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Factors affecting marketing channel selection

by rice farmers in Thailand

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Abstract

This study examines the factors that affect marketing channel selections of rice farmers in Thailand, which are believed to be distinctive compared with those of other agricultural products. One of the possible reasons for the differences is the Thai government has formally, over many years, subsidised rice farmers under the rice pledging scheme (RPS). Since the scheme ended in 2014, rice farmers have been facing a more competitive market environment and need to be more proactive in their choice of marketing and this research aims to generate greater understanding of the drivers of choice in order this issue may be addressed. This study identified factors affecting the marketing channel choices drawing on the framework of the Theory of Planned Behaviour and literature review. A multi-method approach was adopted involving preliminary in-depth interviews with 33 participants and a face-to-face questionnaire survey with 661 rice farmers in 3 main rice production regions by using purposive and convenience sampling techniques.

The results showed that Thai rice farmers mainly rely on three main channels: miller, local collector, and agricultural cooperative to sell their rice. Three other channels also used by farmers were: central paddy market, individual direct selling and group direct selling. Paired samples t-test was used to compare the channels used before and after the RPS ended from which it was determined that there were statistical differences between regions, education levels, sources of information, type of rice growing, production partly for own consumption or not, use of hired vehicles or not and distance to market in the different channels on past behaviour and intention.

Partial least squares structural equation modelling (PLS-SEM) was used to test the hypothetical relationships based on the results from principal components analysis and reliability of scale. The results identified that intention had been directly affected by past behaviour, attitude, subjective norm, farmers' power, consideration of transaction specific cost and channel accessibility of which indirectly influenced on intention through past behaviour. Therefore, the significance of path relationships in different channel choices had been addressed by using multi-group analysis. The findings could have potential implications for many stakeholders, e.g. policy makers, farmers and rice buyers, illustrating the importance of these factors in understanding rice farmers in making channel choice decisions.

Key words: marketing channel, rice, rice pledging scheme, Theory of Planned Behaviour, multi-method, partial least squares structural equation modelling, Thailand

Declaration

I hereby declare that this PhD final thesis is the result of my original work unless where due references and quotation marks have been made in the text. In addition, all the sources in this report have been quoted and acknowledged by means of completed references. The contents and any opinions expressed herein are those of the author and in no way represent those of the Kasetsart and Harper Adams Universities.

Therefore, I certify that there is no material or substance in this thesis, in whole or in part, has previously been submitted for a degree or any other qualification at this University or another institution.

Nithicha Thamthanakoon

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Chapter 1 Introduction

This introductory chapter starts with an explanation of the context of this study. It includes some background information in relation to the importance of rice in the world and rice production and rice marketing channels in Thailand. This also provides a historical account of a controversial Thai government policy–rice pledging scheme. It then introduces the purpose of this research and statement of the problem. It explains what contribution this study makes to the two interrelated fields of marketing channel selection and farmers decision making. Finally, it provides an overview of the thesis.

1.1 The importance of rice in the world and in Thailand

'Rice is the staple food of more than half of the world's population' and is recognised by the United Nations as important in providing food security and poverty alleviation (The United Nations, 2002; p 1). Food and Agriculture Organization of the United Nations (FAO, 2018) has acknowledged that rice is one of the most important commodities in the world and reports that there are nearly 166 million hectares of rice-cultivating areas worldwide, producing in total 759.6 million tons of rice in 2017. The majority of rice production and consumption is located in Asian countries. Thailand is one of the world's largest rice-exporting countries (5th largest rice production) due to the large quantity surplus stock after meeting domestic demand (FAO, 2018). In 2017, Thailand supplied 24.11 % of the total world rice trade (FAO, 2018).

Nearly half (46.88%) of total agricultural land in Thailand is used for rice production. According to the agricultural census conducted by the National Statistical Office (NSO) (2013), Thailand produced nearly 40 million tons of rice in 2013 with 92.7% of the product being sold (36.9 million tons). As the national staple food, the major cash crop and export earner, rice is one of the most important determinants of Thai provincial economy (Chuasuwan, 2018).

1.2 Rice production and marketing channels in Thailand

In Thailand, the north-east, north, and central regions are the most important rice production areas with a combined share of over 98% of the total rice production in Thailand and a respective share of 42.1%, 31.1%, and 25.4 % (Office of Agricultural Economics, Thailand: OAE, 2017). The area planted and the numbers of plantations per year are seen to be contingent upon geographical and climatic conditions, farm size as well as access to irrigation.

Most Thai rice farmers are smallholders. The average rice farm size per household for major rice is relatively small, at 15.81 rai per household (2.5 hectares). The vast majority

of small-scale farmers are located in the north-east and north regions. Commercial rice farmers are more likely to be in the central region where farmers tend to practise intensive farming production for sales.

There are two main pathways to market for Thai rice: pathways for paddy rice (unmilled rice) and pathways for milled rice as shown in Figure 1.1 (Agribusiness Division, 1997).
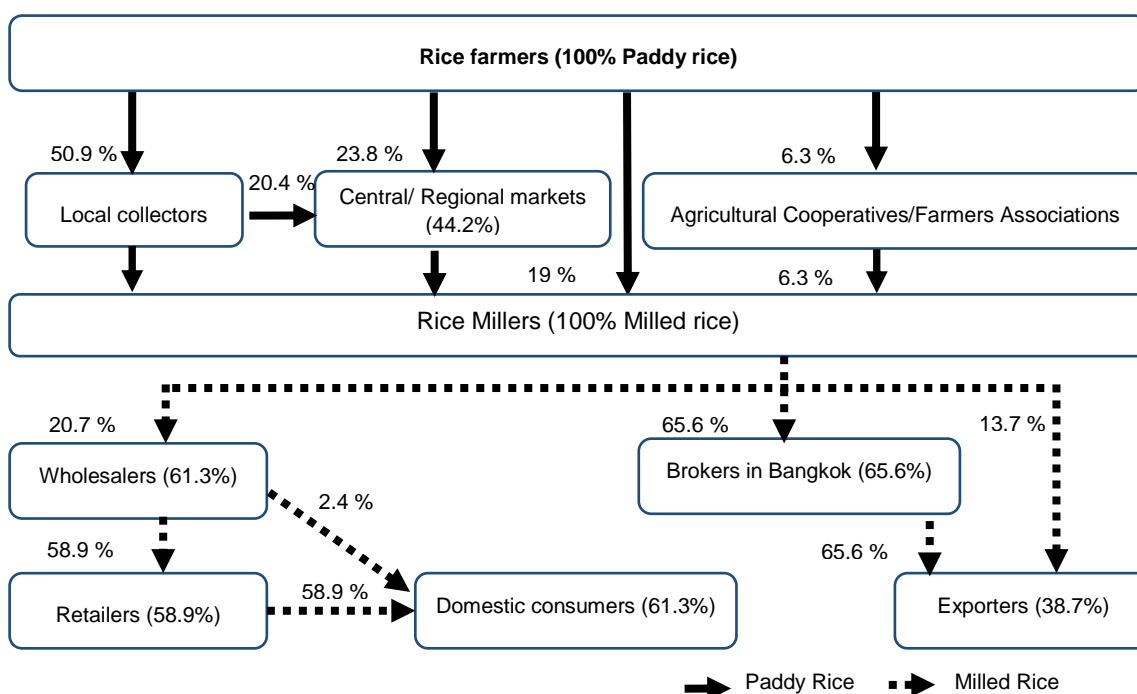
Figure 1.1 Rice Marketing Channels in Thailand in 1997

(Source: Authors' translated from Agribusiness Division, 1997)

Access to market has been seen as one of the key challenges faced by farmers, especially smallholder farmers (Page and Slater 2003; Chamberlin, 2008). Marketing channels play a crucial role in helping farmers to sell their rice to markets. Traditionally, local collector was the main marketing channel, particularly for small-scale farmers, at a time when road infrastructure was poor. Naksawat (1964) reported that 76.6% of paddy rice in central region were sold to local collectors and 10% to local millers.

In 1961, Thai government introduced national economic and social development plan with an aim to support farmer's access to market by enhancing agricultural distribution system and road infrastructure (Isvilanonda, 2010). This has enabled a gradual change of farmers' use of marketing channels i.e. moving away from traditional channel 'local collector' to more modern channels such as 'rice millers' and 'cooperatives' as shown in Figure 1.1.

1.3 The rice pledging schemes

With the increasing importance of rice export from Thailand, in 1981, a specific policy, namely rice pledging scheme (RPS) was introduced to support rice farmers. The initial RPS was operated by the Bank for Agriculture and Agricultural Cooperatives (BAAC) and was initially designed to provide loans to rice farmers at a low interest rate by using paddy rice as collateral. The conditions of the loan were that if rice farmers did not return debt with interest, those paddy rice will belong to BAAC for re-sale later. BAAC operated in central paddy markets and provided services such as storage and weighing (Isvilanonda, 2010). Therefore, the launching of RPS established the central paddy markets as a marketing channel as this was perceived to offer greater value to small farmers. By 1997, the central market had a share of nearly 24%, becoming the second biggest channel after local collectors (50.9%) (Isvilanonda, 2010).

In 2011, greater intervention by the Thai government through a revised controversial rice pledging scheme (RPS) was established. This new RPS fixed the price paid to farmers at between 29-50% above market price. Rice millers and agricultural cooperatives became the key players in collecting rice on behalf of the government from farmers who participated in the new RPS (Liese *et al.*, 2014). This has once again transformed the use of marketing channels. By 2013, over half of rice farmers sold to millers and nearly one quarter sold to agricultural cooperatives as shown in Figure 1.2.
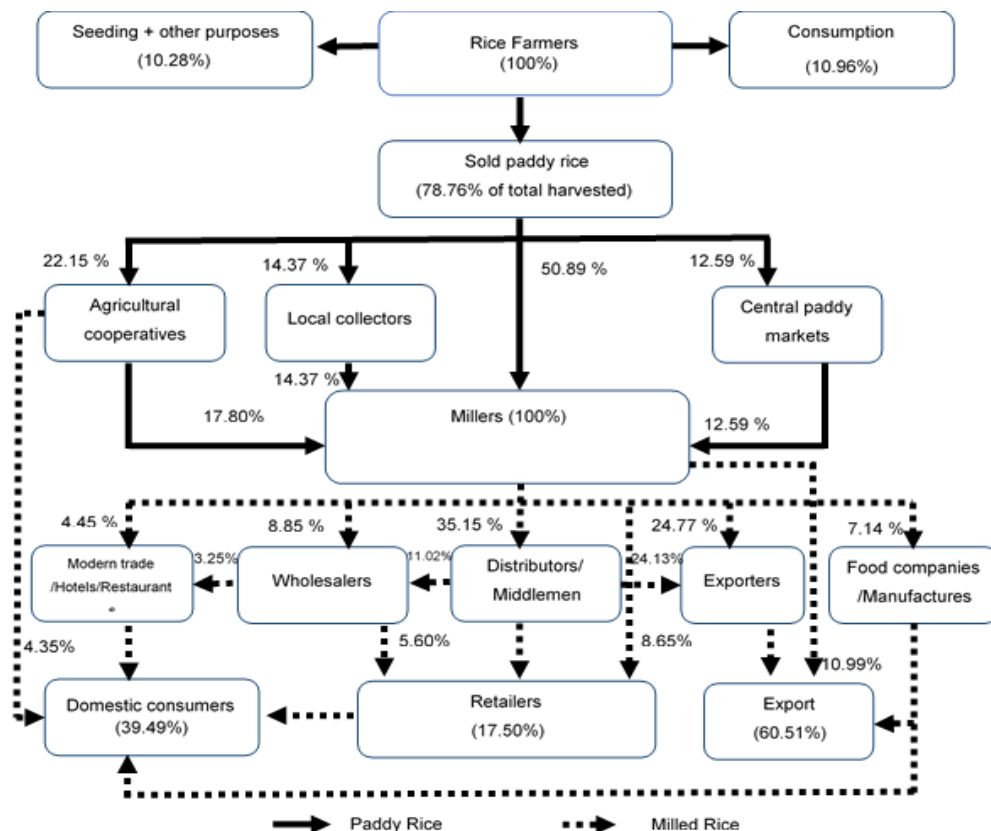
Figure 1.2 Rice marketing channels in the northeast, Thailand 2013/14

(Source: Authors' translated from Srisompun, 2014, p.83)

Yet the introduction of RPS resulted in lower exports. FAO (2011) reported that Thailand exported lower than the previous year due to the shortfall of rice for exports because of the high domestic price under the RPS. Thailand has fallen from its leading position to third position, behind India and Vietnam in 2012 (FAO, 2012). In losing their lead position, the Thai economy was affected. The lack of available funds affected hundreds of thousands of farmers who were unpaid or had payments delayed. The net loss, under the 2011-2014 RPS, came to a total of 286.6 billion baht (£ 6.8 billion) and considerable loss of rice where it was left to rot in warehouses (Thai PBS, 2016). The RPS was then ended in 2014.

1.4 Statement of the problems and its significance

Since 1960s, Thai rice farmers seemed to have been heavily influenced by government policies in their selection of marketing channels for rice. 'Local collectors' lost grounds from over 70% in 1964, to 50.9% in 1997, and then to 14.3% in 2013. 'Millers' increased from 10% to 19%, then to 50.9% respectively. Agricultural cooperatives increased from 6.3% in 1997 to 22% in 2013 (Srisompun, 2014). The trend seemed to have moved from more traditional channels to more modern channels.

This thesis aims to answer the following questions:

- Has the end of the latest RPS in 2014 affected the farmers' choice of marketing channel?
- With the emergence of more modern marketing channels such as e-commerce, direct contract with large retailers, have the rice farmers diversified their use of marketing channels?
- How do farmers make decisions as regards which channel to use?
- Who are the key influencers?
- What are the key factors affecting their choice of channels?

1.5 Contributions to knowledge

This study looks at an area of interest that has had very limited research. There are some studies of factors influencing farmers' choice of marketing channels in other countries such as Ethiopia (Abebe *et al.*, 2016), Macedonia (Tsourgiannis *et al.*, 2008); South Africa (Jari and Fraser 2012), and Swaziland (Xaba and Masuka, 2013), to name a few. Two studies currently exist on marketing channel choice of farmers in Thailand (Mukiama *et al.*, 2014; Schipmann and Qaim, 2011). However, all those studies focused largely on producers of perishable products (e.g. fruit and vegetables), which presents different considerations for farmers. Paddy or unmilled rice has a longer shelf life and requires additional processing prior to sale to consumers, which suggests that there may be different

factors influencing rice marketing channels. For example, the additional processing might be giving one channel (i.e. 'rice miller') a big advantage over other channels.

Additionally, RPS was a policy only applied to the rice farmers and did not pertain to other product channels e.g. that of the vegetable sector. There has been little or no consideration of the implications and impact of RPS on prices paid to farmers and their choice of channel. Other studies of rice farmers have been undertaken yet these have predominantly focused on contract farming (Setboonsarng *et al.,* 2006; Sriboonchitta and Wiboonpoongse, 2008; Schipmann and Qaim, 2011; Mukiama *et al.,* 2014) and in particular specified types of rice such as Japanese or organic rice rather than on conventional production, the most predominant type of rice in Thailand.

This is the first study to date offers some important insights into the decision-making processes of Thai rice farmers, and the factors that influence their choice. The research takes a well-recognised theoretical framework that offered considerable insight into decision making, i.e., the Theory of Planned Behaviour (TPB) (Ajzen and Fishbein,1980; Ajzen, 1991) and its variants the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) and the Reasoned Action Approach (RAA) (Fishbein and Ajzen, 2010). However, the work extends the TPB and RAA models in examining a much wider range of determinants of behavioural intention in farm business decision making. It also established the role of past behaviour in influencing intention. Understanding the importance of such more tangible behavioural predictors will have substantial implications to policy makers and marketing channel providers as well as to farmers.

1.6 Thesis structure

This thesis has seven chapters, including this introductory chapter. This chapter describes the background of the study and introduces questions that have been raised about the marketing channel decision-making of rice farmers in Thailand. The chapter also gives a brief overview of this thesis.

Chapter two examines the sufficiency of existing theoretical framework in the Theory of Planned Behaviour (TPB) and conceptual and empirical understanding of factors affecting farmers' marketing channel selection. A citation analysis of TPB suggested limited application of this framework in farmers' marketing channel decisions. This led to a review of the definition of marketing channels, a critical synthesis of the existing studies of marketing channel choice behaviour, in particular those of farmers in different products and countries. The examination of this literatures suggests that there is limited rigorous research into the factors affecting the marketing channel selection of rice farmers in Thailand. The chapter ends with a conceptual framework, integrating the key components of TPB and findings from previous studies on factors affecting farmers' selection of marketing channels.

Testing of this integrated framework would offer an original contribution into the field of marketing channel choice and farmers' decision making.

