategic formulation, which refers to ***strategic planning*** (Coteur, Marchand, Debruyne, Dalemans, & Lauwers, 2016; Guillaume et al., 2016; Hansson & Ferguson, 2011). Hofstrand (2007) suggested there are two phases in the strategic planning process for an individual farm business.

Phase 1 involves analysing four factors which are:

- *Scanning the external environment*—the process of assessing the economic, business and social environment surrounding the farm business;
- *Scanning the internal environment*—the process of identifying strengths and weaknesses of the farmers' farm business;
- *Identifying personal goals*—something that individual farmers want to achieve. Personal goals may focus on living in a good and safe environment or family employment that provides an opportunity for the next generation;
- *Determining business goals*—this may focus on business profitability and business activities that are determined to the goals of individual and family of farmers.

After the factors for strategic planning have been analysed, Phase 2 involves using factors to formulate strategies for the farm business, in order to achieve the goals. Phase 2 involves the following:

- *Business strategies*—in development of business strategy, farmers primarily consider how long their farm will exist and the direction of their farm business. Farmers' business strategies may focus on expanding or maintaining the size of the business, refocusing the business for improved performance, transferring the farm to the next generation or leaving the business, and selecting their marketing choices;

- *Portfolio analysis*—farmers may examine the mix of their enterprises (e.g. one or more crops) by matching the strengths of their farm business with opportunities of the external environment;
- *Enterprise strategies*—this process involves identifying strategies for each individual enterprise to compete within its industry.

Apart from strategic planning, many authors have pointed out that farmers' strategic decision making is also involved with ***strategic thinking*** (Le Gal, Bernard, & Moulin, 2013; Murray-Prior & Wright, 2001). From this view point, the strategic decisions of farmers can result in the direction of a whole-farm enterprise, e.g. planned projects, development plans for the farm, or marketing choices (Hansson & Ferguson, 2011; Le Gal et al., 2013), thus leading to farm specific trajectory and implementation (Coteur et al., 2016; Robert et al., 2016). Furthermore, farmers' strategic decisions are often made, in order to select among strategic choices which determine farm trajectory. There are a number of recent studies on strategic choices in farm businesses, for example, strategic decisions to: specialise in a single farm enterprise, or diversify in order to gain multiple farm enterprises (Hansson, Ferguson, & Olofsson, 2012); or expand or exit the farm business (Ferguson & Hansson, 2013); placing emphasis on intensive or alternative farming systems (Morel & Léger, 2016); and selecting between marketing channel choices (Tsourgiannis, Warren, & Eddison, 2008).

Farmers generally make their decisions under the dynamic environment in agriculture, such as the weather, technologies, international events, public policies and regulations. Kay et al. (2012) state that smart farmers usually monitor changes in the environment as new information for formulating strategies, and they make strategic decisions when new information is available. Harling (1992) suggests that farmers who think strategically are more likely to be successful than those who do not think strategically, although the decision making process of most farmers is informal and unstructured in regards to their strategic issues.

4.4 Factors affecting strategic decisions in agriculture

As reviewed in Chapter 3, factors that affect strategic decisions are generally related to the business environment (both internal and external environments) and the goals. Strategic decisions of farmers are also shaped by these groups of factors since they are usually made to match the environment in which the farm operates in order to achieve the farmers' goals. According to Farmar-Bowers and Lane (2009), farmers, who are not opportunity recipients, will create opportunities in order to fulfil their motivations. This belief brings about a model of strategic decision making of farmers that is *"Motivation + Strategic opportunities = Action"* (Farmar-Bowers & Lane, 2009, p. 1138). The *motivation* can be referred to as the farmers' goals, and the *strategic opportunities* can be comparable to the business environment. Other studies may categorise factors by different names, such as 'business structure' or 'context' to indicate the business environment (Hansson & Ferguson, 2011; Lamarque, Meyfroidt, Nettier, & Lavorel, 2014) and 'strategic orientations' to indicate farmers' goals (Murray-Prior & Wright, 2001; Tsourgiannis et al., 2008). In terms of strategic decision making, these factors can also be classified into business environment factors (internal environment factors and external environment factors) and goal factors.

The environment, in terms of business as well as agribusiness, can be classified in many different ways. Generally, the environment is distinguished into internal and external environments, because these terms are most widely used in strategic and marketing management. Bowmar (2008) and Hofstrand (2007) suggested that, in strategic decision making, farm businesses are involved in environmental scanning of both internal and external environments. In addition, Inderhees and Theuvsen (2009) pointed out that strategic decisions are affected by the internal environment from the view point of the Resource-Based View (RBV) approach (Penrose, 2009) and the external environment, which is the focus of the Industrial Organisation (I/O) approach (David, 2011).

4.4.1 The internal environment

Strategic decisions of farmers are determined by the internal environment (e.g. the farm specific factors) such as characteristics of farm resources held by the individual farm (Hansson & Ferguson, 2011). The internal resources in agriculture consist of: (i) ***physical resources*** such as land, buildings, machinery and other capitals, and (ii)

human resources such as education, experience and know-how (Farmar-Bowers & Lane, 2009; Hansson, 2007; Inderhees & Theuvsen, 2009).

The effects of physical resources on the strategic decisions of farmers have been widely studied, especially *farm size*, *ownership of farm resources* and *farm production* (Alsos, Ljunggren, & Pettersen, 2003; Pietola & Heikkilä, 2005). It has been proven that *farm size* provides a positive effect on strategic decisions for further farm development because a larger size brings about the advantage of economies of scale (Hansson & Ferguson, 2011; Tsourgiannis et al., 2008). *Ownership of farm resources* also affects farmers' strategic decisions. Alsos et al. (2003) found that the strategic decisions of farmers to diversify their farms are not only affected by the business idea, but also considerable influenced by ownership of farm resources, such as land area and building capital. Similarly, Pietola and Heikkilä (2005) found that farm resources, such as land area and building capital, positively affected some dairy farmers' strategic decision to switch their farm operations from tie-stall housing to free-stall housing. Inderhees and Theuvsen (2009) indicate that ownership of farm resources, such as farm areas, machines and equipment, bring about competitive advantage for farmers. *Farm production* is also one of the influential factors related to farmer's strategic decisions. Woodhouse (2010) points out that farm production is a more important factor than farm size because it reflects farm productivity. The volume of farm production, such as milk production (Tsourgiannis et al., 2008) and vegetable production (Xaba & Masuku, 2013), were found to affect farmers' strategic decisions in marketing choices.

In terms of human resources, factors have been found that relate to the characteristics of farmers, such as *age*, *education* and *farming experience* (Comoe & Siegrist, 2015; Kersting & Wollni, 2012; Ondersteijn et al., 2003). The *age* of the farmer is expected to affect farmers' strategic decisions because farmers of different ages respond differently. Väre (2006) found that age affects farmers' strategic decisions in regards to exiting or maintaining their farms, and his study indicated that younger farmers are likely to exit farming in terms of early retirement. Xaba and Masuku (2013) also found that the age of farmers is an important factor that affects their marketing channel choice decisions, and they indicated that the age factor has a positive effect on non-traditional market participation. *Education* is one of the most important factors related to human resources. A number of studies have investigated the effect of education on strategic decisions. For example, Ondersteijn et al. (2003) found that education positively influences farmers' strategic decisions to change their farm operations, in order to improve farm performance. Kersting and Wollni (2012) found that farmers, who are better educated, are more likely to adopt a good agricultural practice standard in order to participate in high-value markets. *Farming experience* is also an influential factor, as it contributes to farm efficiency and profitability (P. Wilson, Hadley, & Asby, 2001). Apart from the education factor, Kersting and Wollni (2012) also found that farmers who have had a long experience in farming are more likely to participate in high-value markets.

4.4.2 The external environment

The external environment is defined by factors outside of the individual farm (Hansson & Ferguson, 2011). The external environment includes ***macro-environment*** factors, such as the physical environment, economic conditions and social issues. Specifically, the *physical and biological environments,* such as the occurrence of climate change, drought, new pests and insects, directly affect farmers' strategic decisions in running their farm businesses (Comoe & Siegrist, 2015; Guillaume et al., 2016; OECD, 2012; Robert et al., 2016). *Technological changes*, such as improvement of agricultural machinery and equipment, help to improve farm productivity, and they also have an effect on farmers' strategic decisions to move away from labour-intensive production (Pietola & Heikkilä, 2005). Other macro-environmental factors, which affect market and business development, should be taken into account in strategic decisions in agriculture, such as *political and legal conditions* (Inderhees & Theuvsen, 2009). For example, free trade agreements between countries or regions usually bring about impacts on agricultural markets and farmers' revenues (Nekhay, Fellmann, & Gay, 2012). *Economic conditions*, such as price changes, also cause uncertainty to farmers and affect their strategic decision making (Murray-Prior & Wright, 2001). For example, market demand and price changes usually impact on farmers to reduce or increase their planted areas and input uses (Umboh, Hakim, Sinaga, & Kariyasa, 2014). Moreover, *social issues* such as changes in consumers' attitudes, increasing requirements for food safety and environmental protection, impact on farm operations and the strategic decisions of farmers (Moustier, Tam, Anh, Binh, & Loc, 2010; Tselempis, Karipidis, Pavloudi, & Semos, 2015).

The industry competition is another element of the external environment. As reviewed in Section 3.5.2, this concept, referred to the ***micro-environment***, is determined by five competitive forces: the entry of new competitors, the threat of substitutes, the bargaining power of buyers, the bargaining power of suppliers, and rivalry among existing competitors. Hofstrand (2007) suggests that an analysis of changes within *the industry* may include the whole industry in which the farm is competing, or only market segments or niches of the industry. *Buyers* are usually very important to farmers wanting to distribute their produce. Schipmann and Qaim (2011b) found that buyers' services to farmers, such as provision of inputs and credit, are important to farmers' distribution channel choice decisions. *Other farms* can be viewed as competitors who affect farmers' decisions. Inderhees and Theuvsen (2009) indicate that farmers who are interested in market development are better prepared to compete with other farmers in the same industry.

4.4.3 The farmers' goals

It is generally accepted that strategic decisions are made in order to achieve ***economic goals*** such as profit maximisation, production efficiency and market orientation. However, in agriculture, farmers usually have multiple goals that are broader than their economic goals (Brummel & Nelson, 2014; Ferguson & Hansson, 2013; Maybery, Crase, & Gullifer, 2005). Farmers' goals are usually linked with psychological constructs, such as their values, beliefs and attitudes (Hansson et al., 2012; Sutherland, 2010), whereas ***non-economic goals*** include their lifestyles, social and environmental aspirations and motivations (Morel & Léger, 2016; Sutherland, 2010).

Many previous studies on farmers' goals confirm the importance of multiple goals that come from a combination of economic and non-economic goals, playing to understand strategic decisions of farmers. Fairweather and Keating (1994), Perkin and Rehman (1994), and Willock et al. (1999) found that farmers' decision making is not only based on their farm business goals but also on the unique mix of their complex personal and family values and attitudes. The various aspects of farmers' values that identify farmers' multiple goals are also considered to be 'mission statements' in a study of farm strategy conducted by Ondersteijn et al. (2003). Pannell et al. (2006) also noted that farmer and family goals are heterogeneous and they are relevant to one or more of these five categories of goals: (i) material wealth and financial security, (ii) environmental protection and enhancement, (iii) social approval and acceptance, (iv) personal integrity and high ethical standards, and (v) balance of work and lifestyle. Hofstrand and Jolly (2007) similarly stated that goal setting in farm businesses is intended to achieve personal, family and business success. More recently, Farmar-Bowers and Lane (2009), in a study on farmers' strategic decision making processes, pointed out that farmers applied different justifications for their decisions, which included the farm business in terms of money and technologies, together with family issues regarding fairness, support, protection and agreement. Similarly, Duesberg et al. (2013) found that farmer decision behaviour is influenced by multiple goals and values about farming and they indicated that intrinsic values are a greater influence than other values, especially profit maximisation.

It is important to note that different goals reflect different types of strategies, which can be referred to as management styles, strategic groups or strategic orientations. In agriculture, many studies indicate that farmers usually prioritise their economic and non-economic goals differently, thus leading to different management styles, strategic groups or strategic orientations of farmers. For example, Fairweather and Keating (1994) investigated how the multiple goals of farmers in New Zealand were integrated under three management styles:

- *Dedicated producers*—focused on top-quality production with the aim to achieve production goals through planning and financial management;
- *Flexible strategists*—emphasised working on marketing their produce for financial success;
- *Environmentalists*—oriented to a lifestyle working close to nature with chemical use reduction (Fairweather & Keating, 1994).

Similarly, Brodt et al. (2006) examined the multiple goals of almond and wine-grape growers in California USA. The results show the farmers had three management styles similar to Fairweather and Keating's study. They were:

- *Environmental stewards*—lived and worked with conserving nature;
- *Production maximizers*—worked on farm for financial achievement;
- *Networking entrepreneurs*—enjoyed networking with others for farm information sharing (Brodt et al., 2006).

Tsourgiannis et al. (2008) analysed factors affecting the milk distribution channel choice of sheep and goat farmers in Greece, by grouping farmers' goals into five factors called 'strategic dimensions'. They were:

- *Production orientation*—focused on livestock techniques related to milk production;
- *Cost focus*— considered budgeting and planning to obtain the lowest costs;
- *Profit orientation*— focused on farm returns and profitability;
- *Differentiation*— owned or managed facilities for milk distribution channels;
- *Interpersonal relationships*—linked with others to gather knowledge or as competitors (Tsourgiannis et al., 2008).

More recently, Guillem, Barnes, Renwick, and Rounsevell (2012) explored the decision making process of farmers, in order to inform ecological policy design in Scotland, by using perception-based typologies of attitudes and goals in farming. The results indicated four types of farmers:

- *Profit oriented*—focused on maximising profits rather than environmental and social issues;
- *Multifunctionalist*—focused on environmental quality together with farm profits;
- *Traditionalist*—more oriented towards social issues rather than the environment;
- *Hobbyist*—aware of conservation and environmental quality (Guillem et al., 2012).

Rantamäki-Lahtinen and Väre (2012) have studied strategic goals and the development plans of beginning farmers in Finland. They classified strategic goals into three types:

- *Environment responsibility*—covered production that respects nature and living in the countryside that can continue family farm and control own life and wellbeing;
- *Work satisfaction*—consisted of independent and good quality work providing independent income;
- *Economic goals*—focused on profit maximising, better standard of living and economic profitability (Rantamäki-Lahtinen & Väre, 2012).

These previous studies have informed the range of ways in which management styles, strategic groups, or strategic orientations in agriculture can be categorised in relation to the multiples goals of farmers. According to these studies, farmers' goals were related to economic goals (i.e. production, marketing and finance) and non-economic goals (i.e. environmental and lifestyle).

4.5 Strategic marketing decisions in response to the market transformation

Strategic decision making in agriculture can be viewed from different perspectives. Specifically, in response to the transformation of agri-food marketing systems, strategic decision making can be viewed from either the value chain perspective in '***linking farmers to markets***', or the farmer's perspective which reflects the ***strategic capability of individual farmers***.

4.5.1 Strategic marketing decisions from value chain perspective

In response to the transformation of agri-food marketing systems, strategic marketing decisions (SMDs) are often made by some important players, in order to ***link small-scale farmers to high-value markets*** or to marginalise them from the markets (Reardon et al., 2012). It is known that farmers, especially in developing countries, rarely gain competitive advantage, due to their small farm size. Small-scale farmers generally receive only a small proportion of margins from agri-food supply chains, which are usually controlled by domestic traders (Batt, 2004; Cadilhon et al., 2006). This also implicitly assumes that farmers in developing countries limit themselves to sales decisions and rarely apply marketing strategies, in order to gain their competitive advantage. Based on the transformation of agri-food marketing systems, therefore, previous research in developing countries has largely focused on how small-scale farmers are linked to high-value markets. This is because it is considered that these high-value markets provide market opportunities and economic benefits for farmers (Batt et al., 2011; Reardon et al, 2012; Silva et al., 2009). Previous research has also provided an understanding about critical success factors and constraints in linking farmers to high-value markets.

Many empirical studies have attempted to prove that high-value markets benefit farmer welfare, thus leading towards rural development (Batt et al., 2011; Correia & Rola-Rubzen, 2011; Fischer & Qaim, 2012; Ma & Abdulai, 2016; Silva et al, 2009). Correia and Rola-Rubzen (2011) studied linkages between horticultural farmers and high-value markets in Timor Leste. They indicate that the farmers benefit in terms of increasing incomes because high-value market participation contributes to farmers making improvements in both the quantity and quality of their products. Fischer and Qaim (2012) also found positive income effects for a Kenyan group of farmers when participating in high-value markets. More specifically, Ma and Abdulai (2016) investigated the impact of three marketing contract choices for apple farmers in China, i.e. written contracts, oral contracts and no contracts. The results indicate that only written contracts increase farmers' net returns, while other choices do not bring about positive income effects for farmers. This implies that linking farmers to high-value markets may not always provide positive income effects for farmers because the effects vary, depending on other factors such as the marketing contract choice in this case of China. Correspondingly, Barrett et al. (2012) have synthesised findings in five developing countries, i.e. Ghana, India, Madagascar, Mozambique and Nicaragua, suggesting that the income effects from high-value market participation may be different across different types of markets and products. By studying in India, Narayanan's (2014) study confirms that linking farmers to high-value markets has various impacts on incomes for individual farmers, depending on the types of products.

Although many studies have indicated that high-value markets provide market opportunities and economic benefits for farmers, other studies point out challenges for small-scale farmer participation (Neven, Odera, Reardon, & Wang, 2009; Reardon et al., 2012). According to Correia and Rola-Rubzen (2011), there are a number of constraints in linking farmers in developing countries to markets, such as poor access to transportation and communication and human resource limitations. Blandon et al. (2009) have also indicated that poor access to market information is one of the potential barriers for small-scale farmers wanting to participate in high-value markets. Another important constraint is that small-scale farmers have low bargaining power, due to limited production. Small-scale farmers normally confront a lack of capital, labour and knowledge (Reardon et al., 2009; UNCTAD, 2007). This leads to an inability to deal with production requirements, i.e. the quantity and consistency needs of high-value markets (Schipmann & Qaim, 2011b). In addition, high-value markets, such as food processing companies and supermarket chains, usually have a strong focus on quality standards (Trebbin, 2014). In some cases, the cost of compliance with a standard, such as investment in providing facilities, installations and equipment and recurrent costs for training, certification and laboratory tests are often considered higher than the benefits gained by farmers (Kersting & Wollni, 2012; UNCTAD, 2007). Therefore, many small-scale farmers are not capable of supporting these additional costs.

Since modern agri-food value chains are dominated by leading actors, i.e. high-value market players such as modern retailers and exporters, many studies on the topic of 'linking farmers to markets' have been conducted and based on the value chain approach. Leading actors usually play an important role in product marketing, and some of them may have business strategies that are inclusive of small-scale farmers (Vorley, Lundy, & MacGregor, 2009). For example, Martin and Jagadish (2011) studied the marketing role of a leading actor in Papua New Guinea in linking farmers to markets, and the results indicate that the leading actor used a marketing strategy based on market segmentation, which implies various strategies were used to link farmers to markets. However, as indicated by McCullough et al. (2008), leading actors usually prefer larger suppliers, so they can efficiently reduce their transaction costs. This preference may lead to marginalisation or exclusion of small-scale farmers. Barrett et al. (2012) also discuss that a significant majority of agricultural production sold to high-value markets evidently comes from relatively well-capitalised farmers. This occurrence indicates that smaller farmers are being excluded from modern value chains. Based on this occurrence, research on 'linking farmers to markets' has a focus on vertical coordination along these value chains. The studies of Grote and Dörr (2009) in Brazil and Trifković (2014) in Vietnam point out that vertical coordination significantly improves the market access of small-scale farmers and ensures a high quality supply for the value chains. Furthermore, the study of Thiele et al. (2011) in Bolivia, Peru and Ecuador points out that a vertical coordination with multi-stakeholders, which bring traders, supermarkets, processors, research and development organisations together with farmers organisations, is an effective way to benefit small-scale farmers and increase rural development.

4.5.2 Strategic marketing decisions from farmer perspective

Regarding the strategic decisions of farmers in dealing with the agri-food market transformation, previous research has largely focused on farmer groups or collective decisions, rather than on the individual decisions of farmers. A large amount of research work on the strategic marketing decisions of farmers in developing countries has focused on farmers' organisations and collective action for market access. For example, Roy and Thorat (2008) investigated success in the high-value export markets of Indian grape farmers, who were members of farmer cooperatives, compared to non-members. The results indicate that farmer cooperatives contributed to access to high-value markets and members of farmer cooperatives earned higher incomes than non-members. Hellin et al. (2009) studied the benefits of farmer organisations in Mexico and Central America, in regards to market access, making comparisons between farmers who produced a high-value agricultural product (vegetables) and farmers who produced an undifferentiated commodity (maize). They found that the benefits for market access were more evident in the vegetable sector than the maize sector. Similarly, Narrod et al. (2009) described the benefits of collective actions, using two case studies of organised producer groups in Kenya and India. Their results indicate that the organised producer groups were more attractive to buyers of high-value markets, who needed to ensure traceability and a reduction of transaction costs. Kaganzi et al. (2009) also found that the success of potato farmers in Uganda for high-value market access was sustained through collective action, which needed farmers to become more organised with group members. Similarly, Batt et al. (2011) studied on small groups or clusters of vegetable farmers in the Philippines, and they indicate that one of the factors contributing to the viability of farmers' clusters is collective decision making. In Thailand, Kersting and Wollni (2012) analysed the GlobalGAP group certification that encouraged the formation of asparagus farmer groups, in regards to access to high-value markets. Their results also show that support by donors, buyers and public-private partnerships were important and enabled the farmers to adopt the standard. Furthermore, Trebbin (2014) indicates farmer organisations play a role in helping small-scale farmers in India to improve their position in relationship to high-value markets.

For individual farmers, marketing is traditionally considered a process that occurs outside the farm gate. This perspective implies that strategic decisions at farm level lay greater emphasis on production planning, which is frequently independent from the marketing process (McLeay et al., 1996). Accordingly, farmers usually apply the selling concept (make and then sell), rather than the marketing concept (find markets and then make) to their decisions (McLeay et al., 1996). As a result, this limits farmers to be price takers, due to the perishable nature of their produce. Apart from the fact that agricultural commodities are homogeneous, this could be one reason why many farmers have to rely on government regulations, in order to control the marketing mix of their farm produce (Parchure, 2016).

McLeay et al. (1996) argues that farmers are more actively involved with marketing than has been postulated by the traditional viewpoint, which sees farmers as not being capable of making decisions on their marketing strategies. Bowmar (2008) suggests that marketing management is not beyond the scope of farmers, and it should be included in the important decisions of farmers, together with production planning. New Zealand's agricultural policy reform in 1985 can serve as good evidence for this claim. Despite significant reductions in state subsidies, farmers have still maintained their level of economic activities (Gouin, 2006), and this indicates that farmers have increased their own marketing decisions, in order to survive in the new competitive environment. Furthermore, Park and Lohr (2006) studied marketing channel strategies among U.S. organic producers and indicated that farmers' experience in marketing their own products had a positive effect on farm incomes. More recently, Park et al. (2013) examined marketing strategies among U.S. farmers. Their results indicate that the marketing skills of the farmers were beneficial to their earnings.

Bowmar (2008) points out that three factors, i.e. the drive for greater economic returns, the desire for greater control, and the urge for a new technological approach, motivate farmers to be involved in marketing. He further notes that the initiation of marketing strategies impacts on the farm’s operation, since it intensifies capital requirement, changes profitability and cash flow, and transforms advantages of product quality into higher economic returns and market share. As reviewed in Section 3.4.4, in order to gain a competitive advantage, business firms usually apply either a cost leadership or a differentiation strategy. A cost leadership strategy is related to the production of homogeneous products or commodities that may not require advanced marketing activities. Alternatively, a differentiation strategy is associated with a unique product that appeals to buyers, who are interested in product attributes rather than price, and it requires investment in marketing activities (Capon & Hulbert, 2000; Porter, 1998). Barone and DeCarlo (2003) argue that, although differentiating a product is an important strategy for gaining competitive advantage, agricultural commodities are characterised by a lack of differentiation. Therefore, a cost leadership strategy should be more suitable for such agricultural commodities. Unfortunately, small producers are not capable of properly responding to this strategy, since it requires efficiency for greater economies of scale. Barone and DeCarlo (2003) suggest that, in order to deal with this problem, marketing strategies that involve shifting the competition away from the parity of core products, such as producer branding, adding irrelevant product features and using various signals to positively influence perceptions of quality, would be advantageous. This implies that effective marketing strategies for farmers need to focus on particular markets, thus requiring marketing skills and strategic decisions.

4.6 Research assumption

This study focuses on the strategic marketing decisions (SMDs) of individual farmers, and it argues that fruit farmers in Chanthaburi province of Thailand made SMDs in market participation. There are a number of reasons to support this research assumption:

- *The decision problem is related to a strategic marketing issue*

The problem identification of this study is based on the transformation of agri-food marketing systems worldwide (Motiram, 2013; Reardon et al., 2012), which has impacted on the Thai fruit industry for decades (Poapongsakorn, 2011; Srimanee & Routray, 2012). Consequently, Thai fruit farmers needed to make decisions about whether to respond to this market transformation. Since this market transformation was an unprecedented issue for Thai fruit farmers, they could not simply deal with this marketing issue based on day-to-day farming decisions. According to Robbins (2011) and Keuning et al. (2010), strategic decisions are non-programmed decisions in which predetermined solutions (e.g. day-to-day farming methods) cannot be applied because the decision problem is unstructured. This is particularly true for the decision problem related to the strategic marketing issue identified in this study.

- *Marketing decisions have to be considered as strategic decisions*

In the case of this study, strategic decisions were taken, in order to address the marketing issue, which arose as a result of the transformation of agri-food marketing systems. As reviewed in Section 3.4.4, in terms of general business management, the marketing and strategic activities of an enterprise are closely aligned. This is because a business strategy usually places a considerable focus on *competitive advantage*, and it aims to sustain it through its marketing strategy (Kotler & Keller, 2012). Similarly, Barone and DeCarlo (2003) and Bowmar (2008) point out that farmers make strategic marketing decisions in order to sustain competitive advantage and to achieve their goals. Murray-Prior and Wright (2001) also indicate that farmers make strategic decisions in response to not only the physical environment, but also the marketing environment, such as major changes of output prices.

- *Participating in high-value markets is a strategic choice*

In a strategic decision making process, decision makers are involved in searching and selecting alternative solutions, or *strategic choices*, which will be used to respond to changes of strategic problems, as reviewed in Section 3.4.5. In this study, remaining in TMs or participating in HMs are considered as strategic choices for fruit farmers in Chanthaburi province of Thailand. This is because changing from TMs to HMs means that farmers shift from one system to another.

- *The strategic marketing decision shapes the direction of the fruit farms*

According to Shivakumar (2014), strategic decisions significantly change the degree of commitment and scope of the firm. Farmers' strategic decisions are also important decisionss as they shape the direction of the farm enterprise and result in long-term effects (Guillaume et al., 2016; Keshavarz & Karami, 2014). Furthermore, Bowmar (2008) points out that strategic decisions in marketing assist farmers to move away from being traditional commodity producers, since they can then strengthen and secure competitive advantage. In this study, the marketing decisions of fruit farmers (TMs or HMs) are not considered as selecting marketing channels, such as switching selling from collectors to wholesalers which does not lead to a change of direction for the farm. In contrast, making decisions to shift from TMs to HMs aligns with the concept of strategic decision making because it will change the scope of farm operations in regards to good farming practices. Moreover, the consequences of strategic marketing decisions in this study have led to further development of fruit farming in Thailand.

4.7 Conceptual framework

As a result of the importance of strategic decision making in the context of farmers, a number of studies related to the topic of farmers' strategic decisions have been conducted. For example, studies in New Zealand (Fairweather & Keating, 1994) and the US (Brodt et al., 2006) point out that farmers who emphasise on marketing their produce usually enjoy networking and information sharing with others, thus leading to effective marketing decisions for financial success. Studies in Australia (Maybery et al., 2005) and Scotland (Guillem et al., 2012) indicate that some farmers make their strategic decisions based on not only economic goals, such as marketing and financial success, but also on non-economic goals, such as lifestyle and environmental quality. Research on strategic choices and factors affecting farmers' strategic decisions among these choices has been conducted, for example, in Sweden in regards to farmers' decisions on specialisation or diversification of their farm businesses (Hansson & Ferguson, 2012) and decisions on business expansion or exit (Ferguson & Hansson, 2013), in addition to farmers' decisions on intensification and diversification in the US (Amanor-Boadu, 2013).

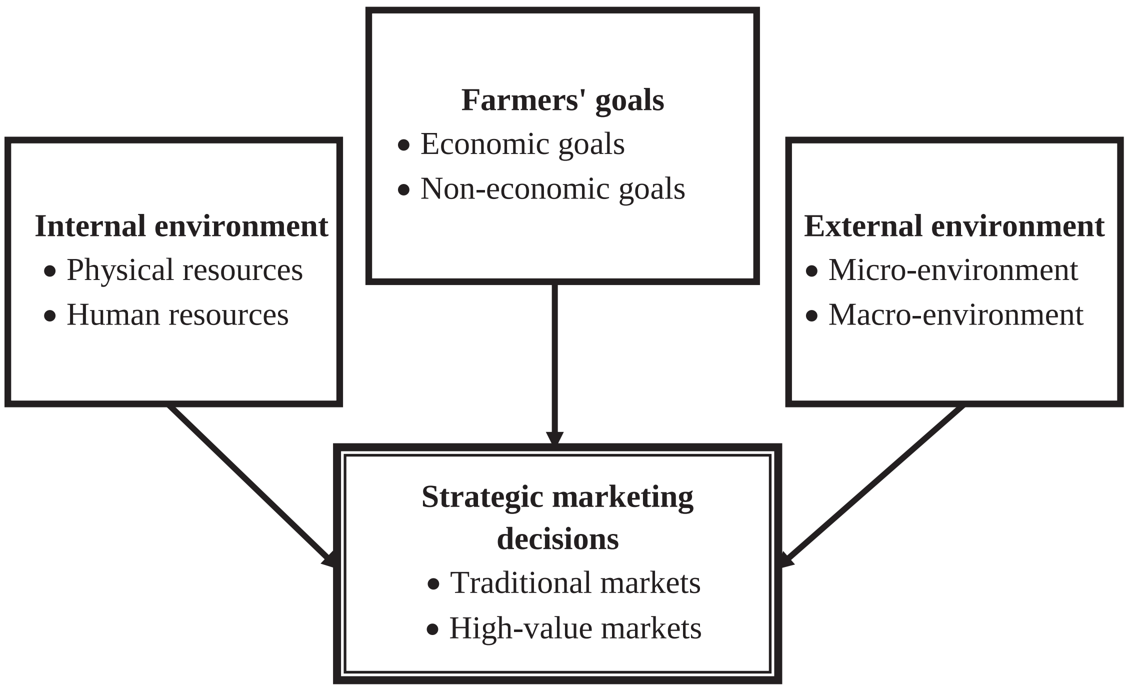
More recent literature focuses on conceptual frameworks of strategic choices and farmers' strategic decision making. Morel and Léger (2016) propose a conceptual framework of strategic decisions by alternative farmers in France. The framework includes strategic determinants on strategic choices, i.e. farmers' aspirations [goals] and perception of situation [the business environment]. Similarly, Coteur et al. (2016) developed a conceptual framework for strategic decisions of farmers in Belgium, in regards to sustainable farming choices. This framework represents a strategic decision making process which includes sustainability assessment, interpretation of results, improvement strategies, implementation strategies, and monitoring and benchmarking. It also indicates the importance of the external environment and farmers' goals.

Previous literature provides an understanding of farmers' contexts regarding strategic decisions, thus providing marketing implications for maintaining their competitive advantage. *However*, it must be taken into consideration that this available research generally explains the strategic decisions of individual farmers in developed countries. As reviewed in Section 4.5.1, developing countries research work mostly concentrates on the topic of *'linking farmers to markets'* and thus reflect the value chain approach. Little is known about *strategic marketing decisions (SMDs)* made by individual farmers in developing countries, in regards to the transformation of agri-food marketing systems. Research in Thailand on the topic of SMDs based on farmers' perspectives, which reflect their strategic capability, is particularly scarce.

This study addresses this research gap by determining factors affecting the strategic marketing decisions (SMDs) of fruit farmers in Chanthaburi province of Thailand. As factors that affect strategic decisions are related to the business environment (internal and external) and farmers' goals, this study explores the effects of these related factors, thus contributing to an understanding of the SMDs of farmers in a developing country context. In addition, knowledge from this study can serve as input when formulating policies and strategies for developing farmers' strategic capability.

This study has also utilised the concept of strategic decision making that exists in general theory, together with an adaptation of the nature of decision making in agriculture. Knowledge based on the literature review provides a conceptual framework of relationships between strategic factors (the business environment and the goal factors) and strategic decision making. Figure 4.3 illustrates this conceptual framework showing the relationships among these factors.

Figure 4.3: Conceptual framework



There are three conceptual categories of factors affecting the SMDs of farmers:

- *The internal environment* includes farm and farmer characteristics that can be referred to as physical resources (i.e. farm size, land ownership, and farm production) and human resources (i.e. age, education and fruit farming experience);

- *The external environment* comprises the micro-environment (i.e. buyers, other fruit farmers, and input suppliers) and macro-environment (i.e. political, economic, social, technological, and environmental factors);
- *The farmers' goals* consist of economic goals (i.e. production, marketing and financial goals) and non-economic goals (i.e. environmental and personal and family goals)

This study attempts to identify key factors that will affect the strategic marketing decisions (SMDs) of farmers who use traditional marketing channels (TM users) and those who use high-value marketing channels (HM users).

4.4 Summary

Special conditions in agriculture bring different aspects of decision making to agriculture that set it apart from other industries. Similar to the general decision making theory, the formative approach advises farmers to use quantitative methods, in order to make the right decisions, whereas the descriptive approach focuses on farmers' decision behaviour, which indicates that farmers have a complex set of goals related to many aspects of their personal and family life. Furthermore, the formative decision making process is comprised of sequential steps, i.e. the problem-analysis-solution process. However, the descriptive decision making process is informal, unstructured and intuitive. Farmers generally operate their farms under the dynamic environment found in agriculture, and it is important to monitor changes in this environment, in order to make effective strategic decisions. Therefore, farmers who think strategically are more likely to be successful than those who do not think strategically. Moreover, factors related to farmers' goals and the environment usually influence the strategic decisions of farmers.

Strategic decisions of farmers are often related to marketing issues. Effective marketing strategies for farmers need to focus on particular markets, thus requiring marketing skills and strategic decisions. Strategic marketing decisions (SMDs) are not beyond the scope of farmers. This study also assumed that fruit farmers in Chanthaburi province of Thailand made SMDs on market participation. As a result of the importance of SMDs of farmers, previous studies have been conducted in relation to this topic, especially in developed countries. Little is known about SMDs made by individual farmers in developing countries including Thailand in regards to the market transformation. This study addresses the research gap by determining factors affecting the SMDs of fruit farmers in Chanthaburi province of Thailand. A conceptual framework based on the literature review has been proposed. There are three conceptual categories of factors affecting the SMDs of farmers in this framework: 1) the internal environment including physical resources and human resources; 2) the external environment comprising the micro-environment and macro-environment; and 3) the farmers' goals consisting of economic goals and non-economic goals.

CHAPTER FIVE

5 Methodology

5.1 Introduction

The purpose of this chapter is to discuss the research methodology employed in this study. Following this introduction, section two discusses research philosophy including the ontology and epistemology leading towards section three: research approaches and methodologies that were applied in the study. Section four discusses the research process consisting of: (i) identification of the research problem, (ii) the contents of the literature review and the conceptual framework, (iii) research aim, objectives and hypotheses, (iv) data collection, and (v) data analysis. Section five discusses research design, i.e. sampling, research strategies and questionnaire design. The last section discusses the validity and reliability of the research.

5.2 Research philosophy

Formally, research is defined as a systematic process of collecting and analysing information in order to increase an understanding of a specific problem or phenomenon (Leedy & Ormrod, 2013; Sekaran & Bougie, 2013). Research is often explained as ***scientific inquiry***, pursuing logical and rigorous methods to collect and analyse data and draw valid conclusions. The scientific viewpoint is that it is based on "*what we see, hear, and touch rather than on personal opinions or speculative imaginings*" (Chalmers, 2013, p. 1). Typically, scientific research starts from a general theory, tests the hypothesis, and then applies this theory to a specific problem or phenomenon (Popper, 2002). This means that scientific research is ***deductive*** in nature. According to Bryman (2012), the role of research is not only testing, but also generating the theory. From this viewpoint, research is also ***inductive***. Furthermore, in the actual practice of science, a problem or phenomenon is often considered within different perspectives, thus bringing about the application of alternative methods of collecting and analysing data (May, 2011). These opinions show that both deductive and inductive approaches are applied in scientific inquiry.

In general, scientific inquiry helps researchers to obtain the *truth* about research problems or phenomena. The question 'When is something true?' is primarily important in studies about *research philosophy*. Two central concepts of research philosophy are ontology and epistemology.

1) Ontology

Ontology is the branch of research philosophy concerning the overall nature of what things are. Ontological research focuses on identifying the kinds of things that actually exist. It also addresses questions about 'What is the nature of existence?' (Blaikie, 2007). The important point of ontological consideration is whether the truth or the existence of things is objective or subjective (Bryman, 2012). This consideration brings about two ontological positions:

- *Objectivism*—this position asserts that the existence of things is independent to people. It implies that all kinds of things are external realities that are beyond the influence of people;
- *Constructionism*—this alternative position challenges the suggestion that people have no role in accomplishing the external realities that they are confronted with (Bryman, 2012).

2) Epistemology

Epistemology is the branch of research philosophy concerning the nature of knowledge. Epistemological research focuses on the ways in which it is possible to gain knowledge. It also addresses the questions about 'What can be known?' (Blaikie, 2007). The important point of epistemological consideration is whether all knowledge should be studied according to the same way as the natural sciences (Bryman, 2012). This consideration brings about two epistemological positions:

- *Positivism*—this position advocates the application of scientific methods. It implies that all knowledge is confirmed by the sense of scientific inquiry in which hypotheses are deductively tested and knowledge is inductively arrived at through the gathering of facts;
- *Interpretivism*—this position denotes an alternative to positivism. It involves researchers interpreting elements of research since access to knowledge is through interpretation for meanings (Bryman, 2012).

Research philosophy regarding ontology (concerned about what is true) and epistemology (concerned about methods of knowing the truth) has connection to two research approaches: quantitative and qualitative. Table 5.1 presents the connection between research philosophy and research approaches. Quantitative research emphasises quantification in the data collection and analysis. It embodies the view of objectivism and incorporates the practices of positivism into research. In contrast, qualitative research emphasises words in the data collection and analysis. It embodies the view of constructivism and incorporates the practices of interpretivism into research.

Table 5.1: The connection between research philosophy and research approaches

	Quantitative research	**Qualitative research**
Ontology	*Objectivism*	*Constructionism*
Epistemology	*Positivism*	*Interpretivism*

Source: Adapted from Bryman (2012, p. 36)

Research philosophy is an important part of research, combining the nature of the world and the function of a researcher. It helps the researcher to develop an understanding of the research topic and to conduct research in an effective manner (Crotty, 1998). Research philosophy shapes approaches to research and guides researchers to action (Lincoln, Lynham, & Guba, 2011). There are major research approaches, namely quantitative, qualitative and mixed methods approaches. Since it focuses on testing or refining a theory the quantitative approach relates to developing numeric measures of observations (Bernard, 2013; Bryman, 2012). The qualitative approach focuses on understanding the processes of interaction among individuals in specific contexts (Bernard, 2013; Creswell, 2014). Integrating between quantitative and qualitative approaches, the mixed methods approach focuses on the research problem (Creswell, 2014; Crotty, 1998). These research approaches also subsequently guide researchers to methodologies for collecting data

This study mainly employed the quantitative approach to ascertain the influence of factors in the strategic marketing decisions of fruit farmers in Chanthaburi province of Thailand. It measured the existence of factors (corresponding to objectivism in the concept of ontology) by applying scientific methods, in order to deductively test the hypotheses (corresponding to positivism in the concept of epistemology). In order to fully address the research problem, in regards to understanding the key factors, this study included some qualitative elements, in order to identify related variables included in the model of analysis. The qualitative data came from the opinions of respondents (corresponding to constructivism in the concept of ontology), and then the researcher interpreted the data, in order to identify the variables (corresponding to interpretivism in the concept of epistemology).

5.3 Research approach and methodology

The research methodologies are designed on the basis of the research approach selected for the study (Creswell, 2014). According to Robson (2011), research designs can be classified into two broad types or styles: (i) fixed designs— the study is fixed to details before collecting data, and (ii) flexible designs— the study is more flexible to details of research procedure. Fixed designs rely heavily on quantitative data, while flexible designs always depend on qualitative data. However, in practice, fixed designs may involve the use of a small amount of qualitative data and vice versa for flexible designs (Robson, 2011). Other authors, for example Gray (2009), Edmonds and Kennedy (2013) and Creswell (2014), point out three key research approaches, namely quantitative, qualitative, and mixed methods research. Table 5.2 summarises the characteristics of these three approaches.