Chapter three explains the methodology and demonstrates the importance of research philosophy and the research design. The chapter also describes and justifies within this context the use of a two-phase multi-method approach involving preliminary in-depth interviews in the first phase and face-to-face questionnaire survey in phase two. It details data collection procedures, sampling strategy, ethics, and data analysis techniques of each phase. Furthermore, instrumentation and measurements of the variables used in the questionnaire are clarified.

Chapter four summarises the findings from content analysis of phase one interviews. The results from this phase enabled the modification of the conceptual model presented at the end of Chapter 2. The revised model was tested in the second phase of this study.

Chapter five presents of the findings of phase-two survey. The first part deals with the descriptive statistics of socio-demographic of respondents divided into three regions (i.e., who they are). It then goes on to describe the main marketing channels used by respondents and their intention (i.e., what they did and what they intended to do). Paired-samples t-test was used to compare the marketing channels before and after RPS ended and descriptive statistics used to explain the impact of the RPS on channel choice behaviour (i.e., whether they behaved differently during and post RPS). Multivariate analysis of variance (MANOVA) was used to compare different types of farmers and farms with intention, past behaviour and each marketing channel (i.e., whether different farmers behave differently).

The next part in Chapter 5 answers the "why" question. Factors affecting the marketing channel selection were described and summarised based on the framework and each channel used. After descriptive statistics of each factor and each channel, principal component analysis (PCA) and reliability of scale were used to reduce and refine variables measured with multiple indicators. The results from PCA were used to define reflective or formative models in partial least squares method to structural equation modelling (PLS-SEM) in the following section. This distinction between reflective and formative models in PLS-SEM led to another the revised framework which was subjected to final testing in PLS-SEM. The final section presents the testing results.

Chapter six discusses the findings from this study in comparison with the existing literature. The discussion centres on answers to the four main research questions.

Finally, the final chapter draws the study to a conclusion, tying up the various theoretical and empirical strands. It presents the theoretical and practical contributions this research makes to the knowledge of marketing channel choice behaviour and farmers decision making generally and, specifically of rice farmers in Thailand. Limitations of this study are acknowledged and implications for future studies are also discussed.

Chapter 2 Literature review

2.1 Introduction

The previous chapter provided background information related to marketing channels used by rice farmers in Thailand and the significance of this research. Aligned with the research purpose stated in Chapter 1, this chapter aims to review previous studies on farmers' decision-making and examine the theoretical approaches which have been deployed in previous research to understand human behaviour.

An examination of this literature has suggested that the Theory of Planned Behaviour offers specific insights into farmers' decision-making. However, studies have tended to be constrained in other areas rather than in marketing channel selection. There is therefore a need to explore factors influencing the marketing channel selection by farmers from the previous studies.

2.2 Theoretical behavioural models

Studies on decision-making have a range of models focused on the Rational Decision-making model (Simon, 1979; Eisenfuhr *et al.*, 2010), the Bounded Rationality model (Gigerenzer & Goldstein, 1996; Gigerenzer & Selten, 2002), the Intuitive Decision Making (Burke & Miller, 1999; Sauter, 1999) and the Ethical Decision-making model (Trevino, 1986; Jones, 1991; Ford & Richardson, 1994).

The Rational and the Bounded Rationality models are focused on a series of steps that should be considered (Simon, 1979; Eisenfuhr *et al.*, 2010), while the Intuitive Decision-making is based on feeling, believed by instinct, instead of using reason or rational thinking (Burke & Miller, 1999; Sauter, 1999). However, it does not indicate that Intuitive Decision-making is non-logical or irrational. Although a reason to choose is not directly through logical thought, the choice is cognitive-based, relying on experience, affect-initiated beliefs, value or ethics, and subconscious mental processing (Burke & Miller, 1999; Sauter, 1999; Matzler *et al.*, 2007).

These decision-making models are structured individual psychological decision-making (PINA E CUNHA, 2007). This study aims to understand both internal reasons behind rice farmers' marketing channel selection and external factors that influence the choice of marketing channel.

One theory which has been used widely to understand and predict human behaviour in social science (Beedell & Rehman, 2000; Ajzen, 2002; Colémont & Van den Broucke, 2008) is the Theory of Planned Behaviour (TPB). This has been applied in health (Darker, 2008; Patcheep, 2011), education (Chien, 2013; Alomary, 2017), and consumer behaviours such as internet shopping behaviour (Laohapensang, 2009), ethical buying (Kuldiloke,

2012), purchase of mobile phones (Kumar, 2017) and consumers' purchasing decisions on CSR banking (Hirunpattarasilp & Udomkit, 2011). Some studies applied TPB in studying farmers' decision making (Beedell & Rehman, 1999; Jackson *et al.*, 2009; Niu & Zhou; 2015; Moellers *et al.*, 2018).

2.2.1 Historical development of the Theory of Planned Behaviour and the key components

Although human behaviours are difficult to understand and predict, social attitude and personality traits clearly play an important role in explaining and predicting human behaviour (Fishbein & Ajzen, 2010). Many theoretical frameworks have been developed to explain psychological processes in human behaviour, which are the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB) and the Reasoned Action Approach (RAA) which will be explored in more details as follows.

Theory of Reasoned Action (TRA)

The purpose of the Theory of Reasoned Action (TRA) was developed by Fishbein & Ajzen (1975) and Ajzen & Fishbein (1980) to explain the relationship between attitudes and behaviour as well as the role of subjective norm in human behaviour (Ajzen & Fishbein, 1980). Behaviour can be predicted by intention; attitude toward a behaviour, and normative beliefs, are the antecedents of intention (Fishbein, 1967). TRA was later revised and expanded in the following decades to the Theory of Planned Behaviour (TPB) (with the perceived behavioural control added) in 1991 (Ajzen, 1991) and the Reasoned Action Approach (RAA) (by incorporating background factors) in 2010 (Fishbein & Ajzen, 2010).

Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour (TPB) extended TRA by introducing perceived behavioural control as an additional construct (Ajzen, 1985, 1988, 1991). TPB aims to explain human behaviour, in terms of intention, by considering three key components: attitude, subjective norm and perceived behavioural control (Ajzen, 1991).

Behaviour can be influenced by intention as the strength of intention relates to how likely people are to perform their behaviours (Ajzen, 1991). Intention is thus assumed to be the antecedent of behaviour. There have been a number of studies which identified that intentions could predict behaviours with considerable accuracy by comparing the intention to the actual behaviour after the period of time. For example, people's voting intentions correlated with actual voting choice in the range of 0.75-0.80 (Fishbein & Ajzen, 1981), the choice of infant feeding intentions correlated with the actual choice at 0.82 (Manstead *et al.*, 1983). These results can indicate that intentions play an important role to predict behaviour.

Behaviour and intention should be defined in details of context, action, target and time (Fishbein & Ajzen, 2010). Intention can be directly predicted by attitude, subjective norm, and perceived behavioural control or indirectly predicted by salient beliefs of these three components (Fishbein & Ajzen, 2010).

Ajzen (1991) defined the three components and salient beliefs of TPB as follows. First, attitude can be defined as human or behavioural beliefs about something. These antecedents will generate positive or negative, good or bad, and pleasant or unpleasant attitude toward a behaviour. Attitude can estimate the set of salient beliefs with behavioural beliefs and outcome evaluations.

The next component is subjective norm, which is defined as perceived social pressure by individual or group (i.e. friends, family, doctors) to perform or not to perform the behaviour. Two salient beliefs are formulated to assess subjective norm: normative beliefs and motivation to comply. Normative beliefs refer to perceived expectations of the referent individual or group to perform behaviour. Furthermore, when it comes to performing behaviour, how people are motivated to comply with these referents' expectations must be considered (Ajzen, 1991). The third component is perceived behavioural control which refers to perceived human capability to perform the behaviour; this can substitute for actual behavioural control. Control, and power to control salient beliefs, refers to any capacity and autonomy aspects which facilitate/ease or impede/prevent performance of the behaviour. These salient control beliefs reflect perceived behavioural control (Ajzen, 1991).

Therefore, the main difference between TRA and TPB is that TPB includes perceived behavioural control as an additional component to predict intention and behaviour. For example, Madden *et al.* (1992) compared TPB with TRA for 10 behaviours of 82 undergraduate business students and found that perceived behavioural control enriches the prediction of intentions and behaviours. TPB, as the extension of TRA, explained more variation in intentions than TRA (Madden *et al.*, 1992).

The Reasoned Action Approach (RAA)

Recently, Fishbein & Ajzen (2010) developed the latest behavioural prediction approach, namely the Reasoned Action Approach (RAA), by considering background factors that could potentially affect the three components in TPB and may have an indirect effect on intention and behaviour. The factors may be individual, social or environmental and include age, gender, education, ethnicity, race, culture, religious, personality, mood, emotion, values, perceived risk, media, skills and past behaviour. However, Fishbein & Ajzen (2010) have argued that it is not necessary that these background factors are connected to salient beliefs. Relevant background factors must be related to the context of study.

Figure 2.1 presents the three variants of TPB i.e., the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB) and the Reasoned Action Approach (RAA). The three models share a core assumption that behaviour is explained through intention, while the difference between TRA and TPB is the perceived behavioural control as an additional component. RAA adds the background factors. TPB and RAA propose that behaviours reflect favourable or unfavourable feelings (attitude) toward behaviour, including both what other people may want the subject to do or not to do (subjective norm) and how easy or difficult it is to perform behaviours (perceived behavioural control) (Ajzen, 1991; Fishbein & Ajzen, 2010).

TPB may be critiqued for a limited consideration of intensity of logic and rationality in decision-making; decisions may be made which are biased or irrational (Fishbein & Ajzen, 2010). It would be difficult to argue that people always apply a rationale to their behaviours such as smoking, drunk driving and physical inactivity (Gibbons *et al.*, 1998). Fishbein and Ajzen (2010) suggest that when people make a relatively unimportant behavioural or spontaneous decision, they are more likely to do in basic underlying cognitive processes. Whilst, when people confront an important decision, they may consider more carefully before performing the behaviour.

Despite of the critique of the TPB, TPB has been widely used in studies of decision making. The next section provides a citation analysis of TPB and its variants, which will demonstrate the significance of this framework in relation to farmers' decision marking.
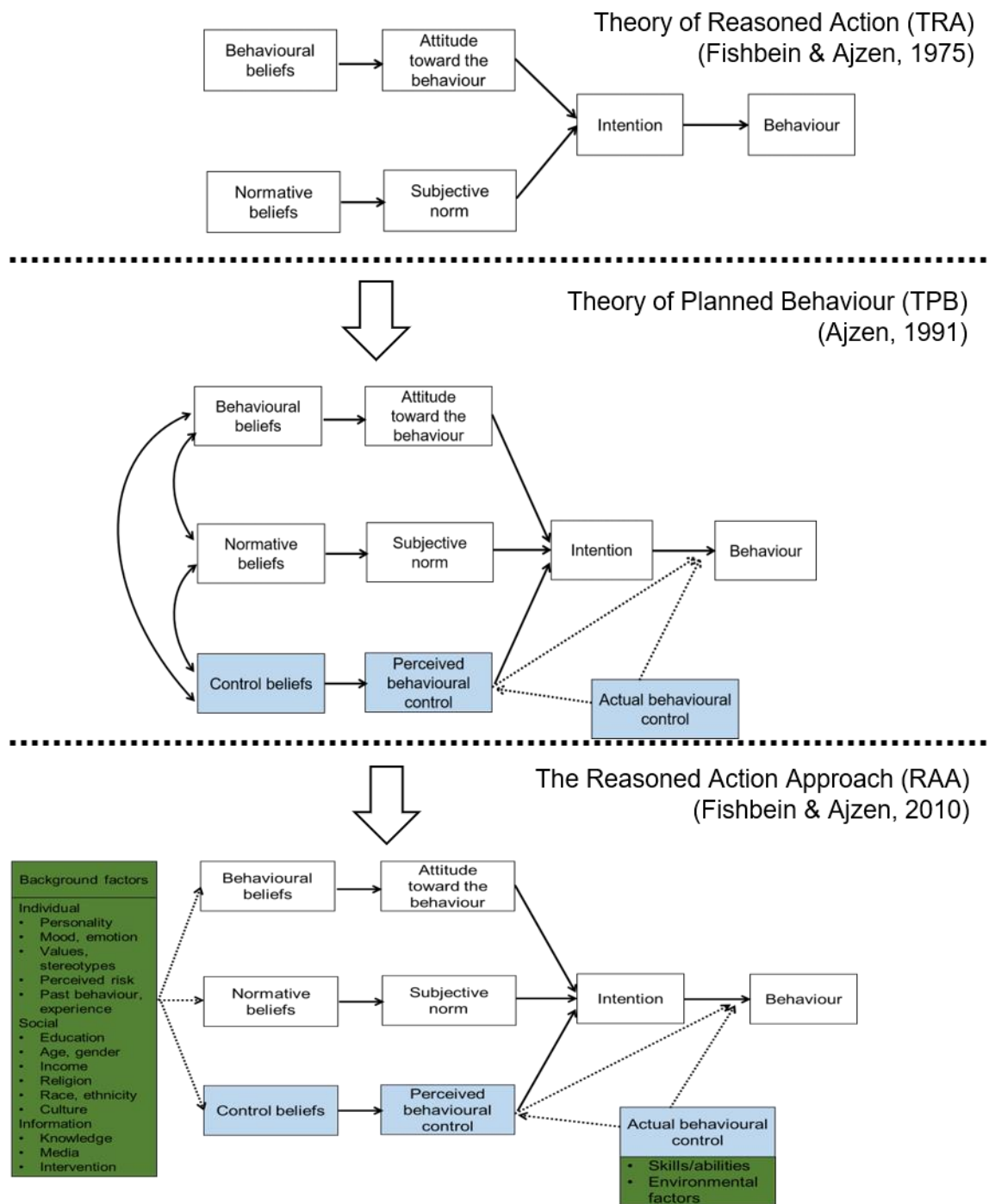
Figure 2.1 Theory of Reasoned Action, Theory of Planned Behaviour and
the Reasoned Action Approach

(Source: Author's illustration from Fishbein & Ajzen, 1975;
Ajzen, 1991; Fishbein & Ajzen, 2010)

2.2.2 Studies citing Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA), and the Reasoned Action Approach (RAA)

Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA) and the Reasoned Action Approach (RAA) have been cited more than fifty thousand times since these theories were published. The information gathered from Google Scholar found that TPB has seen increasing citations since 1991 as shown in Figure 2.2. This suggests that TPB has had a significant contribution to the development of understanding of behaviour.
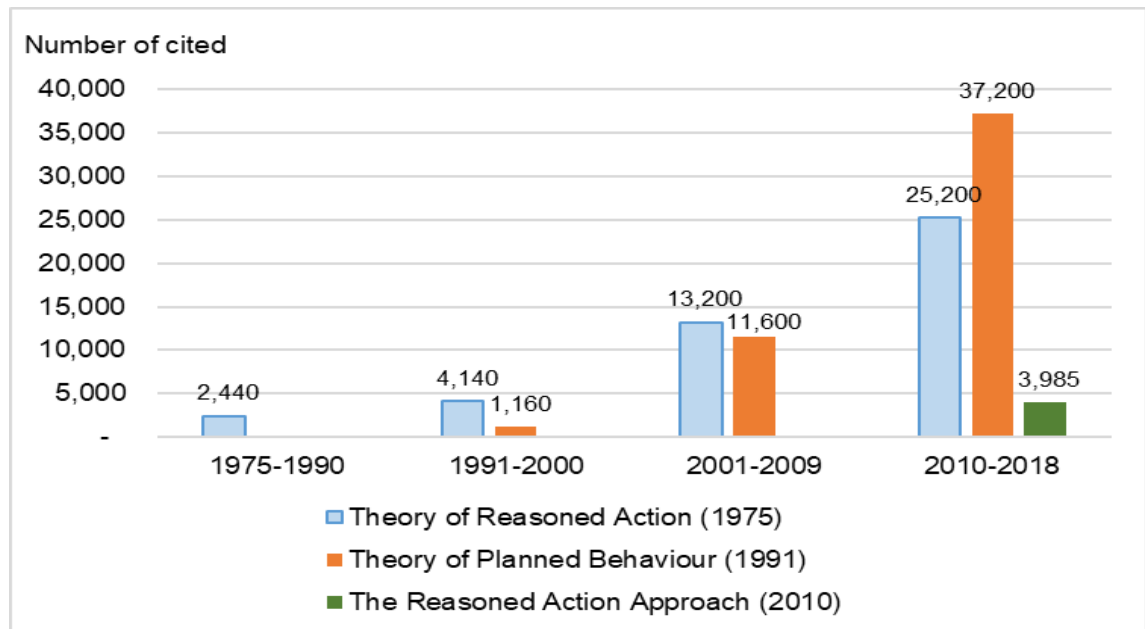
Figure 2.2 Number of citations of three theories in 1975-2018 (bit on other areas)