Table 5.2: Quantitative, qualitative, and mixed methods approaches

Quantitative approach →	Mixed methods	← Qualitative approach
• Consists of distinct variables		• Consists of themes and motifs
• Measures systemically		• Measures based on ad hoc manners
• Has data in the form of numbers		• Has data in the form of words and images
• Replicates procedures		• Rarely replicates procedures
• Proceeds by using numbers		• Proceeds by extracting themes
• Dependent on statistical tools		• Rarely uses statistical tools

Source: Neuman (2006), Robson (2011), and Taber (2012)

- *Quantitative research* examines the association among measured variables for testing theories deductively;
- *Qualitative research* aims to explore and understand the meaning that individuals or groups attribute to a social or human problem, and to inductively interpret the meaning from particulars to general themes;

- *Mixed methods research* integrates both quantitative and qualitative approaches for a more complete understanding of a study problem (Creswell, 2014; Edmonds & Kennedy, 2013; Gray, 2009).

Adhering to the scientific approach, *quantitative research*'s main strengths lie in precision and control, due to rigorous sampling and design, in addition to reliable measurement (Burns, 2000; Robson, 2011). Quantitative research is a testing method that uses statistical analysis and provides answers that have a much firmer standard than those relying on subjective common sense or opinions (Burns, 2000). However, especially in social research that focuses on people, quantitative research is not expected to conduct investigations that are solely scientific, due to difficulties in measuring abstract and subjective constructs, such as feelings, attitudes and perceptions (Sekaran & Bougie, 2013). Unlike physical science research, which is usually involved with formal laboratory techniques and rigid control of conditions, social research cannot be conducted in this type of controlled environment (Burns, 2000). Consequently, it is not always possible to meet the full standard of science, thus leading to some limitations in obtaining a representative sample and generalisability in the research results (Sekaran & Bougie, 2013).

Alternatively, *qualitative research* is more flexible and focuses on real life settings of people (Gray, 2009; Neuman, 2007). Instead of following a fixed linear path, as required in quantitative research, qualitative research moves backward and sideward, in order to collect new data and gain new insights (Neuman, 2007). As noted by Burns (2000) and Gray (2009), qualitative research can explore unexpected and striking findings, so it is valuable when used in circumstances where the phenomenon is little known, or to gain a new perspective on issues. However, the major criticism of qualitative research is its limited validity and reliability, due to the use of data from a small number of people or situations (Burns, 2000; Robson, 2011). Hence, the findings tend to be subjective and cannot be replicated to any other case, nor can they be generalised to a wider context (Burns, 2000; Neuman, 2007).

In order to utilise the strengths of both approaches, some researchers employ *mixed methods research*. According to Edmonds and Kennedy (2013) and Robson (2011), mixed methods research is a pragmatic approach used to achieve research objectives within a single study. Applying multiple strategies, mixed methods research provides good use of triangulation to ensure the quality of data (Denscombe, 2010b; Gray, 2009; Robson, 2011). Creswell (2014, p. 4) also states mixed methods research involves "*the use of both approaches in tandem so that the overall strength of a study is greater than either qualitative or quantitative research*". However, Gray (2009) argues that data sets collected by using incompatible methods can lead to misinterpretation of their commonalities and differences, so the results do not necessarily assure validity. Bryman (2007), Denscombe (2010a), and Gray (2009) note that, apart from the additional time and costs of study, trying to interpret and integrate findings from two discrepant approaches can create more complexity.

According to Creswell (2014), researchers not only select one of the research approaches to conduct, but they also decide on a type of study within these approaches. Research strategies are types of study that provide specific direction for procedure in a study. Research strategies may be called *strategies of inquiry* (Creswell, 2014) or *research methodologies* (Mertens, 2009). Table 5.3 presents several strategies of inquiry within the three research approaches.

Table 5.3: Alternative strategies of inquiry

Quantitative	**Qualitative**	**Mixed methods**
• Experimental designs • Non-experimental designs, such as surveys	• Narrative research • Phenomenology • Ethnographies • Grounded theory studies • Case study	• Sequential • Concurrent • Transformative

Source: Creswell (2014)

As stated in the previous section, this study employed the quantitative approach to test and determine the strategic factors (the environments and farmers' goals) and strategic marketing decisions. Qualitative data was also collected to confirm the variables included in the conceptual framework and to develop the foundation of the main questionnaire. Furthermore, the qualitative data served as a complement to the review of the fruit industry in Chanthaburi and also explored reasons behind the answers given by the fruit farmers. However, this study is still positioned as quantitative research because the qualitative data was not used for the purpose of triangulation and integration of the findings, as required in mixed methods research. In practice, it is common to see that quantitative research involves the collection of some qualitative data needed for a clear understanding of the research problem (Burn, 2000; Creswell, 2014; Robson, 2011).

5.3.1 Qualitative methodology

Qualitative research is an enquiry into what people do and say. There are five common qualitative methodologies across different authors, i.e. narrative, phenomenology, grounded theory, ethnography and case studies research (Creswell, 2014; Savin-Baden & Major, 2013; Sekaran & Bougie, 2013; Tran, 2016). These qualitative methodologies are designed to address different research questions or purposes, for example, to study individuals, explore processes, activities and events, or learn about culture.

- *Narrative research*—qualitative research that studies the lives of individuals. The information provided by individuals is then usually retold into a narrative chronology;
- *Phenomenological research*—qualitative research that enquires to understand life experiences of individuals. The data is usually collected through interviews with individuals or their experiential lens;
- *Grounded theory*—inductive thematic research that derives theory from qualitative data. The process of grounded theory research consists of collecting data, identifying themes, coding those themes, and interpreting the content and structure;
- *Ethnography*—research that involves a researcher's prolonged immersion within a group in order to study the shared patterns of behaviours and culture of the group. The researcher usually gathers data through observations, interviews and documents;
- *Case studies*—enquiry into this type of research focuses on information about a specific event or activity that is unique to the cases, such as individuals, groups, events or situations that the researcher is interested in. It is noted that case studies research may collect and analyse both qualitative and quantitative data (Creswell, 2014; Savin-Baden & Major, 2013; Sekaran & Bougie, 2013; Tran, 2016).

The purpose of using qualitative research in this study was to develop the conceptual framework which was specific to the fruit farmers in Chanthaburi province, together with the foundation of the questionnaire used in the quantitative research. In order to achieve this purpose, this study chose to gather information through the experiential lens of relevant persons in Chanthaburi province, such as agricultural and cooperative extension professionals and the fruit farmers themselves. This means that phenomenological research was applied to the qualitative data collection and analyses in this study.

5.3.2 Quantitative methodology

The prime examples of quantitative research are the experiment and the survey (Creswell, 2014; Robson, 2011). In a selection of research strategies (e.g. the experiment or the survey), the researcher's decision depends on whether the study is exploratory, descriptive, or explanatory:

- *Exploratory study* is undertaken to explore a phenomenon or a situation that is not well known. Secondary data (the literature review) and qualitative strategies, such as focus groups and case studies, are appropriate for this study purpose;
- *Descriptive study* is usually design to collect data related to variables describing persons, events or situations. Descriptive study may involve the collection of either quantitative or qualitative data, and the survey strategy is the most appropriate to address this purpose;
- *Explanatory study* or causal study is solely scientific and tests whether one variable causes another to change. Experimental designs are usually applied to such study (Robson, 2011).

This study can be classified as a descriptive study, because it is involved with collecting data that describes the strategic marketing decisions of the fruit farmers. Thus, a survey design was used for directing the primary data collection and analysis of this study. Other characteristics of a survey summarised in the literature are outlined below:

- A survey is used for collecting information from or about people, in order to describe, explain or compare their knowledge, attitudes and behaviour (Fink, 2003);

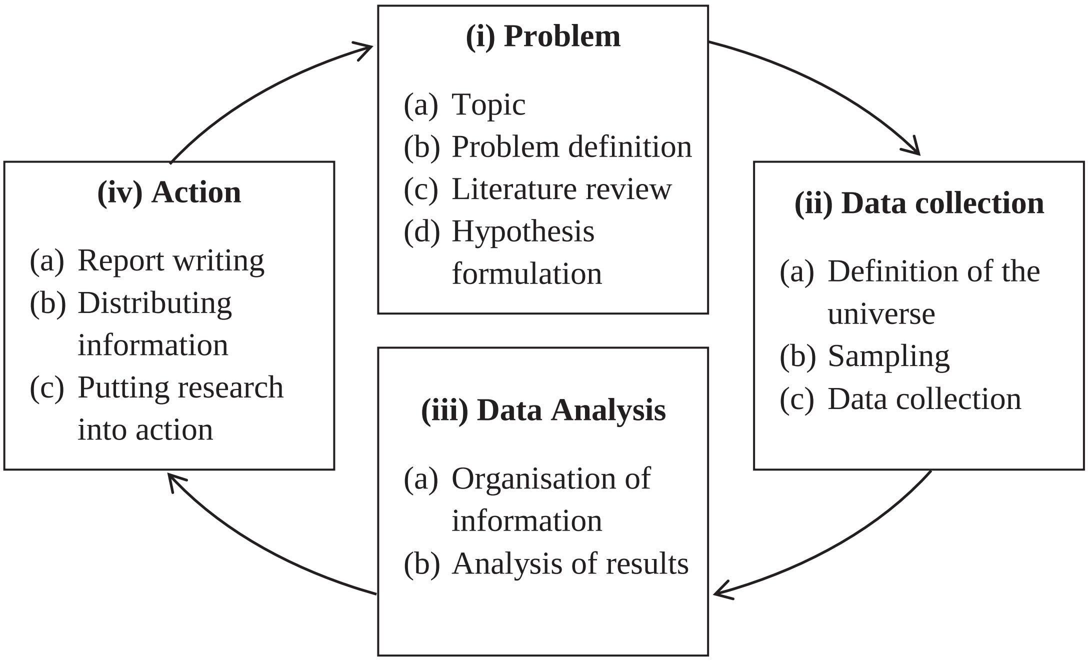
- Although survey research applies a quantitative and fixed design, due to preliminary planning of the research process, details of the procedure are more flexible than those of experimental research, and tend to be changed as the research proceeds (Robson, 2011);
- Indeed, a survey strategy allows both quantitative and qualitative data collection, using many types of questions (Sekaran & Bougie, 2013);
- Moreover, survey research works very well with the idea of empirical research (Denscombe, 2010a).

This study has all the above characteristics: (i) collecting data from people (farmers) to compare their attitudes and behaviour (decision making), (ii) planning the research procedure in advance, but subject to change when obtaining more information (from a pilot study), (iii) mainly collecting quantitative data and gathering some qualitative data, and (iv) an empirical research study in Chanthaburi province of Thailand.

5.4 Research process

Research is a systematic inquiry or investigation using data collection and analysis to find answers to a specific problem (Burns, 2000; Guthrie, 2010; Sekaran & Bougie, 2013). From this definition, research pursues an organised, logical method, and its systematic characteristic implies that research is a process (Edmonds & Kennedy, 2013; Kumar, 2011). The research process usually consists of several stages. For example, Guthrie (2010) indicates there are four simple stages of research: (i) problem identification, (ii) data collection, (iii) data analysis, and (iv) action, with several elements in each stage (Figure 5.1).

Figure 5.1: Four simple stages of research



Source: Adapted from Guthrie (2010)

Other authors present different variations of the stages within the research process. However, the contents are similar to the one discussed above. Sekaran and Bougie (2013) describe the research process as a scientific method that comprises a seven-step process: (i) identify a broad problem area, (ii) define the problem statement, (iii) develop hypotheses, (iv) determine measures, (v) data collection, (vi) data analysis, and (vii) interpretation of data. Likewise, Edmonds and Kennedy (2013) note that scientific research includes seven steps: (i) identify a research problem, (ii) establish the theoretical framework, (iii) indicate the purpose and research questions, (iv) develop the methodology, (v) collect the data, (vi) analyse and interpret the data, and (vii) conclusions.

This study was conducted using the following research process: (i) identification of the research problem, (ii) literature review and conceptual framework development, (iii) research aim and objectives, (iv) data collection, (v) data analysis, and (vi) conclusions. The sequential steps of this study are presented in Figure 5.2.

Figure 5.2: Methodological steps of this study

Identification of the research problem

↓

Literature review and conceptual framework

- Thailand's agriculture sector and fruit industry
- Decision making theory and strategic decision making
- Strategic decision making in agriculture

↓

Research aim, objectives and hypotheses

↓

Data collection

- Qualitative research (pilot study)— face-to-face and semi-structured interviews
- Quantitative research (main survey)— face-to-face interviews with structured questionnaire

↓

Data analysis

- Identification of the key variables base on qualitative results
- Description of the sample and comparisons of two sample groups
- Analysis of key factors that affect the strategic marketing decisions

↓

Conclusions

5.3.1 Identification of the research problem

Identification of a research problem is the most crucial step, because the research problem works as the foundation for later steps of the research process such as research design, measurement procedures, sampling strategy and so forth (Kumar, 2011). After a general area of study is selected, the research problem is usually defined by narrowing the topic down to a specific aspect that can be researchable in a limited time (Bouma & Ling, 2004; Guthrie, 2010). In addition, sufficient financial resources and knowledge and expertise in the area of study should be taken into consideration, when identifying a problem to research (Kumar, 2011).

The research problem of this study was identified from the area of strategic decision making that is relevant to the practical problem of making strategic marketing decisions (SMDs) in agriculture. This topic was narrowed down to a study of the strategic marketing decisions of fruit farmers in Chanthaburi province of Thailand in particular.

The fruit market in Thailand has been transformed over the past three decades and it has become more modernised and globalised. Some farmers have responded to this opportunity, while other farmers still rely on traditional ways to sell their produce. Hence, this research focused on the SMDs of fruit farmers and the analysis of factors that affect their decisions about participating in high-value markets.

5.4.2 Review of the literature

The literature is the body of knowledge which is used to determine whether the research topic is worth studying and to help the researcher to limit the scope to a specific area of investigation (Creswell, 2014). A review of the literature helps the researcher to think about and better understand the research problem, to discover gaps in the literature, and to structure the research on the foundation of existing knowledge (Creswell, 2014; Sekaran & Bougie, 2013). Furthermore, it is also used to develop a conceptual framework that becomes the basis of a study (Kumar, 2011).

There are three main chapters of literature reviewed in this study:

- Thailand's agriculture sector and fruit industry— review of the transformation towards more modernised agriculture in Thailand, the role of the fruit sector, and the importance of Chanthaburi province, in addition to incorporating information from secondary sources to provide background to the study;
- Decision making theory and strategic decision making— review of the theory of decision making in general, the concept of decision making in management, and strategic decision making in particular;
- Strategic decision making in agriculture — review of strategic decisions in agriculture which have departed from those found in strategic management literature, and this information was used to establish the conceptual framework of the study.

5.4.3 Research aim, objectives and hypotheses

The literature brings about clarity and a focus on the research problem that is able to address both research objectives and research questions (Sekaran & Bougie, 2013). Sekaran and Bougie (2013) also note that research questions are built on clear, specified research objectives. Conversely, Kumar (2011) indicates that the research objectives are derived from the research questions into behavioural aims, but some researchers may prefer to formulate only research questions or only research objectives. Kumar

(2011) further states that objectives are the goals that the researcher wants to achieve and are listed under two headings: (i) the main objective or aim— an overall statement of the main associations that the researcher seeks to discover and (ii) sub-objectives— the specific aspects that the researcher wants to investigate within the conceptual framework.

The other form of research questions that need to be addressed is the hypothesis (Edmonds & Kennedy, 2013). According to Bouma and Ling (2004, p. 29), a hypothesis is *"a statement that asserts a relationship between concepts"*. Hypotheses are derived from the theory underlying the conceptual framework and are used to predict relationships among variables, which require statistical testing (Creswell, 2014; Robson, 2011; Sekaran & Bougie, 2013).

The aim of this study is to understand the strategic marketing decisions of fruit farmers in Chanthaburi province of Thailand. The aim was achieved by the following objectives:

1) To review the agriculture sector and the fruit industry in Thailand and in Chanthaburi province in particular.
2) To describe and compare fruit farms and farmer characteristics between farmers who participate in traditional markets and high-value markets in Chanthaburi province of Thailand.
3) To determine factors which affect the strategic marketing decisions of fruit farmers in Chanthaburi province of Thailand.

5.4.4 Data collection

The required data were collected from both secondary and primary sources. Secondary data refers to raw data or compiled data that has already been collected for some other reasons, while primary data refers to information that researchers gather through research methods, consisting of observations, interviews and questionnaires (Kumar, 2011; Sekaran & Bougie, 2013).

Secondary data collection

There are several sources of secondary data including books, academic journals, government publications, reports, personal records and mass media (Kumar, 2011; Sekaran & Bougie, 2013). The advantage of collecting secondary data is time and cost savings, but researchers have to be concerned with its quality, because some data may be obsolete or it was collected to meet specific needs (Sekaran & Bougie, 2013)

For this study, secondary data included statistical data, government reports and other publications used as background information. The data was mainly gathered from the Food and Agriculture Organization of the United Nations (FAO), Thailand's Ministry of Agriculture and Cooperatives, the Ministry of Commerce, and other international and Thailand institutions related to agriculture and economics. Furthermore, data used for gaining an understanding of the fruit industry in Chanthaburi province were gathered from non-published reports from the Chanthaburi Provincial Agricultural Extension Office, the Office of Agricultural Research and Development, and the Chanthaburi Provincial Cooperative Office. In order to structure this thesis on previous research or existing knowledge, a considerable number of academic works such as textbooks, journals, conference proceedings and other academic materials also served as secondary data for this study.

Primary data collection

Primary data can be collected in a variety of ways, such as in the field or in a laboratory, by using several techniques. As suggested by Robson (2011), in research focusing on people, primary data can be obtained by watching (observations) and asking (interviews and questionnaires). Thus, the key methods of primary data collection are observations, interviews and questionnaires:

- *Observations*—a systematic technique to watch what is occurring such as actions and behaviour of people;
- *Interviews*—researchers collect data by asking questions in order to receive answers from people as respondents;
- *Self-administered questionnaire*—a set of written questions where respondents are requested to record their answers (Denscombe, 2010a; Kumar, 2011; Robson, 2011; Sekaran & Bougie, 2013)

Interviews and self-administered questionnaire methods are widely used (Blair, Czaja, & Blair, 2014; Fowler, 2014; Neuman, 2007; Robson, 2011). The difference between the two methods is that the interview method uses interviewers to ask questions and record answers, while the questionnaire method works by sending out questionnaires to respondents and asks them to fill in the answers by themselves. Interviewing can be structured or unstructured:

- *Structured interview*—a set of questions, closed-ended or open-ended, are predetermined with fixed wording and sequence. This method is commonly used in survey research, whereas the interaction between the interviewer and the respondent may be face-to-face or by telephone;
- *Unstructured interview*—this method allows an interview to take place without a planned sequence of questions. Some interviewers may have a list of topics but these can be modified, depending on the flow of conversation. This may be called *semi-structured interviews*. Both unstructured and semi-structured interviews are typically used in qualitative research, such as in-depth and focus group interviews (Kumar, 2011; Robson, 2011; Sekaran & Bougie, 2013).

This study employed the interview method to both qualitative and quantitative data collection. As mentioned previously, semi-structured interviews were conducted through a qualitative data collection in the pilot study with some key facilitators and farmers in the fruit industry, while structured interviews were conducted through a survey with the fruit farmers in Chanthaburi.

5.4.5 Data analysis

After data have been collected, the next step is to analyse them. The processes of data analysis are different between qualitative and quantitative research. The qualitative data analysis normally involves the data in the form of words, whereas the quantitative data analysis deals with numerical data (Creswell, 2014).

Qualitative data analysis

Qualitative data analysis may start after a small amount of data have been collected and this data is then repeated collected and the information analysed, in order to aggregate the data into a small number of themes (Creswell, 2014; Miles, Huberman, & Saldaña, 2014) . According to Miles, Huberman, & Saldaña (2014), the process of qualitative data analysis generally consists of three steps: data reduction, data display and drawing conclusions.

- *Data reduction* refers to the process of *coding* and *categorisation* of data. Coding is the process through which the researcher analyses the qualitative data by reducing, rearranging and integrating to form theory. It labels units of text which are later integrated into categories. It also helps the researcher to recognise patterns in the data and discovers connections between them. Categorisation is the process in which the researcher organises, arranges and classifies coding units;

- *Data display* involves taking the data that have been reduced and displaying them in an organised and condensed manner. There are many ways to display the reduced data, such as charts, graphs, matrices, diagrams and drawing. Data display provides an understanding of patterns and relationships within the data;
- *Drawing conclusions* is the essence of qualitative data analysis, where the researcher explains the observed patterns and relationships (Miles, Huberman, & Saldaña, 2014; Sekaran & Bougie, 2013).

The qualitative data collected in this study was coded and classified into three categories within the preliminary framework: the internal environment, the external environment, and the farmers' goals. The data was also classified into sub-categories under each category. A table was considered to be the most suitable way to bring together the qualitative results, as it is of a descriptive nature. The qualitative results are presented in Chapter 6.

Quantitative data analysis

Quantitative data are usually analysed statistically in order to test the research hypotheses (Sekaran & Bougie, 2013). However, before testing the hypotheses, some preliminary steps need to be completed, in order to ensure data accuracy for further analyses. There are three types of statistical analysis:

- *Univariate analysis*—the analysis of one variable at a time. The most common approaches for univariate analysis consist of frequency tables, diagrams, measures of central tendency (e.g. arithmetic mean, median and mode) and measures of dispersion (e.g. range and standard deviation);
- *Bivariate analysis*—the analysis of two variables at a time in order to examine the relationship between both variables. A number of techniques are available for examining relationships, but the use of them depends on the nature of the two variables. For example, contingency tables with chi-square (χ^2) and

Cramer's *V* tests are used for two categorical variables. Pearson's r tests are used to test between continuous variables (interval or ratio);

- *Multivariate analysis*—the simultaneous analysis of three or more variables. The use of multivariate analytical techniques depends on the purpose of assessing the relationships among variables, i.e. analysis of dependence and analysis of interdependence. Interdependence techniques are used to explore patterns or structures of variables, such as exploratory factor analysis and cluster analysis. Dependence techniques are used to confirm the factors that explain or predict others, such as linear regression analysis, analysis of variance, conjoint analysis and logistic regression analysis (Bryman, 2012; Janssens, 2008).

In this study, a number of statistical techniques were used to describe and compare two groups: farmers who use traditional marketing channels (TM users) and farmers who use high-value marketing channels (HM users), in order to explore the structures of variables and test the factors that affect the strategic market decisions (SMDs) of the farmers. Univariate analyses, such as percentages, maximums, minimums, means and standard deviations, were used to describe the sample. The two sample groups were compared on a number of variables (farm and farmer characteristics). The bivariate analytical techniques used for these comparisons were the chi-square (χ^2) test together with Phi (φ) and Cramer's *V*, in order to estimate the strength of the relationships. The analysis of factors affecting the SMDs of the fruit farmers involved a great number of relevant variables defined from the qualitative results. Exploratory factor analysis was used, in order to reduce data to a small set of underlying factors (constructs). The resulting underlying factors were independent variables, and they were hypothesised to affect a dichotomous dependent variable (the SMDs of the farmers using TM or HM channels). The dichotomous dependent variable was confirmed by using cluster analysis to ensure that there were not any other groups in between. Then binary logistic regression was used to test the hypotheses. Details about the quantitative analyses and results are presented in Chapters 7 and 8.

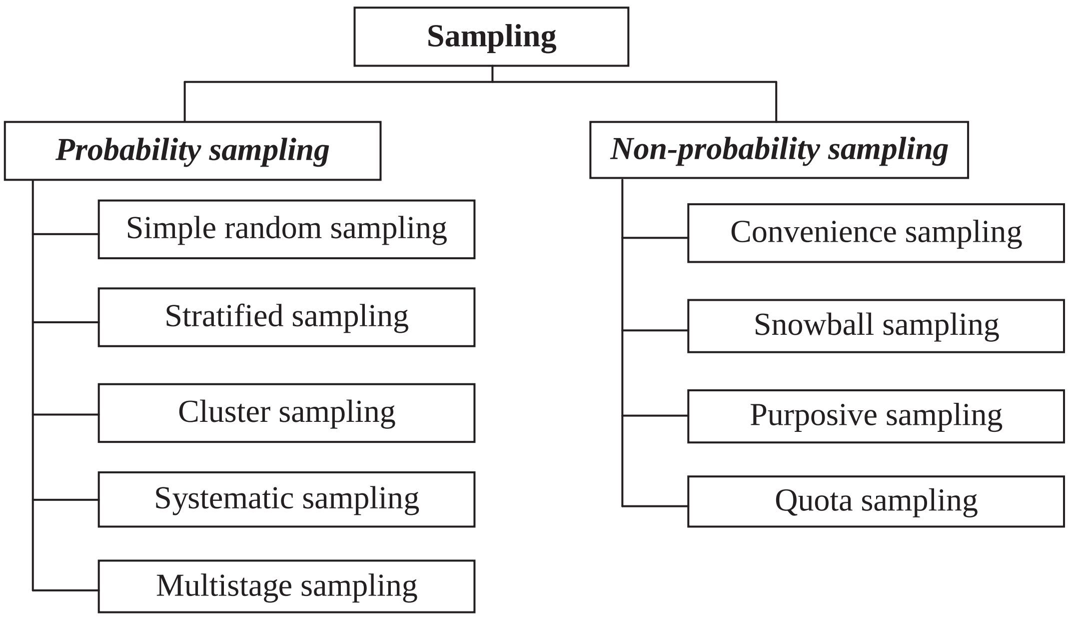
5.5 Research design

Research design is linked with research objectives, the conceptual framework, and research questions thus directing the methodologies used (Denscombe, 2010b; Robson, 2011). Research design includes sampling, research strategies and questionnaire design.

5.5.1 Sampling

One of the major tasks of research design is sampling. According to Sekaran and Bougie (2013), sampling is the process of selecting individuals, objects or events that represent the entire population. The purpose of sampling is to eventually generalise the research findings to the entire population because, in most circumstances, it is impossible to collect data from an entire population (Edmonds & Kennedy, 2013). There are two general types of sampling, i.e. probability sampling and non-probability sampling. Figure 5.3 presents these two general types comprising several sampling techniques.

Figure 5.3: Sampling techniques



Source: Blair et al. (2014); Sekaran and Bougie (2013)

Probability sampling relies on the application of random selection, based on a 'normal distribution' of events in terms of statistical theory, and it aims to obtain a representative sample of the population (Blair et al., 2014; Denscombe, 2010a; Sekaran & Bougie, 2013). Probability sampling techniques include:

- *Simple random sampling*—every individual within the population has an equal chance to be selected;

- *Stratified sampling*—the population is classified into homogeneous subgroups, and then individuals within each subgroup are randomly selected;
- *Cluster sampling*—the population is divided into clusters that include some individuals that, ideally, have a range of characteristics similar to those in the population;
- *Systematic sampling*—the sample is selected from every *n*th individual of the population until the needed sample size is fulfilled.
- *Multistage sampling*—an extension of cluster sampling used to select a sample in stages, or to select samples from a sample (Edmonds & Kennedy, 2013; Robson, 2011).

The other type of sampling is non-probability sampling that does not apply a random process (Blair et al., 2014; Denscombe, 2010a; Sekaran & Bougie, 2013). Hence, samples are typically selected by convenience, judgement or quota:

- *Convenience sampling*—or accidental sampling selects respondents because they are conveniently available or are willing to participate;
- *Snowball sampling*—respondents are selected from one or a few individuals within the group of interest, and then those individuals are asked to identify others in the group;
- *Purposive sampling*—or judgement sampling involves the choice of individuals who can provide the best information based on a specific need or the research objectives;
- *Quota sampling*—similar to stratified sampling, a number of subgroups are identified, but individuals are not randomly selected (Edmonds & Kennedy, 2013; Kumar, 2011; Robson, 2011).

This study employed purposive sampling for both qualitative and quantitative research due to several reasons:

- According to Denscombe (2010a), in a situation where information about the population is inadequate, non-probability sampling should be employed, in order to produce an exploratory sample rather than a representative sample. In this study, an accurate, complete and up-dated list of the fruit farm population required in a probability sampling was not available in Chanthaburi province of Thailand.

- Within non-probability sampling, purposive sampling works as a useful sampling choice, especially in the situation where random sampling leads to relatively small numbers of groups that can supply the information needed (Denscombe, 2010a; Sekaran & Bougie, 2013). As the research topic of this study involved the strategic marketing decisions of fruit farmers, the sample comprised two groups of farmers: (i) those farmers who used traditional markets and (ii) those farmers who used high-value markets. Due to a relatively small number of certified farms (that usually used high-value markets) within the whole fruit farm population, approximately 2,500 certified farms (about 7%) from a total of 35,000 farms in Chanthaburi province (DOA, 2014; OAE, 2014a), purposive sampling, which allows the selection of people who can provide useful information related to the research topic, is appropriate for this study.
- A probability sampling survey that desires to obtain a sufficient number within a low percentage population subgroup may require an increase in the sample size (Fowler, 2014), which is not very cost effective. Denscombe (2010a) suggested that, apart from the capability to obtain valuable information from certain subgroups, purposive sampling leads to lower costs and time saving. In this study, available time, the budget and people needed for full-scale probability sampling were limited. In addition, it involved a particular subgroup (farmers who used high-value markets), so purposive sampling appeared to be feasible.
- Sapsford (2007) states that statistical methods cannot be used to estimate errors in non-probability samples, but most researchers still apply them to do so, because the results of statistical analysis of non-probability samples provide useful information, as a decision principle. Blair et al. (2014) argue that, in academic research, imperfect samples can be useful for testing relationships between variables, but they do not work well on univariate estimates. This is because the samples are likely to have self-adjusting biases on the related variables. However, resistance to the bias will occur as long as the sample is diverse. Consistently, the objectives of this research have involved testing relationships between variables, without univariate estimates, such as the proportion of fruit farmers falling into different strategic marketing decisions.

In order to gain resistance to the bias of purposive sampling used in this research, a diversity of the sample has been taken into consideration. This survey attempts to vary subjects in the sample, in terms of farm size, age of farmers, and fruit farming experience.

As a result of the sampling design, this research cannot be generalised through probability sampling. However, as argued by Blair et al. (2014), the foremost way to generalise in academic research is through theory, because research is confirmatory, not inferential. Furthermore, generalisations can also be made through replication by other studies (Blair et al., 2014; Sapsford, 2007).

In this study, the sample for qualitative research included eight facilitators who could provide useful information about the fruit industry and the fruit farmers in Chanthaburi. Fruit farmers also selected into the samples of both qualitative and quantitative research. The following criteria were applied to select the fruit farmers who:

- had their main income source from fruit farming (more than 80% of total incomes);
- grew at least one of the three main fruit crops, i.e. durian, mangosteen and rambutan;
- had their highest sales from one of their main fruit crops;

The sample of 20 fruit farmers for qualitative research was used for pre-testing the questionnaire. The final sample for quantitative research included 216 respondents, consisting of two sample groups: (i) the fruit farmers who used traditional marketing channels (TM users) and (ii) the fruit farmers who used high-value marketing channels (HM users). Technically, these two groups of respondents were considered as two independent samples, which indicated the statistical techniques used for comparing the two groups of the sample.

5.5.2 Research strategy for collecting data

Research strategies may be called strategies of inquiry (Creswell, 2014) or research methodologies used for gathering information (Mertens, 2009). Researchers usually decide on research strategies within research approaches they used:

Qualitative study

Research strategy in qualitative research usually involves direct interaction with individuals on a one-to-one basis or in a group setting (Bryman, 2012). Strategies used for collecting qualitative data are:

- *Observations*—this method is usually used in ethnographic research by taking field notes on the behaviour and activities of individuals. Observations are useful in collecting qualitative data that may be uncomfortable for participants to discuss;
- *Interviews*—the most widely employed method that the researcher can conduct is face-to-face or telephone interviews with individual participants. There are two major types of qualitative interviews, i.e. unstructured interviews (without a planned sequence of questions) and semi-structured interviews (with a list of questions). Questions in the interviews are intended to elicit views and opinions from participants;
- *Focus groups*—this method is another form of interview, but instead of individual interviews, the researcher engages in group interviews with six to eight participants;
- *Documents*—during the research process, the researcher may collect qualitative documents that are both public documents (e.g. minutes of meetings, annual reports) and private documents (e.g. diaries, letters, e-mails) (Bryman, 2012; Creswell, 2014).

This study collected qualitative data through face-to-face semi-structured interviews because it required information that came from the experiential lens of relevant people. Furthermore, the conceptual framework guided the researcher to determine a list of questions for the semi-structured interviews. In qualitative data collection, this study conducted a two-step process: 1) interviews with related facilitators and 2) interviews with the fruit farmers.

The facilitators included eight key people in Chanthaburi province, i.e. Provincial Agricultural Extension Office (two people), Office of Agricultural Research and Development (two people), Provincial Cooperative Office (one person), agricultural cooperatives (three people). The information gathered through discussion with these facilitators was used to develop a conceptual framework that was more specific than the preliminary framework. Furthermore, the questionnaire was revised in order to be consistent with the conceptual framework. The second step was the interviews with 20 fruit farmers in Chanthaburi province (who were not later included in the sample). In these interviews, the questionnaire was pre-tested and discussed with the fruit farmers. In an iterative way, the questionnaire was revised several times based on the results of the interviews.

Quantitative study

In survey research, interviews and self-administered questionnaires are also widely used (Blair et al., 2014; Fowler, 2014; Robson, 2011). Predetermined questions used in either face-to-face or telephone interviews can be developed similarly to those in the self-administered questionnaire method. Alternatively, questionnaires are distributed to people via mail, email and websites, called mailed questionnaires and internet surveys, respectively. These types of techniques for data collection are also often used in survey research (Blair et al., 2014; Robson, 2011).

Each method of data collection in survey research has its own advantages and disadvantages. As pointed out by Blair et al. (2014) and Fowler (2014), in terms of the unit cost of data collection, internet surveys are the most economical with a high speed of return, compared to other techniques. Mailed survey and telephone interviews have relatively lower costs than face-to-face interviews. However, face-to-face interviews are the best method, in terms of response rates. Furthermore, both types of interviews work well with long and complex questionnaires, while questionnaires designed for mailed and internet surveys should be short and simple. Table 5.4 presents survey data collection methods and their different advantages and disadvantages.

Table 5.4: Advantages and disadvantages of different modes of data collection

Modes of data collection	Advantages	Disadvantages
Face-to face interviews	• Question clarification • Creates non-verbal cues • Visual aids to clarify points • Rich data	• Time consuming • Costly, particularly when wide geographic region is covered • Risk to respondents' confidentiality • Interviewers need to be trained • Risk of interviewer bias
Telephone interviews	• Less costly and speedier than personal interviews • Wider geographical areas can be accessed	• Respondents prefer short interviews • No visual help
Mail questionnaires	• Anonymity is high • Wide geographic regions can be reached • Respondents can take more time to respond at their own convenience	• Response rate is almost always low • Follow up procedures for non-responses may be required
Electronic questionnaires	• Easy to administer • Global access • Very inexpensive • Fast delivery • Respondents can answer at their convenience	• Computer literacy is essential • Respondents must have access to the facility • Respondents must be willing to complete the survey • Response rate is very low

Source: Sekaran and Bougie (2013)

Each choice of data collection method involves many aspects of the survey research process, and it has implication for response rates, question form, the quality of survey estimates and survey costs (Fowler, 2014). According to Blair et al. (2014), many factors, in relation to resources for a survey, research instruments and data quality, must be considered when choosing a method of data collection.

Taking these factors into consideration, face-to-face interviews (with the assistance of structured questionnaires) were employed in this study, because the topic is complex and difficult to understand for poorly educated farmers. As noted by Blair et al. (2014) and Fowler (2014), face-to-face interviews are most appropriate to be used with long questionnaires and complex questions, in order to develop a rapport and help to build up the confidence of the respondents (Blair et al., 2014; Fowler, 2014). Furthermore, other methods, except the face-to-face interviews, were hardly possible for this study, due to the lack of a complete list of fruit farms and other details, such as physical addresses, email addresses, telephone numbers and internet users.

The survey of this study was conducted during the off-harvest season from August to November 2014 within Chanthaburi province of Thailand. The respondents were fruit farm owners, and they were interviewed in various places: farms, villages, offices of agricultural cooperatives, offices of district agricultural extension, and input supply stores. Before starting the interviews, the respondents were given a quick introduction about the research. They were also observed and/or asked whether they were willing to participate in the study. If they agreed to participate, the interviews began with Part 1 of the questionnaire that included some screening questions. Only the respondents who met the criteria set were included in the sample.

During the survey, several strategies were adjusted, in order to gather valid and reliable data and to reach the number of respondents determined within this survey. These were as follows:

- Allowing the farmers who could not read the statements by themselves to see the ordinal scale (the levels of agreement or importance) printed on a piece of paper, so the interviewer did not have to repeat the scale for every statement;
- The farmers who could read and understand the idea of the questions quickly were asked to record their own answers.
- Apart from visiting farmers on their farms, other strategies for finding farmers were added, such as meeting them in: (i) fruit farmers' meetings at some cooperatives and certified farmer group meetings; (ii) other places that they went to do their business, such as the District of Agricultural Extension Offices, the Bank for Agriculture and Agricultural Cooperatives, and some input supply stores, and (iii) through recommendation by some farmers who had already been interviewed.

5.5.3 Questionnaire design

Questionnaires are commonly used in surveys as a research instrument. Questionnaires can be classified into two types: self-administered and interviewer-administered questionnaires (Fowler, 2014). In the case of self-administered questionnaires, respondents complete their answers by themselves with no direct contact between the researcher and the respondents. Alternatively, interviewer-administered questionnaires involve interaction between the researcher and the respondents. There are two broad types of questions that are usually formulated within a questionnaire:

- *Open-ended questions*—these questions bring about qualitative data provided by the respondents ,who independently express their answers in their own words;
- *Closed-ended questions*—these questions produce quantitative data, and the offered answers are structured in a way that respondents can make a choice (Kumar, 2011). Closed-ended questions can be formulated in several forms such as 'yes/no' options, multiple choices, ranking options and rating scales to the degree of agreement (Denscombe, 2010a).

Questions in the questionnaire are assigned scales of measurement in the form of numbers that are used to perform statistical analysis (Sekaran & Bougie, 2013). There are four types of scales:

- *Nominal scales* allow the researcher to assign cases into categories. For example, gender can be categorised as male and female. Nominal scales are also called categorical scales or dichotomous scales (when there are only two categories);
- *Ordinal scales* not only categorise things, but also rank them into order according to some preference, e.g. from best to worst or first to last. Ordinal scales can provide information on how respondents distinguish things by ordering them, but it does not provide any indication of the magnitude of the differences along the order. Ordinal scales are sometimes called ranked scales;
- *Interval scales* show the order of things with equal intervals (or the magnitude of differences) between the points all along the scale. Interval scales are used for responses to various items that measure on rating scales such as Likert-type scales. These rating scales are commonly used to measure values and attitudes of people;
- *Ratio scales* have an absolute zero value, and points along the scale make sense as ratios or proportions in the differences between the points. For example, age can be zero, and it makes sense that ten years is twice as long as five years.

> Ratio scales are used when exact numbers are required (Brown, 2011; Sekaran & Bougie, 2013).

In this study, the questionnaire was designed primarily based on the conceptual framework (Appendix A-1). The questionnaire (used in the pilot study) included both open-ended and closed-ended questions. The closed-ended questions were used for the respondents to provide some exact numbers (e.g. their date of birth, their years of farming experience, and farm areas), and the open-ended questions were used to ask the reasons behind some of their answers. Many forms of closed-ended questions were used, including 'yes/no' options, multiple choices (e.g. types of fruit grown and levels of education), and the Likert-type scale was used for measuring their perceived importance of the external environment and attitudes towards the goal statements. Likert-type scales have also been used in previous agricultural literature, e.g. McLeay et al. (1996), Tsourgiannis et al. (2008) and Hansson et al. (2012).

According to the conceptual framework, three types of strategic factors, i.e. the internal environment, the external environment, and the farmers' goals, were of interest in this study. The internal environment variables were measured by nominal and ratio scale, including:

Variable	**Question**	**Scale**
Screening questions		
Fruit farm income	What percent of your income comes from fruit farming? ......%	Ratio
Main fruit crop	What is the fruit crop that provided you with the highest sales this year? ☐ Durian ☐ Mangosteen ☐ Rambutan ☐ Others	Nominal
Physical resources (farm characteristics)		
Farm size	What is the total size of your farm? ......rais	Ratio
Land ownership	What is the type of land ownership for your farm? ☐ Own land ☐ Rent land ☐ Both	Nominal
Farm production	How many tons to you get from your fruit production? Durian ...... tons, Mangosteen ...... tons, Rambutan ...... tons, Others ...... tons	Ratio

Variable	Question	Scale
Human resources (farmer characteristics)		
Age	What is your age? ..... years	Ratio
Education	What is your level of education? ☐ Below primary ☐ Primary ☐ Secondary ☐ Tertiary	Nominal
Farming experience	How many years have you been involved in farming?	Ratio

The variables of the external environment and the farmers' goals were measured by Likert-type scales, which are usually used to measure attitudes. Statements reflecting each type factors were formulated to capture the attitudes of farmers. For the external environment, a five-point Liket-type scale was used to measure the extent to which farmers perceived the importance of the proposed statements. Each point of the scale was labelled as: not important (1), little important (2), important (3), very important (4), and extremely important (5). This scale may be called an *itemised rating scale* which provides the flexibility to use as many points as considered necessary, and it is frequently used in business research (Sekaran & Bougie, 2013). The question for the external environment was: *'To what extent of importance do the following statements positively impact on your fruit farm business'*. At this stage, the statements included:

Variable	Statement
Micro-environment	
Buyers	Satisfaction of your fruit buyers such as collectors, exporters or cooperatives etc.
Other fruit farmers	A decrease in fruit production from other fruit farmers
Input suppliers	Knowledge from input suppliers such as the use of fertilisers and agricultural chemicals
Macro-environment	
• ***Political***	
Financial support	Support from government for financing fruit farming
Production support	Support from government for fruit production
Marketing support	Support from government for fruit market promotion
• ***Economic***	
Fruit price	Stability of fruit prices
Market growth	Market growth for high quality fruit

Variable	Statement
• ***Social***	
Urbanisation	Increasing fruit demands from urban population
Food safety	Market requirements for food safety
• ***Technological***	
Production technology	Advancement of production technologies
Logistics technology	Advancement of logistics technologies
Information technology	Advancement of information technologies
• ***Environmental***	
Crop diseases	Information about fruit crop diseases
Weather	Information about variation in the weather

For the farmers' goals, a five-point Likert-type scale was also used to measure the extent to which farmers agreed or disagreed with the proposed goal statements. A five-point scale was used in this study because it offers enough choice and makes things manageable for respondents (Johns, 2010). Furthermore, five-point Likert scales have been used in previous agricultural research, such as Gorton et al. (2008) and Hansson et al. (2012). Each point of the scale was labelled as: strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). The question for the goal statements was: *'To what extent do you agree or disagree with each of the following statements'*. At this stage, the statements for farmers' goals included:

Variable	Statement
Economic goals	
• ***Production goals***	
Production techniques	You continually update production techniques at your fruit farm.
Farm work	A successful farmer focuses on production, i.e. farm work, and not on activities outside the farm.
Quality products	You strive to produce the highest quality fruit in your district.
Specialty fruit crops	You grow specialty fruit crops, e.g. different varieties and exotic fruit, more than other farms in your district.

Variable	Statement
• ***Marketing goals***	
Customer requirements	You grow fruit crops that best meet customer requirements.
Market channels	You have detailed knowledge of the distribution channels your produce move through after it leaves the farm.
Market information	Meeting with other farmers is important, in order to find new market opportunities.
• ***Financial goals***	
Costs	You have the lowest possible input cost in general.
Profits	You are aware of exact costs and returns for any fruit crops you produce.
Investment	Your goal is to diversify your assets by having off-farm investments.
Farm development	You are satisfied with the current level of development on your farm.
Non-economic goals	
• ***Environmental goals***	
Agro-chemicals	Fertilisers and pesticides are most necessary for your fruit farm.
Living condition	You consider a decrease in the use of agricultural chemicals would improve the living conditions on the farm.
Environmental awareness	You are doing everything you can to be environmentally aware and conserve the land you farm.
• ***Personal and family goals***	
Social interaction	You think that off-farm activities provide opportunities for social interaction.
Lifestyle	You want to make enough money to maintain a balanced lifestyle.
Family needs	Your ultimate goal is to generate a secure, adequate income to meet the needs of your family.
Quality of life	You think that reducing your work load will help you improve the quality of your life.
Family	The best part of farming is having your family working

Variable	Statement
	alongside you.
Happiness	You enjoy farm work because it makes you feel happy.

Lohr (2010) suggests that the most important step in questionnaire design is to consider the research objectives, in order to obtain precise data. The questionnaire needs to be developed carefully in regards to its validity and reliability (Creswell, 2014; Denscombe, 2010b; Lohr, 2010).

In order to ensure the validity and reliability of the results, the questionnaire was carefully constructed to cover the full range of issues intended to measure and produce accurate information for achieving the research objectives. More than 15 iterations were undertaken, in order to abstain from repetitive and confusing questions, and to develop more precise and concise questions that best met the research objectives. The preliminary questionnaire was discussed with some key facilitators in the pilot study and revised several times before pre-tested with some fruit farmers who were not part of the sample. The results of pre-testing indicated that many questions were likely to be difficult for farmers to understand, due to the academic wording and technical terms used in business. The other problems were concerned with the inappropriate order of the questions and some unnecessary or irrelevant questions. Thus, the questionnaire was further intensively revised.

The final questionnaire (Appendix A-3) consisted of five parts, with 31 questions including both closed-ended and open-ended questions. Part 1 included some screening questions to recruit relevant farmers into the sample, and it focused on the fruit farm and farmer characteristics which informed on the internal environment factors. In Part 2, the questions were related to the marketing channels the farmers decided to use for their main fruit crops. The goal statements were placed in Part 3 and measured by using a five-point Likert scale. There were 19 goal statements related to several aspects of farmers' goals, i.e. production, marketing, financial, environment and personal and family goals. In Part 4, the farmers were asked to evaluate the importance of the external environment on their fruit farm business. The questionnaire concluded with Part 5, which contained questions about the farmers’ future marketing strategies and other comments.

5.6 Validity and reliability

Many authors point out that the methodology adopted in a study should be undertaken, in order to address the research objectives, or to answer the research questions (Denscombe, 2010b; Kumar, 2011; Robson, 2011; Sekaran & Bougie, 2013). As can be found in common scientific research, identification of the research problem and objectives is an indispensable and preliminary part of procedures in the research process. Kumar (2011) states that, in a research journey, there are two key decisions to be made: the first is *what the researcher wants to find out about* (objectives); and the second is *how to go about finding the answers* (methodology).

The quality of research results that come from a sequence of steps-- sampling, data collection and data analysis, can be indicated by validity and reliability (Bouma & Ling, 2004; Denscombe, 2010b; Kumar, 2011; Sapsford, 2007). As described by Denscombe (2010b), validity refers to the quality of the data, whereas reliability refers to the quality of the methods. Bouma and Ling (2004) and Sekaran and Bougie (2013) argue that validity is concerned with the accuracy of data or variables that fit a concept. There are three main types of validity:

1) *Content validity*—items or questions cover the full range of the issue intended to measure;
2) *Predictive or concurrent validity*—the degree to which item scores can predict an outcome, and concurrent results correlate with other results;
3) *Construct validity*—items measure hypothetical construct based on statistical procedures (Creswell, 2014; Kumar, 2011).

This study began with a study of the agriculture sector and fruit industry in Thailand, in order to understand the existence of a transformation within agri-food marketing systems, which have impacted on the SMDs of farmers. This was followed by a comprehensive review of literature relevant to decision making theory, strategic decision making and its applications in agriculture. This helped to ensure the accuracy of data and variables that fitted the concept of SMDs in agriculture. Consequently, this study included farmers' goals and the business environment in the conceptual model, in order to explain the SMDs of farmers. This model was tested in Chanthaburi province of Thailand, and the data collected was analysed based on statistical procedures.

Besides validity, reliability is concerned with dependability or consistency of the measure of a variable (Bouma & Ling, 2004; Kumar, 2011; W. L. Neuman, 2007). A study needs to ensure that the research method used will be consistent, so that the results will represent a real difference that is not partly affected by unreliable methods (Denscombe, 2010b). Kumar (2011) argues that research methods in social research are likely to be less accurate than those in physical science, due to some factors such as wording in questions, the respondent's mood and the nature of the interaction. Furthermore, Bouma and Ling (2004) note that the reliability of observational research is often questioned, because different observers may not record the same results of the same observations.

Apart from employing a logical research procedure, this study adopted the idea of reliability, to ensure the quality of its research results. Similar to social research, this thesis focuses on people (the fruit farmers), which leads to some difficulties in controlling the quality of the results. However, a well-developed research instrument and an appropriate method of data collection helped to ensure reliable results. As a research instrument, the questionnaire for this research was carefully constructed. Drafts of the questionnaire were revised several times before and after pre-testing the questionnaire, in order to identify and realise problems that may occur, such as some misunderstanding with the questions and a willingness to answer. During face-to-face interviews, the interviewer (the researcher) carefully asked questions and sometimes changed strategies, or gave further explanation for farmers, to avoid misunderstanding of some questions. Moreover, the measurement scales used in the questionnaire were analysed statistically to ensure they were reliable prior to all data undergoing analysis. In addition, since this study was involved with the direct participation of people (the fruit farmers), it obtained an approval from the Massey University Human Ethics Committee (Appendix B) before conducting the research.

5.7 Summary

This chapter presents the theoretical context of the research and the methodology employed within the study. This research followed a systemic enquiry of research processes, in order to identify the problem and the objectives, the appropriate research approach, and methods and techniques in data collection and analysis. The overall research methodology proposed in this chapter has sufficiently addressed the research objectives.

This study employs a two-step approach: a qualitative study to identify the variables leading to a quantitative study, in order to ascertain the influence of factors in strategic marketing decisions (SMDs) of fruit farmers in Chanthaburi province of Thailand. The qualitative study was conducted in order to develop a specific conceptual framework, which is the foundation of the questionnaire. This study chose to collect the qualitative data from the experiential lens of key facilitators in the fruit sector and fruit farmers in Chanthaburi province of Thailand. It collected qualitative data through face-to-face semi-structured interviews. Following qualitative study, the quantitative study was conducted through a survey in order to deductively test the hypotheses proposed in the conceptual framework. The research strategy used in the survey was face-to-face interviews with the assistance of structured questionnaires. Purposive sampling was used to select the respondents, who were divided into two sample groups (TM and HM users). In order to produce valid results, the questionnaire was carefully developed and pre-tested before the survey was conducted. The survey data were mainly about farm and farmer characteristics, their attitudes towards the external environment and the farmers' goals. The methods of data analysis consisted of descriptive statistics and the Chi-Square (χ^2) test for comparing the two sample groups. In addition, multivariate analyses, i.e. factor analysis and binary logistic regression, were employed, in order to obtain results that would indicate factors affecting SMDs.

CHAPTER SIX

6 Pilot study and qualitative results

6.1 Introduction

This chapter discusses the pilot study that employed a qualitative approach. Section two presents the planning and organisation of the pilot study including the objectives, research methods used, sample, qualitative questions and questionnaire design. Section three presents the implementation of the pilot study. Section four describes and discusses the qualitative results and points out the related variables for the internal environment, the external environment, and the farmers' goals. Section five presents and discusses the results of the questionnaire pre-tests. The last section discusses the lessons learned from the pilot study.

6.2 Planning and organising the pilot study

A pilot study is usually conducted to ensure the appropriateness of the research methods used in the proposed study (Bryman, 2012). Generally, before a data collection in the proposed study is fully operational, a pilot study should be carried out to examine its feasibility and make corrections if needed (Bryman 2012; Kumar, 2011). Information from a pilot study is very useful, in order to improve the content validity of the research instrument and to plan for ensuring the main survey will run smoothly (Sekaran & Bougie, 2013). In this study, a pilot study was conducted prior to the main survey.

6.2.1 Pilot study objectives

The pilot study in this research had the following objectives:

1) To gather further information and in-depth understanding about the fruit sector in Thailand and in Chanthaburi province in particular;
2) To confirm variables related to strategic marketing decisions of fruit farmers in Chanthaburi province;
3) To pre-test the questionnaire to be used in the main survey.

6.2.1 Research method

The pilot study of this research used a qualitative approach. The chosen research method was semi-structured face-to-face interviews. There were two stages in the pilot study:

1) Interviews with key stakeholders in the fruit industry in Chanthaburi province.
2) Pre-testing the draft questionnaire with fruit farmers.

A list of related questions and a draft of the questionnaire, based on the conceptual framework, were prepared for the interviews with key people. The results were used to revise the draft questionnaire before pre-testing with fruit farmers.

6.2.2 Sample

A pilot study is usually involved with a limited number of respondents (five to ten), but in some cases, it may involve more than 20 respondents (Ary, 2013; Bryman, 2012). Denscombe (2010b) and Gray (2009) state that pilot studies are small-scale trial runs that researchers undertake in order to pre-test how well their proposed research designs, such as sampling design and survey questions, will work. Moreover, since the respondents to a pilot study consist of individuals similar to the respondents in the proposed study, they should not be later included in the sample for final data collection (Ary, 2013; Denscombe, 2010b).

Purposive sampling was employed for the pilot study, in order to select key participants, i.e. relevant government officials, agricultural cooperative leaders, fruit farmers, involved in the fruit industry and fruit farmers in Chanthaburi province. The participants were from the following organisations:

- Two participants from the Provincial Agricultural Extension Office (PAEO), the director and one agricultural extension specialist. The PAEO is a government agency mainly responsible for the promotion of fruit production and marketing, together with the development of fruit grower networks;
- Two participants from the Office of Agricultural Research and Development Region 6 (OARD6), the director and one agricultural academic officer. The OARD6 is a government agency responsible for plant research, and it also

serves as a service centre for agricultural product certification, including the GAP certification;

- One participant from the Provincial Cooperative Office (PCO), the director. The PCO is also a government agency. Its major role is the promotion and development of agricultural cooperatives and their business management;
- Three participants from agricultural cooperatives, one director and two managers of the agricultural cooperatives in Khlung, Makham, and Khao Khitchakut Districts, respectively. These agricultural cooperatives were operating fruit businesses to enable farmer members to produce, improve and market their produce, especially to high-value markets.

The participants for pre-testing the questionnaire were 20 fruit farmers who were growing durian, rambutan or mangosteen as their main fruit crop and they were not later included in the survey sample. The criteria used to select the fruit farmers were similar to those used in the main survey (see Section 5.5.1). The information from these 20 farmers was also used to confirm the variables in the conceptual framework.

6.2.3 Qualitative questions and questionnaire design

The pilot study collected some qualitative data, in order to identify specific variables related to strategic decisions of the fruit farmers in Chanthaburi. The questions used in the interviews were based on the prepared questionnaire (see section 5.5.3 and Appendix A-1) developed from the conceptual framework, which was comprised of three categories of variables, i.e. the internal environment, the external environment and the farmers' goals. These variables were discussed during the interviews.

6.3 Implementation of the pilot study

The pilot study was conducted in June 2014. According to the pilot study objectives, secondary data and some information about the fruit market situation and basic information about fruit farms in Chanthaburi was gathered. In order to fully address the pilot study objectives, qualitative interviews were conducted with the key participants, in order to confirm variables included in this research. There were three categories of variables to discuss, i.e. the internal environment, the external environment and the farmers' goals. The participants were asked to provide comments on each category of variables, based on their knowledge and experience. They were further asked to provide reasons to support their comments.

Based on the results of the interviews, the questionnaire was revised and prepared for interviewing and pre-testing the 20 fruit farmers. According to Blair, Czaja, and Blair (2014), a pre-test is used to identify the following problems: (i) a particular question does not accurately measure the intended construct; (ii) the questionnaire is too difficult for respondents to understand; and (iii) some respondents misunderstand, or they are unwilling to answer, or they do not know how to answer. This pilot study pre-tested the questionnaire, in order to identify any problems that might be encountered when the main survey was conducted. The respondents were asked to comment on the questions related to themselves, their farm characteristics, goal statements, the external environment, and other related parts, based on their understanding.

6.4 Pilot study results

The qualitative data collected from the interviews with these key people were analysed by coding and classification into categories and sub-categories in an iterative way. The results of the interviews for the three categories of variables are as follows.

6.4.1 Variables for the internal environment

The questionnaire developed from the conceptual framework included six variables for the internal environment—three farmer characteristics (i.e. *age, education* and *fruit farming experience*) and three farm characteristics (i.e. *farm size, land ownership,* and *fruit production*). The questionnaire also had screening questions that included *income source* and main *fruit grown* by the farmers. These two variables were also categorised as internal environment variables. The interviews and discussion with the respondents (key people and farmers) confirmed that all the proposed variables were relevant. The respondents also provided their opinions on each variable:

- ***Age***—farmers of different ages usually respond to the environment differently. These participants indicated that age affected the speed of their decision making. "*Younger farmers often make quick decisions with self-confidence, while older farmers make decisions based on their experience*", one of the respondents provided as her opinion on age.

- ***Education***—it is expected that better educated farmers are more likely to adopt a good agricultural practice standard in order to participate in HMs. One of the respondents stated: "*... farmers who have higher qualification usually understand the market situation, and they are good at understanding the principles of good agricultural practices*".
- ***Fruit farming experience***—an influential factor that contributes to farm efficiency, profitability and HM participation. "*Experienced farmers can respond to farming and marketing problems as well as weather variation and market uncertainty*", a respondent replied to explain farming experience.
- ***Farm size***—this factor provides a positive effect on strategic decisions for further farm development because large size brings the advantage of economies of scale. A government official stated: "*Large-scale farmers usually have better market opportunities because modern market buyers* [e.g. exporters and hypermarkets] *prefer to deal with large volumes*".
- ***Land ownership***—ownership of farm resources, such as land area, brings about competitive advantage for farmers. A farmer commented: "*Land ownership provides me with a sense of belonging, which contributes to better farm development and good practices*".
- ***Fruit production***—volumes of fruit reflect farm productivity, when compared with fruit farm sizes. A farmer who sold his produce to supermarket buying agents commented: "*I do not have more area to grow fruit, but I have been able to increase my fruit production over the last three years*".
- ***Income source***—a variable that was used to select farmer respondents whose main source of income came from fruit farming (more than 80% of total income), for the sample (see section 5.5.1). Many farmers only earned their income from fruit, while other farmers had supplementary incomes from other crops. An official commented: "*... farmers who grow other crops together with fruit can reduce price risk*", and "*... farmers who have incomes from other work apart from fruit farming can expand their fruit farm business towards high-value market participation*".
- ***Fruit grown***—another variable was used to select farmer respondents who grew one of these following fruit crops: durian, mangosteen and rambutan as their main fruit crop. These fruit crops were usually sold to different markets. A

farmer replied: "*I mainly grow durian because it has high demands in export markets*".

The respondents also suggested some additional variables related to SMDs:

- ***Gender*—**participants indicated that gender was relevant to HM participation. "*There are a significant number of female farmers playing an important role in agricultural cooperatives and fruit quality improvement*", one of the respondents explained.
- ***Household size*—**was another variable that contributed to HM participation. One of the respondents commented: "*... big families usually have many helpers at peak times, such as for harvesting and grading. This brings about quality fruit production served to the market*"
- ***Total farm size*** and ***fruit farm size*—**participants suggested that farm size variable should be separated into two variables based on total farm area, or the area used to grow fruit. Some of the respondents commented: "*Many fruit farmers also grow other crops such as rubber trees: therefore, the term 'farm size' can means either 'total farm size' or 'fruit farm size'*".
- ***Pick-up trucks*** and ***motorcycles*—** participants suggested that farm size could also be indicated by the number of vehicles used in the fruit farm business. Two types of vehicles commonly used by the farmers were pick-up trucks and motorcycles with trailers. One respondent pointed out: "*One thing that we can know the size of a farm is the number of vehicles used by the farmers. Larger farms usually have more pick-up trucks, while a small farm may have only a motorcycle with trailer*".
- ***Fruit sales*—**are linked to fruit production because farms that had high production usually had high sales. However, higher production and sales were not always created only by large-size farms. Smaller-sized farms that had high productivity could have high production and sales. One respondent explained: "*With the same volume of production, farmers who produced higher quality fruit could have higher sales because they normally received higher prices*".
- ***Cooperative membership*—**most members of agricultural cooperatives have opportunities to sell their produce to high-value markets such as hypermarkets and exporters. A farmer, who was a member of an agricultural cooperative said:

"*We can sell fruit to hypermarkets because the cooperative has good relationships with hypermarkets*"

6.4.2 Variables for the external environment

There were 15 variables included in the prepared questionnaire categorised into two broad categories: micro-environment (i.e. *buyers, other fruit farmers* and *input suppliers*) and macro-environment comprising five sub-categories: political (i.e. *financial support, production support,* and *marketing support*); economic (i.e. *fruit prices* and *market growth*); social (i.e. *urbanisation* and *food safety*); technological (i.e. *production technology, information technology*, and *logistics technology*); and environmental (i.e. *crop disease* and *weather*). The respondents commented on these variables with supporting reasons:

- ***Political factors***—the respondents confirmed that political factors were of significant importance because support from the government assisted fruit farmers to improve fruit quality that could serve high-value markets. An official explained: "*In order to improve the fruit quality to sell to export markets, farmers need training in good agricultural practices together with market information. To achieve this,* ***financial support****,* ***production support*** *and* ***marketing support*** *from the government are essential to the fruit farming sector in Chanthaburi.*" In addition, a respondent commented: "*The consistency of government support is important, but it depends on* ***political stability***". Another factor is that market access depended on good ***road infrastructure***. One farmer commented: "*I really want to sell to the cooperative or any other buyer that offer higher prices, but the road condition is bad especially in the rainy season, so I have to sell my fruit to local collectors who come to buy fruit at the farm*".
- ***Economic factors***—many economic factors influenced the fruit farm business and farmers' SMDs. It is known that ***market growth*** in high quality fruit has been increasing in Chanthaburi province. This factor has subsequently and positively influenced ***fruit prices***. One farmer commented on market growth and fruit price: "*We are growing durian and mangosteen to serve export markets because both of them have high quality demands and now the price is also higher*" The respondents further commented that ***interest rates*** and ***labour*** influenced on their SMDs. One farmer stated: "*We really want to expand our*

fruit farm business in order to serve the export market, but we have limited money. Low interest loan rates for fruit farming would be very advantageous".

- ***Social factors***—respondents confirmed that social factors, in regards to ***urbanisation*** and the requirements for ***food safety***, had changed market structure and farmers' SMDs. One respondent explained: "*In terms of domestic market, quality fruit from Chanthaburi has been increasingly serving modern retail markets in Bangkok and other large cities. These markets usually require food safety standards including Q-GAP*". Another respondent further commented on the increasing demands for high quality fruit because, "*consumers are more health conscious, and they would like to consume more fruit*".
- ***Technological factors***—advance technologies, i.e. ***production, logistics,*** and ***information technologies***, improve productivity and the quality of fruit. The respondents agreed that technologies brought about an increase in the quality of fruit served to HMs. One of respondents explained "*Technologies help us to improve fruit crop varieties, post-harvest activities, storage and transportation as well as communication between farmers and markets*"
- ***Environmental factors***—fruit farmers are usually confronted by variations of ***weather*** and ***crop diseases***, which affect their strategic decisions in running their farm businesses. "*Variations of weather and mangosteen diseases affect both quality and quantity of output. Too much rain in some years destroys the output, and it cannot meet the specification of export markets*", stated a respondent commenting on environmental factors.

Apart from macro-environment variables, respondents also confirmed micro-environment variables with additional variables. They are:

- ***Buyers***—influenced farmers' SMDs because many of them provided marketing services, specified fruit quality and offered output prices. A farmer stated: "*I sell my produce to local collectors because they provide harvesting services that save time and labour for me.*" Another farmer replied: "*I prefer buyers who offer higher prices*" This means that buyers' strategies influence farmers' market decisions.
- ***Other fruit farmers***—fruit supplies from other regions affect fruit prices. "*Fruit production from other provinces affects fruit prices in Chanthaburi, especially*

during the peak of harvesting season. Many farmers try to early harvest in order to sell to buyers that offer high prices in the early season", a respondent explained.

- ***Farmer networks***—participants pointed out that farmer networks provided knowledge and information sharing among farmers that influenced decision making. A farmer commented: "*The farmer network in my village is very helpful for me because we are sharing production techniques and market information. We also have learning centres for groups of fruit farmers working for continuous quality improvement*"
- ***Agricultural cooperatives***—since agricultural cooperatives in Chanthaburi province played an important role in integrating farmers to high-value markets and their success was an essential element. "*Apart from providing agricultural loans, agricultural cooperatives buy fruit from farmers and sell to exporters and hypermarkets*", a respondent replied.
- ***Input suppliers***—are one of the important stakeholders who often meet fruit farmers and share information about fruit production and market situation. "*Input suppliers usually consult me on how to use fertilisers and agro-chemicals. When I go to buy things in their stores, we often talk about fruit production and markets*", a farmers replied.

6.4.3 Variables for farmers' goals

There were 20 goal variables in the pilot questionnaire classified into two broad types: economic goals and non-economic goals. The economic goals comprised production goals (i.e. *production techniques, farm work, quality products,* and *specialty fruit crops*); marketing goals (i.e. *customer requirements, market channels,* and *market information*); and financial goals (i.e. *costs, profits, investment,* and *farm development*). The non-economic goals comprised environmental goals (i.e. *agro-chemicals, living conditions,* and *environmental awareness*); and personal and family goals (i.e. *social interaction, lifestyle, family needs, quality of life, family,* and *happiness*).

The first category of farmers' goals was production goals. The respondents confirmed that all production goals were consistent with the needs and motivation of many fruit farmers in Chanthaburi. The production goals were as follows:

- ***Production technique***—fruit farmers in Chanthaburi had grown fruit for decades. "*Fruit has been farmed in Chanthaburi for many generations. Many farmers today continually develop their production techniques in order to improve their production*", a respondent stated.
- ***Farm work***—some fruit farmers dedicated themselves only to farm work. A farmer gave his opinion: "*Good farmers should concentrate their lives on farm work. A lot of work needs to be done every month. If you neglect your duty, you will not get good outputs.*"
- ***Quality products***—some fruit farmers focused on the good quality of their products. A farmer replied: "*Yes, I strive to produce the best quality fruit. I am so proud that many officials and other farmers come to see my farm as one of the best farms in this district*".
- ***Specialty fruit crops***—some fruit farmers also cultivated specialty fruit crops, i.e. different varieties and exotic fruit. One respondent stated: "*Everyone has had durian 'Mon Thong' variety, but have you ever tried 'Nok Yib'. I know this variety has very special markets*".

The second category of farmers' goals was marketing goals (*customer requirements*, *market channels*, and *market information*). These marketing goals were relevant to fruit farmers' needs and motivations. Respondents suggested *pricing* as an additional variable to the marketing goal category. The results of these variables were:

- ***Customer requirements***—some farmers produced fruit in order to best meet the requirements of buyers. One farmer replied: "*I generally grow fruit varieties which buyers want to buy, and I usually pick them at a suitable time to ensure they are a good size, neither too ripe*".
- ***Market channels***—some farmers knew where their fruit was going. A farmer who knew the marketing channel he used said: "*I know after I sell to the buying agent, my fruit will be transported to a produce warehouse* [distribution centre] *and then distributed to the hypermarket in Bangkok*".
- ***Market information***—some farmers often meet other people (e.g. farmers and other stakeholders) in order to find market information. One farmer stated: "*I usually meet other people such as other farmers, officials, buyers, and input suppliers. These people always give me useful information. For example, I get*

to know that a lot of farmers are removing mangosteen and rambutan and trying to grow more durian because the price has gone up for several consecutive years. But I think I will continue growing mangosteen and rambutan because the price for these crops will go up when others do not have a lot"

- ***Pricing***—the respondents suggested this additional variable was relevant because most farmers desired fair prices for their fruit crops. One respondent explained: "*Although the price is usually set by the market, some farmers who produce good quality fruit may negotiate a better price with buyers*".

The third category of farmers' goals was financial goals. These goals were:

- ***Cost reduction***—some farmers preferred to buy inputs with cheapest prices, while others focused on optimum costs for quality and yields. A farmer replied: "*Generally, farmers want to reduce costs by buying cheapest inputs, but I think it would be better if we buy good quality inputs which bring about best quality and better yields of outputs*".
- ***Profit***—while many farmers desired the lowest cost, other farmers focused on profits. A farmer explained: "*I don't think that trying to have the lowest cost always works. I have once tried to reduce using fertilisers. The consequence was that I lost the quality and yield of output which resulted in reduced profit*".
- ***Investment***—while many farmers only focused on their existing fruit farm businesses, other farmers wanted to diversify to other agricultural activities. A fruit farmer replied: "*I am a fruit farmer, and I would like to do my best with the fruit business before doing other businesses*". Another farmer replied: "*Yes, apart from the fruit farm business, I am growing other crops to grow, in order to generate better income*".
- ***Farm development***—farmers were satisfied in different ways with the level of development on their farms. One farmer said: "*We have farmed fruit for more than 30 years. I am happy with my farm business, as long as the farm generates enough income for our family*". Another farmer thought differently: "*I want to grow different types of fruit perhaps golden banana, so I can have different markets*".

The first category of non-economic goals was environmental goals. The environmental goal variables were:

- ***Agro-chemicals*****—**many farmers thought that fertilisers and pesticides were essential for fruit farming. A farmer commented: "*Fertilisers and pesticides are of significant costs for fruit farming, but I do not reduce using them as it will affect the production and quality*".
- ***Living conditions*****—**a few farmers thought they should reduce use of agro-chemicals for good living and working conditions. A farmer commented: "*We work and live on the farm, and we know using too much agro-chemical affects our environment and health. So, we are trying to reduce using some kinds of agro-chemicals*".
- ***Environmental awareness*****—**some farmers had a sense of place, and they farmed together with land conservation. One farmer replied: "*Yes,* w*e do everything to be environmentally aware and conserve our land*".

The last category of farmers' goals was personal and family goals. Respondents suggested that two variables, i.e. *social interaction* and *lifestyle* should not be included because they were very similar to other variables. One participant suggested: "*I think that the 'social interaction' variable is very similar to 'market information' because both variables are linked to off-farm activities*". Another participant also pointed out: "*I feel the 'lifestyle' variable overlaps 'family needs' because both variables are focused on farming to earn enough money to maintain lifestyle and family needs*". Therefore, the category of personal and family goals consisted of four variables:

- ***Family needs*****—**one important goal for farmers was to earn a sufficient level of income for their families. A farmer stated: "*We do fruit farming in order to get enough money for our family, mainly for living expenses and our children's education*".
- ***Quality of life*****—**some farmers indicated that fruit farming was labour intensive, and they would like to reduce their work load because they were aware of the quality of life. One farmer said: "*My wife and I are now almost 70 years old, and we just want to spend more time with family and friends. However, everything about fruit farming cannot be given up. Once it is time to prune, we have to prune, and once it is time to pick, we have to pick. We have two adult children, but they both have their own works in Bangkok.*"

- ***Farming family***—some farmers preferred fruit farming because their whole family could work together. One farmer said: "*Fruit farming is a good occupation for our family because we can work together including our son's family and daughter. This is our family business that secures our future.*"
- ***Happiness***—some farmers were happy with their fruit farming because they could maintain their simple lifestyle. One farmer explained "*We are happy with our fruit farm because it enables us to live by the principle of sufficiency economy*".

Based on the results, the questions in the questionnaire were further revised by removing some irrelevant questions and designing new questions for the new variables suggested. The new version of the questionnaire (Appendix A-2) was pre-tested with 20 fruit farmers. Table 6.1 presents the changes of variables according to the pilot study. The final variables included in the questionnaire to be used in the main survey (Appendix A-3) consisted of 15 variables for the internal environment, 22 variables for the external environment, and 19 variables for farmers' goals.

Table 6.1: Changes of variables according to the pilot study

Initial variables	Omitted variables	Added variables	Final variables
The internal environment			
Farmer characteristics			
• *Age* • *Education* • *Fruit farming experience* • *Income source*		• *Gender* • *Household size*	• *Age* • *Gender* • *Education* • *Fruit farming experience* • *Household size* • *Income source*
Farm characteristics			
• *Farm size* • *Land ownership* • *Fruit grown* • *Fruit production*	• *Farm size*	• *Total farm size* • *Fruit farm size* • *Pick-up trucks* • *Motorcycles* • *Fruit sales* • *Cooperative membership*	• *Total farm size* • *Fruit farm size* • *Land ownership* • *Pick-up trucks* • *Motorcycles* • *Fruit grown* • *Fruit production* • *Fruit sales* • *Cooperative membership*

Initial variables	Omitted variables	Added variables	Final variables
The external environment			
Political factors			
• *Financial support* • *Production support* • *Marketing support*		• *Political stability* • *Road infrastructure*	• *Political stability* • *Road infrastructure* • *Financial support* • *Production support* • *Marketing support*
Economic factors			
• *Fruit prices* • *Market growth*		• *Interest rates* • *Labour*	• *Interest rates* • *Fruit prices* • *Market growth* • *Labour*
Social factors			
• *Urbanisation* • *Food safety*		• *Health consciousness*	• *Urbanisation* • *Health consciousness* • *Food safety*
Technological factors			
• *Production technology* • *Information technology* • *Logistics technology*			• *Production technology* • *Information technology* • *Logistics technology*
Environmental factors			
• *Crop disease* • *Weather*			• *Crop disease* • *Weather*
Microenvironment factors			
• *Buyers* • *Other fruit farmers* • *Input suppliers*		• *Farmer network* • *Agricultural cooperatives*	• *Buyers* • *Other fruit farmers* • *Farmer network* • *Agricultural cooperatives* • *Input suppliers*
The farmers' goals			
Production goals			
• *Production techniques* • *Farm work* • *Quality products* • *Specialty fruit crops*			• *Production techniques* • *Farm work* • *Quality products* • *Specialty fruit crops*
Marketing goals			
• *Customer requirements*		• *Pricing*	• *Customer requirements*

Initial variables	Omitted variables	Added variables	Final variables
• *Market channels*			• *Pricing*
• *Market information*			• *Market channels*
			• *Market information*
Financial goals			
• *Costs*			• *Costs*
• *Profits*			• *Profits*
• *Investment*			• *Investment*
• *Farm development*			• *Farm development*
Environmental goals			
• *Agro-chemicals*			• *Agro-chemicals*
• *Living condition*			• *Living condition*
• *Environmental awareness*			• *Environmental awareness*
Personal and family goals			
• *Family needs*	• *Social interaction*		• *Family needs*
• *Quality of life*	• *Lifestyle*		• *Quality of life*
• *Family*			• *Family*
• *Happiness*			• *Happiness*

6.5 Results of pre-testing questionnaire

The questionnaire pre-tested with fruit farmers in this pilot study included five sections: 1) general farm and farmer characteristics; 2) current marketing strategies; 3) goal statements; 4) external environment; and 5) future marketing strategies and other comments (see Appendix A-2). The pre-test found several problems in the questionnaire, such as a misunderstanding of questions, confusing questions, ambiguity of words and wording that needed to be clarified, questions that did not match their real practice, and questions that were complex and redundant. Details are provided below.

Results of section one

Section one comprised 20 questions about fruit farms and farmer characteristics. Some questions were difficult to answer, whereas some questions were not so important. The results of pre-testing for section one are as follows:

- Some questions were not consistent with real practice. For example, many respondents could not give accurate answers to the size of land used for each fruit crop (question 14) because they grew mixed crops in the same area. Thus, it was not easy to distinguish the size of land used for each crop. Some of them knew only the number of the fruit trees;

- Also, in question 14, the answer for average output price that respondents received for each crop was unreliable, due to the price range and the chance of receiving the price. For example, mangosteen prices can vary from 200 baht per kilogram in an early season down to 10 baht when the yield is abundant. Consequently, it was difficult to answer the question as an average. Some respondents could recall only the highest price or the lowest price they received;
- Question 15 asked whether farmers use their produce for family consumption. All respondents answered that they usually consumed their own produce and also gave some to others. However, the volume of fruit used for this purpose is not significant, compared to the overall output. All the farmers indicated that fruit used for their consumption was not more than 100 kilograms, while they produced hundreds of tons;

Results of section two

Section two (questions 21 to 27) asked about the current marketing strategies of fruit farmerd. This part had some problems with redundancy of questions. This is because:

- Interviewing for this section resulted in the farmers being faced with complex questions, due to many combinations between many types of fruit crops and markets (question 21 to 22). Some respondents grew three fruit crops and distributed each crop to more than one market. Consequently, it took too long to interview about marketing strategies for all combinations and this situation led to redundancy and boredom;
- For question 26, some respondents felt that it somewhat overlapped with question 20 in the previous sections.

Results of section three

Section three involved 19 statements which were aimed to measure farmers' goals, using a Likert scale. The interviewees were faced with an ambiguity of words and wording that needed to be clarified. The results were that:

- Statement 9 'You have the lowest possible input cost in general.' was interpreted differently among respondents. Many respondents understood it to mean they bought the cheapest inputs, whereas some respondents thought it meant they bought the most efficient inputs that could contribute to the lowest cost for fruit;

- Some statements, such as statements 8 and 12, needed examples to explain the terms 'market information' and 'farm development', respectively;
- In addition to the ambiguous words, misunderstandings were also caused by wording translated from English. For example, during the interview, several statements needed further explanation in Thai wording;

Results of section four

Section four involved 22 statements measuring farmers' attitudes towards the importance of external environment factors. In this part, the interviewer was confronted with problems about confusing questions and the participants' lack of knowledge to answer them. The results are as follows:

- Many respondents asked whether the term 'food safety' in statement 12 meant the GAP standard;
- Statements 13 to 15 needed more explanation about technologies. The respondents needed some examples, such as pest management and post harvest technologies for production technologies and packaging and transportation technologies for logistics technologies;
- Many respondents commented that they did not consider other fruit farmers in the same area or province (statement 19) as their competitors.

Results of section five

There were three questions that asked about the future development of the fruit business in terms of crops and markets. Many respondents commented that the questionnaire might be too long for them to answer, and the open-ended questions in the questionnaire might be too difficult for small-scale farmers.

6.6 Lessons learned

The results of the pilot study for both qualitative interviews and questionnaire pre-tests provided lessons learned in regards to conducting the main survey and revising the main questionnaire.

6.6.1 Lessons learned for the main survey

The pilot study also provided several key lessons that needed to be taken into account when conducting the main survey. These were as follows:

- Face-to-face interviews were the most appropriate method for the main survey, because the survey involved many smallholders, who needed simple explanations and clarification in regards to some technical terms, and, in addition to some questions that could not be immediately understood;
- Coordination with local organisations related to the fruit sector was essential, because they provided useful information for planning and organising the pilot study. For example, the Q-GAP certification agency suggested where high-value market users were most likely to be found, while the Provincial Cooperative Office informed about the meeting schedule of agricultural cooperative members who were farming fruit. It was also necessary to have assistance from someone who was usually in contact with the farmers because access to fruit farms was not very easy, especially when the interviewer was not familiar with the location of the farms. Some farmers considered the interviewer a stranger, so they denied their cooperation;
- The period between August and December was deemed appropriate for the main survey because it was not a busy time for the farmers. Their busy time is usually during the harvest season between May and July. However, an important issue regarding this period concerned the fact that a typhoon often comes in mid-September to early November and this could cause flooding, as happened in 2011. Some areas in Chanthaburi could be badly affected if this weather event occurred. This issue needed to be taken into account and therefore the interviewer attempted to interview as many farmers as possible in the early part of the period.
- Colloquial language was an essential component in the interviews. At the beginning of the pilot study, the interviewer visited the fruit farmers accompanied by some local agricultural and cooperative extension officers, who were proficient in using colloquial language of the local style. This speaking technique worked very well with the farmers and was applied by the interviewer throughout the main survey;

- The willingness of the farmers to provide correct information for the interviews was very critical. Some farmers did not feel comfortable or sufficiently confident to answer the questions, which could have led to unreliable answers. This issue was dealt with by building a rapport through talking about issues that interested and benefited them (such as government financial support and market policies), or referring to some people they knew before entering the interview;
- It was necessary to remind the farmers about the need to be aware of the purpose of some questions in the questionnaire. In section 2, Question 20 asked for all the markets the farmers used for their *main* fruit crop which yield the most sales – not for *all* the fruit produce on their farms. Question 21 to 25 asked about the *main* market in which the farmers mostly sold their *main* fruit crop – not about *all* the markets they used. In addition, section 4 focused on the external environment factors that impacted on their fruit farm business in a *positive* way – not in a *negative* way;
- For some of the farmers, the interviews took too long due to the following reasons: Some farmers would like to talk not only about what they were being interviewed on, but also about their families, neighbours, current situations and other unrelated topics. Other farmers, such as some certified farmers, were not certain when they obtained their first certification, and they needed time to find their certificates in order to answer Question 16. The format of the questionnaire also caused some interviews to take a longer period, especially sections three and four that involved ordinal scaling. The interviewer had to repeat the levels of agreement or importance of the factors for every statement. Many farmers took time to think about which level they should choose.

6.6.2 Lessons learned for revising the questionnaire

The pilot study also provided lessons learned in regards to revising the questionnaire. These were as follows:

- The knowledge obtained from the pilot study contributed to revising some questions and to designing more appropriate choices in close-ended questions;
- Unimportant questions were cut off and complex questions were simplified to make the questionnaire more concise and avoid redundancy that could help shorten the length of the interview. For example, some goal statements were repetitive with complex and long sentences;

- Some new questions were added, e.g. questions about harvesting, reasons to apply for the Q-GAP certification, and reasons for using a particular market;
- Wording (or phrasing) used in this questionnaire was the most challenging, because it needed to be easily understood by the fruit farmers, but it still had to maintain the same meaning as required within this academic research. Moreover, translation into Thai was also challenging, because some English words or phrases are not normally used in the Thai language. Again, translation of the questionnaire needed to find suitable Thai wording that could maintain the same meaning as that designed in the English version.