(Source: Authors' illustration data from Google Scholar which cited Ajzen, 1991; Fishbein & Ajzen, 1975; Fishbein & Ajzen, 2010, Accessed and updated on 2nd September 2018)

The TPB article by Ajzen, published in Organisational Behaviour and Human Decision Processes Journal in 1991, has been cited very widely. A quick scoping search of articles obtained from all databases in Web of Science, the online subscription-based scientific citation indexing service, produced 17,994 records (as at 2nd September 2018). TPB is widely used in social sciences, not only in psychology (49.96%) but also in many research areas such as behavioural sciences (43.06%), business economics (30.36%), other social science (13.7%), sociology (10.92%) and agriculture (3.07%) as shown in Figure 2.3.
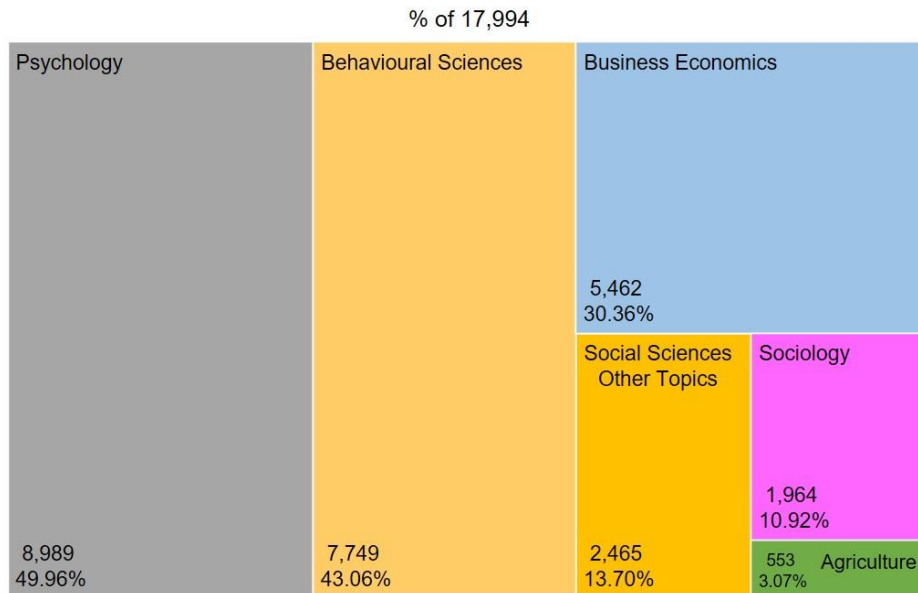
Figure 2.3 Number of citations of Theory of Planned Behaviour by selecting research areas

(Source: Authors' illustration data from Web of Science, 2nd September 2018)

In the sub-category of agriculture, the search in Web of Science generated 253 records (as at 11th September 2018) of the application of TRA, TPB and RAA in relation to farmers (Figure 2.4). These three theories have been cited very widely in general agriculture (65.61%) and in many research areas related to farmers such as psychology (56.13%), environmental sciences ecology (51.78%), business economics (49.41%), behavioural sciences (25.69%) and biodiversity conservation (19.37%).

Using 'farmers' as the key term in Web of Science search, some results released articles on consumers' choice of agricultural products (Hoppe *et al.*, 2013; Giampietri *et al.*, 2016). Furthermore, with a topic search of TPB, there were a number of articles that solely focused on agriculture and farmers but did not include TPB (Debrah, 1994; Frost, 2000), demonstrating a limitation of keyword and topic searches. Subsequently, 101 records were excluded from 253 records, totalling 157 records remaining for the next step (Figure 2.4).

The next process was to identify previous studies that measured/explored 'intention', 'behaviour' or both as dependent variable(s) in qualitative and quantitative studies; literature review and conceptual studies were not included (4 articles). Table 2.1 shows the 153 articles measured intention (104 articles), behaviour (36 articles) or both (13 articles).

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┌─────────────────────────────────────────┐
│              Topic search                │
│ (Fields include Titles, Abstracts,       │
│ Keywords and Indexing fields such as     │
│ Systematics, Taxonomic Terms and         │
│ Descriptors) through Web of Science       │
│ all database (1950-2018)                  │
│ accessed on 11th September 2018           │
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│ TPB Theory of planned behaviour TRA       │
│ Theory of Reasoned Action the reasoned    │
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│ Records related to TPB, TRA, the reasoned │        │ Records which were not relevant    │
│ action approach and Farmer                │───────▶│ with TPB, TRA, the reasoned action │
│ (n = 253-101 = 157)                       │        │ approach and Farmer were excluded  │
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│ Identified studies measured intention,    │
│ behaviour or both as dependent variable   │
│ both qualitative and quantitative studies │        ┌──────────────────────────────────┐
│ (n = 157-4 = 153)                         │        │ Literature review or conceptual    │
└─────────────────────────────────────────┘        │ articles were excluded             │
                    │                               │ (n = 4)                            │
                    ▼                               └──────────────────────────────────┘
```

Records were categorised into different areas
(n=153)
1. Conservation/Environment/Ecology (n= 36)
2. Adoption of technology/innovation (n= 21)
3. Disease/insect control (n= 19)
4. Animal welfare (n=11)
5. Adoption management practices (n=11)
6. Adoption/attendance government programmes (n=11)
7. Organic (n= 9)
8. Goals of farmers (n = 6)
9. Marketing channel selection (n = 3)
10. Other (n= 26)