6.7 Summary

The pilot study was conducted in June 2014 in order to gather information about the fruit sector in Chanthaburi province, identify variables related to strategic marketing decisions of the fruit farmers, and pre-test the questionnaire to be used in the main survey. The pilot study included eight face-to-face semi-structured interviews with government officials and 20 farmers. The questions asked in these semi-structured interviews were based on the conceptual framework, which included the internal environment, the external environment, and the farmers' goals.

Qualitative interview data were analysed by coding and classification into categories and sub-categories in an iterative way. The results show that the internal environment consisted of farmer characteristics (e.g. age, education, fruit farm experience) and farm characteristics (e.g. farm size, production, and vehicles used). The external environment consisted of the micro-environment (e.g. fruit buyers, cooperatives, and input supplies), and the macro-environment (e.g. economic factors, social factors, and environmental factors). Based on the qualitative results, the questions in the preliminary questionnaire were further revised by removing some irrelevant questions and designing new questions for the new variables suggested. The preliminary questionnaire was repeatedly revised and then pre-tested with 20 fruit farmers. The results of the questionnaire pre-test found several problems in the questionnaire, such as a misunderstanding of questions, confusing questions, ambiguity of words and wording that needed to be clarified, questions that did not match their real practice, and questions that were complex and redundant. Moreover, the pilot study provided many lessons learned in regards to conducting the main survey and better revise the questionnaire so it became a valid research instrument in this study.

CHAPTER SEVEN

7 Description of the sample: Comparisons between the two sample groups

7.1 Introduction

The purpose of this chapter is to present descriptive analyses of the sample, classified into two groups: farmers who used traditional marketing channels (TM users) and farmers who used high-value marketing channels (HM users). The chapter is divided into seven sections. Following the introduction, section two describes statistics and variables included in the descriptive analysis for the two sample groups. Sections three and four describe the characteristics of the respondents and their fruit farm businesses. Section five presents current markets used by the respondents and market attributes. Section six presents strategic intention of the fruit farmers regarding fruit crops grown and the markets they will use during the next five years. The final section summarises the results.

7.2 Descriptive analysis

Descriptive statistics, such as percentages, maximums, minimums, means and standard deviations, were used for preliminary data analysis and for describing the sample. In addition, the two sample groups, i.e. farmers who used traditional marketing channels (TM users) and farmers who used high-value marketing channels (HM users), were compared on a number of variables (farm and farmer characteristics). The statistical tool used for these comparisons was the chi-square (χ^2) test of independence. In order to obtain accurate results from the chi-square test, the assumption is that at least 80% of cells in a cross-tabulation table have expected frequencies of five or more that should be met (Morgan, 2013; Pallant, 2013). Except in a 2 by 2 cross-tabulation, all cells should be at least five; if they are not, Fisher's exact test should be used instead (Morgan, 2013).

Other statistical tests that are commonly used together with chi-square or Fisher's exact test are Phi (φ) and Cramer's *V*, in order to estimate the effect size, i.e. the strength of the relationships. Phi is the suitable statistic for the 2 by 2 cross-tabulation; otherwise, Cramer's *V* should be applied (Morgan, 2013). Davis (2013); Gray and Kinnear (2012) point out that phi and Cramer's *V* tests could provide the effect size that reflects their proportional influence on variances. Leech, Barrett, and Morgan (2014) recommend that the magnitude of the relationships is interpreted in accordance with the scale of phi and Cramer's *V* (p. 219):

Measure	Interpretation
.00 and under .10	Negligible association
.10 and under .20	Weak association
.20 and under .40	Moderate association
.40 and under .60	Relatively strong association
.60 and under .80	Strong association
.80 to 1.00	Very strong association

In this study, most variables included in the descriptive analysis were categorical variables consisting of *gender, education, income source, land ownership, the main fruit grown* and *cooperative membership*. Some continuous variables, i.e. *age, fruit farm experience* and *fruit farm size* were grouped and analysed similarly to categorical variables. Each variable was statistically tested as to whether it was significantly related to the two sample groups (TM and HM users), using the chi-square (χ^2) test of independence. Table 7.1 presents the categorical variables included in this study. The results of the analysis for these categorical variables were used to describe the characteristics of the fruit farmers and their fruit farm business. The results of the comparisons between the two groups of the sample, in regards to these categorical variables, are provided in Chapter 6.

Table 7.1: Categorical variables and descriptions

Variables	Categories
Age	1 = 40 years or less
	2 = 41 - 60 years old
	3 = 61 years or more
Gender	1 = males
	2 = females
Education	1 = below primary
	2 = primary
	3 = secondary
	4 = tertiary
Fruit farm experience	1 = 10 years or less
	2 = 11 - 20 years
	3 = 21 - 30 years
	4 = 30 years or more
Income source	1 = fruit incomes
	2 = fruit + agricultural incomes
	3 = fruit + agricultural + non-agricultural incomes
Fruit farm size	1 = 2.00 hectares or less
	2 = 2.01 - 6.00 hectares
	3 = 6.01 hectares or more
Land ownership	1 = own land
	2 = own and rented land
Main fruit grown	1 = durians
	2 = mangosteens
	3 = rambutans
Cooperative membership	0 = non-members
	1 = members

7.3 Characteristics of the fruit farmers

The characteristics of the fruit farmers in the sample can be described by variables of *age, gender, education, fruit farming experience,* and *income sources*.

7.3.1 Age

The majority of the respondents were middle aged, as the average age of all respondents was 52, ranging from 24 to 90 years. In terms of age distribution, as shown in Table 7.2, the majority of the farmers (63%) fell into the range of 41 to 60 years, followed by older farmers (24%), who were over 60 years old. Younger farmers 40 years old and younger (14%) were less than the others. The two types of market users had similar distributions of age ($\chi^2=3.563$, $p=.168$). According to the Office of National Statistics

(2011), approximately 80% of the Thai work force is between the ages of 25 to 59 years and only 3% is in the age group of 60 years and over. Thus, the fruit farmers included in this sample were older, compared to the general Thai labour force.

Table 7.2: Distribution of age

Age	**TM users**		**HM users**		**Total**	
	Count	Percent	Count	Percent	Count	Percent
40 years and less	17	16%	13	12%	30	14%
41 – 60 years	68	65%	67	60%	135	63%
61 years and more	19	18%	32	29%	51	24%
Total	104	100%	112	100%	216	100%

$\chi^2=3.563, p=.168$

7.3.2 Gender

In Thailand, agricultural work, including fruit farming, is considered a main job for rural people, no matter whether they are male or female. However, more males (69%) are usually valued as heads of households rather than females (31%) (Sanphuwan, 2010). Correspondingly, the results of this study (Table 7.3) indicate that more males (67%) than females (33%) were included in the sample as farm owners. There was no relationship between the types of market users and gender ($\chi^2=4.682, p=.211$).

Table 7.3: Gender of the farmers

Gender	**TM users**		**HM users**		**Total**	
	Count	Percent	Count	Percent	Count	Percent
Males	65	63%	79	71%	144	67%
Females	39	38%	33	30%	72	33%
Total	104	100%	112	100%	216	100%

$\chi^2=4.682, p=.211$

7.3.3 Education

Table 7.4 depicts that over half the farmers (54%) had attended formal education for six years or less (primary and lower education), while 32% of the farmers completed their secondary education. Only 14% of the respondents achieved higher education. The relationship between the types of market users and education demonstrated a statistical significant difference ($\chi^2=29.223, p=.000$). As can be seen, the percentages of HM users, who achieved secondary and tertiary education, were higher than those of TM users. Generally, the TM users (64%) achieved primary education. The strength of this relationship was moderate (Cramer's *V=.368*).

Table 7.4: Level of education

Levels of education	**TM users**		**HM users**		**Total**	
	Count	Percent	Count	Percent	Count	Percent
Below primary (< 6 years)	8	8%	3	3%	11	5%
Primary (6 years)	66	64%	40	36%	106	49%
Secondary (12 years)	26	25%	42	38%	68	32%
Tertiary (16 years)	4	4%	27	24%	31	14%
Total	104	100%	112	100%	216	100%

χ^2=29.223, *p=.000*, Cramer's *V=.368*

It was not a surprising result that the HM users were farmers who had achieved higher levels of education than the TM users. As reviewed in Chapter 2, the HM users generally obtained the Q-GAP certification, which required a good understanding of production systems for safe and quality products, such as the use of agro-chemicals, water, data records and quality management (ACFS, 2013). According to Sardsud (2007), the major challenges to effective implementation of the Q-GAP standard were lack of knowledge and low levels of education among farmers, which led to poor understanding of Q-GAP requirements and poor record keeping. Moreover, Kersting and Wollni (2011) also concluded that higher levels of education positively affect Q-GAP standard adoption among Thai small-scale farmers.

7.3.4 Fruit farming experience

The farmers within this sample had experience in fruit farming for approximately 26 years on average, ranging from 1 to 60 years. Table 7.5 shows the fruit farming experience in four ranges of years. The majority of the farmers (91%) had grown fruit for more than 10 years. This indicates that only 9% of the fruit farmers had 10 years and less in fruit farming. The farmers who had run their fruit farms for more than 30 years were approximately 25%. The relationship between the types of market users and fruit farming experience demonstrated a statistical significant ($\chi^2=8.712$, $p=.033$). The magnitude of the relationship was moderate.

Table 7.5: Years of fruit farming experience

Years in fruit farming	TM users		HM users		Total	
	Count	Percent	Count	Percent	Count	Percent
≤ 10 years	13	13%	7	6%	20	9%
11 – 20 years	35	34%	30	27%	65	30%
21 – 30 years	39	38%	39	35%	78	36%
≥ 31 years	17	16%	36	32%	53	25%
Total	104	100%	112	100%	216	100%

χ^2=*8.712*, *p=.033*, Cramer's *V=.201*

As discussed previously, the HM users needed knowledge for good practices in farming operations, in order that they could achieve the standard certification. In addition to knowledge, they also needed the capability to participate with HMs. This means that the HM users had the ability to manage their farm business effectively. Nuthall (2009) pointed out that managerial ability that contributes to the quality of farmers' decision making is determined by their experience, especially the experience of learning from mistakes. Furthermore, Long (2013) also indicated that farmers who have had more opportunities to gain experience and think, read and discuss about a specific subject, demonstrate better managerial ability.

However, the results show there were a considerable number of TM users (16%) who had long experience in fruit farming (more than 30 years). This was because many farmers sold their produce to TMs due to convenience. One experienced farmer said: *"I prefer to sell to local collectors because their places are just only a short distance from my farm"*. Furthermore, some TM buyers came to collect fruit at the farm, and they also provided harvesting services that could save time and labour. A respondent explained: *"I enjoy selling to buyers who provide harvesting services because this saves me time and money"*.

7.3.5 Income sources

This sample included farmers whose income source from fruit farming was at least 80% of their total income. Table 7.6 shows that the majority (64%) of the farmers depended on only their fruit income. 16% of them had supplementary incomes related to agriculture, such as rubber, pepper, oil palm and rice farming, and the other 20% included supplementary incomes from non-agricultural sectors, such as construction and banking. The results also indicate that the two types of market users had different supplementary income sources. The figures show that both types of market users generally depended on fruit incomes, due to the criterion used for selecting the sample. However, more HM users than TM users had other income sources that came from non-agricultural incomes. This means that the HM users were likely to work in non-agricultural sectors for their supplementary incomes, while the TM users focused on agriculture. This relationship demonstrated a statistical significance (χ^2=7.697, p = .007), with moderate strength (Cramer's V = .215). This was partly because the HM users had higher education, which could contribute to non-agricultural sectors, while they also had the benefit of being fruit farmers and worked on their farm as their main occupation. For example, some HM users in the sample were educated in other fields apart from agriculture, such as teaching, banking and computer technologies, so they also worked for educational institutes, commercial banks, and freelance computer technicians.

Table 7.6: Income sources of the fruit farmers

Income source	**TM users**		**HM users**		**Total**	
	Count	Percent	Count	Percent	Count	Percent
Fruit income	63	61%	75	67%	138	64%
Fruit and other agricultural incomes	25	24%	10	9%	35	16%
Fruit, other agricultural and non-agricultural incomes	16	15%	27	24%	43	20%
Total	104	100%	112	100%	216	100%

$\chi^2=7.697$, $p=.007$, Cramer's $V=.215$

7.4 Characteristics of the fruit farm business

The fruit farms in this research are described by a number of characteristics including farm size, land ownership, fruit crops grown, main fruit production and sales, the Q-GAP certification, membership of an agricultural cooperative, and vehicles used for the fruit farms' business. These characteristics are described as follows:

7.4.1 Farm size

The average farm size in the sample was 3.55 hectares, ranging from 0.16 hectare to 32.00 hectares. Apart from fruit crops, a number of farmers used their farm land for other crops, such as rubber trees, peppers and vegetables. As a result, the land that the farmers used for fruit crops was smaller than their total farm land. The average size of the fruit farms was 3.07 hectares. Table 7.7 shows a vast majority (88%) of the farmers were growing fruit in areas not larger than six hectares. Over half TM users (54%) ran their fruit farms on not more than two hectares, whereas 65% of HM users produced fruit on larger areas of over six hectares. The relationship between the types of market users and their fruit farm size demonstrates a statistical difference (χ^2*=12.805, p=.002*), with a moderate strength (Cramer's *V=.243*).

Table 7.7: Fruit farm size

Fruit farm size	**TM users**		**HM users**		**Total**	
	Count	Percent	Count	Percent	Count	Percent
< 2 hectares	56	54%	39	35%	95	44%
2 - 6 hectares	43	41%	53	47%	96	44%
> 6 hectares	5	5%	20	18%	25	12%
Total	104	100%	112	100%	216	100%

χ^2*=12.805, p=.002,* Cramer's *V=.243*

Generally, HMs prefer large suppliers, but TMs normally use all supply sizes (McCullough et al., 2008; World Bank, 2006). This is because HMs normally require not only quality and consistency of produce but also volume, so they can reduce transaction costs (Reardon, Timmer, Barrett, & Berdegué, 2003; Ruben, Boselie, & Lu, 2007). Thus, larger fruit farms were likely to participate in HMs, since they could supply larger volumes.

Although *farm size* was a significant factor (indicating that the larger the farm size, the more likely the farmers sold their produce to HMs), many small farms (less than two hectares) were able to sell their produce to HMs (35%). The rationale for this situation was the level of farmer *education*. One of the significant factors to selling to HMs was a better *education* level. Approximately 8% of the respondents, who had small-sized farms (less than two hectares), have achieved tertiary education (see Appendix C-1). One university-educated farmer said: *"Even though I have only 7 rais* [1.12 ha.] *for* *growing fruit, I am doing my best to continually improve productivity and quality of the output in order to serve the export market"*. Furthermore, many respondents who had a small farm size had long *experience in fruit farming* (another significant factor). One fourth of the respondents, who had small farms (less than two hectares), have a long experience in fruit farming (more than 30 years) (see Appendix C-2). A respondent who had 0.8 hectare of fruit farm land stated: *"I have long been in fruit farming for more than 30 years, so I know how to produce fruit that meet the new market requirements"*.

According to Table 7.7, a few TM users (five respondents) had a large farm size (more than six hectares). The rationale for this situation was the capability to produce high quality fruit. Four out of these five respondents were non-certified farmers (see Appendix C-3). One of the four respondents, who had 6.4 hectares of fruit farm land, stated: "*We started our fruit farm eight years ago, but compared to other farmers we are new to fruit farming*". He further stated about fruit quality: "*We do not focus on high quality fruit or certified fruit products because we only sell to general* [traditional] *markets*" These cases represent the farmers who did not produce high quality fruit and usually used TM channels.

This information implies that farmers who have a small farm size may not always be TM users and vice versa. Small-scale farmers who are educated and experienced usually develop their capability to sell their produce to HMs. Conversely, large-scale farmers who do not focus on high quality fruit production may depend only on TMs.

7.4.2 Land ownership

In terms of land ownership, Table 7.8 presents that a vast majority (92%) of respondents fully owned their fruit farm land. Approximately 4% of the farmers rented less than half their farm land. Only 4% of farmers in the sample rented more than half of their land. As shown, the land ownership pattern of the two types of market users looks quite similar. The chi-square test could not be conducted for this cross-tabulation (Table 6.7), because the assumption was not satisfied, so a collapse of categories was needed. After integrating the two latter categories, i.e. 1-50% rented land and 51-100% rented land, the assumption was met. However, the results of the chi-square test did not demonstrate any evidence of statistical significance ($\chi^2=5.306, p=.269$).

Table 7.8: Land ownership

Land ownership	TM users		HM users		Total	
	Count	Percent	Count	Percent	Count	Percent
100% own land	98	94%	101	90%	199	92%
1-50% rented land	3	3%	6	5%	9	4%
51-100% rented land	3	3%	5	5%	8	4%
Total	104	100%	112	100%	216	100%

Commonly, fruit farms in Thailand are relatively small and operated by family owners who inherited their farm land from ancestors. Horticultural farming (including fruit) is labour intensive, but in Thailand one of the most serious problems is that there has been a decrease in family labour for farming, due to the migration of young rural people into the industrial and service sectors (Poapongsakorn, 2011). Therefore, fruit farmers were likely to limit their fruit farm business in terms of land size and they did not rent a great deal of land.

7.4.3 Fruit crops grown

Fruit farmers in Thailand usually grow mixed crops, and most of the fruit farms in this research grew several crops. Approximately 81% of the respondents grew more than one type of fruit. Over half (54%) grew two to three types of fruit, with a maximum of seven fruit crops grown. This study focused on the three main types of fruit crops which were generally grown in Chanthaburi province: durian, mangosteen and rambutan. Table 7.9 indicates that mangosteen was the most popular and it was grown by 76% of the respondents, followed by durian and rambutan grown by 63% and 47%, respectively.

Table 7.9: The three main types of fruit crops grown by the farmers

Types of fruit crops	Responses		Percent of Cases
	Count	Percent	(216)
Durian	137	34%	63%
Mangosteen	164	41%	76%
Rambutan	102	25%	47%
Total	403	100%	187%*

Note: *Some farmers grew more than one type of fruit

The fruit crop that generated the highest sales for individual farms in the sample was considered as the main fruit crop of their farm. The results in Table 7.10 present that mangosteen was the main fruit crop for 38% of farms, followed by durian (37%)), and rambutan covered a quarter of all farms. As presented in Table 7.10, quite similar proportions of TM users produced these three types of main fruit crops, whereas HM users focused on durian and mangosteen. This is because the HM users usually produced special types of fruit required by HMs. Durian and mangosteen were the focus of HMs because of increasing demands from export markets, while rambutan was mostly produced for domestic consumption. In 2013, Thailand exported approximately 370 thousand tonnes of fresh durian and 220 thousand tonnes of mangosteen, valued at 7.3 and 4.3 billion baht, respectively. However, only four thousand tonnes of rambutan was exported, valued at 0.2 billion baht in value (OAE, 2014b), as presented in Section 2.3.2. Thus, the HM users in the sample were generally farming durian or mangosteen as their main fruit crops, rather than rambutan.

Table 7.10: The main fruit crop that created the highest sales for each farm

The main fruit crop	**TM users**		**HM users**		**Total**	
	Count	Percent	Count	Percent	Count	Percent
Durian	31	30%	48	43%	79	37%
Mangosteen	35	34%	48	43%	83	38%
Rambutan	38	37%	16	14%	54	25%
Total	104	100%	112	100%	216	100%

χ^2*=20.056*, *p=.001*, Cramer's *V=.258*

7.4.4 The Good Agricultural Practice certification

The respondents in this study comprised 106 certified farmers and 110 non-certified farmers. In general, certified farmers were HM users, and non-certified farmers were TM users. However, the results of the sample in Table 7.11 suggest that 11% of TM users obtained certification, and 15% of HM users did not obtain certification. The reasons behind this discrepancy were that some certified farmers were not market oriented, so they obtained the certification for other reasons, such as persuasion by others or desire to employ good production systems (as explained later in this section). On the other hand, some non-certified farms, which could produce enough high quality fruit, could participate in HMs, due to undersupply of certified fruit in the market.

Nevertheless, the two types of market users were strongly related to the state of certification, because the majority (89%) of TM users were non-certified farmers, and 85% of HM users were certified farmers ($\chi^2=118.942, p=.000, \varphi=.742$).

Table 7.11: Certification and the two types of market users

Certification	**TM users**		**HM users**		**Total**	
	Count	Percent	Count	Percent	Count	Percent
Certified	11	11%	95	85%	106	49%
Non-certified	93	89%	17	15%	110	51%
Total	104	100%	112	100%	216	100%

$\chi^2=118.942, p=.000, \varphi=.742$

- ***Non-certified farms***

The 110 respondents (non-certified farmers) have provided several reasons for why they did not obtain the certification (Table 7.12). The most important reason (26%) was a lack of information and knowledge about the certification process. Many of the non-certified farmers stated:

"I have no idea about the certification"
"I do not know information about the certification"
"Officials have never told me about the certification"

21% of them stated that they did not need to use the certification, or they thought that the certification did not have any advantages for them. Many of them stated:

"I do not use the certification for selling fruit, so I am not interested to be certified."
"I can continue to sell my fruit to the market no matter what I get certified or not."
"I do not need to use the certification because I have a small-scale fruit farm."
"I usually sell my produce to traditional markets, and they do not require any certification"

The third most important reason (18%) was that they did not have enough time for the certification process. Another reason, which might be related to this reason, was the stringency of the standard, with which they thought they were not able to comply (6%). The remainder of the non-certified farmers had some involvement with the certification process, but they still did not hold certification at the time of the survey. Their reasons were that they were registered and were waiting for training or inspection (16%); another 10% had gone through the certification process but did not pass; some of them used to be certified but the certification had expired (3%); and other reasons, such as the farm ownership had recently been transferred from parents (2%).

Table 7.12: Reasons for non-certification

Reasons	Frequency	Percent
• Lack of information	28	26%
• No advantage	23	21%
• Lack of time for certification process	20	18%
• On-going process	17	16%
• Did not pass	11	10%
• Stringency of the standard	6	6%
• Expired	3	3%
• Others	2	2%
Total	110	100%

As indicated by Sardsud (2007), one of the barriers that prevent farmers adopting the certification was failure to gain information about the objectives and concept of the Q-GAP programme for farmers. This issue still existed at the time of the survey, partly due to the vast number of small farms (approximately 50,000 farms in Chanthaburi province), in conjunction with the limited budgets and staff of relevant government agencies. As noted by Pongvinyoo, Yamao, and Hosono (2014), Thailand has a limited number of officials responsible for training and processing the certification process. Since Q-GAP implementation did not guarantee either minimum or premium prices, non-certified farmers usually considered there was no motivation for them to gain the certificate (Amekawa, 2013; Sardsud, 2007). Another reason was that fruit farmers have various choices of TMs available to use for their convenience.

- ***Certified farms***

The majority of certified farmers (57%) obtained one fruit crop certification, followed by 33% of farmers who had two fruit crop certifications. The other 10% of farmers had all three certified fruit crops (Table 7.13).

Table 7.13: Non-certified and certified farmers in the sample

Number of certification	Frequency	Percent
Certified farmers	206	100%
One fruit crop certification	60	57%
Two fruit crop certification	35	33%
Three fruit crop certification	11	10%

Table 7.14 indicates that, among the certification of the three main fruit crops, mangosteen was the most certified fruit, being 69% of the certified farmers. Just over half of the certified farmers (51%) obtained durian certification, and only 28% of certified farmers achieved rambutan certification. The results also indicate that the certified farmers in this study had been certified for a period ranging from 0 (just certified in 2014) to 10 years, with an average of 5.3 years. In the case of the average years of each main fruit crop, mangosteen certification had an average of 5.7 years, followed by rambutan and durian certification, with averages of 5.0 and 4.8 years, respectively (Table 7.14).

Table 7.14: The three main fruit crops of the sample's certified farmers

Certification	Responses		Percent of Cases	Average years
	Count	Percent	(106)	
Durian	54	34%	51%	4.8
Mangosteen	73	47%	69%	5.7
Rambutan	30	19%	28%	5.0
Total	157	100%	148%	5.3

More than half (53%) the certified farmers in the sample stated that the Q-GAP certification provided better market opportunities (Table 7.15). The second most important reason was that they were certified because of persuasion from others, such as officials and neighbouring farmers (21%), and the third reason was that they considered the certification contributed to good farming practices or quality improvement (16%). The reasons for certification for different types of fruit crops were different. As can be seen in Table 7.15, among the 54 certified durian farmers, the large majority (74%) indicated that the most important reason was for market opportunities. Correspondingly, over half (52%) of the 73 certified mangosteen farmers also indicated the same reason, followed by persuasion by others (26%) and good practice or quality improvement (15%). However, the reasons for rambutan certification (30 farmers) show a different pattern, since the most important reason was persuasion by others (30%), followed by good practice or quality improvement (23%). Another interesting reason (20%) was that rambutan was grown in areas mixed with other certified crops, so they were certified implicitly.

Table 7.15: Reasons for certification

Reasons	**Durian**		**Mangosteen**		**Rambutan**		**Total**	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
• Market opportunities	40	74%	38	52%	5	17%	83	53%
• Higher prices	1	2%	3	4%	1	3%	5	3%
• Cost saving	0	0%	0	0%	1	3%	1	1%
• Good practices/ quality	7	13%	11	15%	7	23%	25	16%
• Safety	1	2%	1	1%	1	3%	3	2%
• Persuasion by others	5	9%	19	26%	9	30%	33	21%
• Mixed crops certification	0	0%	1	1%	6	20%	7	4%
Total	54	100%	73	100%	30	100%	157*	100%

Note: *Some farmers were certified for more than one fruit crop.

Although the Q-GAP certification did not contribute to explicit price incentives for the farmers, it could provide several benefits, in terms of product quality improvement and market opportunities. Since the Q-GAP standard contains eight elements of control points, i.e. water source, cultivation site, use of agro-chemical, product storage and on-site transportation, disease and pest-free production, quality management, and data records, the certification makes it easier for farmers to meet high-value market requirements (Pongvinyoo et al., 2014). Q-GAP certified products can be labelled with a Q-GAP logo called 'Q quality mark', to indicate high quality and safety for consumers and support for other 'Q' certification, such as 'Q Shop' for supermarkets and 'Q GMP' for pack-houses (ACFS, 2015). Furthermore, the Q-GAP standard has been developed largely in accordance with the requirements of FAO/WHO, so the certification can be used as a baseline for access to international markets (ACFS, 2012), therefore, increasing market opportunities. According to Kersting and Wollni (2012), farmers obtaining the Q-GAP certification are likely to succeed in participation with other international food standard programmes, such as GlobalGAP, which is required by many lucrative markets.

7.4.5 Membership of agricultural cooperatives

The membership of agricultural cooperatives was another variable used in this study. In 2014, there were approximately 18,000 members and 10 agricultural cooperatives over all districts of Chanthaburi province, approximately 34% of the total 53,000 farms (PCO, 2014). Since larger-scale farmers are more competitive and likely to depend on themselves, generally, members of agricultural cooperatives are relatively small-scale farmers. As shown in Table 7.16, approximately 29% of respondents were members of agricultural cooperatives, and the remaining 71% were not members. The relationship between the types of market users and agricultural cooperative membership demonstrates a statistical significance ($\chi^2=4.862$, $p=.018$), but the effect size is weak ($\varphi=.161$). The majority in both sample groups (TM and HM users) were non-members. However, a higher proportion of HM users than TM users were members of agricultural cooperatives. This is partly because many agricultural cooperatives purchase high quality fruit, especially mangosteen and rambutan and supply them to other HMs, i.e. modern traders and exporters. Therefore, some smaller farms could link to HMs via agricultural cooperatives.

Table 7.16: Membership of agricultural cooperatives

Membership of agricultural cooperatives	**TM users**		**HM users**		**Total**	
	Count	Percent	Count	Percent	Count	Percent
Non-members	82	79%	72	64%	154	71%
Members	22	21%	40	36%	62	29%
Total	104	100%	112	100%	216	100%

$\chi^2=4.862$, $p=.018$, $\varphi=.161$

Agricultural cooperatives were not only formed to market products, but they also aimed to achieve other benefits for their members. Table 7.17 shows reasons stated by the 62 respondents, as to why they were members of agricultural cooperatives. Cooperatives marketed fruit for members (37%); lent money to members (32%); and sold agricultural inputs at lower prices (27%). Apart from these benefits, other minor reasons for being a member were persuasion by others and being a member due to parent debt.

Table 7.17: Reasons for being a member of an agricultural cooperative

Reasons	Frequency	Percent
• Lending money to members	20	32%
• Selling agricultural inputs at lower prices	17	27%
• Marketing fruit for members	23	37%
• Others	2	3%
Total	62	100.0

7.4.6 Fruit production and sales

Table 7.18 shows that the farms in the sample produced 1 to 150 tonnes of their main fruit or 20 tonnes, on an annual average. The sales ranged from 9 to 6,840 thousand baht and averaged 525 thousand baht. Regarding the two types of market users, HM users were likely to produce higher volume and sales than TM users. As presented, the average volume of fruit production of HM users is twice that of TM users (26 tonnes versus 13 tonnes). HM users also gained higher than average sales for their fruit than the TM users; approximately three fold (771,000 baht versus 260,000 baht). This indicates that HM users obtained higher prices than TM users and they averaged 30 baht per kilograms and 20 baht per kilograms, respectively.

Table 7.18: Fruit production and sales

Production and sales	TM users			HM users			Total		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Production (ton)	1	50	13	2	150	26	1	150	20
Sales (thousand baht)	9	1,200	260	40	6,840	771	9	6,840	525

7.5 Markets used

Since this study focuses on markets that were used by the fruit farmers, the data collected included information relating to market issues, i.e. different types of markets used and market attributes.

7.5.1 Different types of markets used

The fruit farmers in Chanthaburi used different types of markets that include: 1) traditional markets (TMs), i.e. collectors, street markets, local markets and wholesale markets, and 2) high-value markets (HMs), i.e. cooperatives, exporter buying agents, modern trade buying agents, exporters and processors (as presented in Section 2.3.3). Table 7.19 shows the markets that the respondents generally used to distribute their main fruit crops were export buying agents (37%), local markets (33%) and street markets (27%). Other markets that were moderately used were modern trade buying agents (15%), cooperatives (13%), and collectors at the farm (13%). These percentages also indicate that many farmers used more than one market to distribute their produce.

Table 7.19: Different types of markets used for distributing the main fruit crops

Markets	**Responses**		**Percent of Cases**
	Count	Percent	(216)
Traditional markets (TMs)			
• Local collectors	27	9%	13%
• Street markets	58	19%	27%
• Local marketers	71	23%	33%
• Wholesale markets	6	2%	3%
High-value markets (HMs)			
• Cooperatives	28	9%	13%
• Export buying agents	79	26%	37%
• Modern trade buying agents	32	11%	15%
• Exporters	2	1%	1%
• Processors	2	1%	1%
Total	305	100%	142%*

Note: *Some farmers used more than one type of markets

When grouping these markets into two types, TMs are slightly more used than HMs, by 68% and 60% of the respondents, respectively (Table 7.20). These figures indicate that not all the farmers distributed their produce exclusively to TMs or HMs.

Table 7.20: The two main types of markets used for distributing the main fruit crops

Market types	Responses		Percent of Cases
	Count	Percent	(216)
TMs	147	53%	68%
HMs	130	47%	60%
Total	277	100%	128%*

Note: *Some farmers used both TMs and HMs

7.5.2 Market attributes

Regarding market attributes that influenced the farmers choice for their main markets, Table 7.21 shows that the two most important attributes of main markets were 'better price' and 'convenience', 41% and 34%, respectively. The relationship between the two types of market users and the key market attributes demonstrates statistical difference ($\chi^2=49.388, p=.000$), with relatively strong effect size (Cramer's $V = .478$). As can be seen, 50% of TM users value 'convenience' as the most important attribute, because it was easy to sell fruit produce to TMs. Many farmers also consider that TMs were flexible, as they did not require the Q-GAP certification, and many of the buyers usually came to buy fruit at farm sites. Other important attributes were 'better price' and 'immediate cash'. 25% of TM users valued the good prices offered by TMs as the most important attribute, while 23% valued the buyers usually paid immediately by cash.

However, the market attributes that influenced HM users' choice for their main markets were not consistent with TM users. Approximately, 55% of HM users valued 'better price' as the most important market attribute, followed by 'convenience' (20%) and 'trust' (18%). This is because they perceived that HM buyers offered better prices and some HM buyers also used purchasing strategies that the TM buyers also used, in order to facilitate more convenience for the farmers; HM buyers were relatively larger than TM buyers, using standard purchasing procedures.

Table 7.21: Most important attributes of the main markets

Market attributes	TM users		HM users		Total	
	Count	Percent	Count	Percent	Count	Percent
• Better price	26	25%	62	55%	88	41%
• Convenience	52	50%	22	20%	74	34%
• Immediate cash	24	23%	8	7%	32	15%
• Trust	2	2%	20	18%	22	10%
Total	104	100%	112	100%	216	100%

$\chi^2 = 49.388$, $p = .000$, Cramer's $V = .478$

7.6 Strategic intention

In addition to the existing main fruit crops and the main markets chosen, this study was also interested to gain an insight into the farmers' strategic intention for their fruit farm business during the next five years. These intentions included the following:

7.6.1 Fruit farm operation

Almost all the respondents (98%) intended to continue their fruit farm business during the next five years (Table 7.22). This was because the sample included only farmers, who were working on their fruit farms as their main occupation, providing not less than 80% of their total incomes (a sampling criteria, see Section 5.5.1), so it is not surprising that the majority would like to still rely on fruit farming during the next five years. Only four farmers (2%) stated that they would like to retire and pass on their farms to their children.

Table 7.22: Fruit farm operation during the next five years

Fruit farm operation	Frequency	Percent
Yes	212	98%
No	4	2%
Total	216	100%

7.6.2 New main fruit crops

Among the 212 respondents, who intended to continue their fruit farm business during the next five years, 84% would continue to grow their existing main fruit crop. Only

16% would like to grow a new main fruit crop (Table 7.23). The two types of market users were not related to whether they would like to grow a new main fruit crop or not.

Table 7.23: Intention to grow or not grow a new main fruit crop during the next five years

Intention	TM users		HM users		Total	
	Count	Percent	Count	Percent	Count	Percent
Only existing main fruit crop	84	81%	94	87%	178	84%
Grow a new main fruit crop	20	19%	14	13%	34	16%
Total	104	100%	108	100%	212	100%

χ^2*=1.546, p=.214*

The 178 fruit farmers, who would like to continue to grow their existing main fruit crops, provided many reasons that could be classified into seven categories, as shown in Table 7.24. The most important reason, according to 38% of the sample, was that they would not change because growing a perennial crop would take several years before they reached a reasonable output. Other reasons included 'changing to a new crop needed money for investment' (24%), 'the existing crop has good prices' (24%), and 'experience with the existing crop' (21%). Other less frequent answers included 'the existing crop is easy to grow, harvest, or manage' (19%), 'soil, terrain and climate are suitable for growing the existing main fruit crop' (16%), and 'the existing fruit crop has high market demands' (10%). Some the respondents provided more than one reason and stated:

"Changing to grow a new crop takes time and needs lots of money for the new investment, and I will have a shortage of income while I am waiting for the new output."
"I have a long experience in growing mangosteens, and I know everything about them, so it easy for me to handle."

Table 7.24: Reasons for growing existing fruit crops

Reasons	Responses Count	Responses Percent	Percent of Cases (178)
• Changing to a new crop takes time to reach a reasonable output	67	25%	38%
• Changing to a new crop needs money for investment	43	16%	24%
• The existing crop has good prices	43	16%	24%
• Experience with existing crop (not familiar with other new crops)	37	14%	21%
• Existing crop is easy to grow, harvest and manage	35	13%	20%
• Soil, terrain and climate are suitable for growing existing main fruit crop	28	10%	16%
• Existing crop has high market demands	17	6%	10%
Total	270	100%	153%*

Note: *Some respondents provided more than one reason

As shown in Table 7.23, only 34 respondents would like to change their main fruit crop to a new one. Table 7.25 shows that the majority (82%) would like to grow durian as their main fruit crop in the next five years. Some respondents would like to grow dainty banana (12%), and other fruit crops, i.e. longan and orange (3% and 3%, respectively).

Table 7.25: New main fruit crops

New fruit crops	Frequency	Percent
Durian	28	82%
Dainty banana	4	12%
Longan	1	3%
Orange	1	3%
Total	34	100%

The results in Table 7.26 show that over half (53%) of these 34 farmers would change to a new crop because of good prices, followed by other reasons: 'the new crop needs less labour' (47%), 'the new crop has high market demands or opportunities' (32%), and 'the new crop is easy to grow, harvest and manage' (15%). One of them stated:

"I want to change to durians because they do not need labour to pick them every day, and now the price is going high"

Table 7.26: Reasons for growing a new main fruit crop

Reasons	Responses		Percent of Cases
	Count	Percent	(34)
• Good prices	18	36%	53%
• Less labour	16	32%	47%
• High market demands/ opportunities	11	22%	32%
• Easy to grow, harvest and manage	5	10%	15%
Total	50	100%	147%*

Note: *Some respondents provided more than one reason.

7.6.3 New main markets

The respondents were also asked about their intentions to change their main markets. The results in Table 7.27 show that approximately 76% of the 212 farmers (who would continue working their fruit farm in the next five years) intended to use their existing main markets and approximately 23% would like to change to a new main market. The relationship between the two types of market users and their intention to use a new main market in the next five years was statistically significant ($\chi^2=4.862$, $p=.018$, $\varphi=.161$), but this relationship was weak ($\varphi=-.188$). As shown, more TM users (32%) would like to use a new main market than HM users (16%).

Table 7.27: Intention to use a new main market in the next five years

Intention	**TM users**		**HM users**		**Total**	
	Count	Percent	Count	Percent	Count	Percent
Existing main market	71	68%	91	84%	162	76%
New main market	33	32%	17	16%	50	24%
Total	104	100%	108	100%	212	100%

$\chi^2=7.516$, $p=.006$, $\varphi=-.188$

The 162 farmers who intended to use their existing main market provided many reasons, which can be categorised into six groups, as presented in Table 7.28. The most important reason (51%) was because the existing market was close to the farm, which led to low cost for transportation. Other reasons were 'good, fair prices offered' (37%) and 'long term relationship and trust in the buyers' (32%). Other reasons were that the existing main market had 'good market potential', 'harvesting services' and 'friendliness and flexibility'. Some of them stated:

"The market is not very far from my farm, so it is very convenient for me to bring my produce to sell"
"We have known the buyer for long time and there has been no problem to sell my produce to him"

Table 7.28: Reasons for using the existing market

Reasons	**Responses**		**Percent of Cases**
	Count	Percent	(162)
• Close to the market	82	32%	51%
• Good/fair prices	60	23%	37%
• Long term relationship/ trust	52	20%	32%
• Harvesting services	22	9%	14%
• Good market potential	21	8%	13%
• Friendliness and flexibility	20	8%	12%
Total	257	100%	160%*

Note: *Some respondents provided more than one reason.

There were different new main markets that 50 farmers intended to use during the next five years. Table 7.29 shows that a majority (62%) would like to use export markets, including exporters and export buying agents. The remainder intended to use several different markets, such as special markets (10%) and cooperatives (8%). The special markets mentioned in this table include markets for Q-GAP certified and organic fruit crops. Other markets include several types of TMs.

Table 7.29: Different types of new markets

New markets	Frequency	Percent
• Export markets	31	62%
• Special markets	5	10%
• Cooperatives	4	8%
• Modern trades	2	4%
• Wholesale markets	2	4%
• Others	6	12%
Total	50	100%

The 50 farmers who intended to use a new main market provided many reasons, which can be categorised into five groups of reasons, as shown in Table 7.30. The most frequent reason offered by 65% was because the new market offered better prices based on grading. Other reasons were reliability and trust in the new market (42%), because they used standard procedure in purchasing and provided good market facilities; and good market potential (33%). Some of the farmers also offered a reason that they would like to by-pass existing middlemen and sell directly to final markets, and the last reason was because the new market provided harvesting services. One of the farmers stated:

"I would like to sell to exporters because they can be trusted and because they offer fair prices based on quality."

Table 7.30: Reasons for using the new main markets

Reasons	Responses		Percent of Cases
	Count	Percent	(50)
• Better prices (as grading)	31	37%	65%
• Reliability and trust, providing good facilities	20	24%	42%
• Good market potential	16	19%	33%
• Wanting to cut off existing middlemen	9	11%	19%
• Harvesting services	7	8%	15%
Total	83	100%	173%*

Note: *Some respondents provided more than one reason.

6.7 Summary

The majority of the fruit farmers in the sample were middle aged males (average 52 years). Generally, they had completed primary or secondary education. Approximately 91% had experienced more than 10 years in fruit farming, and all of them depended on fruit for their income. The farm size was relatively small with an average of 3.55 hectares, of which 3.07 hectares were used for growing fruit. Almost all the farmers (92%) fully owned their fruit farm land. They grew many different types of fruit crops and normally mixed them together in the same areas. Usually, durian, mangosteen or rambutan was their main fruit crop, generating the most sales for their fruit farm business.