```
                    │                               ┌──────────────────────────────────┐
                    │──────────────────────────────▶│ Records which were not relevant    │
                    ▼                               │ with TPB, TRA, the reasoned action │
┌─────────────────────────────────────────┐        │ approach, farmer and marketing     │
│ Previous studies related to TPB, TRA, the │        │ channel selection were excluded    │
│ reasoned action approach, Farmer and      │        │ (n = 150)                          │
│ Marketing channel selection               │        └──────────────────────────────────┘
│ (n = 3 ; Australia (1),China (1) and      │
│ Romania (1)                               │
└─────────────────────────────────────────┘
```

Figure 2.4 Flow diagram of the literature search process for identifying studies on farmers decision-making on marketing channel selection by applied three theories

(Source: Authors' illustration data from Web of Science, 11th September 2018)

Table 2.1 Number of studies on farmers decision-making measured/explored intention, behaviour and both as dependent variable(s)

Measured/Explored	Sources
Intention (104 articles)	Adnan *et al.*, 2017a; Adnan *et al.*, 2017b; Aggestam *et al.*, 2017; Alarcon *et al.*, 2014; Andow *et al.*, 2017; Arunrat *et al.*, 2017; Asadollahpour *et al.*, 2016; Baynes *et al.*, 2011; Bechini *et al.*, 2015; Borges & Lansink, 2015, 2016; Borges *et al.*, 2014; Borges *et al.*, 2016; Bruijnis *et al.*, 2013; Chin *et al.*, 2016; Daxini *et al.*, 2018; de Castro Rocha *et al.*, 2009; DeBarr *et al.*, 1998; Donati *et al.*, 2015; Du & Chen, 2011; Duesberg *et al.*, 2017; Dutton *et al.*, 2008; Elliott *et al.*, 2011; Espetvedt *et al.*, 2013a; Espetvedt *et al.*, 2013b; Feng *et al.*, 2010; Fielding *et al.*, 2005; Fleskens & Jorritsma, 2010; Galdino Martinez-Garcia *et al.*, 2013; Galdino Martinez-Garcia *et al.*, 2018; Garforth *et al.*, 2006; Greiner, 2015; Hansson *et al.*, 2012; Heffernan *et al.*, 2008; Herath, 2010a, 2013; Hijbeek *et al.*, 2018; Ho & Yang, 2018; Home *et al.*, 2014; Hou *et al.*, 2016; Hu *et al.*, 2006; Hyland *et al.*, 2018; Jackson *et al.*, 2009; Jiang *et al.*, 2018; Jones *et al.*, 2016; Jonggon, 2016; Jorgensen & Martin, 2015; Josefsson *et al.*, 2017; Juarez-Morales *et al.*, 2017; Kamrath *et al.*, 2018; Kaufmann *et al.*, 2009; Kauppinen *et al.*, 2010; Kauppinen *et al.*, 2013; Kauppinen *et al.*, 2012; Kokoye *et al.*, 2018; Laepple & Kelley, 2013; Lalani *et al.*, 2016; Lee *et al.*, 1997; Li *et al.*, 2013; Lind *et al.*, 2012; Lokhorst *et al.*, 2014; Lokhorst *et al.*, 2011; Martinovska Stojcheska *et al.*, 2015; Mekonnen *et al.*, 2017; Menozzi *et al.*, 2015; Micha *et al.*, 2015; Mislimshoeva *et al.*, 2013; Moellers *et al.*, 2018; Monfared *et al.*, 2015; Morais *et al.*, 2017; Morais *et al.*, 2018; Noremark *et al.*, 2016; Ofoegbu & Speranza, 2017; Palma Lampreia Dos Santos *et al.*, 2010; Pappa *et al.*, 2018; Peluso, 2015; Pino *et al.*, 2017; Poppenborg & Koellner, 2014; Reed & Claunch, 2017; Rezaei *et al.*, 2018; Richens *et al.*, 2018; Robertsen *et al.*, 2018; Schroeder *et al.*, 2015; Senger *et al.*, 2017a, Senger *et al.*, 2017b; Sharifzadeh *et al.*, 2012; Sharp & McLeod, 2016; Sok *et al.*, 2015, Sok *et al.*, 2016, Sok *et al.*, 2018; Sorensen *et al.*, 2008; Stojcheska *et al.*, 2016; Sutherland, 2010; van Dijk *et al.*, 2015, 2016; Van Gossum *et al.*, 2005; Van Hulst & Posthumus, 2016; Vande Velde *et al.*, 2015; Wells *et al.*, 2011; Werner *et al.*, 2017; Wharton *et al.*, 2015; Willcox & Giuliano, 2014; Yazdanpanah *et al.*, 2014; Zeweld *et al.*, 2017
Behaviour (36 articles)	Ambrosius *et al.*, 2015; Beedell & Rehman, 2000; Beedell & Rehman, 1999; Brennan *et al.*, 2016; Breukers *et al.*, 2012; Carr & Tait, 1991; de Lauwere *et al.*, 2012; Delgado *et al.*, 2012; Delgado *et al.*, 2014a, Delgado *et al.*, 2014b; Dolisca *et al.*, 2009; Heong & Escalada, 1999; Herath, 2010b; Herath & Wijekoon, 2013; Jaaskelainen *et al.*, 2014; Jamieson *et al.*, 2015; Larcher *et al.*, 2015; Lynne *et al.*, 1995; Meijer *et al.*, 2015; Meijer *et al.*, 2016; Niu & Zhou, 2015; Nuthall & Old, 2017; O'Kane *et al.*, 2017; Osei *et al.*, 2018; Pandey & Diwan, 2018; Papic & Bogdanov, 2015; Poppenborg & Koellner, 2013; Price & Leviston, 2014; Rehman *et al.*, 2007; Reimer *et al.*, 2012; Steinmetz *et al.*, 2014; Sutherland, 2011; Svensson *et al.*, 2018; Wauters *et al.*, 2010; Wauters *et al.*, 2017; Weary *et al.*, 2016
Both intention and behaviour (13 articles)	Asadi *et al.*, 2010; Bergevoet *et al.*, 2004; Brain *et al.*, 2014; Colemont & Van den Broucke, 2008; Deng *et al.*, 2016; Issa & Hamm, 2017; Jones *et al.*, 2015; Kazemi *et al.*, 2018; Niles *et al.*, 2016; Petrea, 2001; Sutherland & Holstead, 2014; Viira *et al.*, 2014; Wang *et al.*, 2018

(Source: Author's literature review, 2018)

The majority of the studies on farmers decision-making which use TRA, TPB or RAA (67.97%) have measured or explored intention as dependent variable, while several studies measured self-reported behaviours instead (23.53%) as shown in Table 2.1. Most of these studies (84.6%) measured behaviours as actual behaviours or current behaviours not past behaviours. These studies used self-reported behaviours identified by their respondents. However, empirical studies which measured both intentions and behaviours have been low (8.50%). Only two studies (Petrea, 2001; Viira *et al.*, 2014) examined intentions and behaviours by two-stage research design which measured intentions first and after the period of time asked the respondents again about their actual behaviours occurred.

Among 153 previous studies on farmers decision-making which applied TPB, TRA and RAA, nearly half of these studies (40.52%) focused on farmers decision-making in productions such as disease/insect control, animal welfare, adoption management practices, organic practices, adoption of sustainable agriculture and other. Others studied behaviour in conservation/environment/ecology (23.53%), adoption of technology/ innovation (13.73%), adoption/attendance government programmes (7.19%), farmers health/safety (4.58%) goals of farmers (3.92%) and other (5.88%) such as climate change/weather prediction, farmer's family and credit (0.65%) as shown in Figure 2.4.

Although many studies have been carried out on farmers decision-making by applying one of these three theories, only three studies (1.96%) have attempted to investigate marketing channel selection by farmers in Australia (Jackson *et al.*, 2009), in China (Niu & Zhou, 2015) and in Romania (Moellers *et al.*, 2018). The three studies all confirmed the positive effective the key components of TPB on farmers' intention or behaviour. Furthermore, they found the farmers' decision making can be affected by other factors such as relationship dynamics (including trust, social cohesion and networks) (Jackson *et al.*, 2009), transaction specific factors such as price and services provided by the channel (Niu & Zhou, 2015; Moellers *et al.*, 2018). These three studies are based on farmers in Australia (Jackson et al., 2009), in China (Niu & Zhou, 2015), and in Romania (Moellers et al., 2018); however, no studies based on farmers in Thailand were found.

The above literature suggests that the application of TPB can provide insight into farmers' decision making (Burton, 2004). However, such insights have been based on a very limited number of studies. None has looked at the choice of marketing channels by rice farms in Thailand. Therefore, there is a need to review the previous studies in the field of farmers marketing channel selection in order to develop a comprehensive understanding of key influential factors.

2.3 The general framework of marketing channel choice

A marketing or distribution channel can be defined as an organisation or agency which performs activities to link producers with consumers in order to make products or services available (Baines *et al.,* 2017; Kotler *et al.,* 2017). Although various definitions of the term 'marketing channel' exist, this study uses the definition suggested by Jobber and Ellis-Chadwick (2012) which refers to the organisation of products moving from producer to customer.

Within published literature on marketing channels, the distribution channels are mainly categorised as direct or indirect marketing/channels (Macinnis, 2004; Brumfield, 2005; LeRoux, 2014; Seemanon *et al.*, 2015).

A direct marketing channel is a channel where a business can sell its products directly to consumers or end users (LeRoux, 2014) without intermediary levels (Kotler *et al.,* 2017). The advantages of direct channel are that the producers can sell at a higher price through developing relationships with their customers or buyers. However, significant capital and resources are required in order to provide the product direct to buyers or consumers (Baines *et al.,* 2017).

Indirect marketing channels are used by selling products through intermediaries such as retailers, wholesalers, cooperatives, agents/brokers and distributors (Macinnis, 2004; Brumfield, 2005; LeRoux, 2014). With the seller primarily focusing on production, the costs of marketing fall predominantly upon the intermediary (Brumfield, 2005). Yet with the cost of marketing activities absorbed by intermediaries, the suppliers are likely to receive a lower price and have less control over price compared with direct marketing.

Therefore, in marketing channel selection, suppliers are faced with the dilemma of choosing between selling through indirect channels at a relatively low price in large volumes or selling directly to consumers at a higher price but running the risk of unsold products (LeRoux, 2014; Seemanon *et al.*, 2015). However, the risk of lower prices within indirect channels are a consequence of vertical channel conflict where buyers and dealers act opportunistically (Baines *et al.,* 2017; Kotler *et al.,* 2017). Such actions can be inhibited by the increase of co-operation and co-ordination of activities by farmers, but similarly these types of ventures may be affected adversely where there is rivalry between farmers, with a similar lowering of farm gate price.

2.4 Previous studies on farmers' marketing channel selection

This section reviews the previous studies on farmers' marketing channel selection, totalling 52 articles. It first reviewed the marketing channels used by farmers in terms of direct and indirect marketing channels. The next sub-section summarised the factors affecting farmers' marketing channel selection from the previous studies four main

categories: (1) socio-demographic factors including demographic and farming, (2) transaction specific factors, (3) relationship dynamic factors and (4) other factors.

2.4.1 Marketing channels used by farmers

Numerous studies have identified the main channels used by farmers in their supply chains which are mainly have been sold through indirect channels which are: (1) middlemen/intermediaries/brokers, (2) wholesalers, (3) local traders, (4) cooperatives, (5) processing/agro-industrial companies/businesses, (6) export agents, (7) supermarkets, (8) food services (i.e. restaurants/hotels), (9) auctions and (10) specific channel such as development authority, government agents as shown in Table 2.2.

Table 2.2 Marketing channels used by farmers

Marketing channels	Sources
1. Direct marketing	
1.1 Farmers' markets	Verhaegen & Huylenbroeck, 2001; Park & Lohr, 2006; Voors & Haese 2010; Girma & Abebaw, 2012; Benedek *et al.*, 2014
1.2 Consumer/Other farmers/ Friends/ Relatives/End users/ Road side	Staal *et al.*, 2006; Park & Lohr, 2006; Musemwa *et al.*, 2007; Ogunleye & Oladeji, 2007; Monson *et al.*, 2008; Tsourgiannis *et al.*, 2008; Chirwa, 2009; LeRoux *et al.*, 2009; Tsourgiannis *et al.*, 2012; Sikawa & Mugisha, 2011; Cazzuffi & McKay, 2012; Bardhana *et al.*, 2012;; Huang *et al.*, 2012; Jari & Fraser, 2012; Mukiama *et al.*, 2014; Mutura *et al.,*2015; Farmer & Betz, 2016; Adanacioglu, 2017
1.3 Farm gates *	Woldie & Nuppenau, 2009; Jagwe & Machethe, 2011; Cazzuffi & McKay, 2012; Jari & Fraser, 2012; Panda & Sreekumar, 2012; Mabuza *et al.*, 2014
2. Indirect marketing	
2.1 Middlemen/ Intermediaries/Brokers (Did not specific in their local areas)	Gong *et al.*, 2006; Staal *et al.*, 2006; Sharma *et al.*, 2009; Blandon *et al.*, 2010; Bardhana *et al.*, 2012; Escobal & Cavero, 2012; Girma & Abebaw, 2012; Higuchi *et al.*, 2012; Jari & Fraser, 2012; Mabuza *et al.*, 2014; Arinloye *et al.*, 2015; Mafukata, 2015; Maina *et al.*, 2015; Mutura *et al.,*2015; Ndoro *et al.*, 2015; Abebe *et al.*, 2016; Ahmed *et al.*, 2016; Farmer & Betz, 2016
2.2 Wholesalers	Ferto & Szabó, 2002; Park & Lohr, 2006; Tsourgiannis *et al.*, 2008; LeRoux *et al.*, 2009; Panda & Sreekumar, 2012; Tsourgiannis *et al.*, 2012; Huang *et al.*, 2012; Xaba & Masuku, 2013; Abebe *et al.*, 2016

Table 2.2 Marketing channels used by farmers (cont.)

Marketing channels	Sources
2. Indirect marketing	
2.3 Local traders	De Bruyn *et al.*, 2001; Mburu *et al.*, 2007; Musemwa *et al.*, 2007Tsourgiannis *et al.*, 2008; Chirwa, 2009; Woldie & Nuppenau, 2009; Kumar *et al.*, 2011; Schipmann & Qaim, 2011; Sikawa & Mugisha, 2011; Cazzuffi & McKay, 2012; Huang *et al.*, 2012; Jari & Fraser, 2012; Mukiama *et al.*, 2014; Benedek *et al.*, 2014; Maina *et al.*, 2015; Soe *et al.*, 2015; Srinivas *et al.*, 2014; Gelaw *et al.*, 2016
2.4 Cooperatives	Verhaegen & Huylenbroeck, 2001; Ferto & Szabó, 2002; Park & Lohr, 2006; Staal *et al.*, 2006; Ogunleye & Oladeji, 2007; Mburu *et al.*, 2007; Wollni & Zeller, 2007; Tsourgiannis *et al.*, 2008; Sharma *et al.*, 2009; Kumar *et al.*, 2011; Sikawa & Mugisha, 2011; Bardhana *et al.*, 2012; Zivenge & Karavina 2012; Milford, 2014; Mukiama *et al.*, 2014; Mutura *et al.,*2015; Gelaw *et al.*, 2016; Phon & Yamaji, 2016
2.5 Processing/agro-industrial companies/businesses	De Bruyn *et al.*, 2001; Park & Lohr, 2006; Staal *et al.*, 2006 ; Verhaegen & Huylenbroeck, 2001 Ferto & Szabó, 2002; Gong *et al.*, 2006; Tsourgiannis *et al.*, 2008; Sharma *et al.*, 2009; Voors & Haese, 2010; Schipmann & Qaim, 2011; Sikawa & Mugisha, 2011; Escobal & Cavero, 2012; Jari & Fraser, 2012; Tsourgiannis *et al.*, 2012; Srinivas *et al.*, 2014; Arinloye *et al.*, 2015; Mafukata, 2015; Soe *et al.*, 2015
2.6 Export agents	Schipmann & Qaim, 2011; Jari & Fraser, 2012; Arinloye *et al.*, 2015
2.7 Supermarkets	Park & Lohr, 2006; Blandon *et al.*, 2010; Panda & Sreekumar, 2012; Zivenge & Karavina 2012; Mabuza *et al.*, 2014
2.8 Food services (Restaurants/Hotels)	Park & Lohr, 2006; Mburu *et al.*, 2007; Tsourgiannis *et al.*, 2008; Kumar *et al.*, 2011; Tsourgiannis *et al.*, 2012; Mabuza *et al.*, 2014
2.9 Auctions	Musemwa *et al.*, 2007; Jari & Fraser, 2012; Tsourgiannis *et al.*, 2012; Ndoro *et al.*, 2015
2.10 Specific channel (e.g. Development authority, Government agents)	Ogunleye & Oladeji, 2007; Wollni & Zeller, 2007; Harrizon *et al.*, 2016
3. Both direct and indirect marketing channels	Verhaegen & Huylenbroeck, 2001; Park & Lohr, 2006; Staal *et al.*, 2006; Musemwa *et al.*, 2007; Ogunleye & Oladeji, 2007; Tsourgiannis *et al.*, 2008; Chirwa, 2009; LeRoux *et al.*, 2009; Voors & Haese, 2010; Sikawa & Mugisha, 2011; Bardhana *et al.*, 2012; Cazzuffi & McKay, 2012; Girma & Abebaw, 2012; Huang *et al.*, 2012; Jari & Fraser, 2012; Tsourgiannis *et al.*, 2012; Benedek *et al.*, 2014; Maina *et al.*, 2015; Mukiama *et al.*, 2014; Mutura *et al.,* 2015; Farmer & Betz, 2016

Note: * Selling at farm gates, whereas, it might have sold to consumers or intermediaries.

(Source: Author's literature review, 2017)

Several studies have found that farmers sold to direct marketing channels such as farmers' markets (Verhaegen & Huylenbroeck, 2001; Park & Lohr, 2006; Voors & Haese, 2010; Benedek *et al.*, 2014), direct to consumer (Staal *et al.*, 2006; LeRoux *et al.*, 2009; Sikawa & Mugisha, 2011; Bardhana *et al.*, 2012; Girma & Abebaw, 2012; Huang *et al.*, 2012; Mukiama *et al.*, 2014; Mutura *et al.*, 2015; Farmer & Betz, 2016), friends/ relatives (Musemwa *et al.*, 2007; Chirwa, 2009), other farmers/ neighbours (Ogunleye & Oladeji, 2007 Cazzuffi & McKay, 2012), end users (Park & Lohr, 2006; Tsourgiannis *et al.*, 2008; Tsourgiannis *et al.*, 2012) and road side (Jari & Fraser, 2012). Whilst many studies found that 'farm gate selling' is one of the channels used (Woldie & Nuppenau, 2009; Jagwe & Machethe, 2011; Cazzuffi & McKay, 2012; Jari & Fraser, 2012; Mabuza *et al.*, 2014), these studies did not identify whether the buyers would pick up their products at farm gates.

Although many studies have identified direct marketing channels used by farmers, only two studies have focused on only direct marketing channels: direct marketing of small fruit and specialty-product markets in Virginia, U.S. (Monson *et al.*, 2008) and cherry farming in the Kemalpasa District of Izmir, Turkey (Adanacioglu, 2017).

Some research has considered both direct and indirect marketing channels as presented in Table 2.2, for example, direct markets (i.e. farmer's markets, community supported agriculture operations and subscription farms), retail outlets (i.e. food stores, local supermarkets, and restaurants) and wholesale markets for organic farmers in U.S (Park & Lohr, 2006), direct to consumers, small brokers, private and milk state-owned milk collection stations for daily farmers in China (Huang *et al.*, 2012).

Only two previous studies have examined factors influencing marketing channel selection in the rice sector in Southeast Asian countries: Vietnam (Cazzuffi & McKay, 2012) and Myanmar (Soe *et al.*, 2015). Cazzuffi & McKay (2012) found that rice farmers in Vietnam sold to traders as an indirect channel and sold directly to other households at the farmgate. The other study conducted by Soe *et al.* (2015) found that rice farmers in Myanmar sold to indirect channels such as rice millers, brokers, commission men, collectors, and traders at the farm gates. Whilst some studies have been carried out on factors affecting marketing channel selection by rice farmers, no studies have been found which focus on rice farmers in Thailand. After using existing studies to identify marketing channels, the next sub-section will summarise the factors influencing farmers' decisions to choose their marketing channels.

2.4.2 Factors affecting farmers' marketing channel selection

Many studies have been conducted to identify factors affecting choice of marketing channels by farmers. Farming sectors studied include: grain such as rice (Cazzuffi & McKay, 2012; Soe *et al.*, 2015) and maize (Chirwa, 2009), beverage (e.g. tea and coffee) (Ogunleye & Oladeji, 2007; Milford, 2014; Harrizon *et al.*, 2016), fruit & vegetable (e.g. banana, mango, orange, tomato) (Ferto & Szabó, 2002; Woldie & Nuppenau, 2009; Panda

& Sreekumar, 2012), livestock (Gong *et al.*, 2006; Tsourgiannis *et al.*, 2008; Huang *et al.*, 2012), and generic (Verhaegen & Huylenbroeck, 2001; Park & Lohr, 2006; Benedek *et al.*, 2014; Ahmed *et al.*, 2016). See more references in Table 2.3.

Some empirical literature has focused on factors influencing small-scale farmers' marketing choice in particular, i.e. small-scale cattle farmers in India (Kumar *et al.*, 2011), in Kenya (Mburu *et al.*, 2007) and in the Republic of Macedonia (Voors & Haese, 2010), small-scale fresh fruits and vegetables farmers in Honduras (Blandon *et al.*, 2010) and in U.S. (LeRoux *et al.*, 2009). Other studies did not specifically focus on smallholder farmers, but many studies have measured farm size as one of the factors affecting channel selection (Table 2.4).

Factors found to be affecting the choice of marketing channels have been explored, with several studies focusing on specific factors, such as transaction cost economics (Woldie & Nuppenau, 2009; Jagwe & Machethe, 2011; Escobal & Cavero, 2012; Shiimi *et al.*, 2012; Mabuza *et al.*, 2013; Maina, 2015) and socio-economic factors (Mafukata, 2015).

Therefore, from the considerable amount of published literature, factors influencing the choice of marketing channels by farmers can be grouped into four main categories: (1) socio-demographic, (2) transaction specific factors, (3) relationship dynamics factors and (4) other factors (past behaviour, goals and future plans). Socio-demographic factors include farmer-related factors (as shown in Table 2.3) such as age, gender, level of education, experience, and household size; as well as farm-related factors (Table 2.4) such as farm size, type of production, location, membership of farming groups, access to information, and off-farm work. Transaction specific factors (Table 2.5) include price, transportation cost, methods of payment and channel offering. Relationship dynamics (Table 2.6) include trust, personal relationship and power. Other factors (also in Table 2.6) include past behaviour, goals and future plans.

The subsequent sections (2.4.2.1-2.4.2.4) summarise the significance (indicated by "√" in Tables 2.3-2.6) and non-significance (indicated by "x" in Tables 2.3-2.6) of the finding related to these four main categories of factors explored in previous studies which were hypothesised to influence the marketing channels selection of farmers.

2.4.2.1 Socio-demographic factors

Socio-demographic factors measured in previous studies can be divided into two main sub-categories. Firstly, demographic factors or characteristics of farmer which are age, gender, education, farming experience and household size. The other sub-category is farming profile: farm/land size, production including quantity produced and sales, location as well as distance to market, membership, access to information and off-farm work. These factors have also been found to impact the farmers marketing channel selection. As can be seen in Tables 2.3 and 2.4, the majority of previous studies have been mainly focused on socio-demographic factors.

Table 2.3 Summary of demographic factors influencing the choice of marketing channels by farmers tested/explored in previous studies

Sector	Countries	Farm Scale	Channels	Age	Gender	Education	Experience	Household size	Sources
Grain	Malawi	Small	Both	X	X	√		X	Chirwa, 2009
Grain	Myanmar	Other	Indirect		X	X	X		Soe *et al.*, 2015
Grain	Vietnam	Other	Both	√					Cazzuffi & McKay, 2012
Beverage	Ethiopia	Other	Indirect						Gelaw *et al.*, 2016
Beverage	Costa Rica	Other	Indirect	X	√	√	√		Wollni & Zeller, 2007
Beverage	Kenya	Other	Indirect	√	√	√	√	√	Harrizon *et al.*, 2016
Beverage	Mexico	Other	Indirect	X	X		X	X	Milford, 2014
Beverage	Nigeria	Other	Both						Ogunleye & Oladeji, 2007
Beverage	Peru	Other	Indirect	√	X	X			Higuchi *et al.*, 2012
Fruit & Vegetable	Benin	Other	Indirect	√		X			Arinloye *et al.*, 2015
Fruit & Vegetable	Cambodia	Other	Indirect		X	√	X	X	Phon & Yamaji, 2016
Fruit & Vegetable	Central Africa	Small	Indirect	√	√	X		√	Jagwe & Machethe, 2011
Fruit & Vegetable	Ethiopia	Other	Indirect	√		√		X	Abebe *et al.*, 2016
Fruit & Vegetable	Ethiopia	Other	Indirect				X		Woldie & Nuppenau, 2009
Fruit & Vegetable	Honduras	Small	Indirect	√		X		X	Blandon *et al.*, 2010
Fruit & Vegetable	Hungary	Other	Indirect	√					Ferto & Szabó, 2002
Fruit & Vegetable	India	Other	Indirect						Panda & Sreekumar, 2012
Fruit & Vegetable	Kenya	Other	Both	√	√	√	√		Maina *et al.,* 2015
Fruit & Vegetable	Peru	Other	Indirect	X	√	√			Escobal & Cavero, 2012
Fruit & Vegetable	South Africa	Small	Both				√		Jari & Fraser, 2012
Fruit & Vegetable	Swaziland	Other	Indirect			√			Mabuza *et al.*, 2014
Fruit & Vegetable	Swaziland	Other	Indirect	√	X	√			Xaba & Masuku, 2013
Fruit & Vegetable	*Thailand*	Small	Both		√		√		Mukiama *et al.*, 2014
Fruit & Vegetable	*Thailand*	Other	Indirect						Schipmann & Qaim, 2011
Fruit & Vegetable	Turkey	Other	Direct				√		Adanacioglu, 2017
Fruit & Vegetable	U.S.	Small	Both						LeRoux *et al.*, 2009
Fruit & Vegetable	U.S.	Other	Both	X		√	√		Farmer & Betz, 2016
Fruit & Vegetable	U.S.	Other	Direct		X	X	X	√	Monson *et al.*, 2008
Fruit & Vegetable	Zimbabwe	Other	Indirect	X	X	X	X	X	Zivenge & Karavina, 2012

Table 2.3 Summary of demographic factors influencing the choice of marketing channels by farmers tested/explored in previous studies (cont.)

Sector	Countries	Farm Scale	Channels	Age	Gender	Education	Experience	Household size	Sources
Livestock	Afghanistan	Other	Indirect	X	X				Srinivas *et al.*, 2014
Livestock	China	Other	Indirect	√		√	√	X	Gong *et al.*, 2006
Livestock	China	Other	Both	√		X			Huang *et al.*, 2012
Livestock	Greece	Other	Both	√					Tsourgiannis *et al.*, 2008
Livestock	Greece & U.K.	Other	Both						Tsourgiannis *et al.*, 2012
Livestock	Ethiopia	Other	Both	√	√	√		√	Girma & Abebaw, 2012
Livestock	India	Small	Indirect	X	X	√		X	Kumar *et al.*, 2011
Livestock	India	Other	Both	√		X		√	Bardhana *et al.*, 2012
Livestock	India	Other	Indirect	√		√			Sharma *et al.*, 2009
Livestock	India	Other	Both	X	X	X			Staal *et al.*, 2006
Livestock	Kenya	Small	Indirect	X		X			Mburu *et al.*, 2007
Livestock	Kenya	Other	Both	X	X	√			Mutura *et al.*,2015
Livestock	Macedonia	Small	Both	√		√	X	X	Voors & Haese, 2010
Livestock	Namibia	Other	Indirect	√		√			De Bruyn *et al.*, 2001
Livestock	Namibia	Other	Indirect	√			√		Shiimi *et al.*, 2012
Livestock	South Africa	Other	Indirect	X		X	X	X	Mafukata, 2015
Livestock	South Africa	Other	Both	√	X	√	√		Musemwa *et al.*, 2007
Livestock	South Africa	Other	Indirect	√		X			Ndoro *et al.*, 2015
Livestock	Uganda	Other	Both	√		√			Sikawa & Mugisha, 2011
Generic	Belgium	Other	Both						Verhaegen & Huylenbroeck, 2001
Generic	Hungary	Small	Both	√	√	√	√	√	Benedek *et al.*, 2014
Generic	Pakistan	Small	Indirect			√			Ahmed *et al.*, 2016
Generic	U.S.	Other	Both				√		Park & Lohr, 2006

Note: √ = Significant factors, X = Non-significant factors

(Source: Author's literature review, 2017)

1) Demographic factors/characteristics of farmer

Age

Age has been used as an independent predictive factor in many studies of farmers' marketing channel choice with mixed levels of statistical significance (Table 2.3).

Age has been identified as a significant factor influencing channel choice by farmers in some studies (as indicated by "√" in Table 2.3). For example, age was found to significantly affect pineapple farmers' decision making on whether to sell to urban or rural markets in Benin. Older farmers preferred rural market outlets, while younger farmers had a preference to sell to the urban market (Arinloye *et al.*, 2015). One explanation for this result is that older farmers have a long-term relationship with the agent in the rural market, whilst younger farmers are more willing to take risks to go further to sell to urban market (Arinloye *et al.*, 2015). It is consistent with another product in the fruit and vegetable sector: an increase in age of mango farmers in Makueni, Kenya by one year increased the probability of choosing a broker by 5.71%, while decreasing the probability of choosing a local trader by 5.71%, indicating that older farmers prefer to sell to a broker at the farm gate (Maina *et al.,* 2015).

However, these results differ from some published studies (Staal *et al.*, 2006; Mburu *et al.*, 2007; Kumar *et al.*, 2011; Zivenge and Karavina, 2012; Srinivas *et al.*, 2014; Mafukata, 2015; Mutura *et al.*, 2015) as indicated by "x" in Table 2.3. For instance, age was not a significant influencing factor for the market channel choice based on survey of 991 smallholder maize farmers in Malawi (Chirwa, 2009). The results from multinomial logit model found that there was no statistically significant difference between the age of household head and three channels used: private traders, local market and relatives/neighbours. The author determined that other factors, which were education, relationship and distance to market, were identified as the main driving factors affecting the choice of marketing channels by small-scale maize farmers in Malawi (Chirwa, 2009).

Gender

Gender is another demographic factor examined by many studies with mixed results.

Gender was identified as a significant factor influencing channel choice in different sectors, for example: beverages (Wollni and Zeller, 2007; Harrizon *et al.*, 2016); fruit & vegetable (Jagwe and Machethe, 2011; Escobal and Cavero, 2012; Mukiama *et al.*, 2014; Maina *et al.*, 2015); livestock (Girma and Abebaw, 2012); and small-scale farmers in Hungary (Benedek *et al.*, 2014). For example, female vegetable farmers in Khon Kaen, Thailand were found to be less likely to sell to a collector, however, they would be more likely to choose a cooperative by 10.9% (Mukiama *et al.*, 2014). Harrizon *et al.* (2016), in a

study of tea farmers in Kenya, found that male-headed households had significantly greater participation in the Kenya Tea Development Authority channel.

Some studies have found that gender was not a significant factor differentiating marketing channel choice (Staal *et al.*, 2006; Musemwa *et al.*, 2007; Chirwa, 2009; Monson *et al.*, 2008; Kumar *et al.*, 2011; Higuchi *et al.*, 2012; Zivenge & Karavina, 2012; Xaba & Masuku, 2013; Milford, 2014; Srinivas *et al.*, 2014; Mutura *et al.*,2015; Soe *et al.*, 2015; Phon & Yamaji, 2016).

Education

Education is another factor which has been frequently associated with farmers' marketing channel selection directly or indirectly. Education level impacts on farmers' access to up-to-date market information (Arinloye *et al.,* 2015), which affects farmers' selection of marketing channels. Farmer and Betz (2016) found that West Virginian farmers who had a higher educational attainment tended to sell direct to consumers, which implied that better educated farmers were able to seek more information and take risks with a direct marketing channel. Their study also suggested that better educated farmers were less concerned with technological change and less reliant on external financing options (Farmer and Betz, 2016). The findings of this study were somewhat similar to that by Mutura *et al.* (2015) who found that the more educated small-scale dairy farmers in Kenya were more likely to sell through cooperatives than middlemen, due to their ability to understand and interpret market information. A common theme is that using indirect channels usually does not need as much information-seeking as using direct marketing channels. The use of marketing channels by farmers has been frequently related to education attainment: direct channels require information-seeking and risk assessment. Educational impact is complex, but it seems that if rice farmers in Thailand prefer to sell to indirect channels this has a significant association with their education level.

Education was not found to have affected farmers' channel choice in some other studies: paddy rice farmers in Myanmar (Soe *et al.*, 2015), coffee farmers in Peru (Higuchi *et al.*, 2012), pineapple farmers in Benin (Arinloye *et al.*, 2015) and small-scale fresh fruits and vegetables in Honduras (Blandon *et al.*, 2010). In those studies, the farmers who were sampled had lower level of education in general. For example, level of education of Myanmar paddy rice farmers as expected to negatively influence selling at the farm gate; however, the result showed that educational attainment did not affect the channel selection (Soe *et al.*, 2015). The authors suggested that this might have been caused by the fact that there was little difference among respondents' education (with the highest level of education being secondary school) (Soe *et al.*, 2015).

Experience

Various empirical studies consider whether the length of experience of farmers has a significant impact on choice of marketing channel (as indicated by "√" in Table 2.3). Farmers with less experience have a high probability of using a single marketing channel, while more experienced farmers tend to diversify and market through different channels (Park & Lohr 2006). Harrizon *et al.* (2016) found that small-scale tea farmers in Kenya with more experience were less likely to sell to the Kenya Tea Development Authority (KTDA). At one time the KTDA was the only channel for small-scale tea farmers, however the liberalization of the tea sector in 2000 led to the emergence of new marketing channels in Kenya. Tea farmers then had more choices to sell green leaf tea. The authors suggested that this was one of the reasons that tea farmers who had more experience were less likely to participate in a KTDA channel.

Farmers with more experience are able to choose to sell directly to consumers. Adanacioglu (2017) found in a study of cherry farming in the Kemalpasa District of Izmir, Turkey, that farmers with more than 20 years' experience were more likely to choose direct marketing channels. Maina *et al.* (2015) found much the same with small-scale mango farmers in Makueni County, Kenya.

However, some studies (Monson *et al.*, 2008; Voors & Haese, 2010) have found that length of experience was not statistically significant in channel selection. Their explanations of these results might be other factors found to be more significant than experience, such as organic production and certification (Monson *et al.*, 2008).

In summary, farmers with more experience are expected to have more knowledge in both production and marketing. Mukiama *et al.* (2014) identified that small-scale vegetable farmers in Khon Kaen, Thailand who had less experience were more likely to choose the low risk or reliable channel, such as farmer cooperative, than sell to collector or direct channels.

Household size

The last factor in the demographic sub-group is household size. The size of household factor relates to labour availability (Higuchi *et al.*, 2012; Abebe *et al.*, 2016) and product surplus for selling (after meeting the farm's own consumption) (Girma and Abebaw, 2012).

Some studies have found this significantly influenced the channel choice decision (Monson *et al.*, 2008; Jagwe & Machethe, 2011; Bardhana *et al.*, 2012; Girma & Abebaw, 2012; Harrizon *et al.*, 2016). Household size was found to be positively and statistically significant in research that considered on farm family labour availability for tea plucking (Harrizon *et al.*, 2016) and for livestock production (Girma & Abebaw, 2012). Another study found a statistically significant negative effect: larger households tended to sell less of their product to direct channels (Monson *et al.*, 2008). Other studies have found that this did not

affect choice of marketing channel (Gong *et al.*, 2006; Chirwa, 2009; Blandon *et al.*, 2010; Voors & Haese, 2010; Kumar *et al.*, 2011; Zivenge & Karavina, 2012; Milford, 2014; Mafukata, 2015; Abebe *et al.*, 2016; Phon & Yamaji, 2016).

2) Farming factors

The next sub-category, farming profile, was divided into six sub-groups: farm/land size, type of production, farming location, membership, access to information and off-farm work as presented in Table 2.4.

Farm size

Farm size, including cultivated land size and herd size, was found to be an influencing factor in most studies as shown in Table 2.4. Farm size is a determinant factor, indicative of volume of production and quantity for sale (Abebe *et al.*, 2016). An increase in farm size leads to the increase in the proportion of the crop that is available for market and greater willingness to sell (De Bruyn *et al.*, 2001). It is expected that farm size variable will correlate and influence the marketing channel decision-making.

There have been many empirical investigations into the farm size of smallholder farmers (Mburu *et al.*, 2007; Chirwa, 2009; LeRoux *et al.*, 2009; Blandon *et al.*, 2010; Voors & Haese, 2010; Jagwe & Machethe, 2011; Kumar *et al.*, 2011; Benedek *et al.*, 2014; Mukiama *et al.*, 2014). Some of these studies have found that farm size influenced the marketing channel decision-making (Mburu *et al.*, 2007; Chirwa, 2009; LeRoux *et al.*, 2009; Voors & Haese, 2010; Benedek *et al.*, 2014; Mukiama *et al.*, 2014). For example, small-scale vegetable farmers in Khon Kaen, Thailand whose vegetable land size was less than 0.5 rai (≤0.08 hectare, ≤0.19 acre) were more likely to sell though a collector at the farm gate. The reason for this was that they tried to avoid transportation costs (Mukiama *et al.*, 2014). Some studies found that larger farms, with more labour and a higher output, had the possibility of choosing whether to go to retail markets (Mabua *et al.*, 2013) or wholesale channels (LeRoux *et al.*, 2009).

However, size and productivity do not necessarily directly influence the choice of marketing channels (De Bruyn *et al.*, 2001). Some studies have found that farm size makes no significant difference in terms of channel choice because the range of land size of respondents in these studies was low (Blandon *et al.*, 2010; Higuchi *et al.*, 2012).

Table 2.4 Summary of farming factors influencing the choice of marketing channels by farmers tested or explored in previous studies

Sector	Countries	Farm Scale	Channels	Farm Size	Production	Location	Membership	Access to information	Off-farm work	Sources
Grain	Malawi	Small	Both	√	√	√				Chirwa, 2009
Grain	Myanmar	Other	Indirect		√	√		√	X	Soe *et al.*, 2015
Grain	Vietnam	Other	Both		√	√				Cazzuffi & McKay, 2012
Beverage	Ethiopia	Other	Indirect			√	√			Gelaw *et al.*, 2016
Beverage	Costa Rica	Other	Indirect	√	√	√	√	X		Wollni & Zeller, 2007
Beverage	Kenya	Other	Indirect	√	√	√	√			Harrizon *et al.*, 2016
Beverage	Mexico	Other	Indirect	√	√	√	√	√		Milford, 2014
Beverage	Nigeria	Other	Both			√				Ogunleye & Oladeji, 2007
Beverage	Peru	Other	Indirect	X		√	√			Higuchi *et al.*, 2012
Fruit &Vegetable	Benin	Other	Indirect	√	√	√				Arinloye *et al.*, 2015
Fruit &Vegetable	Cambodia	Other	Indirect		√	√	√	√		Phon & Yamaji, 2016
Fruit &Vegetable	Central Africa	Small	Indirect	√	√	√	X	√		Jagwe & Machethe, 2011
Fruit &Vegetable	Ethiopia	Other	Indirect	√	√	√	X			Abebe *et al.*, 2016
Fruit &Vegetable	Ethiopia	Other	Indirect	√		√		√		Woldie & Nuppenau, 2009
Fruit &Vegetable	Honduras	Small	Indirect	X	√	√	√			Blandon *et al.*, 2010
Fruit &Vegetable	Hungary	Other	Indirect					√		Ferto & Szabó, 2002
Fruit &Vegetable	India	Other	Indirect		√	√	X	√		Panda & Sreekumar, 2012