The fruit farms in the sample could be separated by the Q-GAP certification. The certified farms covered 49% of the sample, and they had at least one main fruit crop certified. The remainder (51%) were defined as non-certified farms. The certified farmers indicated that the certification provided them with market opportunities, while the non-certified farmers stated that they were not certified because they did not have enough information and time for the certification process, and because they did not use the certification for selling their produce. Due to the small-size characteristic of the farms, some farmers (29%) were members of an agricultural cooperative. The most important reason to become a member was that agricultural cooperatives were selling fruit to HMs. Another reason was that the cooperatives could provide them with funds for their fruit farm business and could also supply agricultural inputs with fair prices.

In terms of fruit markets, the fruit farmers in the sample used many different types of markets that could be classified as traditional markets (TMs) and high-value markets (HMs). Between these two market types, TMs were more frequently used, while HMs purchased larger volumes. Many farmers in the sample used both market types but, in terms of the main market for each farm, TMs and HMs were used by 48% and 52% of the farmers, respectively. Regarding the main fruit types, durian and mangosteen farmers used HMs rather than TMs, but rambutan farmers used TMs rather than HMs. The results also indicate that the market attributes characterising the two market types were different. This was because the fruit farmers valued TMs for their attributes of convenience, better prices and immediate cash, whereas they valued HMs for their good prices, convenience and trust.

In regards to comparisons between TM and HM users, relating to these characteristics, the results show that the types of market users were related to many variables, i.e. education, fruit farming experience, income source, fruit farm size, main fruit grown and cooperative membership. HM users had completed secondary and tertiary education, compared to TM users, where the majority had only completed primary education. HM users had longer experience in fruit farming and some of them also had other agricultural incomes and worked in other sectors, while TM users generally depended on fruit incomes. HM users mainly grew durian and mangosteen on larger farm areas than TM users, who usually grew all of types of fruit. Furthermore, the fruit farmers who were cooperative members were HM users rather than TM users.

Apart from current decisions, strategic intention was also described. The results show that the majority of the farmers intended to continue their fruit farm business during the next five years, by growing their existing main fruit crop. The main reasons were that growing a new fruit crop took time and needed money for investments, and they received good prices for their existing fruit crop. The intention to grow the existing fruit crop was significantly different between the main fruit types. Durian was the most preferred fruit crop to be grown, followed by mangosteen and rambutan. The main markets for the main fruit crops, which would be used during the next five years, were also reported. The majority of the farmers intended to use their existing main market. However, HM users intended to use their existing main market more than TM users intended to do so. The main reasons for using their existing main markets were short distance, better prices offered, long term relationship and trust. In the case of farmers who intended to use new main markets, export-related markets were the most preferred. The main reasons for using new main markets were good prices offered, reliability and trust, and good market potential.

The results of the descriptive analysis and statistical tests are informative, as they provide more understanding about the fruit marketing context. In the real situation, all relevant factors simultaneously affect the strategic marketing decisions of the fruit farmers. Apart from the characteristics of farmers and their farm business, other factors related to the internal and external environment and the farmers' goals were taken into account in further analyses presented in the following chapter.

CHAPTER EIGHT

8 Factors affecting strategic marketing decisions of the fruit farmers

8.1 Introduction

This chapter provides the quantitative results regarding factors affecting strategic marketing decisions (SMDs) of the fruit farmers in Chanthaburi province of Thailand. It includes five sections. Following this introduction, section two explains factor analysis and provides the results from the analysis where three groups of underlying factors: the internal environment, the external environment and the farmers' goal factors, were analysed. Section three presents the conceptual model describing the relationship between the independent and dependent variables together with the hypotheses. Section four explains logistic regression analysis and presents the results of the model testing that reveal the effects of the key factors: business size, experience, market requirements, effectiveness, efficiency, sustainability, and self-sufficiency. The final section profiles the two marketing channels users.

8.2 Establishing the factors

The analysis of factors affecting the strategic marketing decisions (SMDs) of the fruit farmers involved a great number of relevant variables (which resulted from the qualitative study) and a limited number of respondents in the sample. In order to deal with this problem, a statistical technique for data reduction, called factor analysis, was used to identify a small and focus set of underlying factors that still maintained information from the original variables. The results not only reveal 'latent constructs' behind the original variables, but they also alleviate the problem from the limited sample.

8.2.1 Factor analysis

Factor analysis is a statistical technique that can be used to identify a small number of underlying factors, which are linear combinations of observed variables (Leech et al., 2014). The idea of factor analysis is to exploit the correlations among observed variables, so that these original variables are reduced by combining them with a more focused set of unobserved (or latent) factors called underlying factors (Janssens, 2008; Leech et al., 2014). Many studies related to strategic decisions in agriculture have used factor analysis, in order to reduce or group the original variables into strategic factors, sometimes called strategic dimensions (Inderhees & Theuvsen, 2009; McLeay et al., 1996; Tsourgiannis et al., 2008). For example, McLeay et al. (1996) used factor analysis to reduce 49 marketing and strategic variables into 13 strategic dimensions of New Zealand intensive crop farmers. Tsourgiannis et al. (2008) studied factors that affected the marketing channel choice of sheep and goat farmers in Greece and employed factor analysis to reduce 24 strategic variables into five strategic dimensions, i.e. production orientation, cost focus, profit orientation, differentiation and interpersonal relationships. Furthermore, Inderhees and Theuvsen (2009) used factor analysis to extract five strategic factors (i.e. growth, diversification, cooperation, retrenchment and outsourcing) from 18 strategic variables related to German farmers' strategies within globalising markets.

In this study, data collected from the main survey comprised various components related to the internal and external environments and the farmers' goals. The internal environment included various characteristics of the fruit farmers and their farm business that created 14 variables for data analyses. The external environment and the farmers' goals were captured by 22 items that asked the respondents about the importance of the external environment and 19 goal statements, in order to learn about their strategic thinking. Through the use of factor analysis, this vast amount of information (55 variables) was also grouped into a small number of underlying factors (or strategic factors).

Factor analysis consists of three stages: factorability assessment, factor extraction and factor rotation and interpretation. Details of each stage are presented as follows.

1) Factorability assessment

Two main issues need to be assessed as to whether the data set is suitable for factor analysis. The first issue is that the number of respondents should be at least ten times that of the number of variables (Janssens, 2008). Other researchers suggest that five respondents for each variable are acceptable in most cases (Tabachnick & Fidell, 2012). The other issue concerns whether the correlations between individual variables are sufficiently high. This is because relatively high correlations mean the variables share common factors. According to Tabachnick and Fidell (2012), many correlations greater than .3 should be found in the assessment of the correlation matrix that can be generated by the SPSS. Therefore, if fewer correlations are found, this will indicate that the data set may not be suitable for factor analysis.

Kaiser-Meyer-Olkin's measure of sampling adequacy (KMO) and Bartlett's test of sphericity are statistical measures that can assist an assessment of data factorability. The KMO indicates if the distribution of values is adequate for factor analysis, or if there are adequate (observed) variables for each underlying factor. A measure of KMO should be greater than .7 and it is unacceptable if less than .5 (Kaiser, 1970). The Bartlett's test is a measure of the multivariate normality, and it also tests on whether the degree of correlation between observed variables is sufficiently high. Technically, it tests whether the correlation matrix is an identity matrix (which indicates that the variables are uncorrelated). A significant value (p<.05) indicates the correlation matrix differs from identity and the data meet multivariate normality, which is acceptable for factor analysis (Bartlett, 1954).

This study included 216 respondents, so the data set had sufficient respondents for all three sets of variables: 14 variables for the internal environment, 22 variables for the external environment, and 19 variables for the farmers' goals. Other assumptions for each set of variables (i.e. correlation matrix, the KMO and Bartlett's test) were also checked and met.

2) Factor extraction

According to Leech et al. (2014); Mazzocchi (2008); Pallant (2013); Tabachnick and Fidell (2012), the two most commonly used techniques for factor extraction are exploratory factor analysis (EFA) and principal components analysis (PCA). The authors further indicate that these two techniques can be used alternatively to each other for the same problems, as they frequently lead to very similar results. However, the techniques are different in the ways of statistical development, and they are recommended to be used in regard to the objective of data reduction. The EFA is appropriate for analysing pre-determined factors or constructs underlying the observed (measured) variables, whereas the PCA is simply used to derive a relatively small number of components, which contain as much information in original variables as possible (Leech et al., 2014).

Furthermore, as noted by Mazzocchi (2008), the PCA provides uncorrelated component scores that are preferred as a preliminary method to further statistical analyses, especially for cluster analysis or regression analysis. Technically, PCA yields components (not factors), because total variability is taken into account. However, as one of the techniques collectively referred to as 'factor analysis', researchers often use the term 'factor' interchangeably to 'component' yielded by the PCA (Pallant, 2013).

The goal of PCA is to extract a maximum share of variance from the observed variables for each factor (component). This means that the first factor accounts for the largest amount of the total variance, the second factor accounts for the largest amount of the remaining variance, the third factor accounts for the largest amount of the remaining variance after the second factor, and so on. Factors extracted by PCA are orthogonal to all previous extracted factors or, in other words, they are not correlated to each other (Tabachnick & Fidell, 2012). Because adding one more factor increases a smaller portion of the variance explaining the original data, the researcher usually determines a small number of important factors which can explain as much of the total variance as possible. Although the determination of the number of factors is a subjective procedure (Janssens, 2008; Pallant, 2013), the researcher may use a number of criteria to determine when they should stop adding factors:

- Kaiser's criterion will only retain the factors of which the eigenvalue (the proportion of variance explained by each factor) is greater than one;
- Scree plot is a graphic visualisation of the association between eigenvalues and the number of factors. This involves inspecting the plot to find an indicating point where the line changes direction and levels out. As recommended, the number of factors is the number of points above this transition point;
- Parallel analysis involves comparing the eigenvalues obtained from factor analysis with the eigenvalues that are randomly generated, using the same sample size and the same number of observed variables. The actual eigenvalues that are greater than the random ones indicate the number of factors.

This study employed the PCA method for data reduction, as it is more appropriate to be used in the case that no prior underlying construct is assumed. This study also preferred using the term 'factor' for the results of PCA. The three criteria, i.e. Kaiser's criterion, Scree plot and Parallel analysis, were also employed, in order to determine the numbers of underlying factors for the sets of variables of the internal environment, the external environment and the farmers' goals.

3) Factor rotation and interpretation

Since the initial results of factor analysis do not frequently demonstrate a simple structure, a factor rotation is further conducted, in order to meaningfully interpret the underlying factors. The goal of factor rotation is to make the pattern of factor loadings clearer and interpretable, by using arithmetic to find a new set of factor loadings which achieves the simple structure. A simple structure is a condition in which factor loadings of some variables are close to 1 for some factors and close to 0 for other factors.

There are two approaches to factor rotation: orthogonal and oblique approaches. The orthogonal approach assumes that the factors in the analysis are uncorrelated, whereas the oblique approach assumes the factors are correlated. According to Tabachnick and Fidell (2012), orthogonal rotation provides results that are much simpler to understand and interpret. Each broad type of factor rotation comprises a number of rotational techniques: e.g. varimax, quarimax and equamax for orthogonal rotation and direct oblimin and promax for oblique rotation. The most commonly used techniques are varimax for the orthogonal rotation and direct oblimin for the oblique rotation (Brown, 2009; Pallant, 2013; Tabachnick & Fidell, 2012). In practice, the two rotational approaches often result in very similar solutions (Brown, 2009). However, using the orthogonal rotation requires the researcher to assume that the underlying factors are uncorrelated. This assumption may be incorrect. Tabachnick and Fidell (2012) recommend the use of oblique rotation first and then observe the correlations among factors. If the factor correlations are .32 and above and counted 10% or more overlap in variance among factors, this amount of correlations warrants using the oblique rotation.

Generally, the results after factor rotation present a simple structure that involves each variable loading strongly on one factor, and each factor is represented by a number of strongly-loaded variables. As suggested by Hair (2009), significant factor loadings can be identified on the basis of sample size. At 95% confident interval, the significant factor loadings are as follows (Hair, 2009):

Sample size	Significant factor loading
350	.30
250	.35
200	.40
150	.45
120	.50
100	.55
85	.60
70	.65
60	.70
50	.75

In this study, the sample size is 216 respondents, so factor loadings at .40 and above were taken into account for identifying the underlying factors.

Apart from factor loadings that assist the researcher to interpret each of the underlying factors, the results of factor analysis can also guide the calculations of factor scores for individual respondents. In order to obtain the scores for each underlying factor, the researcher used either a summated scale method or a regression method (DiStefano, Zhu, & Mindrila, 2009; Janssens, 2008). The summated scale method simply calculates a summated scale as the sum or the mean of those observed variables that typify the respective factor. As suggested by Hair (2009); Janssens (2008), before factor scores are calculated by using the summated scale method, variables should be preceded by a reliability analysis: the calculation of 'Cronbach's Alpha' to indicate the scales' internal consistency. The acceptable Cronbach's Alpha value for summated scale is .60 and greater (Janssens, 2008). The regression method calculates factor scores on the basis of linear combinations of the observed variables, which can be presented by the following equation:

$$F_j = a_{1j}X_1 + a_{2j}X_2 + \cdots + a_{nj}X_n$$

where F_j = factor j

X_i = observed variable

a_{ij} = weighting coefficient

In this study, the verimax technique was applied because, after testing by using the direct oblimin technique, the factor correlation matrixes of the three sets of variables mentioned above appeared uncorrelated factors. Consequently, the results could bring about simplicity of interpretation and understanding. Since the observed variables related to the internal environment were measured in different units, the regression method was used, as it resulted in standardised factor scores. For factors scores related to the external environment and the farmers' goals, the solutions were calculated by using the summated scale method, because all variables were measured by the same scale, in order to retain simplicity of interpretation. The results of factor analysis in this study indicate nine underlying factors from the three sets of variables, namely business size, experience, market requirements, government support, production information, self-sufficiency, efficiency, effectiveness and sustainability, as detailed in Section 7.2.4.

8.2.2 Underlying factors

In order to identify the underlying factors for each group and to retain simplicity of interpretation, the original variables were analysed separately for the three groups, i.e. the internal environment, the external environment and the farmers' goals.

Underlying factors for the internal environment

As presented in the previous chapter, the characteristics of the farmers and their fruit businesses comprised many variables related to the internal environment. A number of statistical tests indicated that some of these variables were insignificant, whereas others were important, in terms of describing the difference between the two groups in the sample. However, these insignificant variables might have been meaningful in factor analysis and therefore all ten continuous variables of the internal environment were taken into account, i.e. *age, fruit farming experience, household size, total farm size, fruit farm size, fruit crops grown, pick-up trucks, motorcycles, fruit production* and *fruit sales*. Table 8.1 presents these variables with minimum, maximum and mean values obtained from the data collected.

Table 8.1: Variables of internal environment included in the factor analysis

Variables	Unit	Min.	Max.	Mean	S.D.
Age	Years	24	90	52.44	11.16
Fruit farming experience	Years	1	60	25.94	11.26
Household size	Persons	1	10	4.15	1.58
Total farm size	Hectares	.16	32.0	3.55	3.40
Fruit farm size	Hectares	.16	28.8	3.07	3.00
Fruit crops grown	Number	1	7	2.69	1.23
Pick-up trucks	Number	0	4	1.18	.65
Motorcycles	Number	0	9	1.46	1.22
Fruit production	Tons	1	150	19.63	22.00
Fruit sales	Baht	9,000	6,840,000	525,087	821,175

As presented, the measurement units and values of these variables are different. This issue can lead to undesirable results, because the variables with a wider measurement unit have a larger weight on factor extraction (Mazzocchi, 2008). As seen in Table 8.1, the main fruit sales variable has a very much wider range of values, compared to those of the other variables, so it has the most influence on factors extracted. In order to cope with this problem, the variables needed to be standardised, so they all had zero means and variance equal to 1 (Janssens, 2008; Mazzocchi, 2008). As this data set was analysed by using the SPSS, the variables were automatically standardised by the program.

The results firstly indicate that three variables, i.e. *household size*, *fruit crops grown* and *motorcycles*, needed to be removed from the factor solution. This is because the household size loaded heavily on two factors so, after consideration, it was removed. Subsequently, each of the two other factors loaded on their own factors alone, so they were also removed, in order to reduce the number of factors, and furthermore they were not statistically significant factors (Appendix D-1).

A number of statistical tests were undertaken to check whether the other seven variables met the assumptions of factor analysis. The correlation matrix (Appendix D-2) shows many of the correlations were high enough ($r > .3$), thus indicating that the data set of internal environment might be suitable for factor analysis. The Kaiser-Meyer-Olkin measure for sampling adequacy (KMO) was .694 ($\approx$ .7), pointing to an adequate distribution of values for factor analysis and also adequately observed variables for each underlying factor. The Bartlett's test demonstrated that the correlation matrix was significantly different from the identity matrix (p-value=.000). This meant that there were sufficient correlations between variables for factor analysis.

A principal components analysis (PCA) was conducted, in order to extract the underlying latent factors from the observed variables. Based on Kaiser's criterion, two factors were suggested, as their eigenvalues were greater than 1. The Total Variance Explained table (Appendix D-3) indicates that these two factors explained a total of 74% of the variance. The Scree plot (Appendix D-4) also shows two factors were suitable, because the line graph changes at the third factor, and it levels off after that. A parallel analysis also confirmed two factors that had actual eigenvalues from PCA greater than the random eigenvalues generated by the program, Monte Carlo PCA for Parallel Analysis (Watkins, 2000) (Appendix D-5).

A varimax rotation was required, in order to identify a simple structure for simplicity of factor interpretation. These two factors could be interpreted as 'business size' and 'experience' which were uncorrelated to each other. The results in Table 7.2 present loadings of the original variables on these two factors, communalities, h^2 (the sum of squared loadings for original variables across the two factors), the eigenvalues after factor rotation, and percentages of variance explained by the two factors. The variables were grouped for these two factors, ordered by size of factor loadings, and omitted loadings less than .40 (the cut-off value for 216 cases of sample size), in order to facilitate interpretation and improve the clarity of the results.

Table 8.2: Factor loadings from PCA with varimax rotation for a two-factor solution for the internal environment

Variable	Factor loading		h^2
	Business size	***Experience***	
Fruit farm size	.907		.823
Fruit sales	.867		.751
Total farm size	.854		.732
Fruit production	.852		.727
Pick-up trucks	.670		.450
Age		.929	.864
Fruit farming experience		.926	.864
Eigenvalues	3.486	1.726	
% of variance	50%	25%	

Note: Loadings < .40 are omitted.

The first factor seemed to indicate the ***business size*** of the fruit farms, which had strong loadings on the first five variables: *fruit farm size*, *fruit sales*, *total farm size*, *fruit production* and *pick-up trucks*. The other factor seemed to indicate ***experience*** of the fruit farmers, and it had high loadings on the two next variables—*fruit farming experience* and *age*. The communalities achieved medium to high values, thus indicating all the variables were relevant.

The results from PCA with a varimax rotation also provided weighting coefficients (Appendix D-6) for calculating factor scores used in the consequent analysis (presented in the following section). For these internal environment factors, standardised scores of the original variables were applied in conjunction with the weighting coefficients. As a result, the mean score of each factor was equal to zero, which indicated the average business size or average experience, with a standard deviation equalled to one. For respondents who had a smaller business size or less experience than the average, factor scores were negative, and for those who had a larger business size or longer experience than the average, factor scores were positive. Since the factor scores came from standardised scores of original variables, they approximately ranged from -3 to +3 (Janssens, 2008; Tabachnick & Fidell, 2012). This meant that the minimum and maximum values of business size or experience were -3 and +3, respectively, with averages of zero. As a result, interpretation of factor scores was not simple, because they were combinations of original variables. In the case of this study and farmers who had an average business size (factor score = 0), it may not be interpreted that they had all mean scores of original variables, i.e. total farm size = 3.55 hectares, fruit farm size = 3.07 hectares, number of pick-up trucks used = 1.18 trucks, fruit production = 19.63 tonnes, and average fruit sales = 525,087 baht. This was because some of the farmers might have a smaller farm size but a larger volume of production and larger sales than average values. Other farmers who had larger farm sizes than average but did not have a large amount of fruit to sell due to low production might have smaller business sizes than average. Similarly, in the case of farmers with average experience (factor score = 0), it might not be interpreted that they all had mean scores of age (52.44 years) and fruit farming experience (25.94 years), because some of them might be younger but still had more fruit farming experience than average values. Thus, in order to interpret the factor score appropriately, original variables were considered all together.

Underlying factors for the external environment

The external environment data comprised a set of 22 items (variables) constructed and measured on a 5-point Likert scale, from not important (1) to extremely important (5). These 22 variables were initially grouped into political, economic, social, technological, and microenvironment factors (Appendix D-7). In order to reorganise the data to a more focused set of factors which were meaningful for the consequent analysis, a factor analysis was conducted, in order to identify the underlying structure of these external environment variables, using PCA with the varimax rotation.

The results (Appendix D-8) initially showed the correlation between some observed variables and latent factors was not exclusive (rotated factor loadings greater than .40 in more than one factors). Another issue was that some variables had different content from other variables loading on the same factors. These issues needed to be addressed by eliminating some of those variables. However, all these variables were not removed at the same time, because the removal of one variable might bring about better results for the other variables. Thus, many iterations of factor analysis were conducted until the best and most satisfying structure was found. The final factor structure included nine external environment variables, as shown in Table 8.3.

Table 8.3: External environment variables included in the factor analysis results

Variable code	Item
Financial support	Support from government banks for financing the fruit farm business
Production support	Support from government agencies for fruit production
Marketing support	Support from government agencies for fruit market promotion
Market growth	Market growth for high quality fruit
Health consciousness	Increasing health consciousness
Food safety	Market requirements for food safety including Q-GAP standard
Crop disease	Timely information on fruit crop diseases
Weather	Timely information on variations of weather
Buyers	Satisfaction of fruit buyers, such as collectors, exporters or cooperatives etc.

The assumptions of sufficient correlations and multivariate normality were checked. The correlation matrix (Appendix D-9) shows a considerable number of correlations were greater than .3. The KMO was .783, thus indicating adequate distribution of values for factor analysis and adequate observed variables for each underlying factor. The Bartlett's test indicated that the correlation matrix was significantly different from an identity matrix (*p*-value=.000), so there were sufficient correlations between variables for factor analysis.

In determining the number of factors, Kaiser's criterion (the factors from which the eigenvalues are greater than 1) indicated three factors should be taken into account (Appendix D-10). Correspondingly, the Scree plot (Appendix D-11) confirmed that three factors were suitable because, from the fourth factor onwards the curve flattens. However, the parallel analysis suggested there might be only two factors (Appendix D-12). After analysing for two and three factors by using PCA, a three-factor solution demonstrated it was more suitable in terms of content.

These three factors could be interpreted as 'market requirements', 'government support' and 'production information', which were uncorrelated to one another. Table 8.4 presents factor loadings of the original variables on these three factors, communalities (h^2), the eigenvalues after factor rotation, and percentages of variance explained by these three factors. The variables were grouped for the three factors, ordered by size of factor loadings, and loadings less than .40 were omitted, in order to facilitate interpretation and improve clarity of the results.

Table 8.4: Factor loadings from PCA with varimax rotation for a three-factor solution for the external environment

Variable	**Factor loading**			h^2
	Market requirements	***Government support***	***Production information***	
Food safety	.874			.779
Market growth	.746			.629
Health consciousness	.720			.596
Buyers	.719			.562
Production support		.844		.791
Financial support		.821		.675
Marketing support		.691		.658
Weather			.899	.836
Crop disease			.806	.752
Eigenvalues	2.564	2.042	1.674	
% of variance	28%	23%	19%	

Note: Loadings < .40 are omitted.

The first factor accounted for 28% of the variance and loaded strongly on the first four variables. This factor was named '***market requirements***' of which the four variables consisted of *food safety*, *market growth, health consciousness*, and *buyers*. The second factor, named as '***government support***', accounted for 23% and consisted of three variables: *production support, financial support*, and *marketing support*. The last factor, accounting for 19% and was named '***production information***', strongly loading on two factors, i.e. *weather* and *crop disease*. The communalities (h^2) showed excellent values, thus indicating all the variables were relevant in this factor structure.

In order to retain simplicity of interpretation, factor scores for these three external environment factors were calculated based on the summated scale method that assumed all variables had the same weight. This meant that scores for the market requirement factor came from the average scores among the first four variables. Scores for the government support factor were the average among the next three variables, and lastly, scores for the production information factor were the average between the two last variables. As mentioned earlier, the summated scale method required an extensive analysis of reliability, to ensure a high degree of consistency before calculating the scores. The results of Cronbach's alpha for *market requirements, government support,* and *production information* were equal to .805, .758, and .748, respectively, representing good internal consistency. Since all original variables had the same unit of measurement, factor scores for these external environment factors were calculated using the summated scale method, and they were interpreted in a simple way to the original variables.

Underlying factors for the farmers' goals

According to the literature, the strategies farmers adopt for their farm business correspond to their multiple goals of combining business and lifestyle choices (Duesberg et al., 2013; Farmar-Bowers & Lane, 2009; Hofstrand & Jolly, 2007). In this study, the fruit farmers were asked to evaluate their multiple goals through identifying 19 goal statements (variables) measured on 5-point Likert scale, from strongly disagree (1) to strongly agree (5). These goal statements were placed into five categories: production, marketing, financial, environmental and personal/family goals (Appendix D-13).

Similar to the analysis of the external environment, the results for the farmers' goals firstly showed that a number of variables did not load exclusively on one underlying factor (Appendix D-14). Furthermore, the content of some variables loaded on the same factors were very different. Consequently, some of those variables were eliminated. A number of iterations of factor analysis with variable reductions and additions were conducted, in order to identify the most suitable factor structure. The final trial resulted in 13 variables to be included in the analysis, as shown in Table 8.5.

Table 8.5: Goal variables included in the factor analysis results

Variable	Goal statement
Production techniques	You continually update the production techniques on your fruit farm.
Farm work	A successful farmer focuses on production, i.e. farm work, and not on activities outside the farm.
Quality products	You strive to produce the highest quality fruit in your district.
Customer requirements	You grow fruit crops that best meet customer requirements.
Pricing	You receive a fair price for your fruit crops
Market channels	You know where your produce goes after it leaves the farm.
Market information	You usually meet other people in order to find market information.
Agro-chemicals	Fertilisers and pesticides are not the most necessary item for your fruit farming.
Living condition	You consider a decrease in the use of agricultural chemicals would improve the living conditions on the farm.
Environmental awareness	You are doing everything you can to be environmentally aware and conserve the land you farm.
Quality of life	You think that reducing your work load will help you improve the quality of your life.
Family	The best part of farming is having your family working alongside you.
Happiness	You enjoy farm work because it makes you feel happy.

The data was assessed for factorability. The correlation matrix (Appendix D-15) showed many correlations being greater than .3. The KMO was .750, thus indicating adequate distribution of values for factor analysis and adequate observed variables for each underlying factor. The Bartlett's test indicated that the correlation matrix was significantly different from an identity matrix (p-value=.000), so there was sufficient correlation between variables for factor analysis.

The determination for the number of underlying factors relied on three criteria. Kaiser's criterion indicated a four-factor structure (Appendix D-16). The Scree plot (Appendix

D-17) differently suggested there were three factors, because the curve flattened from the fourth factor. The parallel analysis also indicated that three factors should be appropriate (Appendix D-18). After analysing for three and four factors, using PCA, a four-factor solution appeared to be more suitable in terms of content.

The four factors pointed out the different focuses of the farmers on fruit farming: 'effectiveness', 'sustainability', 'self-sufficiency' and 'efficiency'. Table 8.6 presents factor loadings of the original variables on these four factors, communalities (h^2), the eigenvalues after varimax rotation, and percentages of variance explained by these four factors. The variables were grouped in four factors, ordered by size of factor loadings, and omitted loadings less than .40, in order to facilitate interpretation and improve clarity of the results.

Table 8.6: Factor loadings from PCA with varimax rotation for a four-factor solution for the farmers' goals

Variable	**Factor loading**				h^2
	Effectiveness	***Sustainability***	***Self-sufficiency***	***Efficiency***	
Customer requirements	.835				.701
Market channels	.801				.680
Pricing	.740				.566
Market information	.698				.536
Living condition		.841			.766
Environmental awareness		.760			.697
Agro-chemicals		.660			.599
Family			.766		.671
Happiness			.710		.594
Quality of life			.584		.355
Farm work				.740	.650
Quality products				.585	.462
Production techniques				.521	.567
Eigenvalues	2.752	2.010	1.614	1.468	
% of variance	21.0%	15.5%	12.5%	11.0%	

The first goal factor accounted for 21% of the variance and could be interpreted as '***effectiveness***'. According to Page (2010), effectiveness focuses on the customer and whether the process delivers what they want. This definition implies that the business, which adheres to effectiveness, always produces the correct item/s that matches market requirements. Similarly in this study, the four variables, which were strongly loading on the effectiveness factor, were *customer requirements, pricing, market channels,* and *market information*. The second factor accounted for 15.5% of the variance and could be named as '***sustainability***'. Epstein and Rejc (2014) noted that sustainability is the business responsibility needed to endure economic, social and environmental performance. In agriculture, sustainability mostly focuses on practices that have a minimal impact on the environment (Stewart & Stewart, 2015). In this study, there were three variables: *agro-chemicals, living condition,* and *environmental awareness* for the sustainability factor. The third factor accounted for 12.5% of the variance interpreted as '***self-sufficiency***'. Idato (2013) noted that with regard to food production, self-sufficiency needs no external assistance in satisfying one's basic needs and maintain a frugal lifestyle. In agriculture, self-sufficiency is usually applied to small-scale farms that use low external inputs (Tripp & Longley, 2006). In this study, the self-sufficiency factor consisted of three variables: *quality of life*, *family* and *happiness*, suggesting that the farmers orientated their farms on a livelihood basis to satisfy family needs and happiness. The last factor accounted for 11% of the variance, namely '***efficiency***'. According to Page (2010), efficiency focuses on responsibility for the overall process that minimises the use of resources. This definition implies that the business, which adheres to efficiency, always focuses on the right process or production techniques that will provide good results. In this study, the efficiency factor came from three variables: *production techniques*, *farm work*, and *quality products*.

The calculation of scores for these goal factors was based on the summated scale method, so the mean of the combination of variables for each factor was applied. In order to ensure reliable results, all 13 variables were assessed by reliability analysis. The results showed Cronbach's alpha values were .786, .761, .693, and .609 for *effectiveness, sustainability, self-sufficiency,* and *efficiency*, respectively. These values met the condition of internal consistency. Factor scores for these goal factors were interpreted similarly to the original variables.

8.2.3 Descriptions of the underlying factors

The analyses of the business environment and the farmers' goals were conducted by using the principal components analysis (PCA) with varimax rotation. These analyses resulted in nine underlying factors classified into three broad types: 1) the internal environment factors (*business size* and *experience*), 2) the external environment factors (*market requirements, government supports,* and *production information*), and 3) the farmers' goal factors (*effectiveness, efficiency, sustainability,* and *self-sufficiency*). Table 8.7 presents descriptions of these nine factors.

Table 8.7: Nine underlying factors

Factor	Label
Internal environment	
Business size (BS)	The farm business characteristic which is based on fruit farm size, number of pick-ups used, main fruit production and sales
Experience (Exp)	The farmer characteristic which is based on age and years of fruit farming experience
External environment	
Market requirement (MR)	Perceived importance of Q-GAP certification required, market growth for high-quality fruit, satisfaction of fruit buyers, and increasing health consciousness
Government support (GS)	Perceived importance of government support in fruit production, finance and marketing promotion
Production information (PI)	Perceived importance of information services for fruit production regarding weather and fruit crop diseases
Farmers' goals	
Effectiveness (Effec)	The goal which focuses on customer requirements, marketing channels used, fruit prices and market information
Efficiency (Effic)	The goal which focuses on farm work and production techniques regarding the quality of fruit produce
Sustainability (Sustain)	The goal which focuses on environmental awareness and land conservation for the fruit farm regarding fertilisers and agro-chemicals used
Self-sufficiency (Suffic)	The goal which focuses on family, happiness and quality of life

As a result of factor analysis, the data of these factors were linear combinations of the original observed variables. As stated earlier, the internal environment factors had standardised scores that normally ranged from -3 to +3, with a mean of 0. The external environment and goal factors had summated scores that ranged from 1 to 5. Table 8.8 presents these nine factors and descriptions of the scores.

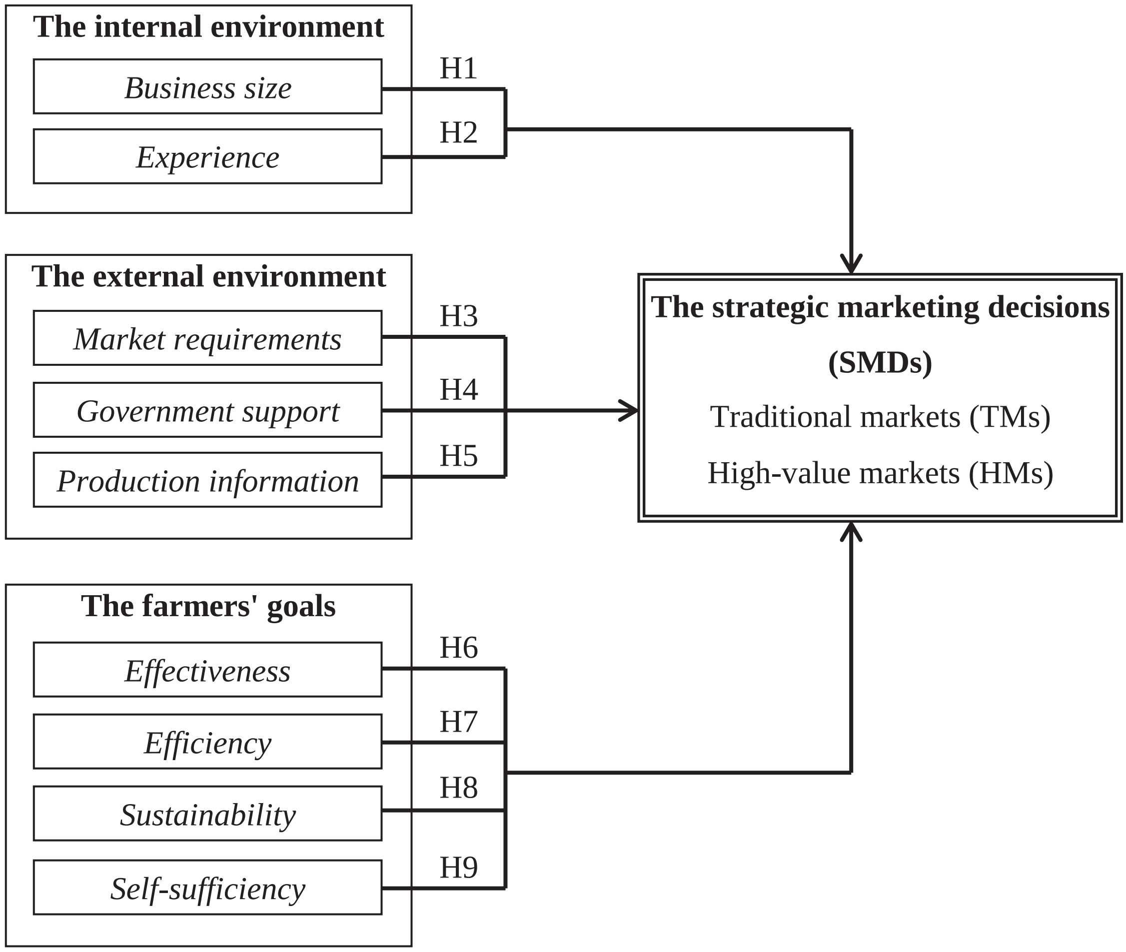
Table 8.8: Nine factors and descriptions of the scores

Factor	Description
Internal environment	
Business size (BS)	-3 = smallest business size, 0 = average business size, 3 = largest business size
Experience (Exp)	-3 = lowest experience, 0 = average experience, 3 = highest experience
External environment	
Market requirement (MR) *Government support (GS)* *Production information (PI)*	1 = not important, 2 = little important, 3 = important, 4 = very important, 5 = extremely important
Farmers' Goals	
Effectiveness (Effec) *Efficiency (Effic)* *Sustainability (Sustain)* *Self-sufficiency (Suffic)*	1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree

8.3 The conceptual model

Based on the conceptual framework, this study further developed a more specific conceptual model describing the relationships between some specific factors and the strategic marketing decisions (SMDs) of the farmers in Chanthaburi. The results of this factor analysis identified underlying factors that were hypothesised to affect the SMDs of farmers. Figure 8.1 illustrates the conceptual model with three key conceptual categories of the underlying factors affecting the SMDs of farmers. The underlying factors were seen as the independent variables, whereas the 'SMDs of farmers' was seen as the dependent variable in testing the model.

Figure 8.1: Conceptual model of strategic marketing decisions in agriculture



8.3.1 Independent variables

As a result of the factor analysis, there were nine underlying factors seen as the independent variables in the conceptual model. These underlying factors were divided into three conceptual categories:

- The internal environment consisted of two variables, i.e. *business size* and *experience*;
- The external environment consisted of three variables, i.e. *market requirement*, *government support*, and *production information*;
- The farmers' goals consisted of four variables, i.e. *effectiveness*, *efficiency*, *sustainability*, and *self-sufficiency*.

Table 8.9 presents these conceptual categories and the combined nine variables (underlying factors) of original variables.

Table 8.9: Three conceptual categories of underlying factors and original variables

The internal environment	The external environment	The farmers' goals
Business size	***Market requirement***	***Effectiveness***
• *Total farm size*	• *Market growth*	• *Customer requirements*
• *Fruit farm size*	• *Health consciousness*	• *Pricing*
• *Pick-up trucks*	• *Food safety*	• *Market channels*
• *Fruit production*	• *Buyers*	• *Market information*
• *Fruit sales*	***Government support***	***Efficiency***
Experience	• *Financial support*	• *Production techniques*
• *Age*	• *Production support*	• *Farm work*
• *Fruit farming experience*	• *Marketing support*	• *Quality products*
	Production information	***Sustainability***
	• *Crop disease*	• *Agro-chemicals*
	• *Weather*	• *Environmental awareness*
		Self-sufficiency
		• *Quality of life*
		• *Farming family*
		• *Happiness*

8.3.2 Dependent variable

The dependent variable of the conceptual model was the SMDs of the fruit farmers which link to the two sample groups, i.e. farmers who used traditional market channels (TM users) and farmers who used high-value market channels (HM users). In order to separate the respondents into TM or HM users, a criterion regarding the volume of fruit supplied to each type of market was determined for the respondents who used both types of markets. Through this criterion, the respondents who supplied a higher volume of their main fruit crops (more than 50%) to TMs were considered as TM users, and those who supplied a higher volume of their main fruit crops to HMs were considered as HM users. In other words, the TM users were the fruit farmers who used TMs as their main markets but they might use HMs as supplementary markets. The TM users were normally non-certified farmers, who could not usually distribute their produce to HMs, as they required Q-GAP certification. According to the pilot study, however, due to a low supply of certified fruit, some HMs implemented alternative strategies for sourcing high quality fruit from some non-certified farmers who had good records and were trusted, for example some registered farmers waiting for the certification process, or those who had been in contact with the buyers for years. Conversely, the HM users were generally certified farmers, who had more opportunities to sell their produce to a wider range of markets. However, some HM users might continue to use TMs as supplementary markets. Their main reason was their long relationship with TMs, which had occurred before they became certified farmers, and sometimes TMs could offer better prices.

Table 8.10 presents a classification of the 216 respondents into two sample groups: 104 TM users and 112 HM users. The majority of the TM users sold their produce only to TMs, and only a few of them sold a small amount of their produce to HMs. Almost two thirds of HM users sold only to HMs, and approximately one third of them sold a small amount of their produce to TMs.

Table 8.10: Classification of market users

Market users	%supply to HMs	Frequency	Percent
TM users	0%	86	83%
	1-10%	0	0%
	11-20%	4	4%
	21-30%	6	6%
	31-40%	7	7%
	41-50%	1	0%
Total TM users		104	100%
HM users	50-59%	3	3%
	60-69%	9	8%
	70-79%	14	12%
	80-89%	14	12%
	90-99%	4	4%
	100%	68	61%
Total HM users		112	100%
Total sample		216	

In order to ensure that the justification in classifying the two sample groups for the dependent variable was correct, this study employed ***cluster analysis*** to confirm whether there were two groups, or other additional groups in between (see Appendix D-19). The results confirm there were two groups of respondents consisting of 104 TM users and 112 HM users as presented above.