Fruit &Vegetable	Kenya	Other	Both		X	√	√	√		Maina *et al.,* 2015
Fruit &Vegetable	Peru	Other	Indirect	√	√	√	√			Escobal & Cavero, 2012
Fruit &Vegetable	South Africa	Small	Both		√	X	√	√		Jari & Fraser, 2012
Fruit &Vegetable	Swaziland	Other	Indirect		√	√	√	√	√	Mabuza *et al.*, 2014
Fruit &Vegetable	Swaziland	Other	Indirect	√	√	√	√	X		Xaba & Masuku, 2013
Fruit &Vegetable	*Thailand*	Small	Both	√	√		√			Mukiama *et al.*, 2014
Fruit &Vegetable	*Thailand*	Other	Indirect	√		√		√	√	Schipmann & Qaim, 2011
Fruit &Vegetable	Turkey	Other	Direct	√	√	√				Adanacioglu, 2017
Fruit &Vegetable	U.S.	Small	Both	√	√	√				LeRoux *et al*., 2009
Fruit &Vegetable	U.S.	Other	Both	√	√	√			X	Farmer & Betz, 2016
Fruit &Vegetable	U.S.	Other	Direct	√	√					Monson *et al.*, 2008
Fruit &Vegetable	Zimbabwe	Other	Indirect	√	X	X	√	√		Zivenge & Karavina, 2012

Table 2.4 Summary of farming factors influencing the choice of marketing channels by farmers tested or explored in previous studies (cont.)

Sector	Countries	Farm Scale	Channels	Farm Size	Production	Location	Membership	Access to information	Off-farm work	Sources
Livestock	Afghanistan	Other	Indirect		√	X		X		Srinivas *et al.*, 2014
Livestock	China	Other	Indirect	√		√		X		Gong *et al.*, 2006
Livestock	China	Other	Both	√		√			√	Huang *et al.*, 2012
Livestock	Greece	Other	Both	√	√	√			√	Tsourgiannis *et al.*, 2008
Livestock	Greece & U.K.	Other	Both		√					Tsourgiannis *et al.*, 2012
Livestock	Ethiopia	Other	Both		√	√	√	√	√	Girma & Abebaw, 2012
Livestock	India	Small	Indirect	X	X	X				Kumar *et al.*, 2011
Livestock	India	Other	Both	√	√	√		X		Bardhana *et al.*, 2012
Livestock	India	Other	Indirect	√	√	√	√			Sharma *et al.*, 2009
Livestock	India	Other	Both	√	√	√				Staal *et al.*, 2006
Livestock	Kenya	Small	Indirect	√	√	√	√	√	√	Mburu *et al.*, 2007
Livestock	Kenya	Other	Both	√	√			√		Mutura *et al.*,2015
Livestock	Macedonia	Small	Both	√	√	√				Voors & Haese, 2010
Livestock	Namibia	Other	Indirect	√		√		√		De Bruyn *et al.*, 2001
Livestock	Namibia	Other	Indirect		√	√		√		Shiimi *et al.*, 2012
Livestock	South Africa	Other	Indirect	√	√	X	X	√		Mafukata, 2015
Livestock	South Africa	Other	Both	√		√				Musemwa *et al.*, 2007
Livestock	South Africa	Other	Indirect		√	√	X	X		Ndoro *et al.*, 2015
Livestock	Uganda	Other	Both		√	√	√	X		Sikawa & Mugisha, 2011
Generic	Belgium	Other	Both					√		Verhaegen & Huylenbroeck, 2001
Generic	Hungary	Small	Both	√	√		√			Benedek *et al.*, 2014
Generic	Pakistan	Small	Indirect			√		√		Ahmed *et al.*, 2016
Generic	U.S.	Other	Both	√	√	√				Park & Lohr, 2006

Notes: √ = Significant factors, X = Non-significant factors

(Source: Author's literature review, 2017)

Production

Production is one of the factors that most previous studies identified as a significant factor affecting the marketing channel selection, as shown in Table 2.4. Production is measured, using quantity produced, sales volume, and types of farming (e.g. organic, conventional).

High production increases the proportion sold, and farmers with high production were more likely to sell to wholesalers (Abebe *et al.*, 2016) or miller (Soe *et al.*, 2015) rather than sell to middlemen (Mabuza *et al.*, 2014) or selling at farm gate to local collectors (Mabuza *et al.*, 2014; Soe *et al.*, 2015).

Despite this, some studies found that production was not a significant factor in the choice of marketing channel (Kumar *et al.*, 2011; Zivenge & Karavina, 2012; Maina *et al.*, 2015). A possible explanation for this is that they were small-scale farms.

Location and the distance to market

Location, including the distance to market and road infrastructure, is another major area of interest within the field of marketing channel research (Table 2.4). Some studies identified location based on regions (Park & Lohr, 2006; Chirwa, 2009; Bardhana *et al.*, 2012), rural or urban (Farmer & Betz, 2016) and upper midlands or lower highlands (Mburu *et al.*, 2007). Location was found to have significant influence on selection of marketing channels.

Previous studies identified distance to market as having a determinant impact on farmers' decision to select marketing channels (Table 2.4). Bardhana *et al.* (2012) found that distance to market has a significant positive effect on the decision to sell to dairy cooperatives in local villages, rather than accepting the transportation cost that other channels produce. Some research showed a lack of choice of channels because the distance from markets was too far (Cazzuffi & McKay, 2012). Long distance from markets increases transportation costs (Maina *et al.*, 2015) and restricts farmers to sell to the monopolistic local marketing channel (Tsourgiannis *et al.*, 2008).

However, in some studies, good road infrastructure (Kumar *et al.*, 2011; Jari & Fraser, 2012), and distance to markets (Zivenge & Karavina, 2012; Srinivas *et al.*, 2014) do not appear as significant determinants of marketing channel selection. Contradictory results may reflect the lack of channel availability in some villages (Srinivas *et al.*, 2014) or channel location (Zivenge & Karavina, 2012).

Membership

Membership of cooperatives (Girma & Abebaw, 2012), group organisations (Harrizon *et al.*, 2016) or unions (Cazzuffi & McKay, 2012) is a key variable affecting channel choice decision-making. Higuchi *et al.* (2012) showed that farmers who sold through intermediaries did not receive or exchange knowledge and information that might increase their competitive advantage, unlike farmers who were members of marketing organisations. Similarly, small-scale vegetable farmers in Khon Kaen, Thailand who belong to a farmers' group were more likely to sell to a cooperative than non-members (Mukiama *et al.*, 2014). However, to become a member of a cooperative requires attendance at meetings which may be unattractive for some farmers (Milford, 2014).

Some studies have found that belonging to a group did not affect the marketing channel used (Panda & Sreekumar, 2012; Mafukata, 2015; Ndoro *et al.*, 2015). These results can be explained by reference to the sample size being statistically insignificant (Mafukata, 2015; Ndoro *et al.*, 2015).

In general, group membership factor relates to access to information. Ahmed *et al.* (2016) found that access to market information could have a positive influence on whether small-scale Pakistani farmers would sell to Tehsil and district markets. This is similar to Jari and Fraser (2012) who found that access to market information has a positive effect in both formal and informal market choices for small-scale farmers in the Kat River Valley, South Africa.

Access to information

Access to market information is related to market access and decision-making on channel selection. There are many types of market information which farmers use to gain insights that will contribute to choose wise marketing channel choice, for example, accurate and up-to-date market prices, quality requirements, the new varieties production (Arinloye *et al.*, 2015) and the times and places of sales (De Bruyn *et al.*, 2001).

Government extension agents (Mburu *et al.*, 2007) friends and neighbours of farmers, were identified as the main sources of market information (Srinivas *et al.*, 2014). Some studies found that the ownership of mobile phones enabled greater access to information (Ferto & Szabó, 2002; Abebe *et al.*, 2016) and significantly influenced decisions to sell to a cooperative (Ferto & Szabó, 2002), but were insignificant if selling through middlemen (Abebe *et al.*, 2016). It appears that where farmers own mobile phones they are more likely to engage in cooperative action resulting in greater access to information.

Group membership and access to information (e.g. market, price and production information) significantly different in different sectors and countries, and impact differently on channel choice (Table 2.4). Ahmed *et al.* (2016) found that when small-scale farmers in Pakistan had market information, it increased the probability of market access by 4.3 times over those who had no or little market information. Furthermore, smallholder livestock

farmer in Ethiopia who were members of agricultural cooperative and easy to access to market information, it reduced the probability to sell to local traders and enhanced farmer's direct access to consumers (Girma and Abebaw, 2012).

Off-farm work

Previous studies have found that financial status including income, debt level and access to credit influences marketing channel selection. For example, income was found to be a statistically significant factor influencing direct selling (Mukiama *et al.*, 2014; Adanacioglu, 2017). However, questions about farmers' incomes and how much debt they have are sensitive (Tsagarakis & Georgantzis, 2003), and most studies tend to use off-farm income as a proxy for financial status.

Off-farm work has been associated with farmers' ability to generate extra cash and, therefore, their willingness to accept late payment from marketing channels. This has been linked farmers' decision about marketing channels in many previous studies as shown in Table 2.4. For example, dairy farmers with off-farm work in Kenya showed a higher probability to sell through dairy cooperatives (Mburu *et al.*, 2007). The reason for this was cooperatives paid monthly for milk delivered, off-farm work increased opportunities to get the extra cash during the delay in payment. However, off-farm work did not have a significant impact on marketing channel selection for paddy rice farmers in Myanmar (Soe *et al.*, 2015) and West Virginia farmer in U.S. (Farmer & Betz, 2016). A possible explanation for these results is that 85.20 % of paddy rice farmers in Myanmar (Soe *et al.*, 2015) and 60% of West Virginia farmers in U.S. (Farmer & Betz, 2016) had off-farm work.

2.4.2.2 Transaction specific factors

Transaction specific factors are those which directly relate to price as well as marketing costs including transportation costs, payment including mode and speed of payment, channel offers (i.e. buying capacity, contract or agreement with the channel and incentives, both monetary and non-monetary). They are likely to influence farmers' decisions to choose channels (Table 2.5).

Price

Price is one key indicator that many studies have examined. Table 2.5 shows price as a significant factor in every sector and in both developing (Afghanistan, Costa Rica, Ethiopia, Honduras, India, Kenya, Mexico, Nigeria, Peru, Vietnam, Thailand, and Zimbabwe) and developed countries (Belgium, Greece, Hungary, U.K. and U.S.).

Table 2.5 Summary of transaction specific factors influencing the choice of marketing channels by farmers tested or explored in previous studies

Sector	Countries	Farm Scale	Channels	Price	Transportation cost	Payment	Channel offers	Sources
Grain	Malawi	Small	Both	X				Chirwa, 2009
Grain	Myanmar	Other	Indirect					Soe *et al.*, 2015
Grain	Vietnam	Other	Both	√				Cazzuffi & McKay, 2012
Beverage	Ethiopia	Other	Indirect	√			√	Gelaw *et al.*, 2016
Beverage	Costa Rica	Other	Indirect	√				Wollni & Zeller, 2007
Beverage	Kenya	Other	Indirect	√			√	Harrizon *et al.*, 2016
Beverage	Mexico	Other	Indirect	√		√	√	Milford, 2014
Beverage	Nigeria	Other	Both	√	√	√		Ogunleye & Oladeji, 2007
Beverage	Peru	Other	Indirect					Higuchi *et al.*, 2012
Fruit & Vegetable	Benin	Other	Indirect				√	Arinloye *et al.*, 2015
Fruit & Vegetable	Cambodia	Other	Indirect	X				Phon & Yamaji, 2016
Fruit & Vegetable	Central Africa	Small	Indirect					Jagwe & Machethe, 2011
Fruit & Vegetable	Ethiopia	Other	Indirect	√		√		Abebe *et al.*, 2016
Fruit & Vegetable	Ethiopia	Other	Indirect					Woldie & Nuppenau, 2009
Fruit & Vegetable	Honduras	Small	Indirect	√	√	√	√	Blandon *et al.*, 2010
Fruit & Vegetable	Hungary	Other	Indirect					Ferto & Szabó, 2002
Fruit & Vegetable	India	Other	Indirect					Panda & Sreekumar, 2012
Fruit & Vegetable	Kenya	Other	Both	√	√	√		Maina *et al.,* 2015
Fruit & Vegetable	Peru	Other	Indirect	√	√	√		Escobal & Cavero, 2012
Fruit & Vegetable	South Africa	Small	Both					Jari & Fraser, 2012
Fruit & Vegetable	Swaziland	Other	Indirect					Mabuza *et al.*, 2014
Fruit & Vegetable	Swaziland	Other	Indirect	X				Xaba & Masuku, 2013
Fruit & Vegetable	*Thailand*	Small	Both					Mukiama *et al.*, 2014
Fruit & Vegetable	*Thailand*	Other	Indirect	√		X	√	Schipmann & Qaim, 2011
Fruit & Vegetable	Turkey	Other	Direct					Adanacioglu, 2017
Fruit & Vegetable	U.S.	Small	Both	√	√			LeRoux *et al*., 2009
Fruit & Vegetable	U.S.	Other	Both	√				Farmer & Betz, 2016
Fruit & Vegetable	U.S.	Other	Direct					Monson *et al.*, 2008
Fruit & Vegetable	Zimbabwe	Other	Indirect	√				Zivenge & Karavina, 2012

Table 2.5 Summary of transaction specific factors influencing the choice of marketing channels by farmers tested or explored in previous studies (cont.)

Sector	Countries	Farm Scale	Channels	Price	Transportation cost	Payment	Channel offers	Sources
Livestock	Afghanistan	Other	Indirect	√	√	√		Srinivas *et al.*, 2014
Livestock	China	Other	Indirect	X	√	√		Gong *et al.*, 2006
Livestock	China	Other	Both				√	Huang *et al.*, 2012
Livestock	Greece	Other	Both	√	√	√		Tsourgiannis *et al.*, 2008
Livestock	Greece & U.K.	Other	Both	√		√		Tsourgiannis *et al.*, 2012
Livestock	Ethiopia	Other	Both				√	Girma & Abebaw, 2012
Livestock	India	Small	Indirect	√				Kumar *et al.*, 2011
Livestock	India	Other	Both	X				Bardhana *et al.*, 2012
Livestock	India	Other	Indirect	√			√	Sharma *et al.*, 2009
Livestock	India	Other	Both	X		√	√	Staal *et al.*, 2006
Livestock	Kenya	Small	Indirect	√			√	Mburu *et al.*, 2007
Livestock	Kenya	Other	Both		√			Mutura *et al.*,2015
Livestock	Macedonia	Small	Both					Voors & Haese, 2010
Livestock	Namibia	Other	Indirect		√	√		De Bruyn *et al.*, 2001
Livestock	Namibia	Other	Indirect		√	√		Shiimi *et al.*, 2012
Livestock	South Africa	Other	Indirect					Mafukata, 2015
Livestock	South Africa	Other	Both		√	√		Musemwa *et al.*, 2007
Livestock	South Africa	Other	Indirect					Ndoro *et al.*, 2015
Livestock	Uganda	Other	Both	X	√	√		Sikawa & Mugisha, 2011
Generic	Belgium	Other	Both	√			√	Verhaegen & Huylenbroeck,
Generic	Hungary	Small	Both	√		√	√	Benedek *et al.*, 2014
Generic	Pakistan	Small	Indirect		√			Ahmed *et al.*, 2016
Generic	U.S.	Other	Both					Park & Lohr, 2006

Note: √ = Significant factors, X = Non-significant factors

(Source: Author's literature review, 2017)

Price is related to grading/quality conditions; all previous studies that measured grading found this to be a significant factor. For example, price has been found to have positive significance in the decision to use particular marketing channels, for example traditional village traders, companies, and the Royal project of sweet pepper farmers in Thailand (Schipmann & Qaim, 2011). Gelaw *et al.* (2016) identified that price was one of the most significant factors to choose trader by coffee farmers in Ethiopia because they received higher price from this channel.

However, price was not always the main driving factor influencing the choice of marketing channels in maize (Chirwa, 2009), vegetable (Phon & Yamaji, 2016; Xaba & Masuku, 2013) and dairy (Gong *et al.*, 2006; Staal *et al.*, 2006; Bardhana *et al.*, 2012; Sikawa & Mugisha, 2011). The possible explanation of these results is that they are small-scale farmers (Chirwa, 2009) with low bargaining power (Gong *et al.*, 2006), incurring high transportation costs if they choose to sell to the higher price offer (Staal *et al.*, 2006).

Transportation cost

A number of studies have explored the role that cost plays in shaping choice of marketing channels, particularly transportation cost. Transportation cost is associated with the distance from the market which the longer distance, the higher the transport cost (Sikawa & Mugisha, 2011; Shiimi *et al.*, 2012). All studies that measured this factor found a significant influence on marketing channel choice decision-making (Table 2.5). For example, high transportation cost had a negative effect on access to the markets by small farmers in Pakistan because higher cost leads to a disinclination of farmers to market their produce (Ahmed *et al.,* 2016). Maina *et al.* (2015) found that the increased of transportation cost by one shilling increased the probability of selecting local traders, brokers and marketing group for selling mango in Makueni County, Kenya by 88.87%, 88.76% and 10.56% respectively.

Payment

Terms of payment including modes (e.g. cash or credit) and speed of payment (e.g. prompt, delayed or advance payments) has a significant influence on marketing channel selection. Small-scale farmers need immediate payment in cash (De Bruyn *et al.*, 2001), whereas some farmers still prefer to choose a channel that offers a price premium with payment delay (Gong *et al.*, 2006). Tsourgiannis *et al.* (2008) identified that speed of payment has a significant effect on the choice of marketing channel of sheep and goat farmers in Greece when choosing local milk processing plants, cooperatives and large national dairy firms.

Their results differ from Schipmann & Qaim (2011); this research found that payment mode was not significantly influential for marketing channel choice, for both contract and non-contract farmers if payment was later than one week after delivery.

Most previous studies found that payment was a determinant factor in the choice of marketing channel for both small-scale and other farmers. This study examines payment in terms of cash payment, mode, and speed of payment. The definition of this factor for this study followed phase one interviews.

Channel offers

The offer made by indirect channels, in terms of buying capacity, monetary and non-monetary incentives, and services, can be an important decision-making influence. All previous studies exploring how variables determine channel selection found that this factor has a significant impact on marketing channel selection. Buying capacity was identified by farmers as one aspect of channel offering (Benedek *et al.*, 2014). Farmers favoured channels which would purchase all their products, especially if they had the freedom to deliver whenever the product becomes available (Blandon *et al.*, 2010).

Incentives may refer to gifts (Arinloye *et al.*, 2015), provision of market information (Arinloye *et al.*, 2015), technical training/knowledge transfer (Schipmann & Qaim, 2011; Arinloye *et al.*, 2015), bonus payment (Harrizon *et al.*, 2016), willingness to help the farmer in times of social and economic crisis (Gelaw *et al.*, 2016), and financial support (Staal *et al.*, 2006; Mburu *et al.*, 2007; Milford, 2014; Arinloye *et al.*, 2015). For example, research by Mburu *et al.* (2007) and Milford (2014) found that if cooperatives provided loans or prepayments to farmers, it had a positive influence on choosing the cooperative as a channel.

2.4.2.3 Relationship dynamics factors

The dynamic of a relationship with the channel, in terms of trust, personal relationships and power in negotiations, is likely to be significant (Table 2.6). A considerable amount of literature has been published on the relation between trust and personal relationship in marketing. Some studies found a strong correlation between trust and relationship (Morgan and Hunt, 1994; Geyskens *et al.*,1996; Doney and Cannon,1997; Geyskens *et al.*, 1999; Wong and Sohal, 2002). However, many studies on factors influencing the marketing channels by farmers considered trust and personal relationships as separate factors.

Table 2.6 Summary of relationship dynamics and other factors influencing the choice of marketing channels by farmers tested or explored in previous studies

Sector	Countries	Farm Scale	Channels	Trust	Personal Relationships	Power & Bargaining	Past behaviour	Goals & Future plans	Sources
Grain	Malawi	Small	Both		√		√		Chirwa, 2009
Grain	Myanmar	Other	Indirect						Soe *et al.*, 2015
Grain	Vietnam	Other	Indirect						Cazzuffi & McKay, 2012
Beverage	Ethiopia	Other	Indirect	√	√		√		Gelaw *et al.*, 2016
Beverage	Costa Rica	Other	Indirect						Wollni & Zeller, 2007
Beverage	Kenya	Other	Indirect						Harrizon *et al.*, 2016
Beverage	Mexico	Other	Indirect	√					Milford, 2014
Beverage	Nigeria	Other	Indirect						Ogunleye & Oladeji, 2007
Beverage	Peru	Other	Indirect						Higuchi *et al.*, 2012
Fruit & Vegetable	Benin	Other	Indirect		X	√	√		Arinloye *et al.*, 2015
Fruit & Vegetable	Cambodia	Other	Indirect						Phon & Yamaji, 2016
Fruit & Vegetable	Central Africa	Small	Indirect						Jagwe & Machethe, 2011
Fruit & Vegetable	Ethiopia	Other	Indirect		√				Abebe *et al.*, 2016
Fruit & Vegetable	Ethiopia	Other	Indirect	√					Woldie & Nuppenau, 2009
Fruit & Vegetable	Honduras	Small	Indirect						Blandon *et al.*, 2010
Fruit & Vegetable	Hungary	Other	Indirect			√		√	Ferto & Szabó, 2002
Fruit & Vegetable	India	Other	Indirect						Panda & Sreekumar, 2012
Fruit & Vegetable	Kenya	Other	Both	√		√			Maina *et al.,* 2015
Fruit & Vegetable	Peru	Other	Indirect	√	√	√			Escobal & Cavero, 2012
Fruit & Vegetable	South Africa	Small	Indirect		√				Jari & Fraser, 2012
Fruit & Vegetable	Swaziland	Other	Indirect			√			Mabuza *et al.*, 2013
Fruit & Vegetable	Swaziland	Other	Indirect						Xaba & Masuku, 2013
Fruit & Vegetable	*Thailand*	Small	Both						Mukiama *et al.*, 2014
Fruit & Vegetable	*Thailand*	Other	Indirect		√	√			Schipmann & Qaim, 2011
Fruit & Vegetable	Turkey	Other	Direct						Adanacioglu, 2017
Fruit & Vegetable	U.S.	Small	Both		√				LeRoux *et a*l., 2009
Fruit & Vegetable	U.S.	Other	Both					√	Farmer & Betz, 2016
Fruit & Vegetable	U.S.	Other	Direct						Monson *et al.*, 2008
Fruit & Vegetable	Zimbabwe	Other	Indirect						Zivenge & Karavina, 2012

Table 2.6 Summary of relationship dynamics and other factors influencing the choice of marketing channels by farmers tested or explored in previous studies (cont.)

Sector	Countries	Farm Scale	Channels	Trust	Personal Relationships	Bargaining power	Past behaviour	Goals & Future plans	Sources
Livestock	Afghanistan	Other	Indirect						Srinivas *et al.*, 2014
Livestock	China	Other	Indirect			√		√	Gong *et al.*, 2006
Livestock	China	Other	Both				√		Huang *et al.*, 2012
Livestock	Greece	Other	Both	√	√	√		√	Tsourgiannis *et al.*, 2008
Livestock	Greece & U.K.	Other	Both	√	√			√	Tsourgiannis *et al.*, 2012
Livestock	Ethiopia	Other	Both						Girma & Abebaw, 2012
Livestock	India	Small	Indirect						Kumar *et al.*, 2011
Livestock	India	Other	Both						Bardhana *et al.*, 2012
Livestock	India	Other	Indirect						Sharma *et al.*, 2009
Livestock	India	Other	Both						Staal *et al.*, 2006
Livestock	Kenya	Small	Indirect						Mburu *et al.*, 2007
Livestock	Kenya	Other	Both						Mutura *et al.*,2015
Livestock	Macedonia	Small	Both						Voors & Haese, 2010
Livestock	Namibia	Other	Indirect			√	√		De Bruyn *et al.*, 2001
Livestock	Namibia	Other	Indirect			√			Shiimi *et al.*, 2012
Livestock	South Africa	Other	Indirect						Mafukata, 2015
Livestock	South Africa	Other	Both	√					Musemwa *et al.*, 2007
Livestock	South Africa	Other	Indirect	X	√	√			Ndoro *et al.*, 2015
Livestock	Uganda	Other	Both						Sikawa & Mugisha, 2011
Generic	Belgium	Other	Both			√			Verhaegen & Huylenbroeck,
Generic	Hungary	Small	Both		√			√	Benedek *et al.*, 2014
Generic	Pakistan	Small	Indirect						Ahmed *et al.*, 2016
Generic	U.S.	Other	Both				√		Park & Lohr 2006

Note: √ = Significant factors, X = Non-significant factors

(Source: Author's literature review, 2017)

Trust

Mohr and Spekman (1994) suggest that trust is a key feature of partnership success, and that this includes commitment, communication, joint planning, and problem resolution. Geyskens *et al.* (1999) examined the role of trust in marketing channels by means of a review of 24 empirical articles published between 1970-1995, finding trust affects satisfaction, decision-making, attitude of brand loyalty, and long-term orientation of both economic and relationship outcomes in marketing channels.

Previous studies measured trust in terms of level of trust (Woldie & Nuppenau, 2009; Escobal & Cavero, 2012; Milford, 2014; Maina *et al.*, 2015), reliability of market information (Gelaw *et al.*, 2016), loyalty (Tsourgiannis *et al.*, 2008; Tsourgiannis *et al.*, 2012) and trustworthiness of the grading system (Musemwa et al., 2007). The results from these studies found that trust had a significant influence on marketing channel selection (Table 2.6).

Only one previous study found that there was no significant difference between trust in private buyers and speculators for cattle farmers in South Africa because the level of trust between cattle farmers and these two channels were both considerably high overall (Ndoro *et al.*, 2015).

Personal relationships

Previous studies identified personal relationship as farmers have known the buyer (Tsourgiannis *et al.*, 2008; Schipmann and Qaim, 2011; Ndoro *et al.*,2015), while the length of relationship means how long have farmers known the buyer (Escobal and Cavero, 2012; Arinloye *et al.*, 2015).

Personal relationship, together with the length of such relationships, has significant influence on channel choice (Tsourgiannis *et al.*, 2008; Chirwa, 2009; LeRoux *et al.*, 2009; Schipmann and Qaim, 2011; Escobal and Cavero, 2012; Jari and Fraser, 2012; Tsourgiannis *et al.*, 2012; Benedek *et al.*, 2014; Ndoro *et al.*, 2015; Abebe *et al.*, 2016; Gelaw *et al.*, 2016). For example, Ndoro *et al.* (2015) showed that whether farmers knew the buyer/channel had a positive significant effect, increasing by 17.2% the probability of selling to a speculator compared with selling through auction.

However, Arinloye *et al.* (2015) found that the relationship small-scale pineapple farmers in Benin had with channels did not have any significant influence on the farmers' decision-making. A probable explanation may be found in terms of sample size and that most farmers had at least five years relationship with their buyers.

Bargaining power/ Negotiation

Bargaining power is identified as an influential factor in decision making on channel choice. As shown in Table 2.6, many studies have examined the effect of negotiating power on channel choice. For example, it was found that bargaining power has significant influence on the marketing channel selection of sheep and goat farmers in the region of east Macedonia in Greece (Tsourgiannis *et al.*, 2008), sweet pepper farmers in Thailand (Schipmann and Qaim, 2011) and pineapple small-scale farmers in Benin (Arinloye *et al.*, 2015).

Gong *et al.* (2006) found that if cattle farmers' bargaining power in China increased they were more likely to sell directly to the processors, whereas small-scale farmers that had low bargaining power were more likely to sell to the spot market and intermediaries. Another example by Ferto & Szabó (2002), in a study of vegetable farmers in Hungary, suggested that farmers with strong bargaining power preferred to sell to wholesale markets or wholesalers, while farmers who had low bargaining power attempted to sell through cooperatives in order to gain a better price.

In the rice sector, studies by Cazzuffi & McKay (2012) and Soe *et al.* (2015) indirectly examined this factor. Cazzuffi & McKay (2012) showed that some rice farmers in Vietnam had to sell at the farm gates due to the isolation of their household and consequential limitation of choice. Soe *et al.* (2015) reported that paddy rice in Myanmar had to sell immediately after harvest because they lacked bargaining power and needed money to pay back their loans. The results of these studies may relate to the low bargaining power of rice farmers.

2.4.2.4 Other factors

The last grouping of factors, based on previous studies, are patterns of decision-making or past marketing channels choice behaviour, together with goals and future plans of farmers (Table 2.6). These two factors were measured in some studies, however they found that these factors had significantly affected marketing channel selection.

Past behaviour

Past behaviour is one of the significant factors in many studies, with measurement in terms of the frequency of selling (De Bruyn *et al.*, 2001), repeat selling to the buyer (Chirwa, 2009), and the problems of sellers may experience with buyers who refuse to purchase or cheat the seller (Park & Lohr, 2006; Huang *et al.*, 2012; Arinloye *et al.*, 2015; Gelaw *et al.*, 2016). Gelaw *et al.* (2016) reported that 23.7% of the respondents who are coffee farmers in Ethiopia have been cheated by traders. As a result, farmers seek alternative buyers.

Chirwa (2009) suggested that past behaviour was related to relationship dynamics as small-scale maize farmers in Malawi had repeated selling to buyer (private traders, local markets or neighbours) because they had personal relationship, building reputation and trust with the buyer.

Past behaviour is not only a significant factor, identified by previous studies, but also is one of the indicators to predict intention in the Theory of Planned Behaviour (TPB), as discussed in the section 2.2.2.

Goals and future plans

Goals and future plans of farmers were identified as significant factors in several ways. Based on previous studies, five significant examples are given here:

1) investment plans for future years (Ferto & Szabó, 2002);

2) amount invested (Gong *et al.*, 2006);

3) maximisation of profit as the most important farming goal
    (Tsourgiannis *et al.*, 2008; Tsourgiannis *et al.*, 2012);

4) the health of the land and willingness to consider new techniques
    (Farmer & Betz, 2016);

5) plans to diversify activities (Benedek *et al.*, 2014).

To summarise, previous studies of marketing channel selection by farmers mostly focused on socio-demographic factors (farmer and farming), followed by transaction specific factors and relationship dynamics. Only a few studies measured past behaviour and goals/ future plans. Some studies applied transaction cost economics as the theoretical framework (Woldie & Nuppenau, 2009; Jagwe & Machethe, 2011; Escobal & Cavero, 2012; Shiimi *et al.*, 2012; Mabuza *et al.*, 2014; Maina, 2015) while other studies did not apply the theory.

Empirical investigation of farmers' marketing channel selection that concentrate on psychological factors such as attitudes and personality traits, and the integration of economic (i.e. price, cost, payment) and behavioural approaches, is rare.

2.5 Summative framework

Existing literature on farmers marketing channel selection behaviours have largely taken an economics-based rather than behavioural-based approach. Although the Theory of Planned Behaviour (TPB) has been widely used in behavioural research, TPB has not been applied in studies of rice farmers' marketing channel choice. The summative framework here is the first attempt to integrate all key determinants of farmers' marketing channel selection.

Theory of Planned Behaviour (TPB) antecedents

| Attitude toward the channel choice | Subjective norm | Perceived behavioural control |

Intention to choose the marketing channels

Other factors
-Past behaviour
-Goals/Future plans)

Relationship dynamics factors
-Trust
-Personal relationship
-Bargaining power

Transaction specific factors
-Price
-Transportation cost
-Payment
-Channel offers

Socio-demographic factors
1) Farmer
    1.1 Age
    1.2 Gender
    1.3 Education level,
    1.4 Experience,
    1.5 Household size
2) Farming
    2.1 Farm size
    2.2 Production
    2.3 Location
    2.4 Membership
    2.5 Access to information
    2.6 Off-farm work

Figure 2.5 The framework of factors influencing farmers' marketing channel selection in this study

(Source: Author's own, 2014)

The above framework (Figure 2.5) extends on the conventional TPB model adding four sets of factors, i.e. transaction specific factors, relationship dynamics, farmers' goals and past behaviour. While socio-demographic factors are used to compare the types of farmers and farms with intention in using marketing channels. Although there might be interrelationship between the factors, this framework only focuses on the linkages between the factors and the intentional behaviour.

2.6 Research gaps and justification for research

Studies of marketing channel selection in Thailand have been limited. To the best knowledge of the researcher, only two studies on marketing channel choice of farmers in Thailand have been undertaken and published to date. One sampled vegetable farms (Mukiama *et al.*, 2014), and the other, sweet pepper farmers (Schipmann and Qaim, 2011), in particular. Mukiama *et al.* (2014) study was based on 123 small-scale vegetable farmers in Knon Kaen Province, north-east region in Thailand. Their results showed that characteristics of farmers such as gender, income, experience, group membership, and characteristics of farms including soil conservation practice, and type of pesticide used were found to significantly affect the farmers' choices of marketing channels such as collectors, direct retailing, farmers' cooperatives. They found that females, or less experienced farmers who belong to a farmers' group and practice safe production preferred to sell to the farmer's cooperatives.

Another study, conducted by Schipmann and Qaim's (2011), was based on 244 small-scale sweet pepper farmers in Chiang Mai province, north region in Thailand. They found that channel relationship and trust were the most important factors for small-scale sweet pepper farmers' choice of market channels (for example, village traders, companies and the Royal project).

Whilst those two studies have provided some good insights into factors affecting Thai farmers' choice of marketing channels, they have only examined a small range of influencing factors and only for the vegetables sector.

Studies of factors influencing farmers' choice of marketing channels have been mainly based on samples in other countries and largely producers of perishable products (e.g. milk and fruit and vegetable) as summarised in the previous section. Paddy or unmilled rice has a longer shelf life than perishable products, such as fruits and vegetables, and require milling and processing before being sold to end consumers. In view of the product-specific characteristics, it may infer that factors influencing marketing channels may be different from other agricultural sectors.

Previous studies of rice farmers in Thailand related to contract farming (Setboonsarng *et al.,* 2006; Sriboonchitta and Wiboonpoongse, 2008; Schipmann and Qaim, 2011; Mukiama *et al.,* 2014). They also tended to focus on specified types of rice such as Japanese or organic rice rather than conventional production by rice farmers.

Marketing channel selection by rice farmers in Thailand may differ from channels used for other agricultural products. One of the reasons is the Thai government used to subsidise rice farmers under the rice pledging scheme which was first launched in 1981/82 crop year (Attavanich, 2015). The initial aim of this programme was to provide credit to farmers when prices were low in order to delay sales until prices rose later (Chulaphan *et al.,* 2012).

However, in the rice pledging scheme run between 2011 and 2014 the Thai government bought unlimited quantities of unmilled rice from farmers at a price higher than the market price by approximately 29-50%, depending on the type of rice (Pootpisut, 2014; Attavanich, 2015). It is estimated that 22% of the total unmilled rice was sold to the government under the pledging program in 2011(Titapiwatanakun, 2012). This controversial programme was terminated in 2014.

When the scheme ended in February 2014 rice farmers were faced with a more competitive market environment and needed to use more proactive decision making in their choice of market. There is a need to understand the liberalisation of the market has had any impact on choice of marketing channels.

The main unresolved issue is what are the factors affecting the choice marketing channel by rice farmers in Thailand and in the period of time after RPS ended. This will be the first study to date offering some important insights in both economic and behaviour approaches by applying TPB as theoretical framework with the additional factors from previous studies into the literature. This study will make some valuable contribution to the body of knowledge on marketing channel selection and in TPB.

Chapter 3 Research methodology

3.1 Introduction

The purpose of this chapter is to explain the research paradigm taken in this study in order to address the research questions identified. This includes the explanation of the researchers' ontological and epistemological positions and how they guided the research design and the methodology for data collection and analysis used in this study. It also addresses the reliability and validity of the research instruments and research ethics issues.

3.2 Research aims and questions

The primary focus of this study was to develop an understanding of factors affecting the marketing channel selection by rice farmers in Thailand. To achieve this aim, the following four questions need to be addressed:

1) Has the end of new RPS in 2014 affected the farmers' choice of marketing channel?

2) With the emergence of more modern marketing channels such as e-commerce, direct contract with large retailers, have the rice farmers diversified their use of marketing channels? Overall, what marketing channels have been used?

3) Which types of farmers are likely to use what channel?

4) Why did farmers use a particular marketing channel?

3.3 Ontological and epistemological positions

The research philosophy holds a guiding role in the design of research and choice of research methodology. As indicated in Saunders *et al.* (2015), there is a need for congruence between the philosophical position, the research methodology or approach. Central to research design is the ontological and epistemological assumptions made by the researcher. Ontology relates to the nature of reality, and epistemology to how we know the reality.