8.3.3 Hypotheses

Based on the conceptual model, there were nine hypotheses to be tested in the quantitative research in this study:

H1: There is a significant relationship between ***business sizes*** *and strategic marketing decisions.*

H2: There is a significant relationship between ***experience*** *and strategic marketing decisions.*

H3: There is a significant relationship between ***market requirements*** *and strategic marketing decisions.*

H4: There is a significant relationship between ***government support*** *and strategic marketing decisions.*

H5: There is a significant relationship between ***production information*** *and strategic marketing decisions.*

H6: There is a significant relationship between ***effectiveness*** *and strategic marketing decisions.*

H7: There is a significant relationship between ***efficiency*** *and strategic marketing decisions.*

H8: There is a significant relationship between ***sustainability*** *and strategic marketing decisions.*

H9: There is a significant relationship between ***self-sufficiency*** *and strategic marketing decisions.*

Since the nine independent variables were hypothesised to affect a dichotomous dependent variable (the SMDs of farmers using TM or HM channels), the most appropriate statistical technique for testing the model was a logistic regression.

8.4 Testing the model

8.4.1 Logistic regression analysis

Logistic regression, or a logit model, is a regression model used when an analytical problem is involved with a categorical dependent variable with several continuous and/or categorical independent variables (Hutcheson & Moutinho, 2008). As noted by Hair (2009), in a situation where the dependent variable is dichotomous (binary groups), logistic regression is called binary logistic regression, and this is preferred because of its robustness and ease of interpretation and diagnostics. The application of logistic regression has also been found in previous research on strategic decisions in agriculture. For example, Neupane, Sharma, and Thapa (2002) used logistic regression to assess the effects of demographic and socioeconomic factors on the adoption of agroforestry in the hills of Nepal. Xaba and Masuku (2013) also used logistic regression to assess the effects of demographic and other internal resource factors on marketing channel choice decisions of vegetable farmers in Swaziland. In addition, Tselempis et al. (2015) used logistic regression to analyse the impact of demand-related factors on fruit and vegetable farmers' decisions to implement quality management systems in Greece.

In the case of this study, the aim is to analyse the factors that affected the SMDs of fruit farmers in Thailand. The underlying factors resulting from factor analysis were further analysed as to whether they significantly affected the farmers' SMDs. Accordingly, in this analysis, the nine factors from factor analysis were independent variables determining the dependent variable (TM or HM users). Since this study dealt with a dichotomous dependent variable, binary logistic regression was applied to analyse the differences between the two types of market users on a multivariate profile (the nine independent variables). The results of this analysis indicate the effects of the factors on the farmers' SMDs. In order to effectively develop a logistic regression model, this analysis followed these four stages:

1) Checking statistical assumptions of logistic regression

Logistic regression has the advantage of being free from the basic assumptions of multivariate normality and variance-covariance equality. This makes its application suitable in many situations. However, apart from the dichotomy of the dependent variable, the following assumptions need to be checked:

- Sample size should be considered similar to most found in multivariate techniques, as very small samples result in large sampling errors. For accurate results, the total sample size should be a minimum of 20 cases for each independent variable (Leech et al., 2014), and the sample size for each category of the dependent variable should be a minimum of 10 cases for each independent variable (Hair, 2009);
- Outliers can bring about a poor fit of the logistic regression model because a case may be strongly predicted by the model in one category, but it is actually classified in another category. These outlying cases can be identified by assessment of standardised residuals of which absolute values exceed 3.00 (Agresti, 2013; Tabachnick & Fidell, 2012). However, such outliers are not necessary, in order to be influential points. Cases with Cook's distance scores greater than 1.00 are suspected of being influential outliers (Tabachnick & Fidell, 2012);
- Multicollinearity is problematic to logistic regression when independent variables are highly correlated. Extremely high correlations among independent variables can be indicated by exceedingly large standard errors and failure of the tolerance test (Tabachnick & Fidell, 2012). Very low tolerance values (<.10) indicate the independent variable has high correlations with other independent variables and, consequently, the redundant variables need to be removed (Pallant, 2013).

In this study, the assumptions of logistic regression, i.e. ratio of cases to independent variables, influential outliers and multicollinearity, were checked. The total sample size and the number of cases, for both sample groups (TM and HM users), were adequate for the nine underlying factors because the ratio of cases to independent variables was 24:1 (216 cases to 9 factors), which exceeded the required ratio of 20:1. The ratio of cases for the 104 TM users and for the 112 HM users to the nine factors were also satisfied, thus exceeding the requirement of 10:1. Other assumptions in regards to outliers and multicollinearity were checked and met. After checking for influential outliers, all cases had standardised residuals between ±3 and Cook's distance scores less than 1.0. Thus, there was no need to remove any case from the data set. For the multicollinearity assessment, Appendix D-20 shows not any one factor had tolerance values less than .10, thus indicating an absence of multicollinearity. Furthermore, the results demonstrated adequate model fits and small standard errors of the factors (see Table 8.11).

2) Estimation of logistic regression model

Logistic regression is a multivariate analysis that extends the method of linear regression to enable a binary dependent variable to be modelled. In this study, the dependent variable demonstrated a binary classification of the market user types, which reflected the strategic marketing decisions (SMDs) of the fruit farmers on their utilisation of TMs or HMs. The independent variables consisted of the environment factors and the goal factors resulting from the factor analysis. The model for this study aimed to analyse the effects of these independent variables on the probability of being an HM user. High probabilities ($Pr > .5$) indicated HM user type, whereas low probabilities ($Pr < .5$) indicated TM user type.

The actual values of the collected data for the dependent variable were equal to 0 (TM users) and 1 (HM users), and the predicted values (the probabilities of being HM users) were from 0 to 1. This indicates that, unlike linear regression, the relationship between the probability of being an HM user and the proposed key factors was not linear but binomial. In logistic regression analysis, this binary data of the dependent variable was transformed to logit values, thus allowing linear relationship between these key factors and the transformed data (logit values). The key term for the logit transformation is the odds ratio:

$$Odds_{HM} = \frac{\Pr(HM)}{1 - \Pr(HM)}$$

Transformation into logit values was undertaken by taking the logarithm to the odds. As a result, the equation of the logistic regression model was:

$$Logit_{HM} = ln\left[\frac{\Pr(HM)}{1 - \Pr(HM)}\right] = a + b_1X_1 + b_2X_2 + \cdots b_nX_n$$

where $Logit_{HM}$ = logit values regarding being the HM user

$\Pr(HM)$ = probability of being the HM user

a = constant

$b_1, b_2, ..., b_n$ = logistic coefficients

$X_1, X_2, ..., X_n$ = environment and goal factors (the nine underlying factors)

3) Assessment of the overall model fit

Similar to multiple linear regression, the model fit for logistic regression can be determined by comparing the goodness-of-fit statistics between the new model (the model with all or subsets of predictors) with the baseline model (the model with only the intercept) (Field, 2009). The goodness-of-fit statistic used in logistic regression is the value of -2 times the log of the likelihood value, called -2 log likelihood or *-2LL*. Smaller *-2LL* values mean the model fits the data better, and a perfect fit model has a *-2LL* value equal to 0. The significance of the difference can be examined by the χ^2 statistic or log-likelihood ratio test (with *p*-value < .05), and formulated as:

$$\chi^2 = 2[LL(new) - LL(baseline)] = -2ln\left[\frac{(likelihood\ without\ the\ variable)}{(likelihood\ with\ the\ variable)}\right]$$

The significance of the new model means that the independent variables (the predictors) included in it provides sufficient information to predict the dependent variable. Furthermore, the effect of a particular independent variable is indicated by the difference between the *-2LL* values of the two nested models (one including the dependent variable and the other not).

Apart from the *-2LL,* the model fit can be presented by the proportion of variation in the dependent variable that is explained by the model. Similar to R^2 measures in multiple regression, two alternative pseudo R^2 namely Cox & Snell R^2 and Nagelkerke R^2, are applied in logistic regression. The values of both measures range from 0 to 1, reflecting the amount of variation accounted for by the logistic regression model, with 1.00 indicating a perfect model fit.

In this study, the *-2LL* was used to make a comparison between the null model and the full model (with nine underlying factors) and between the full model and other nested models (without some underlying factors), so that the best model choice could be selected.

4) Interpretation of the results

Since logistic regression transforms the probability of event (being HM users in this study) to the logit, the coefficients of the independent variables indicate the variation of the logit (not the probability). In order to interpret the results, the original coefficients may be transformed (antilog) to exponentiated coefficients. While the original coefficients reflect changes in logits, the exponentiated coefficients reflect changes in odds. The antilog results in this following equation:

$$Odds = e^{Logit} = e^{a+b_1X_1+b_2X_2+\cdots b_nX_n}$$

This means that the exponentiated coefficients do not affect the odds in terms of addition, but they do in terms of multiplication because:

$$Odds = e^{a}e^{b_1X_1}e^{b_2X_2}\dots e^{b_nX_n}$$

In logistic regression, the Wald test is used to examine whether each original coefficient is different from 0. An original coefficient of 0 indicates no impact on the logit and, subsequently, it brings about an exponentiated coefficient of 1 that means no impact on the odds. Both forms of the coefficients can be used to interpret the direction and magnitude of each independent variable's relationship. The direction of the relationship can be indicated by the sign of the original coefficients. Straightforwardly, a positive sign informs positive relationship, and a negative sign informs negative relationship. The exponentiated coefficients are interpreted differently, as they always have positive values. Due to the multiplicative impact, exponentiated coefficients above 1 indicate a positive relationship, and values below 1 indicate a negative relationship.

The magnitude of the relationship is indicated by the amount of change in probability for each unit change in the dependent variable. As mentioned previously, the original coefficients reflect the change in the logit value, but it is not particularly easy to depict the change in probability. Alternatively, the exponentiated coefficients depict the change in probability because the odds value is easier to be converted to probability than the logit value:

$$\Pr(event) = \frac{e^{Logit}}{1 + e^{Logit}} = \frac{Odds}{1 + Odds}$$

Moreover, the percentage change in odds for each unit change in the independent variable can be calculated by using this equation:

$$\%\text{ change in odds} = (\text{Exponentiated coefficient} - 1) \times 100$$

8.4.2 Nine-factor model

The logistic regression model for the SMD of the fruit farmers was initially represented by this following equation:

$$Logit_{HM} = a + b_1BS + b_2Exp + b_3MR + b_4GS + b_5PI + b_6Effec + b_7Effic + b_8Sustain + b_9Suffic$$

which suggests that the HM user type may be predicted by all nine factors, when considered together. This proposed model was analysed by comparing it to the null model, in order to find the existence of the nine factors when explaining SMDs. The results showed that without the nine factors, the predictive accuracy of the null model was only 52%. When modelling the nine factors separately, four factors, i.e. *business size, experience, market requirements* and *effectiveness,* were each significantly related to the SMDs of the fruit farmers (Appendix C-21). However, when all nine factors were modelled together, two more factors, i.e. *efficiency* and *self-sufficiency* were also statistically significant (see Table 8.11). The Wald statistic with the *p*-value less than .05 indicated that the logistic coefficients of these significant factors were different from 0, pointing out that the exponentiated coefficients were not equal to 1. The remainder of the factors, i.e. *government support, production information* and *sustainability*, were not statistically significant and they might not affect the SMDs of the fruit farmers: however, they were still part of the model.

Table 8.11: Statistical tests for the logistic coefficients of the model of nine factors

	B*	S.E.	Wald	df	*p-value*	Exp(B)*
Business Size	.909	.338	7.245	1	.007	2.482
Experience	.966	.247	15.233	1	.000	2.627
Market requirements	1.917	.481	15.909	1	.000	6.803
Government support	.063	.313	.041	1	.840	1.065
Production information	-.117	.378	.096	1	.756	.889
Effectiveness	2.541	.506	25.263	1	.000	12.694
Efficiency	-1.255	.509	6.086	1	.014	.285
Sustainability	-.639	.401	2.543	1	.111	.528
Self-sufficiency	-.833	.398	4.391	1	.036	.435
Constant	-5.964	2.518	5.609	1	.018	.003

*B = logistic coefficient, Exp(B) = exponentiated coefficient

The overall model of the nine factors also proved its significance from the null model (χ^2=*144.62*, *p=.000*). The goodness-of-fit statistic -2 log likelihood (-$2LL$) equated to 154.53. The Cox & Snell R^2 and Nagelkerke R^2 were .49 and .65 respectively, so this model explained 49% to 65% of the variation in the dependent variable ($Logit_{HM}$). The overall predictive accuracy of the nine-factor model was high. Table 8.12 presents that the correct classification rates were 85% for TM users and 88% for HM users; the overall correct classification rate was 86%.

Table 8.12: Classification table of the nine-factor model

Observed		**Predicted**		
		Types of market users		Percentage Correct
		TM users	HM users	
Types of market users	TM users	88	16	84.6
	HM users	14	98	87.5
Overall Percentage				86.1

Regarding the factors that were not statistically significant, i.e. *government support*, *production information* and *sustainability* (Table 8.11), the results did not mean that these factors were not practically significant to the fruit farmers, but it meant that the two groups of fruit farmers valued these factors in a similar manner.

In terms of *government support*, the Thai government has promoted high-value agricultural products, including fruit, for over four decades. Srimanee and Routray (2012) suggest that government policies have encouraged diversification of agricultural production since 1972, followed by market improvement, export promotion and productivity enhancement. These policies brought about changes in the production structure, but productivity and export quantities of fruit remained low until the period of economic crisis from 1997 to 1998. From this period onwards, fruit exports considerably expanded, as a response to increased demands for safe food and increased food prices in 2006 (Poapongsakorn, 2011). Therefore, a significant number of Thai fruit farmers produce quality fruit for export, as a result of market opportunities. This indicates that market requirements generally and directly influence the SMD of the fruit farmers to participate in HM, rather than being influenced by government policies. The results of this study indicate that farmers' attitude towards the importance of government support could not distinguish the two types of market users from each other, since HM farmers made SMDs due to market requirements rather than government support. The other factor from the external environment group, which was not statistically significant, was *production information*. This factor was a combination of two variables: information on fruit crop diseases and variations in the weather. The results indicate that both groups of market users similarly value the importance of this basic information, because crop diseases and weather conditions were common situations for all farmers and greatly impacted on the farmers' fruit production.

The last factor that was not statistically significant was a goal-type factor, *sustainability*. As described previously, this factor related to environmental awareness and land conservation for the fruit farm, in regards to the fertilisers and agro-chemicals used. The results indicate that the focus attention on these environmental issues is similar for both types of market users. Although the HM users were mostly Q-GAP certified farmers, who had to comply with the standards for good agricultural practices to ensure fruit quality and safety and to minimise negative impacts on the environment, their focus attention was largely on marketing issues. According to the survey data, the most important reason for the certified farmers to comply with the Q-GAP standard was market opportunities. Correspondingly to the study of Wongprawmas et al. (2015) on the perceptions of stakeholders in the Thai fresh produce industry on the Q-GAP standard, certified farmers generally perceived that the Q-GAP certification was not useful without market requirements on food safety. They adopted the Q-GAP standard in order to provide HM access, rather than environmental awareness. Thus, in terms of 'sustainability', the results show that the two types of market users have the same intentions and suggest that in some aspects different farmers did not always have different goals.

8.4.3 Six-factor model

Since the nine-factor model included a number of factors that were not statistically significant, i.e. government support, production information and sustainability, it was better to find a new model with a smaller number of factors, but still retain the same fit and predictive capability. In order to identify the most possible significant factors included in the new model, all the insignificant factors were not removed at the same time, because some of them might be significant when others were eliminated. Thus, a number of new models that excluded one, two, or all the insignificant factors were estimated. The results in Table 8.13 show that all the new models were not significantly different from the original model (*p-values* > *.05*), in terms of the model fit, and they confirm that all the insignificant factors did not affect the SMDs of the fruit farmers. Consequently, the smallest model (the six-factor model) was chosen.

Table 8.13: Comparison between the nine-factor model and other smaller models

Model	***-2LL***	χ^2	***p-value***
Nine-factor model	154.53		
Eight-factor model (without *GS*)	154.57	.041	.840
Eight-factor model (without *PI*)	154.62	.097	.756
Eight-factor model (without *Sustain*)	157.15	2.621	.105
Seven-factor model (without *GS* and *PI*)	154.64	.109	.947
Seven-factor model (without *GS* and *Sustain*)	157.17	2.641	.267
Seven-factor model (without *PI* and *Sustain*)	157.26	2.729	.255
Six-factor model (without *GS*, *PI* and *Sustain*)	157.26	2.731	.435

The goodness-of-fit statistic (-*2LL*) of the six-factor model was equal to 157.26 and this was not statistically different from 154.53 of the nine-factor model. The Cox & Snell R^2 and Nagelkerke R^2 were .48 and .64 respectively, so this model explained 48% to 64% of the variation in the dependent variable ($Logit_{HM}$). Table 8.14 presents that the correct classification rates are 83% for TM users and 87% for HM users; the overall correction classification rate is 85% and this is not so different from the nine-factor model.

Table 8.14: Classification table of the six-factor model

Observed		**Predicted**		
		Types of market users		Percentage
		TM users	HM users	Correct
Types of market users	TM users	86	18	82.7
	HM users	15	97	86.6
Overall Percentage				84.7

The Wald statistic for the logistic coefficients of the model, as shown in Table 8.15, indicates that all six factors significantly affected the SMDs of the fruit farmers, as the *p-values* was less than .05. The small values of standard errors also confirm the absence of multicollinearity among the six factors. The positive sign of the first four factors' coefficients, i.e. *business size*, *experience*, *market requirements* and *effectiveness*, indicate positive relationships with HM users, whereas the two latter factors, i.e. *efficiency* and *self-sufficiency*, have negative relationships due to the negative sign.

Table 8.15: Logistic regression assessing the effect of the six factors

	B	S.E.	Wald	df	*p-value*	Exp(B)
Business Size	.805	.323	6.214	1	.013	2.237
Experience	.901	.231	15.270	1	.000	2.463
Market requirements	1.732	.431	16.124	1	.000	5.650
Effectiveness	2.487	.489	25.906	1	.000	12.031
Efficiency	-1.224	.471	6.747	1	.009	.294
Self-sufficiency	-.936	.379	6.086	1	.014	.392
Constant	-7.145	2.382	8.996	1	.003	.001

8.4.4 Effects of the factors

The magnitude of each factor's relationship was indicated by the exponentiated coefficient which provided multiplicative effects to the odds of being HM users. When calculated from these exponentiated coefficients, the results in Table 8.16 show a percentage change in odds, when factors increase by one unit. It appears that *effectiveness* is the most influential factor because an increase by one unit increases the odds by 1,103%. The second most influential factor is *market requirement*, where an increase by one unit brought about a 465% increase in odds, followed by *experience* and *business size* resulting in a 146% and 123% increase in odds, respectively. In contrast, increases by one unit of *efficiency* and *self-sufficiency* led to a 71% and 61% decrease in odds, respectively.

Table 8.16: The effect of each factor in the six-factor model

Factor	Exp(B)	% change in odds	Direction of relationship
Effectiveness	12.031	1,103%	Positive
Market requirements	5.650	465%	Positive
Experience	2.463	146%	Positive
Business Size	2.237	123%	Positive
Efficiency	.294	71%	Negative
Self-sufficiency	.392	61%	Negative

These figures of percentage changes in odds seem to present large impacts because the constant term (-7.145) defines a starting point of almost zero (.001) in odds (see Table 8.15). Thus, large percentage changes in odds were needed for significant changes in probability. In order to understand how these coefficients defined the probability of being HM users, many set of values for the six factors were calculated. A first set of 'centric values' was selected to represent a baseline, or a reference point, for comparisons to other sets of values. Table 8.17 shows the set of 'centric values' representing a fruit farmer having an average *business size* and average *experience*, who thinks that *market requirements* are important, and neither agrees nor disagrees that *effectiveness, efficiency* and *self-sufficiency* are the focuses. The probability calculated from these values is equal to .28, thus indicating that, in a typical case presented as a reference point, the farmer is likely to be a TM user.

Table 8.17: A set of values for the six factors used to represent as a reference point

	Score	**Meaning**
Factor		
Business size	0	Average size
Experience	0	Average experience
Market requirement	3	Important
Effectiveness	3	Neither agree nor disagree
Efficiency	3	Neither agree nor disagree
Self-sufficiency	3	Neither agree nor disagree
Logistic regression results		
Logit	-.968	
Odds	.380	
Probability	.275	TM user

The effect of business size

Every unit change for each factor was calculated to see how the probability changed from the reference point. The first factor in consideration was the *business size* for which the values ranged from -3 to 3. The results in Table 8.18 show that a change in *business size* from the reference point affected the probability of being HM users in two ways: decreasing and increasing the probability. When the *business size* decreases from the average size (0) by one unit, the probability also decreases from .275 to .145 or by .130, and when the *business size* further decreases by two and three units the probability changes to .071 and .033, respectively. On the other way, the probability increases when the *business size* increases, for example, an increase from the average size by one unit, the probability changes to .459. However, the increase is not sufficient to change the result of market user type, because the probability .459 still indicates as being TM users. Thus, by referring to the reference point (the situation that the farmer had average *experience* (*Exp* = 0), thought that *market requirements* were important (*MR* = 3), and was neutral with *effectiveness* (*Effec* = 3), *efficiency* (*Effic* = 3) and *self-sufficiency* (*Suffic* = 3)), small and medium *business sizes* (*BS* = -3 to 1) indicate the TM user type, whereas larger sizes (*BS* = 2 to 3) indicate the HM user type.

Table 8.18: The effect of business size

***Business size* (*BS*)**	**Logit***	**Odds**	**Probability (*Pr*)**	**Market user type**	**Change in *BS***	**Change in *Pr***
-3	-3.383	.034	.033	TM	-3	-.242
-2	-2.578	.076	.071	TM	-2	-.204
-1	-1.773	.170	.145	TM	-1	-.130
0	-.968	.380	.275	TM	0	.000
1	-.163	.850	.459	TM	1	.184
2	.642	1.900	.655	HM	2	.380
3	1.447	4.250	.810	HM	3	.535

**Exp=0, MR=3, Effec=3, Effic=3, Suffic=3*

The effect of experience

Changing the level of experience among the fruit farmers also affected their SMDs. Table 8.19 shows that, similar to the *business size* factor, increases in *experience* leads to increases in probabilities of being HM users. Based on the situation presented as the reference point, very low experience (*Exp* = -3) to quite high experience (*Exp* = 1) were likely to result in TM users, while higher experience (*Exp* = 2 and 3) were likely to result in HM users.

Table 8.19: The effect of experience

***Experience* (*Exp*)**	**Logit***	**Odds**	**Probability (*Pr*)**	**Market user type**	**Change in *Exp***	**Change in *Pr***
-3	-3.671	.025	.025	TM	-3	-.250
-2	-2.770	.063	.059	TM	-2	-.216
-1	-1.869	.154	.134	TM	-1	-.141
0	-.968	.380	.275	TM	0	.000
1	-.067	.935	.483	TM	1	.208
2	.834	2.302	.697	HM	2	.422
3	1.735	5.668	.850	HM	3	.575

**BS=0, MR=3, Effec=3, Effic=3, Suffic=3*

The effect of market requirements

The farmer's attitude towards the importance of the *market requirements* also significantly affects participation in HM in a positive direction. Table 8.20 presents that, when the *market requirements* are valued as a very (*MR* = 4) or extremely (*MR* = 5) important factor incorporated with other factors consistent with the reference point, logistic regression predicts high probabilities of a decision to participate in HMs. Conversely, when the *market requirements* are thought not important (*MR* = 1), of little importance (*MR* = 2) or just important (*MR* = 3), logistic regression results in low probabilities of a decision to participate in HMs.

Table 8.20: The effect of market requirements

***Market requirement* (*MR*)**	**Logit***	**Odds**	**Probability (*Pr*)**	**Market user type**	**Change in *MR***	**Change in *Pr***
1	-4.432	.012	.012	TM	-2	-.263
2	-2.700	.067	.063	TM	-1	-.212
3	-.968	.380	.275	TM	0	.000
4	.764	2.147	.682	HM	1	.407
5	2.496	12.131	.924	HM	2	.649

**BS=0, Exp=0, Effec=3, Effic=3, Suffic=3*

The effect of effectiveness

The *effectiveness* factor has a positive direction to the probability of being HM users. Table 8.21 shows that when *effectiveness* is not the focus (*Effec* = 1 to 3), the prediction results in low probability, thus indicating the TM user type. Alternatively, when *effectiveness* was the focus (*Effec* = 4 and 5), the decision turns to the HM user type. More importantly, the probability changes considerably, by .525 (from .275 to .820), when the factor changes from 'neither agree nor disagree' (*Effec* = 3) to agree (*Effec* = 4).

Table 8.21: The effect of effectiveness

***Effectiveness* (*Effec*)**	**Logit***	**Odds**	**Probability (*Pr*)**	**Market user type**	**Change in *Effec***	**Change in *Pr***
1	-5.942	.003	.003	TM	-2	-.272
2	-3.455	.032	.031	TM	-1	-.244
3	-.968	.380	.275	TM	0	.000
4	1.519	4.567	.820	HM	1	.545
5	4.006	54.904	.982	HM	2	.707

**BS=0, Exp=0, MR=3, Effic=3, Suffic=3*

The effect of efficiency

In contrast to the former four factors mentioned above, *efficiency* has a negative effect on the decision to participate in HM. Based on the reference point, Table 8.22 presents the probability of being HM users is high (.815), when the *efficiency* is level 1 (strongly disagree). The probability is medium high (.563) when this factor is level 2 (disagree), but the result still indicates the HM user type. When the values of this factor are even higher (*Effic* = 3 to 5), the prediction results in the TM user type.

Table 8.22: The effect of efficiency

Efficiency (*Effic*)	Logit*	Odds	Probability (*Pr*)	Market user type	Change in *Effic*	Change in *Pr*
1	1.480	4.392	.815	HM	-2	.540
2	.256	1.292	.563	HM	-1	.288
3	-.968	.380	.275	TM	0	.000
4	-2.192	.112	.100	TM	1	-.175
5	-3.416	.033	.032	TM	2	-.243

**BS=0, E=0, MR=3, Effec=3, Suffic=3*

The effect of self-sufficiency

Similar to the *efficiency* factor, the *self-sufficiency* factor also had a negative effect on the decision to participate in HMs. Table 8.23 shows that, based on the reference point, most values of this factor, i.e. disagree (*Suffic* = 2) to strongly agree (*Suffic* = 5) predict on the TM user type. Only the value of 1 (strongly disagree) changes the results to the HM user type. This indicates that the effect of this factor is weaker than that of other factors, because value changes for this factor leads to gradual changes in the probability.

Table 8.23: The effect of self-sufficiency

Self-sufficiency (*Suffic*)	Logit*	Odds	Probability (*Pr*)	Market user type	Change in *Suffic*	Change in *Pr*
1	.904	2.469	.712	HM	-2	.437
2	-.032	.969	.492	TM	-1	.217
3	-.968	.380	.275	TM	0	.000
4	-1.904	.149	.130	TM	1	-.145
5	-2.840	.058	.055	TM	2	-.220

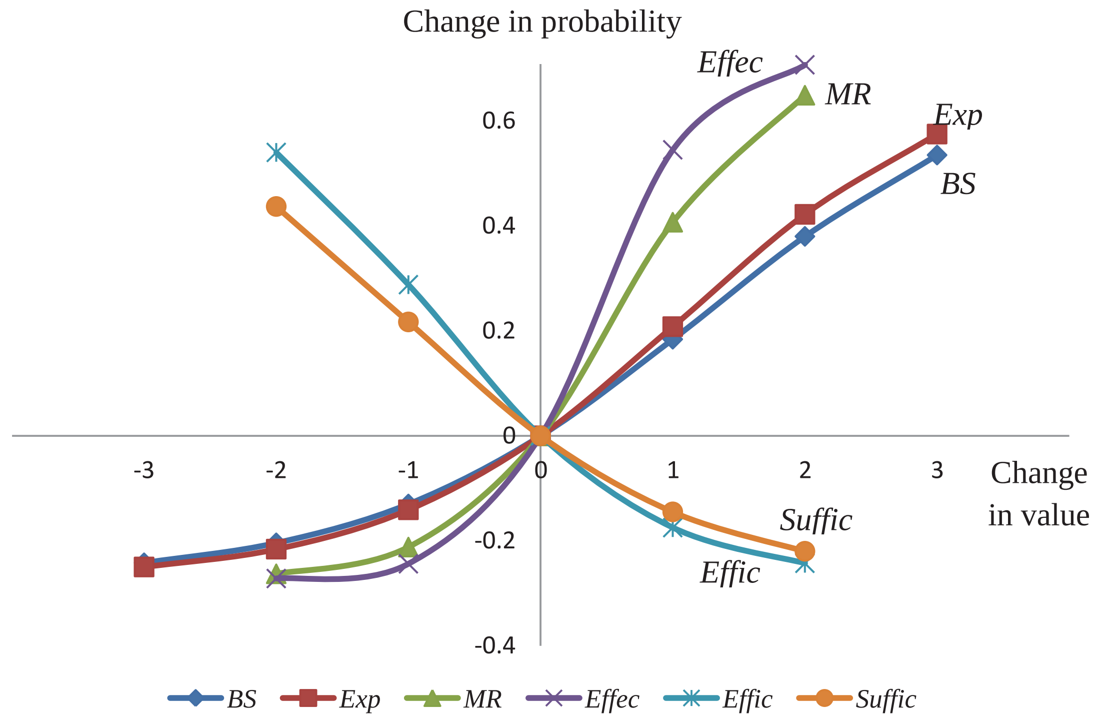
**BS=0, E=0, MR=3, Effec=3, Effic=3*

8.4.5 Links between the six key factors and strategic marketing decisions

According to the logistic regression results, the change in the probability is not equal for every unit change of the factors included in the model. This is because the relationship between the factors and the probability is not linear. For example, changes (increasing and/or decreasing) in effectiveness by one unit have resulted in unequal changes in the probability. An increase by one unit from 3 (be neutral) to 4 (agree) makes the probability increase by 198% (from .275 to .820), but a decrease by one unit, from 3 to 2 (disagree), makes the probability decrease approximately 89% (from .275 to .031). Changes in the same direction also demonstrate unequal changes in the probability. As stated, an increase in effectiveness by one unit from 3 to 4 makes the probability increase by 198%. However, when the factor shifts from 4 to 5 (strongly agree), the probability increases by only approximately 20% (from .820 to .982).

The relationships of the six factors to the probability of being HM users can be illustrated by Figure 8.2. The point of origin represents the determined reference point (*BS=0, Exp=0, MR=3, Effec=3, Effic=3, Suffic=3, and Pr=.275*). As can be seen, the probability changes considerably near the reference point, because the graphs for all factors are steep when they change from the reference point by one unit (either increase or decrease), and flatten when they change by two or three units. These curvy graphs confirm that the change of the probability is not equal for every unit change of the factors. Figure 8.2 also shows the graph of *effectiveness* is steepest, as it is the most influencing factor. In addition, the graphs of *efficiency* and *self-sufficiency* show negative slopes, as they have negative impacts on the probability.

Figure 8.2: Relationships between value and probability changes of the six factors



Note: *BS* = Busniess size, *Exp* = Experience, *MR* = Market requirements, *Effec* = Effectiveness, *Effic* = Efficiency, and *Suffic* = Self-sufficiency

Another approach to understanding how the six factors determine the SMDs of the fruit farmers was to calculate the predicted probabilities for the two market user types, using the group mean of the factors. In this way, the predicted probability would represent the 'typical' member of each market user type. Table 8.24 presents comparisons of the two group mean values for the six factors and the results from logistic regression. As shown, the TM user had smaller sized farm than the HM user, as the mean of -.30 for the TM user indicates below average size, and the mean of .28 for the HM user indicates above average size. In terms of experience, the TM user also had lower experience (below average) than the HM user, who had above average in experience. Market requirements were perceived by the TM user as an important to very important factor (*MR* = 3.54), whereas they were perceived by the HM user as being more than a very important factor (*MR* = 4.25). These two types of market users also perceived the degrees of effectiveness differently. The TM user was about neutral (*Effec* = 3.10) to running the fruit farm with effectiveness, whereas the HM user was likely to agree (*Effec* = 3.89) with effectiveness. Based on these group means, the two types of market users have the mean scores for efficiency and self-sufficiency very close to each other.

The figures show that they are likely to agree that they focused on efficiency and self-sufficiency. As expected, the results of logistic regression indicate that the probability of being the HM user for the 'typical' member of the TM user is .12, and for the 'typical' member of the HM user it is .88.

Table 8.24: Estimation of probability values, using the group means of the six factors

Factor	**Group mean**	
	TM user	***HM user***
Business size	-.30	.28
Experience	-.17	.15
Market requirement	3.54	4.25
Effectiveness	3.10	3.89
Efficiency	3.83	3.81
Self-sufficiency	3.89	3.88
Logit	-2.02	1.97
Odds	.13	7.19
Probability	.12	.88

According to strategic management theory, strategic decisions are made by matching the *internal environment* with the *external environment,* in order to accomplish *goals*. This study confirms that factors related to the internal environment (business size and experience), the external environment (market requirements) and farmers' goals (effectiveness, efficiency, and self-sufficiency), are significant factors. These six key factors have proved their effects on the SMDs of the fruit farmers in Chanthaburi province of Thailand.

8.5 Profile of the fruit farmers

Based on the six key factors, together with the results presented in Chapter 6, the two types of fruit farmers (TM and HM users) can be profiled, in order to explain the differences between them.

8.5.1 Traditional marketing channel users

TM users are likely to have small fruit farms, approximately less than two hectares, with relatively small quantities of fruit production. In 2014, they produced approximately 13 tons of their main fruit and gained an average of 260,000 baht (1 NZD ≈ 25 baht) in sales. The TM users have generally completed their primary education with an average of 24 years' experience in fruit farming. Living in rural areas, the TM users are unaware of market opportunities, and they are not generally certified farmers in Q-GAP. They usually sell their produce at local markets at their convenience and receive relatively lower prices. Organising their lives around working and living on the farm, family members help in the farm growing fruit and other varieties of crops. Some of these farmers sell their produce, if they produce more than what they consume, while many of them want to increase production, in order to earn more income for their families. However, they are not market driven but product driven, so they make marketing decisions based on their need to sell their produce.

8.5.2 High-value marketing channel users

HM users generally have larger sized farms usually more than two hectares and they have more than one pick-up truck for their fruit farm businesses. They also produce relatively large quantities of their main fruit. In 2014, they produced their main fruit, approximately 26 tonnes, valued around 771,000 baht (1 NZD ≈ 25 baht). The HM users are generally better educated and more highly experienced. They have commonly completed secondary or tertiary education, and they have run their fruit farms for approximately 28 years, on average. They usually sell their produce for export or to modern trade buying agents, and many of them are also members of an agricultural cooperative. Fruit farming for them has gone beyond subsistence or focusing only on farm operations. Being aware of new opportunities, as a result of the changing external environment, they are the new entrepreneurs in agriculture in Thailand. They usually do not limit themselves with only working on the farm but they also attempt to gather other information outside the farm, and they always give precedence to market requirements. Therefore, they are market driven and usually produce fruit with the Q-GAP standard, which matches HM requirements.

7.7 Summary

This chapter analyses three sets of variables related to the internal environment, the external environment and farmers' goals. The results from factor analysis indicate there are nine underlying factors within these three sets of variables. There are two internal environment factors (business size and experience), three external factors (market requirements, government support, and production information), and goal factors (effectiveness, efficiency, sustainability, and self-sufficiency). In order to assess the effects of the nine underlying factors on the SMDs, binary logistic regression has been employed. The results reveal that six factors, i.e. business size, experience, market requirements, effectiveness, efficiency, and self-sufficiency, affect SMDs of the fruit farmers in Chanthaburi province of Thailand. These results also suggest that farmers who used TM channels generally have a greater focus on self-sufficiency and efficiency, meaning that they generally focus on their livelihood and farm operations. Alternatively, farmers who participate in HMs are generally explained by larger business size, greater experience at fruit farming, more perceived importance of market requirements and more focus on effectiveness, thus meaning that these farmers think more about business aspects.

CHAPTER NINE

9 Conclusions

9.1 Introduction

This final chapter summarises the results and concludes the overall thesis. Following this introduction, section two provides a summary of the research outcomes that correspond to the research objectives. Section three discusses the research results, linking with the literature reviewed. Section four describes the implications of the results for academics and stakeholders involved in the fruit industry in Thailand. Section five informs about the limitations of this study and some possible areas of future research are drawn in section six. This chapter comes to an end with the final conclusion.

9.2 The research objectives and results

Problem setting in this study was based on the transformation of agri-food marketing systems and its impact on Thai fruit farmers' strategic decisions, as to whether they should participate in high-value markets (HMs), which require the national Good Agricultural Practices (Q-GAP) certification. Based on general strategic management theory, strategic decisions aim to achieve economic goals under the influence of a business environment; however, strategic decisions in agriculture tend to depart from the norms of general strategic management theory. This is due to the special characteristics of agriculture, in addition to small-scale farm size, limited business knowledge, and farmers' goals that incorporate non-economic goals with economic goals in their decision making. Consequently, this study analyses the effects of factors including the business environment and farmers' goals on their strategic marketing decisions (SMDs), focusing on the fruit farmers in Chanthaburi province of Thailand.

The objectives of this study were as follows:

1) To review the agriculture sector and the fruit industry in Thailand and in Chanthaburi province in particular.

2) To describe and compare fruit farms and farmer characteristics between farmers who participate in traditional markets and high-value markets in Chanthaburi province of Thailand.
3) To determine factors which affect the strategic marketing decisions of fruit farmers in Chanthaburi province of Thailand.

9.2.1 Thailand's agriculture sector and fruit industry

A review of Thailand’s agriculture and fruit industry provided the background to this study. Thailand's agriculture sector is important to its economy, as it is a source of employment for approximately 32% (13 million) of the Thai labour force (39 million). It also contributes to both domestic consumption and export earnings (1.3 trillion baht in 2014) from various types of agricultural products. The most important agricultural products are rice, natural rubber, livestock, fish products, fruit and vegetables. Similar to most developing countries, Thailand has witnessed a transformation of agri-food systems over the past three decades and expanded its capacity to produce high-value agricultural products for export and also contribute to the development of modern retail chains.

Tropical fruit is a key high-value agricultural product of Thailand. Located in the tropical zone, Thailand produces a wide range of tropical fruit including durian, mangosteen and rambutan. Over the past 20 years, Thailand has become the world’s fourth largest producer of tropical fruit after India, the Philippines and Indonesia. Since 1999, tropical fruit production in Thailand has increased significantly, from 700 thousand tonnes in 1999 to 2.2 million tonnes in 2014. In response to the increasing demand for high-quality and safe fresh fruit, since 2003 Thailand has introduced the Q-GAP standard, in order to meet market requirements. Currently, Thailand is the world’s largest exporter of fresh tropical fruit, in terms of value, followed by Hong Kong, the US, Indonesia and Malaysia. The export destinations for Thai fruit are China, ASEAN countries, Hong Kong, the US and Japan. Current market channels for Thai fruit not only include TMs, but there are also some choices for HMs that focus on domestic modern retail chains and export markets. This transformation of the market has particularly occurred in Chanthaburi, which is the most important province of the country in terms of tropical fruit production. This province uses 72% of its agricultural area for growing fruit, particularly durian, mangosteen and rambutan, yielding 44%, 38% and 44% of overall production in Thailand, respectively.

9.2.2 Fruit farms and farmer characteristics

This study describes the characteristics of farmers (age, gender, education, fruit farm experience and income source) and those of the fruit farm business (fruit farm size, land ownership, main fruit grown and cooperative membership) in Chanthaburi province of Thailand. Furthermore, it compares the characteristics of fruit farmers who sell their produce at TMs with those who participate in HMs.

The majority of the fruit farmers in this study were male (67%) and middle aged (52 years old on average), who had completed primary or secondary education. The majority (91%) had worked more than ten years in fruit farming, and approximately 64% of the farmers earned their incomes only from fruit farming. They farmed many different types of fruit, including the three fruit crops studied: durian, mangosteen and rambutan. A vast majority (92%) fully owned their land for fruit farming. The average fruit farm size was 3.07 hectares. Approximately half of the farmers in this study had at least one of their fruit crops certified with Q-GAP. Some of the fruit farmers were agricultural cooperative members (29%), because they wanted to sell their produce to HMs. The fruit farmers in this study were classified into two grouped based on the types of markets they used: TM and HM users.

In comparison, there were some differences between the TM and HM users. The HM users were better educated having completed secondary and tertiary education, while the majority of TM users had only completed primary education. The HM users had greater experience in fruit farming; some of them also had other agricultural incomes or worked in other sectors for supplementary incomes, while the TM users depended mostly on their fruit income. Regarding farm characteristics, the HM users mainly grew durian and mangosteen on larger farm areas than the TM users, who usually grew mixed types of fruit. Moreover, the fruit farmers, who were cooperative members, were HM users rather than TM users. This is because agricultural cooperatives play a role in buying fruit from their members and coordinating with HM players, such as exporters and modern retail chains.

9.2.3 Factors affecting strategic marketing decisions

The results of this study reveal that: *business size* and *experience* are the key internal environment factors; *market requirements* are the key external environment factor; and *effectiveness*, *efficiency* and *self-sufficiency* are the key goal factors that affect the

SMDs of these fruit farmers in Chanthaburi province (see descriptions of these factors in Section 8.2.3). The first four factors and the last two factors affect the SMDs in opposite ways. Larger business size, longer experience, more focus on market requirements, and more focus on effectiveness lead to a higher probability for farmers to make the choice to use HM channels. Alternatively, more focus on efficiency and self-sufficiency lead to a higher probability of farmers choosing to use TM channels.

Based on these results, the fruit farmers who sold their produce at TMs had relatively smaller business sizes and less experience at fruit farming. They perceived market requirements as being less important and they focussed less on effectiveness. Focusing on self-sufficiency and efficiency, they usually organised their lives around living and working on the farm. Some of them considered growing fruit and other varieties of crops for consumption and sold the surplus to markets. Many of them put more effort into farm work and fruit production techniques, in order to improve production efficiency. In contrast, the fruit farmers who participated in HMs had relatively larger business sizes and greater experience at fruit farming. Focusing on market requirements and effectiveness, they usually thought more about business aspects and did not limit themselves to working on the farm, and often preferred to find a balance between on- and off-farm work.

The results of this study suggest fruit farmers need to think strategically, in order to achieve complex goals that comprise their own needs, market needs and environmental needs. In order to broaden market opportunities for fruit farmers, knowledge on effective SMDs is needed. The key factors affecting SMDs indicate that fruit farmers need to develop and think as strategists. 'Strategist-farmers' usually match their competence (e.g. experience) with market opportunities, in order to achieve complex goals. This study is based on the situation in which market requirements focus on the quality of fruit with regards to good agricultural practices. The results show that HM farmers usually thought market requirements were highly important, thus indicating that HM farmers were more involved in strategic thinking than TM farmers. However, as the business environment is not static, 'strategist-farmers' may not only view current situations, but also try to anticipate future directions of the fruit industry, which could provide new market opportunities and help them to meet complex goals. In addition, farmers need to think holistically, by finding a balance between economic and non-economic advantages, in order to develop their strategic thinking.

9.3 Discussion

Farmers' decisions in response to market transformation in the Thai fruit industry are considered as *strategic* decisions because they shape the direction of the farm enterprise (Guillaume et al., 2016). They also affect the farm enterprise over a long-term period because they bring about change in farming practices (Keshavarz & Karami, 2014; Robert et al., 2016) for perennial fruit crops (Cittadini et al., 2008). Significant factors that have affected the strategic marketing decisions (SMDs) of fruit farmers in Chanthaburi were found in all three of the hypothesised categories—the internal environment, the external environment, and the goals. These results also show the importance of the business environment (both internal and external) in agriculture and the complex set of farmers' goals (Bowers & Lane, 2009; Kay et al., 2012).

9.3.1 The internal environment

The results correspond to the resource-based viewpoint which focuses on internal resources, i.e. physical resources and human resources (David, 2011). The important physical and human resource which affect SMDs of the fruit farmers were *business size* and *experience*, respectively.

Business size

It is not surprising for the *business size* to be a positive significant factor, because the competitiveness of the HM depends mainly on efficient and effective supply chains (World Bank, 2006). According to Ruben et al. (2007), modern supply chains normally prefer large volumes of supplies, in order to reduce transaction costs. Generally, the HM not only buys quality produce, but also considers consistency and quantity of supplies to enhance cost efficiency (McCullough et al., 2008; Reardon et al., 2003). Correspondingly, this study's results indicate that the larger business size of the fruit farmers, the higher possibility to utilise HM channels.

The business-size factor was a combination of many farm characteristics, i.e. total farm size, fruit farm size, number of pick-up trucks used, fruit production and fruit sales. These characteristics indicated that business size was measured by both inputs (farm size and number of pick-up trucks) and outputs (fruit production and sales). This suggested that there were a number of ways to increase business size. Generally thinking, in order to increase business size, farmers usually increase their farm land to grow more fruit. As discussed in Section 7.4.2, fruit farmers in Thailand generally limit their farm business in term of land size due to lack of labour. Therefore, another way that can help them increase their business size is to increase productivity, so that they can obtain more tonnes of fruit production and sales. Furthermore, farmers can also increase their business size via collective actions, such as being members in an agricultural cooperative that can increase the volume of fruit to sell to HMs. Collective actions can be an effective way for coping with limitations due to small business size, because farmers can act collectively in negotiations, investments and other activity involvements (Oerlemans & Assouline, 2004). A large amount of research work has confirmed that collective actions can bring advantages for small-scale farmers, from HM access to marketing performance improvements (Barham & Chitemi, 2009; Kaganzi et al., 2009; Markelova et al., 2009).

Experience

The farmer experience factor is the combination between age and number of years in fruit farming. The results of this study show that the experience factor positively affects farmers' decisions to use HMs. Considerable recent work on marketing decisions in agriculture, such as Kersting and Wollni (2012); Tsourgiannis et al. (2008); Xaba and Masuku (2013), also found that farmer experience affected their market choice decisions. A study on HM access of Thai fruit and vegetable farmers by Kersting and Wollni (2012) points out that farmers, who had longer experience in fruit and vegetable production, were more likely to adopt the GlobalGAP standard and participate in HMs. In order to produce high quality horticultural products, skilled labour is needed (Schipmann & Qaim, 2011b). Farmers with longer experience usually have higher skills to produce fruit that matches HM requirements, rather than those with less experience. Apart from farming skills, farmers need ability in management, so that they can control the quality of their produce and work together within the supply chain. According to Nuthall (2009), the experience of the farmer is the major factor associated with managerial ability, because farmers with longer experience gain more opportunities to learn from their mistakes. In other words, experience provides the fruit farmers with the ability to gain more knowledge that can improve their farming skills and managerial ability.

Consistent with the effect of experience, the results of this study also indicate that HM users have generally achieved a higher level of education than TM users (as presented in Section 7.3.3). These results imply that both education and experience provide more knowledge for the fruit farmers, thus increasing their capability to participate in HMs. Based on these results, in order to gain more knowledge farmers need to take a long time to gain more experience. However, according to Crawford et al. (2015), farmers can also effectively gain more knowledge from other farmers, so-called peer-to-peer knowledge sharing, where newer farmers can learn from experienced farmers. This notion complements the way of collective actions discussed previously. Oerlemans and Assouline (2004) recommend that networking should be undertaken with respect to management of the group (e.g. balanced leadership and collective responsibility) and the collective learning process (e.g. learning to improve group performance). Furthermore, Tepic et al. (2012) point out that learning from others provides development of the ability for farmers to assimilate knowledge from the environment, which is positively related to innovativeness and profitability.

9.3.2 The external environment

The results also indicate that the external environment, i.e. *market requirements*, was an important factor affecting the SMDs. This is because information from the external environment is a common factor in identifying opportunities or diagnosing problems in a decision making process (Lewis, 2006), recognising changes in the strategic decision making process (Brouthers et al, 1998: Luffman, 1991), generating and evaluating alternative strategies in the strategic formulation process (David, 2011; Morden, 2007), as well as in the decision making process in agriculture (Kay et al., 2012; Ohlmer et al, 1998) and strategic planning in agriculture (Hofstrand, 2007). In the case of this study, the fruit farmers, who perceived the importance of a market requirement factor, led them to a specific farm trajectory and the implementation of good agricultural practices. This indicates that these farmers depended on strategic planning in their SMD process (Coteur et al., 2016; Le Gal et al., 2013; Robert et al., 2016).

Market requirements

The significant factor driving the fruit farmers to participate in HM was their perception on the importance of market requirements related to the Q-GAP certification, market growth for high-quality fruit, increasing health consciousness and satisfaction of fruit buyers. These market requirements now exist, as a result of the transformation of agri-food systems, which have had a dramatic impact on farmers' marketing decisions, especially in developing countries (Reardon et al., 2009; Swinnen, 2007). This study's results show that the fruit farmers, who perceive these market requirements as being highly important, were likely to participate in HM. This study corresponds to previous studies on increasing HM requirements on quality produce, such as Moustier et al. (2010); Narrod et al. (2009); Ruben et al. (2007); Tselempis et al. (2015).

Although market requirements on quality fruit have occurred for decades, many farmers in Chanthaburi province were not aware of the importance of this situation. According to the results presented in Section 7.4.4, the majority of the fruit farmers, who did not obtain the Q-GAP certification, reported a lack of information and knowledge about the certification process and they thought the certification did not provide any advantages for them. Conversely to non-certified farmers, certified farmers generally pointed out that the certification provided market opportunities for them. In order to increase perception towards the importance of market requirements, more valuable related information should be provided to farmers. Ohlmer et al. (1998) studied the decision making process of farmers and suggest that providing good information to farmers can help them to detect and define problems, in order to make decisions effectively. They also further suggest that facilitation for knowledge sharing, such as marketing clubs or group discussions can help farmers to enhance their perceptive ability for learning relevant concepts. This implies that by doing this, fruit farmers can also have opportunities to perceive market information and situations within the external environment.

9.3.3 The farmers' goals

Apart from strategic planning that relies on information from market requirements, these fruit farmers also made their SMDs based on strategic thinking that was reflected in their multiple goals, which are directed to whole-farm operations (Le Gal, et al., 2013; Murray-Prior & Wright, 2001). The farmers' goals in this study referred to a sense of 'mission' (in strategic management theory) that is related to values, attitudes and expectations of decision makers (David, 2011; Johnson & Scholes, 2002). The critical goal factors that affected the SMDs of the fruit farmers were *effectiveness*, *efficiency* and *self-sufficiency*.

Effectiveness

According to the results of this study, the fruit farmers who have a greater focus on effectiveness usually have updated information on market requirements, fruit prices and the marketing channels they use. In the general decision making process, farmers who continually update information tend to detect problems and eventually find suitable solutions for solving them (Ohlmer et al., 1998). In this study, the effectiveness factor focused on market information, in order to produce fruit with the quality that matched market requirements. Therefore, farming for those who have a greater focus on effectiveness is to satisfy market needs, so they produce fruit that meets the standard required, meaning they are focused on both marketing and production of fruit. The results of this study are consistent with previous research conducted by Brodt et al. (2006) and Fairweather and Keating (1994), which indicates that farmers whose marketing focus attention usually seeks a balance between on- and off-farm activities and who are motivated to 'think more business', are like general entrepreneurs. This implies that farmers who largely focus on effectiveness have a capability for strategic thinking, as they broaden their world views and include 'outside the farm' information in their SMD process.

The capability to think strategically for Thai fruit farmers is increasingly important in the current market situation. Strategic thinking is relevant to the processes of examining uncertainty within the external environment and solving strategic problems (Graetz, 2002; Moon, 2013). Strategic thinking allows a holistic view that considers the connection and interaction among individuals or components, by focusing on the whole picture, rather than many isolated parts (Comstock, 2015). This suggests that farmers, who would like to develop their strategic thinking, should think holistically. The fruit farmers who think strategically would be advised not to focus on only a single goal, but should find a balance between their multiple goals.

Efficiency

According to the results of this study, the fruit farmers who have a greater focus on efficiency have less probability of using HMs. This is because they commonly focused on working on their farm operation rather than off-farm activities, in order to find new or updated market information. Furthermore, they generally produced fruit without the Q-GAP certification, since they were unaware of market requirements. This confirms the results stated previously that the farmers, who did not obtain the certification, reported a lack of information and awareness of market requirements. Although the farmers who had a greater focus on efficiency generally dedicated themselves to farm operations by using production techniques for quality fruit, they usually sold their produce at TMs. According to the results in Section 7.5.2, the most important reason for farmers who sold at TMs was the 'convenience' attribute, whereas the most important reason for those who sold at HMs was the 'better price' attribute. This indicates that farmers, who largely focused on efficiency, intended to produce quality fruit, but generally they did not seek market opportunities to obtain better prices, but instead they would sell at markets at their own convenience.

Based on the results of this study, although greater focus on efficiency brought less probability of using HM channels, efficiency should always be promoted, as it adds benefits to the way of good production. In order to develop farmers to be more HM users, it is necessary to find a balance between the multiple goals of farmers through the integration of 'outside the farm' information with 'inside the farm' operation'.

Self-sufficiency

According to the results of this study, the fruit farmers who have a greater focus on self-sufficiency have less probability of using HM channels. Farming for these farmers is largely for livelihood, rather than making money. They farm as a family, and they do so for happiness and quality in their own lives, thus confirming Long (2013) viewpoint that some farmers value their lifestyle and see it as more important than making money for business. Thus, the farmers who focus on self-sufficiency do not generally produce fruit in order to serve market requirements. Traditionally, Thai farmers have generally relied on semi-subsistence farming. However, during Thailand’s fourth National Economic and Social Development Plan (NESDP) in 1977-1981, fruit production was promoted for increasing diversification and commercialisation of high-value agricultural products. Since that time, public policies have emphasised productivity and market improvement until the seventh NESDP that began in 2002. Later on and up to the present time, policies have included the issue of food safety, in response to market requirements (Srimanee & Routray, 2012). As a result of this development, it can be assumed that Thai farmers have currently changed their goals to focus more on economic advantages. Therefore, the efficiency and effectiveness factors have become dominant and replaced self-sufficiency dominance. However, fruit farmers who think strategically also need to think holistically, in order to find a balance between their multiple goals that focus on economic and non-economic advantages. This is because economic advantages can be used to accomplish non-economic advantages and vice versa (Farmar-Bowers & Lane, 2009; Gasson, 1973).

9.4 Implications

9.4.1 Implications for academics

This study provides an understanding of Thailand's agriculture and fruit industry and farmers' decisions, in response to the transformation of the marketing systems. The contributions of this study include the following:

- ***New conceptual model***

This study has developed a conceptual framework which emerged based on a thorough literature review on strategic decision making theory and its application to agriculture. It also further developed the framework to be a conceptual model. This newly established model has been empirically tested in Chanthaburi province of Thailand.

- ***Extended study on strategic decisions***

This study extends previous business research in strategic decisions and covers specific factors related to the context in agriculture and different types of farmers' goals. A large body of previous research on strategic decision can usually be found in other industries that usually focus on strategic decisions made by top management. However, strategic decisions made by family type farmers are different in this context, including farmers' goals, thus providing a different aspect on strategic decision making.

- ***Extended study on SMDs in agriculture***

This study extends previous knowledge on SMDs in agriculture by focusing on farmer level decisions. It is generally considered that marketing in agriculture is a process that occurs after the product leaves the farm gate, and that strategic decisions at farm level usually lay a greater emphasis on production planning. However, this study has focused on strategic decisions at farm level, in response to marketing issues, i.e. the transformation of agri-food marketing systems.

- ***Additional information on Thailand's agriculture sector and fruit industry***

This study presents a comprehensive review on Thailand's agriculture and fruit industry. It provides a better understanding of the agriculture sector in Thailand, which is moving towards more modernisation and internationalisation, together with trends of fruit production and exportation in Thailand and Chanthaburi province in particular.

- ***Additional information from Thailand as a developing country***

This study complements the literature on SMDs with evidence from Thailand as a developing country. Previous studies on SMDs in agriculture have focused mainly on developed countries. In the case of developing countries, previous studies have largely investigated whether HMs benefit or marginalise small-scale farmers, and the policy implications that consequently arise. To date, very few published studies have actually focused on SMDs of farmers in developing countries.

9.4.2 Implications for industry stakeholders

The results of this study have identified several recommendations for stakeholders involved in the fruit industry in Thailand: fruit farmers, agricultural cooperatives, HM fruit buyers and policy makers.

Fruit farmers

In the current market situation, strategic decisions for marketing fruit produce are not just a case of finding a market. Fruit farming in Thailand has gone beyond a livelihood basis, as a result of rapid growth in the fruit industry. As with most businesses, the fruit industry is now becoming increasingly complex and globally connected. In order to meet current market requirements, some farmers think more than just 'make and sell' and they are making decisions based on market requirements, so that they can participate in HMs. However, the majority of fruit farmers in Chanthaburi province are small-scale and they dedicate themselves to farm work, and use TM channels for their sales. The results of this study can provide these farmers with a better understanding of how to participate in HMs. These results suggest that, in order to participate in HMs, farmers need to find ways to:

- increase their business size, e.g. increase productivity and become a member of an agricultural cooperative for increased market power;

- learn from others' experiences, such as leading farmers, in order to establish good farming practices;
- balance on- and off-farm work, in order to obtain market information and establish good market relationships

Agricultural cooperatives

Agricultural cooperatives in Chanthaburi province play an important role in connecting fruit farmers with HMs. Agricultural cooperatives perform collective actions that reduce the limitation of fruit farmers, due to their small business size. Cooperatives are farmer organisations that increase farmers' bargaining power. In addition, they encourage knowledge sharing among members. Accordingly, agricultural cooperatives can promote participation in HMs among members and also:

- promote more fruit farmers to be members, because currently only one third of farmers are members of cooperatives;
- promote standard farming practices that match HM requirements;
- develop product innovation, for example, effective post-harvest, storage and packaging systems that can best keep the quality of fruit. so it matches HM requirements. Value added products, such as frozen, dried and other processed fruit should be further developed;
- strengthen connections with HMs together with developing new markets;
- provide market information and encourage knowledge sharing among members.

HM fruit buyers

HM fruit buyers ideally prefer sourcing fruit from suppliers who provide good quality, quantity and consistency of produce, with lowest transaction costs. However, sourcing fruit from individual small-scale farmers may not meet these preferences. The results of this study imply that purchasing fruit for HMs is beyond a transactional relationship, as many farmers need some assistance to meet HM requirements. Basically, it is suggested that buyers should purchase fruit from agricultural cooperatives, in order to reduce transaction costs. Furthermore, buyers should establish relationships with the agricultural cooperatives and provide support (e.g. innovation, technologies, quality standards and financial assistance), in order to help their members produce high quality fruit. This support may include:

- help to encourage members to produce fruit with standard farming practices;
- help to improve members' knowledge and experience in quality fruit production by facilitating them to learn from experts;
- cooperation with planning and supply chain coordination for fruit marketing, such as packaging and brand building;
- sharing information and benefits between buyers and agricultural cooperatives;
- financial support for members, so they can adopt new technologies and achieve high quality fruit production.

Policy makers

The results of this study also have some recommendations for policy makers. Policies should be designed to promote:

- standard farming practices in fruit production, by improving the Q-GAP certification process to be more efficient, thus increasing the number of certified fruit farmers;
- business expansion of agricultural cooperatives, by increasing cooperative networks, financial support for post-harvest, storage, packaging and other logistics systems and fruit product development;
- international market development, especially export markets in high income countries, by encouraging farmers to produce fruit that meets international standards;
- special market development for farmers, who do not focus on meeting standards for mainstream markets, but who offer locally-grown fruit that guarantees quality by trust or branding of local communities.

9.5 Limitations of the study

There were a number of limitations identified in this study. They are summarised as follows:

- This study employed a quantitative cross-sectional survey approach and consequently, it resulted in data that informs only a certain point of time; however, the business environment is dynamic, and farmers' goals can change over time.

- This study applied purposive sampling to select the respondents in the sample. As purposive sampling does not apply a random process on the probability basis, the generalisability of the research results is restricted.
- The research sample used in this study is relatively small in size (216 respondents), thus limiting options for statistical analysis. In particular, when research is involved with a great number of variables, it is necessary to increase the sample size, in order to meet statistical assumptions.
- In this study, the face-to-face interview method was employed for data collection, as it worked well with long and complex questionnaires. However, the face-to-face interview is a time consuming method. Therefore, it was not feasible for this doctoral study to collect data from a larger number of respondents.

9.6 Future research

This study has identified factors affecting SMDs of fruit farmers in Chanthaburi province of Thailand. In future, repetitive studies should also be conducted in other fruit producer provinces in Thailand, or other developing countries. Since the transformation of marketing systems has impacted on agriculture in Thailand and SMDs exist in other farming sectors, similar research that investigates SMDs of other farming sectors in Thailand would be valuable. Furthermore, future research that covers other decision choices, such as direct marketing channels, for example farmer markets and community supported agriculture, could provide a wider understanding of SMDs in agriculture.

Since the business environment and farmers' goals change over time, a longitudinal study in the future could provide information regarding how factors affecting SMDs vary and it could ascertain whether farmers change from one decision to another, when either the business environment or their goals change. Apart from the quantitative approach, future research should also utilise other research approaches that include qualitative research (e.g. case studies), or mixed methods, in order to enhance an in-depth understanding of SMDs in agriculture. Moreover, future research on farmer networking, knowledge sharing and collective actions, such as agricultural cooperatives, would be advantageous for development of the strategic capabilities of farmers, as these activities can assist farmers to minimise their limitations due to business size, knowledge and experience, so they can then fulfil their complex goals.

9.7 Final conclusion

This study has analysed the strategic marketing decisions of fruit farmers in Chanthaburi province of Thailand. It found that, in the situation of agri-food market transformation, there are key strategic factors that have led some farmers to participate in high-value marketing channels, compared to others who continue using traditional marketing channels. The research determined that participation in high-value markets is positively related to business size, experience, perceived importance of market requirements, and farmers' goals in regards to effectiveness. These results suggest that, in order to further develop the Thai fruit industry which is characterised by small-scale farmers, these positive factors need to be promoted. Nevertheless, small sized farms need to improve their productivity and increase their business capacity, via collective action that allows them to benefit from collective learning with experienced farmers, so they can update market information and set correct goals in regards to fruit industry development. However, it has to be noted that some farmers may have different goals that reflect their lifestyles. These farmers aim to achieve their production goals by focusing on efficiency, while others may desire a simpler lifestyle by focusing their life on self-sufficiency. This implies that fruit produced from these types of farmers needs to be promoted in alternative ways. Overall, based on the key strategic factors found, this study highlights ways to develop the strategic capability of farmers as important stakeholders in the fruit industry in Thailand.

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APPENDICES

Appendix A-1: Pilot questionnaire

MASSEY UNIVERSITY

Institute of Agriculture and Environment, Collage of Sciences

Survey

Strategic decisions and market linkages of fruit farmer in Thailand

Part 1: General farm and farmer characteristics

1. What is your age? ....years
2. What is your level of education?
   ☐ Below primary ☐ Primary ☐ Secondary ☐ Tertiary
3. Approximately, how many years have you involved in farming? ....years
4. What is the total size of your farm? ....rais
5. What is the type of land ownership for your fruit farming?
   ☐ Own land ☐ Rented land ☐ Both own and rented lands
6. How many percents does your income come from fruit farming? ....%
7. What are the fruit crops you are growing?
   ☐ Durian ☐ Mangosteen ☐ Rambutan
   ☐ Others (please specify) ....
8. What is the quantity of each crop you produced this year?

Fruit crop	Production (tons)
Durian	
Mangosteen	
Rambutan	
Others	

9. How much income did you obtain from each fruit crop this year?

Fruit crop	Income (baht)
Durian	
Mangosteen	
Rambutan	
Others	

10. Do you currently have certification of the Department of Agriculture for your main fruit crop? Why?
    ☐ Yes Reason .... (Go to question 11)
    ☐ No Reason .... (Go to question 12)
11. How many years have you obtained certification for your main fruit crop?
    ☐ Less than 1 year ☐ 1-2 years ☐ 3-4 years ☐ 5 years and above
    (Go to question 13)

12. Are you planning to obtain this certification within the next five years? Why?
    ☐ Yes Reason .... (Go to question 13)
    ☐ No Reason .... (Go to question 14)

- 1 -

13. Do you intend to continue obtaining this certification in the next five year? Why?

☐ Yes Reason ....

☐ No Reason ....

Any other comments on part 1 ....

....

....

....

Part 2: Goal statements

14. To what extent do you orientate your farm-business operation toward each of the following statements?

Goal statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. You continually update the production techniques in your fruit farm.	1	2	3	4	5
2. A successful farmer focuses on production, i.e. farm work, and is not on activities outside the farm.	1	2	3	4	5
3. You strive to produce the highest quality fruit in your district.	1	2	3	4	5
4. You grow specialty fruit crops, e.g. different varieties and exotic fruit, more than other farms in your district.	1	2	3	4	5
5. You grow fruit crops that best meet customer requirements.	1	2	3	4	5
6. You have detailed knowledge of the distribution channels your produce move through after it leaves the farm.	1	2	3	4	5
7. Meeting with other farmers is important to find new market opportunities.	1	2	3	4	5
8. You have the lowest possible input cost in general.	1	2	3	4	5
9. You aware of exact costs and returns for any fruit crops you produce.	1	2	3	4	5
10. Your goal is to diversify your assets by having off-farm investments.	1	2	3	4	5
11. You are satisfied with the current level of development on your farm.	1	2	3	4	5
12. Fertilizers and pesticides are most necessary for your fruit farm.	1	2	3	4	5
13. You consider a decrease in the use of agricultural chemicals would improve the living conditions on the farm.	1	2	3	4	5
14. You are doing everything you can to be environmentally aware and conserve the land you farm.	1	2	3	4	5
15. You think that off-farm activities provide opportunities for social interaction.	1	2	3	4	5
16. You want to make enough money to maintain a balanced lifestyle.	1	2	3	4	5
17. Your ultimate goal is to generate a secure, adequate income to meet the needs of your family.	1	2	3	4	5
18. You think that reducing your work load will help you improve the quality of your life.	1	2	3	4	5
19. The best part of farming is having your family working alongside you.	1	2	3	4	5
20. You enjoy farm work because it makes you feel happy.	1	2	3	4	5

Any other comments on part 2 ....
....
....
....

Part 3: The external environment

15. Please indicate the extent of importance do the following statements positively impact on your fruit farm business'.

External environment statement	Not important	Little important	Important	Very important	Extremely important
Micro-environment					
1. Satisfaction of your fruit buyers such as collectors, exporters or cooperatives etc.	1	2	3	4	5
2. A decrease of fruit production from other competitor fruit farmers	1	2	3	4	5
3. Knowledge from Input suppliers such as using of fertilizers and agricultural chemicals	1	2	3	4	5
Macro-environment					
4. Support from government in financing the fruit farming	1	2	3	4	5
5. Support from government in fruit production	1	2	3	4	5
6. Support from government in fruit market promotion	1	2	3	4	5
7. Stability of fruit prices	1	2	3	4	5
8. Market growth for high quality fruit	1	2	3	4	5
9. Increasing fruit demands from urban population	1	2	3	4	5
10. Market requirements on food safety	1	2	3	4	5
11. Advancement of production technologies	1	2	3	4	5
12. Advancement of logistics technologies	1	2	3	4	5
13. Advancement of information and communication technologies	1	2	3	4	5
14. Information about fruit crop diseases	1	2	3	4	5
15. Information about variation of the weather	1	2	3	4	5

Any other comments on part 3 ....
....
....
....

Part 4: Current marketing strategies

16. What are the markets for your main fruit crop?

☐ Collectors ☐ Exporters ☐ Cooperatives ☐ Processors

☐ Government agencies ☐ Others (please specify) ....

17. What is the main market for your main fruit crop? (Please indicate approximate volume you supplied this year)

The main fruit crop	The main market	Volume (tons)

18. What are the reasons that make you choose this main market? (Please order the most three important reasons if possible.)

Reasons	Rank (3 orders)
a. Trust	
b. Personal relationship (e.g. relatives and friends)	
c. Fruit price premium	
d. Standard price by grading	
e. Convenience to sell (e.g. lots of buyers and short distance)	
f. Ease of market access (do not have many difficult conditions)	
g. Harvesting service	
h. Other services, e.g. market information	
i. Other reasons (please specify)	

19. What are major constraints that you are facing with the main market? (Please order the most three important reasons if possible.)

Reasons	Rank (3 orders)
a. Unreliable prices offered	
b. Lowering the price	
c. Stringent standard requirements	
d. Inconvenience to sell (e.g. long distance to the market)	
e. Difficulty of market access (e.g. lots of conditions)	
f. No harvesting service	
g. Untidy or damage after harvesting service	
h. Other reasons (please specify)	

20. Who is harvesting your main fruit crop?
☐ Yourself ☐ Buyers (such as collectors or exporters) ☐ Both (uncertainly)
21. Who is transporting of your main fruit crop to the main market?
☐ Yourself ☐ Buyers (such as collectors or exporters) ☐ Both (uncertainly)
22. What is the transportation package you usually use for your main fruit crop?
☐ No transportation package ☐ Large basket ☐ Perforated plastic container
☐ Others (please specify) ....
23. To what extent are you satisfied with the main market that you currently use?

The main market	Totally unsatisfied	Unsatisfied	Neutral	Satisfied	Totally Satisfied
	1	2	3	4	5

24. How is your main fruit crop usually priced for its main market?
☐ Use market price ☐ One-off pricing negotiation relying on mixed grad quality
☐ Standard graded fruit price ☐ Contractual arrangement price
☐ Others (please specify).....................................

Any other comments on part 4 ....
....
....
....

Part 5: Strategic marketing decisions

25. Are you planning to continue your fruit farm business in the next five to ten years?
    ☐ Yes
    ☐ No Why not? ....(*FINISHED*
26. What is the main fruit crop that you intend to grow the most in the next five to ten years?
    ☐ The existing main fruit crop
        Why? ....
    ☐ A new main fruit crop (specify) ....
        Why? ....
27. What is the main market that you intend to use in the next five to ten years?
    ☐ The existing main market
        Why? ....
    ☐ A new main market (specify) ....
        Why? ....

28. Could you please give some opinions on how to develop your fruit farm business as a whole?

....
....
....

Any other comments on part 5 ....
....
....
....

Thank you for giving information for the survey. Your time and effort is very much appreciated.

Appendix A-2: Pre-testing questionnaire

MASSEY UNIVERSITY
NEW ZEALAND
Institute of Agriculture and Environment, Collage of Sciences

Survey

Strategic marketing decisions in agriculture: A study of fruit farmers in Thailand

Part 1: General farm and farmer characteristics

1. What is your age? .... years
2. Gender: ☐ Male ☐ Female
3. What is your level of education?
   ☐ Below primary ☐ Primary ☐ Secondary ☐ Tertiary
4. Approximately, how many years have you been involved with fruit farming? ....years
5. Apart from fruit farming, do you have any other income sources?
   ☐ Yes ☐ No (>Q7)
   If 'Yes' what are these kinds of work?
   ☐ Agricultural related work (please specify) ....
   ☐ Non-agricultural related work (please specify) ....
6. Which income source is highest?
   ☐ Fruit farming ....% ☐ Agricultural rerated work ....% ☐ Non-agricultural related work ....%
7. How many people live in your household? ....persons
8. How many people in your household are working full time on your fruit farm? ....persons
9. Who are involved with most important decisions in your fruit farm?
   ☐ Only yourself ☐ Your parents ☐ Your spouse ☐ Your children ☐ Your relatives
   ☐ Others (please specify) ....
10. What is your total farm land? .... rais
11. What is the total size of your fruit farm? .... rais
12. What is the type of land ownership for your fruit farming?
    ☐ Own land .... rais ☐ Rented land .... rais ☐ Land owned by public .... rais
13. What are the different types of fruit crops that you are growing?
    ☐ Durian ☐ Mangosteen ☐ Rambutan ☐ Longkong ☐ Salak
    ☐ Longkan ☐ Banana ☐ Others (please specify) ....
14. What are the sales of your main fruit crops this year (2014)?

The main fruit crop	Area (rais)	Production (tons)	Price (baht)
Durian			
Mangosteen			
Rambutan			

15. Based on the production in question 14, do you use your produce for consumption? (Please indicate the volume that you consume, the volume for sales in kilogram)

Fruit crop	Consumption (kg)	Sales (kg)
☐ Durian		
☐ Mangosteen		
☐ Rambutan		
☐		
☐		

16. Do you currently have certification from the Department of Agriculture for your main fruit crops?
☐ Yes ☐ No Why not? .... (>Q18)
If 'Yes' which crops that you have certification? ....

17. When did you receive your first certification for each crop? (please indicate reasons that you needed certification)

The main fruit crop	The first year of certification	Reasons
Durian		
Mangosteen		
Rambutan		

18. Are you planning to obtain this certification within the next five years?
☐ Yes Why? ....
☐ No Why not? ....

19. Are you a member in an agricultural cooperative?
☐ Yes (please specify the name) .... ☐ No
If 'Yes', when did you become a member? Year ....

20. What types of vehicles are you using for your fruit farm business? (Please indicate the number of each type)
☐ Pick-up .... vehicles ☐ Truck .... vehicles ☐ Motorcycle with trailer .... vehicles
☐ Other types (specify) .... vehicles ☐ Do not use

Any other comments on part 1 ....
....
....

Part 2: Current marketing strategies

21. What are the markets for your fruit crops? (For each fruit crop, please indicate approximate volume you supplied last year)

Market	Fruit crop				
	Durian	Mangosteen	Rambutan		
Traditional markets					
• Collectors					
• Wholesale markets					
• Street markets					
• Local markets					
High-value markets					
• Cooperatives					
• Buying agents for HM					
• Exporters					
• Processors					

22. What is the main market that you are using for each fruit crop? (Please indicate advantages and limitations of the main market)

Fruit crop	Main market	Volume (tons)	Advantage	Limitation
Durian				
Mangosteen				
Rambutan				

23. To what extent are you satisfied with the following attributes of the main market that you currently use? (Please order the three most important attributes that make you choose this main market)

Attribute	Poor	Fair	Good	Very good	Excellent	Rank (3 orders)
1) Prices offered	1	2	3	4	5	
2) Speed of payment	1	2	3	4	5	
3) Method of payment	1	2	3	4	5	
4) Convenience	1	2	3	4	5	
5) Trust	1	2	3	4	5	
6) Information sharing	1	2	3	4	5	
Overall	1	2	3	4	5	

24. Are you facing any problems with your main market? ☐ Yes ☐ No

If 'Yes' please indicate those problems.

1) ....

2) ....

3) ....

25. Are you doing any packaging of your main fruit crop on farm?

☐ Yes ☐ No

If 'Yes' what types of packaging you are doing on farm? (please specify) ....

26. How do you transport your main fruit produce to markets?

☐ Your own vehicles ○ Pick-up ○ Truck ○ Motorcycle with trailer ○ Others

☐ Rent vehicles

☐ Buyers come to pick up your produce

27. How your main fruit crop is usually priced in the main market?

☐ Farm gate price ☐ Market price ☐ Contractual arrangement price

☐ Others (please specify)..........

Any other comments on part 2 ....

....

....

Part 3: Goal statements

28. To what extent do you orientate your farm-business operation toward each of the following statements?

	Goal statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	Production goals					
1)	You continually update the production techniques in your fruit farm.	1	2	3	4	5
2)	A successful farmer focuses on production, i.e. farm work, and is not on activities outside the farm.	1	2	3	4	5
3)	You strive to produce the highest quality fruit in your district.	1	2	3	4	5
4)	You grow specialty fruit crops, e.g. different varieties or exotic fruit, more than other farms in your district.	1	2	3	4	5
	Marketing goals					
5)	You grow fruit crops that best meet customer requirements.	1	2	3	4	5
6)	You receive a fair price for your fruit crops	1	2	3	4	5
7)	You know where your produce go after it leaves the farm.	1	2	3	4	5
8)	You usually meet other people in order to find market information.	1	2	3	4	5

Goal statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Financial goals					
9) You have the lowest possible input cost in general.	1	2	3	4	5
10) You are aware of the exact return for any fruit crop you produce.	1	2	3	4	5
11) Your goal is to diversify your assets by having other investments apart from fruit farm.	1	2	3	4	5
12) You are satisfied with the current level of development on your farm	1	2	3	4	5
Environmental goals					
13) Fertilizers and pesticides are most necessary for your fruit farming.	1	2	3	4	5
14) You consider a decrease in the use of agricultural chemicals would improve the living conditions on the farm.	1	2	3	4	5
15) You are doing everything you can to be environmentally aware and conserve the land you farm.	1	2	3	4	5
Personal and family goals					
16) Your ultimate goal is to generate a secure, enough income to meet the needs of your family.	1	2	3	4	5
17) You think that reducing your work load will help you improve the quality of your life.	1	2	3	4	5
18) The best part of farming is having your family working alongside you.	1	2	3	4	5
19) You enjoy farm work because it makes you feel happy.	1	2	3	4	5

Any other comments on part 1 ....
....
....

Part 4: The external environment

29. Please indicate how importance of the following factors ***positively*** impacts on your fruit farm business.

Factor	Not important	Little important	Important	Very important	Extremely important	Do not know
Macroenvironment						
Political factors						
1) Political stability	1	2	3	4	5	
2) Good condition of road infrastructure	1	2	3	4	5	
3) Support from government banks in financing the fruit farming	1	2	3	4	5	
4) Support from government in fruit production	1	2	3	4	5	
5) Support from government in fruit market promotion	1	2	3	4	5	
Economic factors						
6) Low interest rate for agricultural loan	1	2	3	4	5	
7) Stability of fruit prices	1	2	3	4	5	
8) Market growth for high quality fruit	1	2	3	4	5	
Social factors						
9) Cheap labour for fruit farming	1	2	3	4	5	
10) Increasing fruit demand from urban population	1	2	3	4	5	
11) Increasing health consciousness	1	2	3	4	5	
12) Market requirements on food safety	1	2	3	4	5	

Factor	Not important	Little important	Important	Very important	Extremely important	Do not know
Technological factors						
13) Advancement of production technologies	1	2	3	4	5	
14) Advancement of information and communication technologies	1	2	3	4	5	
15) Advancement of logistics technologies	1	2	3	4	5	
Environmental factors						
16) Information about fruit crop diseases	1	2	3	4	5	
17) Information about variation of the weather	1	2	3	4	5	
Microenvironment						
18) Satisfaction of your fruit buyers such as collectors, exporters or cooperatives etc.	1	2	3	4	5	
19) A decrease of fruit production from competitor fruit farmers	1	2	3	4	5	
20) Shared knowledge from other fruit farmers such as fruit farming techniques	1	2	3	4	5	
21) Success of Farmers' cooperatives	1	2	3	4	5	
22) Knowledge from input suppliers , e.g. using of fertilizers or other agricultural chemicals	1	2	3	4	5	

Part 5: Strategic marketing decisions

30. Are you planning to continue your fruit farm business in the next five years?
    - ☐ Yes
    - ☐ No Why not? .... *(>Q31)*
31. What is the main fruit crop that you intend to grow the most in the next five years?
    - ☐ The existing main fruit crop
      Why? ....
    - ☐ A new main fruit crop (specify) ....
      Why? ....
32. What is the main market that you intend to use in the next five years?
    - ☐ The existing main market
      Why? ....
    - ☐ A new main market (specify) ....
      Why? ....
33. Any other comments?
    ....
    ....

Thank you for cooperation. Your time and effort is highly appreciated.

Appendix A-3: Main survey questionnaire

MASSEY UNIVERSITY
NEW ZEALAND
Institute of Agriculture and Environment, Collage of Sciences

Survey

Strategic marketing decisions in agriculture: A study of fruit farmers in Thailand

Part 1: General farm and farmer characteristics

1. What is your age? .... years
2. Gender: ☐ Male ☐ Female
3. What is your level of education?
   ☐ Below primary ☐ Primary ☐ Secondary ☐ Tertiary
4. Approximately, how many years have you been involved with fruit farming? ....years
5. Apart from fruit farming, do you have any other income sources?
   ☐ Yes ☐ No (>Q7)
   If 'Yes' what are these kinds of work?
   ☐ Agricultural related work (please specify) ....
   ☐ Non-agricultural related work (please specify) ....
6. Which income source is highest?
   ☐ Fruit farming ....% ☐ Agricultural rerated work ....% ☐ Non-agricultural related work ....%
7. How many people live in your household? ....persons
8. How many people in your household are working full time on your fruit farm? ....persons
9. Who are involved with most important decisions in your fruit farm?
   ☐ Only yourself ☐ Your parents ☐ Your spouse ☐ Your children ☐ Your relatives
   ☐ Others (please specify) ....
10. What is your total land? .... rais
11. What is the total size of your fruit farm? .... rais
12. What is the type of land ownership for your fruit farming? ☐ Own land .... rais ☐ Rented land .... rais
13. What are the different types of fruit crops that you are growing?
    ☐ Durian ☐ Mangosteen ☐ Rambutan ☐ Longkong ☐ Salak
    ☐ Longkan ☐ Banana ☐ Others (please specify) ....
14. What are the sales of your main fruit crops this year (2014)?

The main fruit crop	Area (rais)	Production (tons)	Price (baht)	Sales (baht)
Durian				
Mangosteen				
Rambutan				

15. Do you currently have certification from the Department of Agriculture for your main fruit crops?
    ☐ Yes ☐ No Why not? .... (>Q17)
    If 'Yes' which crops in Q14 that you have certification? ....
16. When did you receive your first certification for each crop? (please indicate reasons that you needed certification)

The main fruit crop	The first year of certification	Reasons
Durian		
Mangosteen		
Rambutan		

17. Are you planning to obtain this certification within the next five years?
☐ Yes Why? ....
☐ No Why not? ....
18. Are you a member in an agricultural cooperative?
☐ Yes (please specify the name) .... ☐ No
If 'Yes', when did you become a member? Year ....
19. What types of vehicles are you using for your fruit farm business? (Please indicate the number of each type)
☐ Pick-up .... vehicles ☐ Truck .... vehicles ☐ Motorcycle with trailer .... vehicles
☐ Other types (specify) .... vehicles ☐ Do not use

Part 2: Current marketing strategies

20. What are the markets for your main fruit crop that yielded the most sales this year?

Traditional markets		***High-value markets***	
☐ Collectors	☐ Wholesale markets	☐ Cooperatives	☐ Buying agents
☐ Street markets	☐ local markets	☐ Exporters	☐ Processors

☐ Others (please specify) ....
21. What is the main market for your main fruit crop? (Please indicate approximate volume you supplied this year)

The main fruit crop	The main market	Volume (tons)

22. To what extent are you satisfied with the following attributes of the main market that you currently use? (Please order the three most important attributes that make you choose this main market)

Attribute	Poor	Fair	Good	Very good	Excellent	Rank (3 orders)
1) Prices offered	1	2	3	4	5	
2) Speed of payment	1	2	3	4	5	
3) Method of payment	1	2	3	4	5	
4) Convenience	1	2	3	4	5	
5) Trust	1	2	3	4	5	
6) Information sharing	1	2	3	4	5	
7) Services (e.g. harvesting, grading)	1	2	3	4	5	
8) Others	1	2	3	4	5	
9) Overall	1	2	3	4	5	

23. Are you facing any problems with your main market? ☐ Yes ☐ No
If 'Yes' please indicate those problems.
1) ....
2) ....
3) ....
24. Who is harvesting your main fruit crop?
☐ Yourself ☐ Buyers (such as collectors or exporters) ☐ Both yourself and buyers
25. Who is transporting your main fruit crop to the main market?
☐ Yourself ☐ Buyers (such as collectors or exporters) ☐ Both yourself and buyers
26. Are you doing any packaging of your main fruit crop on farm?
☐ Yes ☐ No
If 'Yes' what types of packaging you are doing on farm? (please specify) ....
27. How your main fruit crop is usually priced in the main market?
☐ Farm gate price ☐ Market price ☐ Contractual arrangement price
☐ Others (please specify)...

Part 3: Goal statements

28. To what extent do you orientate your farm-business operation toward each of the following statements?

Goal statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1) You continually update the production techniques on your fruit farm.	1	2	3	4	5
2) A successful farmer focuses on production, i.e. farm work, and not on activities outside the farm.	1	2	3	4	5
3) You strive to produce the highest quality fruit in your district.	1	2	3	4	5
4) You grow specialty fruit crops, e.g. different varieties or exotic fruit, more than other farms in your district.	1	2	3	4	5
5) You grow fruit crops that best meet customer requirements.	1	2	3	4	5
6) You receive a fair price for your fruit crops	1	2	3	4	5
7) You know where your produce goes after it leaves the farm.	1	2	3	4	5
8) You usually meet other people in order to find new market opportunities.	1	2	3	4	5
9) You always focus on the best quality of the inputs you use rather than the lowest cost of buying.	1	2	3	4	5
10) You are aware of the exact profit for any fruit crop you produce.	1	2	3	4	5
11) Your goal is to diversify your assets by having off-farm investments.	1	2	3	4	5
12) You are satisfied with the current level of development on your farm	1	2	3	4	5
13) Fertilizers and pesticides are the most necessary item for your fruit farming.	1	2	3	4	5
14) You consider a decrease in the use of agricultural chemicals would improve the living conditions on the farm.	1	2	3	4	5
15) You are doing everything you can to be environmentally aware and conserve the land you farm.	1	2	3	4	5
16) Your ultimate goal is to generate a secure, sufficient level of income to meet the needs of your family.	1	2	3	4	5
17) You think that reducing your work load will help you improve the quality of your life.	1	2	3	4	5
18) The best part of farming is having your family working alongside you.	1	2	3	4	5
19) You enjoy farm work because it makes you feel happy.	1	2	3	4	5

Part 4: The external environment

29. Please indicate how importance of the following factors ***positively*** impacts on your fruit farm business.

Factor	Not important	Little important	Important	Very important	Extremely important	Do not know
1) Political stability	1	2	3	4	5	
2) Good condition of road infrastructure	1	2	3	4	5	
3) Support from government banks for financing the fruit farm business	1	2	3	4	5	
4) Support from government agencies for fruit production	1	2	3	4	5	
5) Support from government agencies for fruit market promotion	1	2	3	4	5	
6) Low interest rate for agricultural loans	1	2	3	4	5	
7) Stability of fruit prices	1	2	3	4	5	
8) Market growth for high quality fruit	1	2	3	4	5	
9) Cheap labour force for fruit farming	1	2	3	4	5	
10) Increasing fruit demand from urban population	1	2	3	4	5	

Factor	Not important	Little important	Important	Very important	Extremely important	Do not know
11) Increasing health consciousness for fruit consumption	1	2	3	4	5	
12) Market requirements for food safety including Q-GAP standard	1	2	3	4	5	
13) Advancement of fruit production technologies, e.g. plant breeding, biotechnology, and pest management technologies	1	2	3	4	5	
14) Advancement of information and communication technologies	1	2	3	4	5	
15) Advancement of logistics technologies, e.g. packaging, transportation and storage technologies	1	2	3	4	5	
16) Timely information on fruit crop diseases	1	2	3	4	5	
17) Timely information on variations of weather	1	2	3	4	5	
18) Satisfaction of your fruit buyers, such as collectors, exporters or cooperatives etc.	1	2	3	4	5	
19) Decrease of fruit production from fruit farmers in other provinces	1	2	3	4	5	
20) Shared knowledge from other fruit farmers such as fruit farming techniques	1	2	3	4	5	
21) Success of Farmers' cooperatives	1	2	3	4	5	
22) Consultation of input suppliers about application of fertilizers or other agricultural chemicals	1	2	3	4	5	

Part 5: Strategic marketing decisions

30. Are you planning to continue your fruit farm business in the next five to ten years?
    ☐ Yes
    ☐ No Why not? .... (*>Q33*)
31. What is the main fruit crop that you intend to grow the most in the next five to ten years?
    ☐ The existing main fruit crop
    Why? ....
    ☐ A new main fruit crop (specify) ....
    Why? ....
32. What is the main market that you intend to use in the next five to ten years?
    ☐ The existing main market
    Why? ....
    ☐ A new main market (specify) ....
    Why? ....
33. Any other comments?
    ....
    ....

Thank you for cooperation. Your time and effort is highly appreciated.

Appendix B: Research ethics approval

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA

3 June 2014

Bhawat Chiamjinnawat
28 Church Street
Awapuni
PALMERSTON NORTH 4412

Dear Bhawat

Re: Analysis of Strategic Decisions and Market Linkages of Fruit Farmers in Thailand

Thank you for your Low Risk Notification which was received on 27 May 2014.

Your project has been recorded on the Low Risk Database which is reported in the Annual Report of the Massey University Human Ethics Committees.

You are reminded that staff researchers and supervisors are fully responsible for ensuring that the information in the low risk notification has met the requirements and guidelines for submission of a low risk notification.

The low risk notification for this project is valid for a maximum of three years.

Please notify me if situations subsequently occur which cause you to reconsider your initial ethical analysis that it is safe to proceed without approval by one of the University's Human Ethics Committees.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

A reminder to include the following statement on all public documents:

> *"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research.*
>
> *If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Professor John O'Neill, Director (Research Ethics), telephone 06 350 5249, e-mail humanethics@massey.ac.nz".*

Please note that if a sponsoring organisation, funding authority or a journal in which you wish to publish requires evidence of committee approval (with an approval number), you will have to provide a full application to one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

Yours sincerely

J. O'Neill

John G O'Neill (Professor)
Chair, Human Ethics Chairs' Committee and
Director (Research Ethics)

cc Dr Elena Garnevska
Institute of Agriculture and Environment
PN433

Prof Peter Kemp, HoI
Institute of Agriculture and Environment
PN433

Assoc Prof Blessing Maumbe
Institute of Agriculture and Environment
PN433

Massey University Human Ethics Committee
Accredited by the Health Research Council

Research Ethics Office, Research and Enterprise
Massey University, Private Bag 11222, Palmerston North 4442, New Zealand **T** 06 3505573; 06 3505575 **F** 06 350 5622
E humanethics@massey.ac.nz; animalethics@massey.ac.nz; gtc@massey.ac.nz **www.massey.ac.nz**

Appendix C-1: Fruit farm size and level of education

Level of education	fruit farm size (hectares)						Total	
	< 2.00		2.00 - 6.00		> 6.00			
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Below primary	5	5%	6	6%	0	0%	11	5%
Primary	54	57%	42	44%	10	40%	106	49%
Secondary	28	30%	33	34%	7	28%	68	32%
Tertiary	**8**	**8%**	15	16%	8	32%	31	14%
Total	95	100%	96	100%	25	100%	216	100%

Appendix C-2: Fruit farm size and fruit farming experience

Years in fruit farming	fruit farm size (hectares)						Total	
	< 2.00		2.00 - 6.00		> 6.00			
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
≤ 10 years	8	8%	8	8%	4	16%	20	9%
11 – 20 years	34	36%	27	28%	4	16%	65	30%
21 – 30 years	29	31%	39	41%	10	40%	78	36%
≥ 31 years	**24**	**25%**	22	23%	7	28%	53	25%
Total	95	100%	96	100%	25	100%	216	100%

Appendix C-3: Fruit farm size, main market used, and GAP certification

The main market used			fruit farm size (hectares)			Total
			< 2.00	2.00 - 6.00	> 6.00	
TMs	GAP certification	no	49	40	**4**	93
		yes	7	3	**1**	11
	Total		56	43	**5**	104
HMs	GAP certification	no	2	12	3	17
		yes	37	41	17	95
	Total		39	53	20	112
Total	GAP certification	no	51	52	7	110
		yes	44	44	18	106
	Total		95	96	25	216

Appendix D-1: Rotated component matrix for ten internal environment factors

	Component*			
	1	2	3	4
Fruit farm size	**.913**	.021	-.027	.289
Total farm size	**.867**	.046	-.071	.330
Fruit sales	**.838**	.024	.316	-.205
Fruit production	**.831**	.004	.233	-.147
Pick-up trucks	**.578**	.023	**.440**	.043
Age	-.034	**.931**	.015	-.013
Fruit farming experience	.091	**.924**	-.033	.009
Motorcycles	.310	-.049	**.713**	-.185
Household size	-.048	.024	**.685**	**.480**
Fruit crops grown	.115	-.012	.010	**.850**

*Principal components analysis with varimax rotation

Appendix D-2: Correlation matrix of the variables for the internal environment

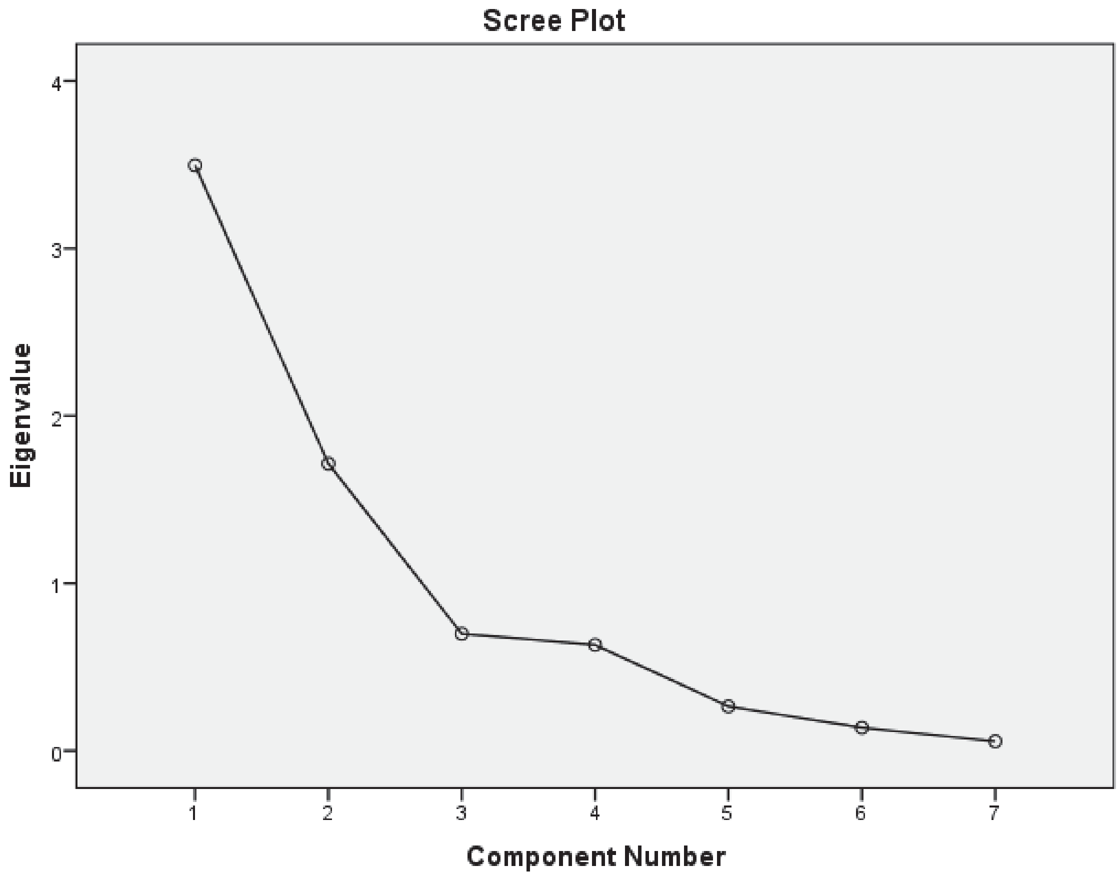
	Age	*Fruit farming experience*	*Total farm size*	*Fruit farm size*	*Number of pick-ups*	*Total market volume*	*Main fruit sales*
Age	1.000	.723	.009	-.015	.029	-.018	.000
Fruit farming experience	**.723**	1.000	.121	.103	.031	.069	.086
Total farm size	.009	.121	1.000	.936	.453	.561	.564
Fruit farm size	-.015	.103	**.936**	1.000	.498	.646	.653
Pick-up trucks	.029	.031	**.453**	**.498**	1.000	.451	.512
Fruit production	-.018	.069	**.561**	**.646**	**.451**	1.000	.859
Fruit sales	.000	.086	**.564**	**.653**	**.512**	**.859**	1.000

Appendix D-3: Total variance explained in the internal environment variables

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	**3.497**	49.953	49.953
2	**1.714**	24.492	**74.445**
3	.699	9.981	84.426
4	.632	9.035	93.461
5	.264	3.776	97.237
6	.137	1.961	99.198
7	.056	.802	100.000

Principal components analysis

Appendix D-4: Scree plot for the factors of the internal environment



Appendix D-5: Parallel analysis for the factors of the internal environment

Factor number	Actual eigenvalues from PCA	Random eigenvalues from parallel analysis*	Decision
1	**3.497**	**1.2591**	**Accept**
2	**1.714**	**1.1470**	**Accept**
3	.699	1.0728	Reject
4	.632	.9931	Reject
5	.264	.9220	Reject
6	.137	.8474	Reject
7	.056	.7585	Reject

*1000 replications, using Monte Carlo PCA for Parallel Analysis

Appendix D-6: Component Score Coefficient Matrix

	Component*	
	1	2
Age	-.030	.541
Fruit farming experience	.001	.537
Total farm size	.244	.013
Fruit farm size	.260	-.004
Pick-up trucks	.193	-.009
Fruit production	.245	-.022
Fruit sales	.249	-.010

*Principal components analysis with varimax rotation

Appendix D-7: Variable names and labels for the external environment

Variable	Item
Political factors	
Political stability	Political stability
Road infrastructure	Good condition of road infrastructure
Financial support	Support from government banks for financing the fruit farm business
Production support	Support from government agencies for fruit production
Marketing support	Support from government agencies for fruit market promotion
Economic factors	
Interest rates	Low interest rate for agricultural loans
Fruit prices	Stability of fruit prices
Market growth	Market growth for high quality fruit
Labour	Cheap labour for fruit farming
Social factors	
Urbanisation	Increasing fruit demand from urban population
Health consciousness	Increasing health consciousness
Food safety	Market requirements for food safety including the Q-GAP standard
Technological factors	
Production technology	Advancement of fruit production technologies, e.g. plant breeding, pest management, and post harvest technologies
Information technology	Advancement of information and communication technologies
Logistics technology	Advancement of logistics technologies, e.g. packaging, transportation and storage technologies
Environmental factors	
Crop disease	Timely information on fruit crop diseases
Weather	Timely information on variations of weather
Microenvironment factors	
Buyers	Satisfaction of fruit buyers such as collectors, exporters or cooperatives etc.
Other fruit farmers	Decrease of fruit production from fruit farmers in other provinces
Farmer network	Shared knowledge from other fruit farmers such as fruit farming techniques
Agricultural cooperatives	Success of agricultural cooperatives
Input suppliers	Consultation from input suppliers about application of fertilisers or other agricultural chemicals

Appendix D-8: Rotated component matrix for six external environment factors

Variable	Component*					
	1	2	3	4	5	6
Exfact 12	**.823**	.127	.147	.112	.016	.044
Exfact 8	**.713**	.248	.048	.149	.154	.108
Exfact 11	**.680**	.047	.085	.141	.087	.252
Exfact 18	**.601**	.208	.195	.177	-.002	.083
Exfact 15	**.565**	.189	.194	**.521**	.014	.128
Exfact 21	**.524**	-.152	**.497**	.047	.242	.146
Exfact 17	.161	**.732**	.122	.283	-.157	.118
Exfact 7	.083	**.714**	.015	-.142	.292	.049
Exfact 16	.260	**.694**	.007	.168	.118	.190
Exfact 20	**.489**	-.043	**.612**	.059	-.039	.078
Exfact 22	.248	.294	**.607**	.027	.280	-.073
Exfact 19	-.187	-.065	**.570**	**.516**	.229	.005
Exfact 10	.187	.058	**.556**	.411	.065	.299
Exfact 9	.207	.346	**.537**	-.133	-.075	.291
Exfact 14	.272	.051	.051	**.841**	.064	-.003
Exfact 13	.293	.119	.000	**.665**	.044	.281
Exfact 1	.055	.141	-.074	.062	**.827**	-.008
Exfact 6	.165	.045	.231	.048	**.626**	.189
Exfact 3	.026	-.036	.132	.167	**.603**	**.578**
Exfact 2	-.017	**.483**	.213	-.014	**.498**	.162
Exfact 4	.187	.157	.230	.102	.138	**.815**
Exfact 5	.277	.319	-.024	.134	.129	**.711**

*Principal components analysis with varimax rotation

Appendix D-9: Correlation matrix of the variables for the external environment

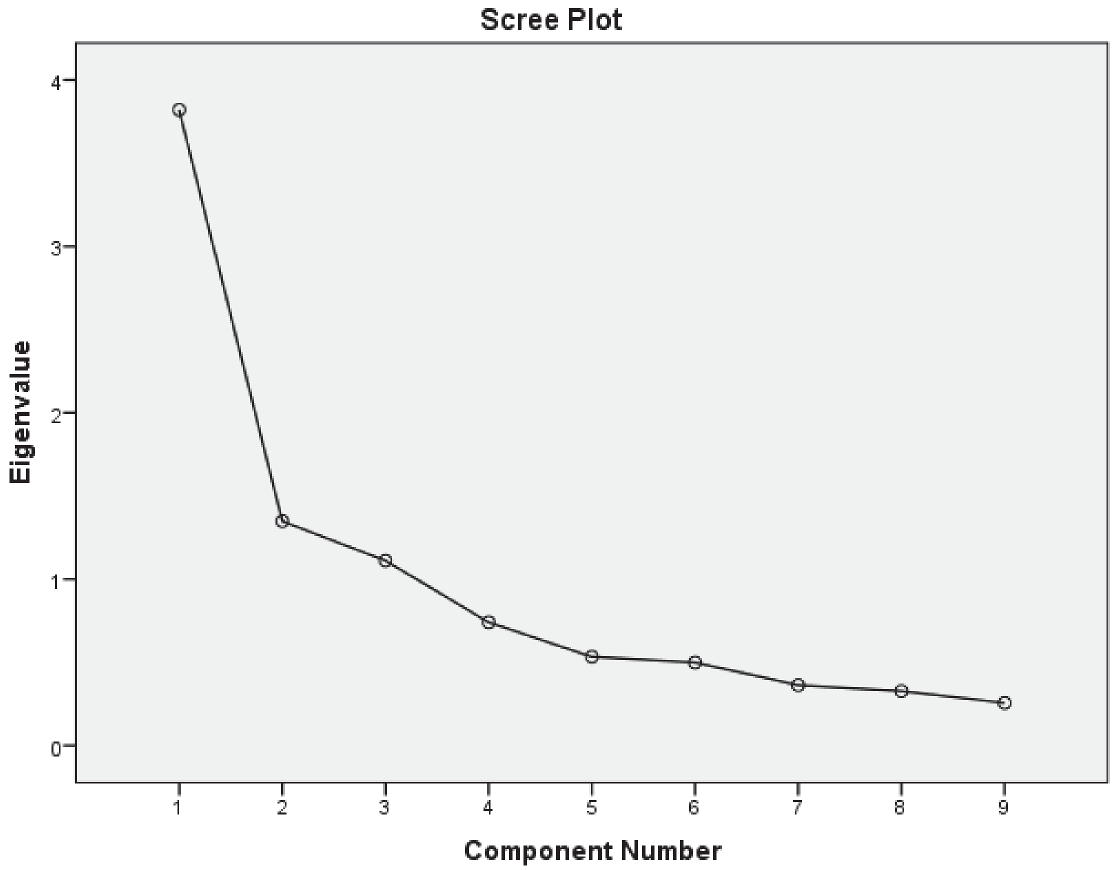
	exfact12	exfact8	exfact11	exfact18	exfact4	exfact3	exfact5	exfact17	exfact16
Exfact 12	1.000	.613	.589	.522	.280	.112	.305	.244	.312
Exfact 8	**.613**	1.000	.455	.464	.330	.213	.363	.295	.358
Exfact 11	**.589**	**.455**	1.000	.398	.327	.273	.352	.209	.328
Exfact 18	**.522**	**.464**	**.398**	1.000	.322	.071	.356	.302	.253
Exfact 4	.280	**.330**	**.327**	**.322**	1.000	.532	.693	.236	.326
Exfact 3	.112	.213	.273	.071	**.532**	1.000	.349	.104	.260
Exfact 5	**.305**	**.363**	**.352**	**.356**	**.693**	**.349**	1.000	.335	.395
Exfact 17	.244	.295	.209	**.302**	.236	.104	**.335**	1.000	.598
Exfact 16	**.312**	**.358**	**.328**	.253	**.326**	.260	**.395**	**.598**	1.000

Appendix D-10: Total variance explained in the external environment variables

Factor number	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	**3.820**	42.449	42.449
2	**1.348**	14.981	57.430
3	**1.111**	12.345	69.775
4	.741	8.232	78.007
5	.534	5.930	83.936
6	.499	5.547	89.483
7	.363	4.030	93.514
8	.328	3.643	97.157
9	.256	2.843	100.000

Principal components analysis

Appendix D-11: Scree plot for the factors of the external environment



Appendix D-12: Parallel analysis for the factors of the external environment

Factor number	Actual eigenvalues from PCA	Random eigenvalues from parallel analysis*	Decision
1	**3.820**	**1.3182**	**Accept**
2	**1.348**	**1.2163**	**Accept**
3	1.111	1.1322	Reject
4	.741	1.0598	Reject
5	.534	0.9943	Reject
6	.499	0.9278	Reject
7	.363	0.8584	Reject
8	.328	0.7893	Reject
9	.256	0.7036	Reject

*1000 replications, using Monte Carlo PCA for Parallel Analysis

Appendix D-13: Variable names and labels for the goal statements

Variables	Goal statements
Production goals	
Production techniques	You continually update the production techniques on your fruit farm.
Farm work	A successful farmer focuses on production, i.e. farm work, and not on activities outside the farm.
Quality products	You strive to produce the highest quality fruit in your district.
Specialty fruit crops	You grow specialty fruit crops, e.g. different varieties or exotic fruit, more than other farms in your district.
Marketing goals	
Customer requirements	You grow fruit crops that best meet customer requirements.
Pricing	You receive a fair price for your fruit crops
Market channels	You know where your produce goes after it leaves the farm.
Market information	You usually meet other people in order to find market information.
Financial goals	
Costs	You always focus on the best quality of the inputs you use rather than the lowest cost of buying.
Profits	You are aware of the exact return for any fruit crop you produce.
Investment	Your goal is to diversify your assets by having other investments apart from fruit farm.
Farm development	You are satisfied with the current level of development on your farm
Environmental goals	
Agro-chemicals	Fertilisers and pesticides are not the most necessary item for your fruit farming.
Living condition	You consider a decrease in the use of agricultural chemicals would improve the living conditions on the farm.
Environmental awareness	You are doing everything you can to be environmentally aware and conserve the land you farm.
Personal and family goals	
Family needs	Your ultimate goal is to generate a secure, sufficient level of income to meet the needs of your family.
Quality of life	You think that reducing your work load will help you improve the quality of your life.
Family	The best part of farming is having your family working alongside you.
Happiness	You enjoy farm work because it makes you feel happy.

Appendix D-14: Rotated component matrix for six goal factors

Variable	Component*					
	1	2	3	4	5	6
Goal 6	**.802**	.013	-.015	-.043	.099	-.162
Goal 5	**.783**	-.002	.010	.083	-.115	.171
Goal 7	**.761**	.133	.150	.048	-.179	.000
Goal 8	**.638**	.194	.113	.210	-.083	.205
Goal 10	**.588**	-.182	-.037	-.045	.233	.190
Goal 12	**.430**	.057	.228	.267	.203	-.168
Goal 14	.092	**.835**	.151	.021	.138	.043
Goal 15	.092	**.736**	.360	-.177	.081	.110
Goal 13	.154	**-.655**	.137	-.106	.365	.185
Goal 1	.349	**.435**	-.056	.145	**.404**	.357
Goal 18	.092	.135	**.772**	.090	.143	.059
Goal 19	.117	.232	**.720**	-.095	.091	-.097
Goal 17	-.006	-.080	**.464**	.280	-.097	.121
Goal 11	-.017	-.141	-.079	**.744**	-.074	.160
Goal 4	.205	.207	.329	**.582**	.123	-.110
Goal 2	-.173	.008	.102	-.040	**.783**	-.033
Goal 3	.293	.090	.141	**.453**	**.477**	.029
Goal 9	.221	.080	-.072	.199	-.095	**.694**
Goal 16	-.130	-.086	**.436**	-.161	.196	**.609**

*Principal components analysis with varimax rotation

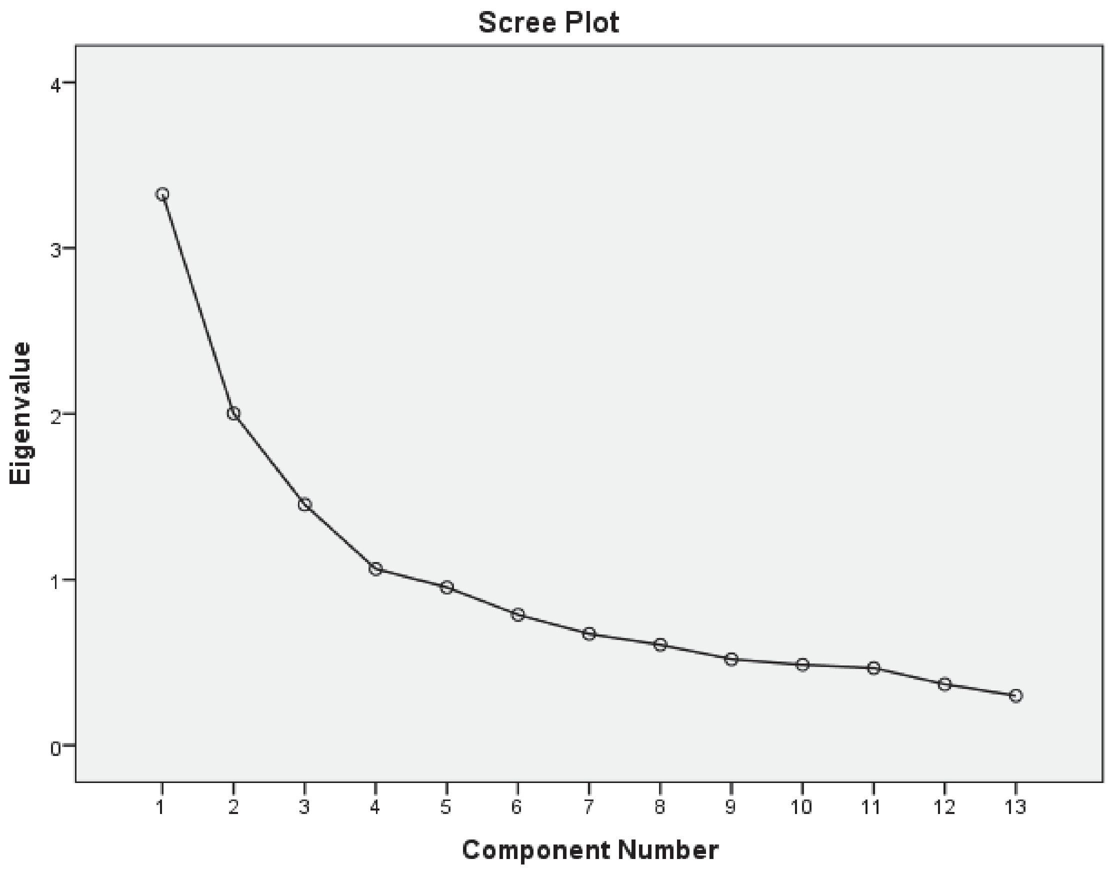
Appendix D-15: Correlation matrix of the variables for the farmers' goals

	Goal5	Goal7	Goal6	Goal8	Goal14	Goal15	Goal13	Goal18	Goal19	Goal17	Goal2	Goal3	Goal1
Goal5	1.000	.592	.505	.454	.072	.023	-.070	.112	.063	.017	-.179	.279	.293
Goal7	**.592**	1.000	.509	.508	.176	.217	.004	.148	.155	.071	-.128	.174	.240
Goal6	**.505**	**.509**	1.000	.385	.090	.092	-.099	.102	.074	-.018	-.061	.212	.259
Goal8	**.454**	**.508**	**.385**	1.000	.274	.181	-.012	.177	.163	.055	-.092	.231	.291
Goal14	.072	.176	.090	.274	1.000	.624	.339	.234	.255	.040	.098	.137	.372
Goal15	.023	.217	.092	.181	**.624**	1.000	.236	.315	.410	.070	.076	.101	.305
Goal13	-.070	.004	-.099	-.012	**.339**	.236	1.000	-.004	.001	.000	-.161	-.066	.013
Goal18	.112	.148	.102	.177	.234	**.315**	-.004	1.000	.489	.218	.200	.250	.144
Goal19	.063	.155	.074	.163	.255	**.410**	.001	**.489**	1.000	.103	.120	.175	.138
Goal17	.017	.071	-.018	.055	.040	.070	.000	.218	.103	1.000	.045	.073	.102
Goal2	-.179	-.128	-.061	-.092	.098	.076	-.161	.200	.120	.045	1.000	.150	.113
Goal3	.279	.174	.212	.231	.137	.101	-.066	.250	.175	.073	.150	1.000	.312
Goal1	.293	.240	.259	.291	**.372**	**.305**	.013	.144	.138	.102	.113	**.312**	1.000

Appendix D-16: Total variance explained by the goal variables

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	**3.326**	25.581	25.581
2	**2.003**	15.404	40.985
3	**1.452**	11.171	52.156
4	**1.064**	8.181	60.337
5	.952	7.327	67.664
6	.788	6.060	73.725
7	.672	5.169	78.893
8	.606	4.665	83.558
9	.519	3.994	87.552
10	.486	3.737	91.289
11	.466	3.583	94.872
12	.368	2.830	97.702
13	.299	2.298	100.000

Appendix D-17: Scree plot for the factors of the farmers' goals



Appendix D-18: Parallel analysis for the factors of the farmers' goals

Factor number	Actual eigenvalues from PCA	Random eigenvalues from parallel analysis*	Decision
1	**3.326**	**1.4285**	**Accept**
2	**2.003**	**1.3216**	**Accept**
3	**1.452**	**1.2424**	**Accept**
4	1.064	1.1651	Reject
5	.952	1.0950	Reject
6	.788	1.0412	Reject
7	.672	0.9829	Reject
8	.606	0.9276	Reject
9	.519	0.8733	Reject
10	.486	0.8207	Reject
11	.466	0.7627	Reject
12	.368	0.7054	Reject
13	.299	0.6335	Reject

*1000 replications, using Monte Carlo PCA for Parallel Analysis

Appendix D-19: Cluster analysis

Cluster analysis is a statistical method used to separate objects or individuals (cases or observations) into homogeneous groups called clusters (Charry, Coussement, & Demoulin, 2016; Mooi & Sarstedt, 2011). There are four steps in a cluster analysis:

1) Selecting the clustering variables

Criteria used to classify cases or observations of research are called clustering variables. There may be many clustering variables taken into consideration in a study. Clustering variables should be relevant to a specific objective of the study, and they should not have absolute correlations, i.e. above .90 (Mooi & Sarstedt, 2011).

2) Selecting the clustering procedure

This step involves measuring similarity or distance among cases and clusters, in order to form clusters. There are three approaches to grouping the most similar cases into a cluster determining each case's cluster membership (Mooi & Sarstedt, 2011; Tabachnick & Fidell, 2012):

- *Hierarchical clustering* has two types of procedures, i.e. agglomerative clustering and divisive clustering. Agglomerative clustering starts with each case representing and individual cluster. These clusters are then sequentially merged according to their similarity. Divisive clustering initially merges all cases into a single cluster, which is then gradually separated into more clusters. Hierarchical clustering involves selecting distance measures between pair of cases, such as *Euclidean distance* (for ratio and interval data) and *Chebychev distance* (for ordinal data);
- *Partitioning clustering* (usually called *k-means clustering*) assumes the distribution of cases (*n*) in a number of clusters (*k*). The k-mean procedure uses within-cluster variation as a measure to form clusters. The clustering process initially assigns cases to a number of clusters, and then reassigns them to other clusters, in order to minimise the within-cluster variation;
- *Two-step clustering* combines the principles of hierarchical and partitioning methods. It is comprised of two stages: the first stage is similar to the k-mean procedure, and the second stage uses the first stage's results to conduct a modified hierarchical procedure to form clusters.

3) Deciding on the number of clusters

Clustering methods provide different guidance for deciding on the number of clusters. The outcome of hierarchical clustering provides a rough guidance based on the distances at which the cases are combined. The common way to visualise cases and clusters is by drawing a *dendrogram*, which illustrates the distances between cases and clusters. The alternative way is to plot the number of clusters against the distance and then look at the distinctive break, similar to the scree plot in factor analysis. Mooi and Sarstedt (2011) comment that the final decision regarding the number of clusters still depends on the literature and knowledge or practical considerations based on the researcher's choice.

In k-means clustering, the clustering process assigns cases into *k* clusters which the researcher has to pre-specify. This means that the number of clusters has to also be pre-determined, based on previous knowledge or theory. Alternatively, researchers may employ a hierarchical procedure to determine the number of clusters and k-means afterwards. In two-step clustering, specifying the number of clusters is more flexible because the research only determines the maximum number of clusters. The outcome specifies the number of clusters within the maximum number, based on statistical evaluation criteria (measures of overall goodness-of-fit), i.e. *Akaike's Information Criterion (AIC)* or *Bayes Information Criterion (BIC)*

4) Interpreting the cluster solution

Interpreting clusters involves assessing the cluster centroids. A centroid is the average value of the clustering variables for all cases in a certain cluster. By comparing the centroids, the clusters are conceptually distinguishable, with *t*-tests or ANOVA. This information also helps to meaningfully label and name each cluster.

This study used a criterion (the clustering variable) regarding the percentage of fruit production sold to HMs for each case. Since there was only a single clustering variable, there was no problem about absolute correlations of variables. In order to specify the number of clusters (to see whether there were additional groups of respondents between TM and HM users), two-step clustering was employed to determine the maximum number of clusters, i.e. 10. Since the clustering variable was ratio-scale data, *Euclidean distance* was used to measure the similarity among cases, determining the cluster membership for each case. Furthermore, both *AIC* and *BIC* were used to specify the number of clusters to confirm the results with each other.

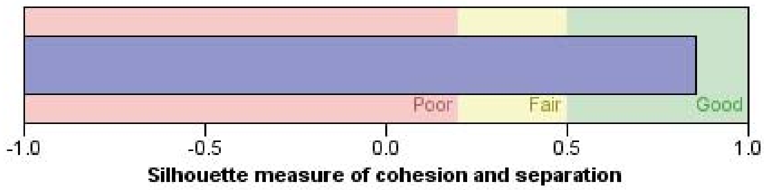
The results of two-step clustering indicated that a two-cluster solution was most appropriate (see model summary below). Both *AIC* and *BIC* provided the same results regarding the number of clusters. The results also indicated the quality of the cluster solution (the overall goodness-of-fit) was good. The number of cases in each cluster was 104 for Cluster 1 and 112 for Cluster 2. The centroid of each cluster was the average percentage of fruit production sold to HMs, showing 5% and 90% for Clusters 1 and 2, respectively. This means that Cluster 1 was the group of respondents who were able to sell a small quantity of their fruit production to HMs, which averaged 5% of their total production, while Cluster 2 was the other group of respondents who largely sell their produce to HMs, which averaged 90% of their total production. Based on these results, Cluster 1 could be labelled as TM users because they mostly used TM channels (95%), and Cluster 2 could be labelled as HM users because they mostly used

HM channels (90%). Therefore, the results of cluster analysis confirmed that there were two sample groups for the dependent variable, i.e. TM users and HM users.

Model Summary

Algorithm	TwoStep
Inputs	1
Clusters	2

Cluster Quality



Final Cluster Centres

	Cluster	
	1	2
%of total main fruit volume sold to high-value markets	5.18	90.32

Number of Cases in each Cluster

Cluster	1	104.000
	2	112.000
Valid		216.000
Missing		.000

Appendix D-20: Results of multicollinearity assessment

Business size	Collinearity Statistics	
	Tolerance	VIF
Experience	.871	1.148
Market requirements	.475	2.106
Government support	.711	1.407
Production information	.728	1.374
Effectiveness	.583	1.716
Sustainability	.872	1.147
Self-sufficiency	.828	1.207
Efficiency	.809	1.236

Experience	Collinearity Statistics	
	Tolerance	VIF
Market requirements	.470	2.127
Government support	.733	1.363
Production information	.723	1.383
Effectiveness	.567	1.763
Sustainability	.874	1.144
Self-sufficiency	.866	1.155
Efficiency	.814	1.229
Business size	.858	1.165

Market requirements	Collinearity Statistics	
	Tolerance	VIF
Government support	.707	1.415
Production information	.790	1.265
Effectiveness	.820	1.220
Sustainability	.912	1.096
Self-sufficiency	.829	1.207
Efficiency	.799	1.251
Business size	.868	1.152
Experience	.872	1.147

Government support	Collinearity Statistics	
	Tolerance	VIF
Production information	.767	1.303
Effectiveness	.571	1.753
Sustainability	.873	1.146
Self-sufficiency	.852	1.173
Efficiency	.797	1.255
Business size	.897	1.115
Experience	.939	1.065
Market requirements	.488	2.051

Production information	Collinearity Statistics	
	Tolerance	VIF
Effectiveness	.582	1.719
Sustainability	.872	1.147
Self-sufficiency	.828	1.207
Efficiency	.841	1.189
Business size	.864	1.157
Experience	.872	1.147
Market requirements	.514	1.947
Government support	.723	1.383

Effectiveness	Collinearity Statistics	
	Tolerance	VIF
Sustainability	.876	1.142
Self-sufficiency	.831	1.203
Efficiency	.807	1.239
Business size	.884	1.132
Experience	.872	1.146
Market requirements	.680	1.472
Government support	.686	1.459
Production information	.742	1.347

Sustainability	Collinearity Statistics	
	Tolerance	VIF
Self-sufficiency	.850	1.176
Efficiency	.804	1.244
Business size	.859	1.165
Experience	.874	1.144
Market requirements	.492	2.034
Government support	.682	1.467
Production information	.723	1.384
Effectiveness	.569	1.757

Self-sufficiency	Collinearity Statistics	
	Tolerance	VIF
Efficiency	.842	1.188
Business size	.858	1.165
Experience	.910	1.099
Market requirements	.470	2.130
Government support	.700	1.429
Production information	.722	1.385
Effectiveness	.568	1.761
Sustainability	.894	1.119

Efficiency	Collinearity Statistics	
	Tolerance	VIF
Business size	.871	1.148
Experience	.889	1.124
Market requirements	.471	2.124
Government support	.680	1.470
Production information	.762	1.312
Effectiveness	.573	1.744
Sustainability	.879	1.138
Self-sufficiency	.875	1.142

Appendix D-21: Statistical tests for the nine factors considered separately

Factor	Score	df	Sig.
Business Size	**18.069**	**1**	**.000**
Experience	**5.532**	**1**	**.019**
Market requirements	**60.235**	**1**	**.000**
Government support	3.110	1	.078
Production information	3.779	1	.052
Effectiveness	**73.804**	**1**	**.000**
Sustainability	.913	1	.339
Self-sufficiency	.016	1	.901
Efficiency	.140	1	.708
Overall Statistics	104.697	9	.000