Ontologically, two extreme positions are objectivism and subjectivism. Objectivists see "truth" as value free, objective, and external to the researcher (Saunders *et al.*, 2015). Subjectivists believe that all "truth" is either constructed by society or the individual, and all truth is subjective and that there is no external reality (Marsh and Furlong, 2002). Epistemologically, positivism and interpretivism represent another set of two extreme stances in how the researcher relates to the truth. Positivists believe that 'truth' is observable, measurable, generalisable and repeatable whilst interpretivists see the task of the research as to seek and capture the meaning of the action/ behaviour of the subject/s

studied and uncover the internal reality (Wahyuni ,2012). They believe that 'truth' is subject to individual's interpretation.

This researcher takes the view that there is no absolute "truth" and reality is partly objective and observable and partly socially constructed and interpreted, depending on the type of questions and in the social science research context. No research is entirely repeatable as neither the researcher nor the subject of study can be completely value free. This is particularly true for human behaviour (Wahyuni, 2012; Creswell, 2014). Therefore, this research positions itself within the broad framework of pragmatism (Kelemen and Rumens, 2008). As explained by Saunders *et al.* (2015) below.

> *"Pragmatists recognise that there are many different ways of interpreting the world and undertaking research, that no single point of view can ever give the entire picture and that there may be multiple realities"* (Saunders *et al.*, 2015, p.130).

The philosophical basis of pragmatism is that the world is not "an absolute unity" and the research is embedded in social, historical, political, and other contexts (Creswell, 2014). Pragmatism as a philosophical doctrine was introduced by Peirce (1839–1914), James (1842–1910), and Dewey (1859–1952), and brought to popularity by Cherryholmes (1992) (Ormerod, 2006). Whilst controversies exist, pragmatism lends itself to business and management studies very well. As Ormerod (2006) puts it:

- *"Pragmatism supports an empirical (in other words scientific) approach.*
- *Pragmatism recognises the individual psychological nature of meaning.*
- *Pragmatism emphasises the uncertainty and changing nature of our findings.*
- *Pragmatism holds that inquiry is social, as is knowledge. Retaining, maintaining and updating knowledge is a collective exercise"* (Ormerod, 2006, p. 905-907)

It's no surprise that pragmatism has established its ground in most books and articles about business research methods (e.g., Tashakkori and Teddlie, 2010; Saunders *et al.*, 2015, Creswell and Clark, 2018).

3.4 Research design

Pragmatists hold that the research question determines the nature of the research design (Blaikie, 1993). The determination of the methodology is similarly contingent upon the research philosophy. As suggested by Creswell (2014, p 11), *"pragmatism opens door to multiple methods"*, the approach adopted in this study. This allows for the contextualisation of the theory in the context of Thai rice marketing channels. Details of how the pragmatism influenced the research process can be seen in Table 3.1.

Table 3.1 The influence of pragmatism on the research process of this study

Pragmatism	Research components	Application in this study
Reality is not value free and context free	Identification of research question	• Need to understand decision making in the context of marketing channel, in rice farming sector, during and post-RPS in Thailand
Truth is partly socially constructed	Research design, instruments and data analysis	• Exploratory phase one interviews involving in-depth interviews with purposive sampling • Content analysis • Theory building (revised conceptual framework) • Development of context-specific measurements for phase-two survey questionnaire
Truth is partly generalisable and objective	Research design, instruments and data analysis	• Exploratory and confirmatory phase two quantitative survey • More representative and large-scale sampling • Some measurements of concepts were taken from previous studies • Ordinal measurement • Rigour of statistical analysis of data
Reality is not entirely value free	Research interpretation	• Cautious generalisability to other sectors and other countries • Findings are subject to bias

(Source: Author's own, 2014 Adapted from Ormerod, 2006; Creswell, 2014; Saunders *et al.*, 2015)

This research has adopted two phases multi-method design. This sequence was chosen because there was a need to first of all establish what channels were used by rice farmers during and post-RPS, whether farmers have changed channels after the end of RPS in 2014, and factors affecting the choice of marketing channels by rice farmers in Thailand. The researcher believed that the socially constructed research findings during stage one had to be tested across a more representative sample (Creswell, 2014; Gray, 2014). Additionally, there was a need to triangulate individual interpretations with reasonable statistical rigour.

3.5 Phase one: qualitative phase

3.5.1 Purpose

The purpose of phase one qualitative research was to explore the marketing channels used by rice farmers in Thailand and to identify factors affecting their choice by obtaining qualitative results from in-depth face-to-face interviews with 33 rice farmers in three provinces and in the three main rice production regions in Thailand.

3.5.2 Data collection method: Face-to-face interviews

In the qualitative phase, the researcher conducted face-to-face interviews with semi-structured open-ended questions in order to explore respondents' selection of marketing channels, their attitudes and opinions about their use of marketing channels. For qualitative research, one of the validity threats are related to the content of information collected. This is closely related to the procedure to make sure right questions were asked to the right people. Therefore, sample selection and the manner of how the interviews were conducted matters greatly.

3.5.3 Sampling procedures

1) Sample frame and size

The geographical regions of Thailand are: north, north-east, central and south. The target population for this study mainly inhabits in three regions: north, north-east and central, the three main rice production regions. The south region was excluded because it has only 1.62% of total major planted area and 4.31% of total second crop planted area of rice production (OAE, 2015).

In terms of sample size, Creswell (2014) suggests the sufficient sample size used in qualitative research should range between 20 and 30. This is supported by Thomson (2004), who reviewed 50 research articles using qualitative techniques and found that over a third (34%) used samples sizes between 20 and 30 and 22% used sample sizes over 30. The sufficiency of sample size depends on whether information from participants include different viewpoints and whether any new information or perspectives can be gathered by further interviews (Arksey and Knight, 1999; Mason, 2010). As a result, 33 small-scale rice farmers in Thailand were interviewed.

Face-to-face interviews were conducted in June 2015 with 11 interviews in each of the three provinces in three regions, totalling 33 in-depth interviews. Three main rice production provinces and regions in Thailand were Chiang Rai province in the north region, Amnat Charoen province in the north-east region and Suphan Buri province in the central region. Figure 3.1 shows where data were collected in the qualitative phase in three main regions in Thailand.
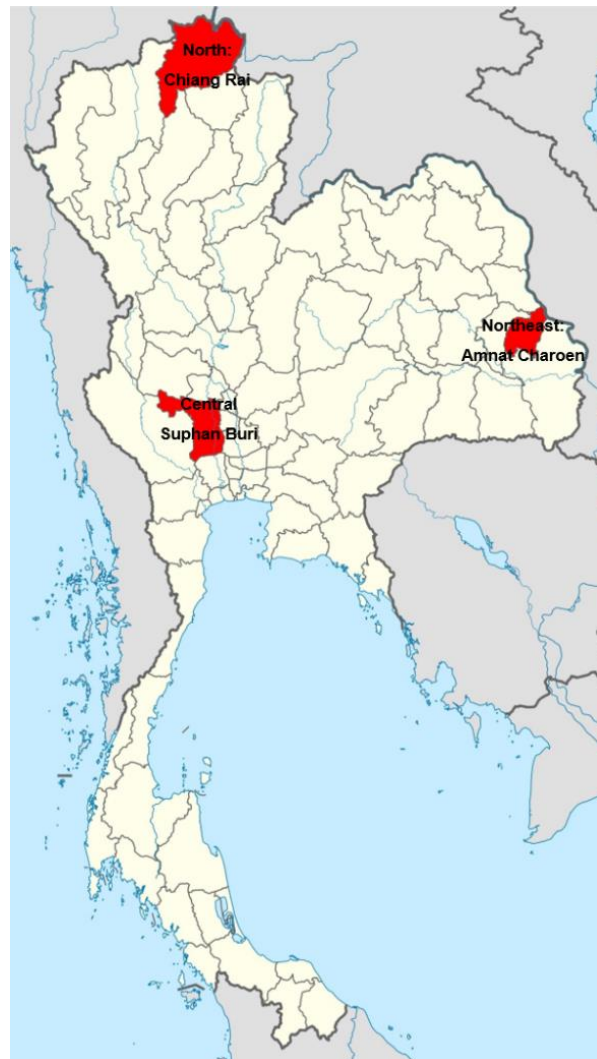
Figure 3.1 Data collection in qualitative phase in 3 main regions in Thailand

(Source: Author's own, 2015)

2) Sampling methods/ techniques

Two sampling techniques were used. A theoretical sampling technique was used firstly in order to determine the geographical regions. Chiang Rai province in the north region, Amnat Charoen province in the north-east, and Suphan Buri in the central region were selected based on their proximity to transport and market infrastructure. Secondly, two types of rice farmers were targeted: subsistence farmers (with farm size of 2 ha or less) and emerging farmers (with farm size of over 2 ha). A sample of rice farmers was identified through a preliminary interview with the officers of the sub-district administrative organisation (SAO) in each of the regions. The farmers approached were asked to confirm that they were either decision maker of own household or involved in decisions of selling rice.

A convenience sampling technique was used to identify individual farmers. This was done by the administration officer of the sub-district administrative organisation (SAO) and Agricultural Extension Officers in each of the regions. The officers were briefed on the

purpose of the interviews and criteria of farmers to be interviewed were fully discussed between the officers and the researcher. However, the selection of villages was entirely at the recommendation of the officers. This could potentially have been a source of bias as officers might chose villages within shorter distance or at their own preferences for whatever reason. As a result, interviews were conducted in two villages in each province, totalling six villages in all. These were:

1) Pha Ngam (North)

2) Huai So (North)

3) Phon Mueang Noi (North-East)

4) Bung (North-East)

5) Ban Krang (Central)

6) Rai Rot (Central)

3.5.4 Interviews procedures and challenges

Another threat of content validity comes from respondents not speaking their mind, not providing relevant information, being led by the researcher too much, or not understanding the questions well. In order to control validity, the following three procedures were applied in the design and conduct of the interviews:

1) using semi-structured interviewing with questions suggested by the literature review and theoretical framework;

2) provide prompts to enable participants to expand and express their responses, but the researcher did not ask any leading questions;

3) ensuring that the interview process for each person was sufficiently long to explore in-depth information.

Open-ended interview questions were developed related to the four categories of factors: socio-demographic, transaction specific, relationship dynamics and other factors. In addition, the three main components of the Theory of Planned Behaviour (TPB) underpinned the formulation of questions: attitude, subjective norm, perceived behavioural control (Ajzen, 1991). The list of questions and their related objectives are given in Appendix A. All questions were developed in English and then translated to Thai. Back translation was used to check the accuracy of translation.

Face-to-face interviews were carried out in local language at the respondents' houses or farms and recorded for full transcription and translation by the researcher who is a Thai native speaker. The researcher asked general questions to allow the respondents to explain their opinions at the beginning, followed by the central questions and sub-questions. The sequence of the questions from the list aimed to guide the researcher, but was respondent led. In addition, respondents were free to decide whether they wished or not to answer and could withdraw at any time. A gift worth £2 was given to each respondent as a token of appreciation for participation and their time.

3.5.5 Data recording and storage

All interviews were conducted in any of the three locations and each lasted for at least one hour. To ensure the completeness of information, all interviews were audio recorded. Handwritten notes were also taken. There were 35 hours of recordings from 33 interviews. The data collected was stored securely on the university's shared drive and the researcher's own laptop. Files were password protected.

3.5.6 Data analysis and interpretation

Content analysis is generally used with qualitative data (Grey, 2014) to systematically transform or study texts into organised categories (Erlingsson and Brysiewicz, 2017). Deductive and inductive content analysis was used to identify factors that influenced the selection of marketing channels. Four main categrories of themes were explored through axial coding: transaction specific; relationship dynamics; past bahaviour and goals/future plans; and socio-demographic factors. These categories were derived from the literature review and theoretical framework. New factors were identified by an inductive content analysis approach through open coding.

Data analyis of the interview transcripts were imported into NVivo 10, a qualitative data analysis (QDA) computer software package. Data was coded according to categories and sub-categories guided by the literature reviewed. Additional factors from interviews were generated and categorised using new codes. The findings and revised conceptual framework, with the counting frequency of codes, were presented.

Another issue of qualitative research relates to the accuracy of data and consistency of data interpretation (i.e., reliability). The accuracy of data was mainly to do with the transcripts to make sure no obvious mistakes or omissions were made in transcription. This was done by the researcher through double checking. Reliability of qualitative data analysis is normally done through intercoder comparison and agreement. However, as this research is not that of a team research, reliability was checked through coding and recoding. The validity of coding and content was assessed by supervisors in the final stage before results were summarised.

The findings and conceptual framework of the qualitative phase are presented in Chapter 4. The findings informed the modification of the conceptual framework. Whilst qualitative interview has its strenghts in producing rich, socially constructed meanings and knowledge, one of the limitations of such research is its limited generalisability (Creswell, 2014). It was out of this concern that phase-two survey was designed.

3.6 Phase two: quantitative survey

3.6.1 Purpose

The purpose of the questionnaire survey was to test the conceptual framework and hypotheses affecting marketing channels selection across a wider population. The statistical analysis of how the factors influenced choice of marketing channels also injects some rigour to the findings. However, the researcher holds the view that understanding of what drives human behaviour is very much subjective.

Therefore, the design for this stage of study was not meant to achieve full objectivity as advocated by positivist. Instead, it was designed to establish causal relationships with relative objectivity, to achieve certain degrees of comparability within the rice farming sector in Thailand and some degrees of generalisability to other social contexts such as rice farming in other developing countries or other grain farming sectors in developing countries. The researcher's ontological belief of relativism underpins the pragmatist epistemology and the research design, particularly in the way the questionnaire was designed (i.e., how the reality was measured) and how the data was analysed (e.g., the use of formative model in partial least squares structural equation modelling: PLS-SEM).

3.6.2 Survey instrument

Despite high costs in time and money, a face-to-face questionnaire survey was chosen over other methods of survey such as postal survey, online survey and drop and collect survey. The reasons for choosing a face-to-face survey are explained as follows. Firstly, the rice farmers in Thailand were not used to participating research survey. This means postal survey would not generate many responses. Phase one interview also showed that farmers might need some explanations when answering questions. So, drop and collect delivery would not be very effective either. Online survey was not possible in some locations because of the lack of an internet infrastructure in rural areas. This was evident from government report (ETDA, 2016), which identified that slow connection/ service (72%), difficulties accessing the internet (33.8%), high expenses (26%), and inadequate coverage of internet service (20.3%) were the main problems of internet usage in Thailand.

Another reason to choose face-to-face survey was because the Agricultural Extension Officers demonstrated their effectiveness in gathering rice farmers in each village. It was felt that a face-to-face survey in an assembly hall with farmers gathered by the officers would be a very cost efficient, but effective method. It would allow the researcher and assistants the opportunity to explain the questions if necessary. However, the farmers were still able to complete the questionnaire themselves.

3.6.3 Sampling procedures

1) Sampling frame and size

Multistage sampling techniques were used. A theoretical sampling technique was used in the first step to determine geographical regions. Three regions were selected to cover the three main rice production regions. They were north, north-east and central regions with a collective share of 98.4% of total rice production in Thailand (OAE, 2015). Three provinces were targeted in each region, totalling 9 provinces as shown in Figure 3.2.
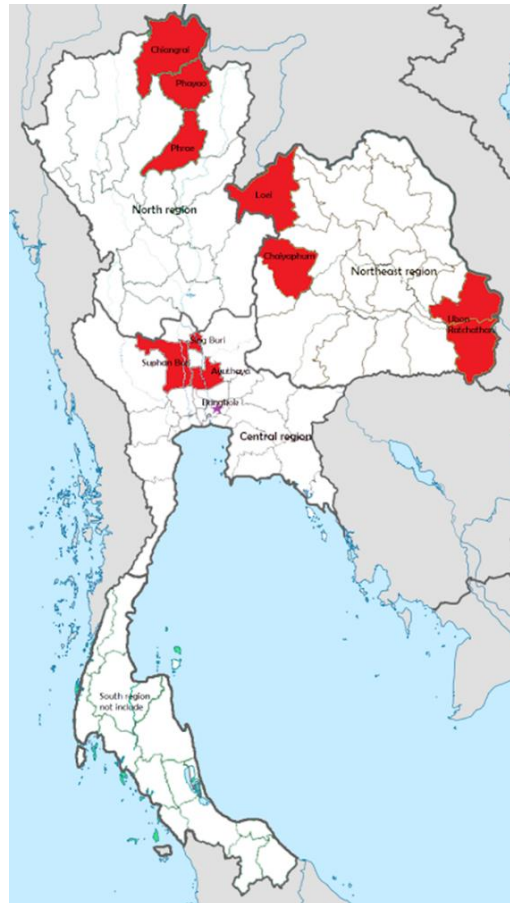
Figure 3.2 Data collection in quantitative phase in 9 provinces of 3 regions in Thailand

(Source: Author's own, 2016)

Three main factors were considered to ensure representativeness of the provinces and villages in each of the three regions: (1) the total number of rice farmer households, (2) rice varieties and (3) farm size.

When requests were made to the officers for assistance in identifying target provinces and villages, it was made clear that the province and the villages should be main rice production areas which represent different rice varieties in each province and different farm sizes. After receiving that request, the officers suggested three provinces in each

region. Purposive and convenience sampling techniques were used to identify target villages from nine provinces in Thailand, with help from the officers of the sub-district administrative organisation (SAO) and agricultural extension officers. Twenty-one villages were chosen.

In view of budget limits and time, a total target sampling size was 630 by calculating 0.07% of the total number of household (Table 3.2). However, it was not feasible to have a sample target with three farm size groups. The reasons for this are explained in the next section.

Table 3.2 Target sampling size in 3 main regions of rice production in Thailand

Regions/ Provinces	The total number of rice household 2014/15 (Households) (Major and Second crop rice)			The average number of rice area per household (Rais/Household) 2014/15 (Major and Second crop rice)			Sampling size calculated (Adjusted sampling size)
	Large (> 120,000)	Medium (120,000 -68,410)	Small (< 68,410)	Large (≥ 20 Rais)	Medium (19.99- 12.5 Rais)	Small (< 12.5 Rais)	
North	Mean 69,965 Households			Mean 16.06 (Rais/Household)			182 (190)
Chiang Rai	137,993				12.79		97 (90)
Phayao		69,026				11.68	48 (50)
Phrae			52,990			8.37	37 (50)
North-east	Mean 123,893 Households			Mean 12.96 (Rais/Household)			292 (290)
Ubon Ratchathani	231,594				15.43		162 (150)
Chaiyaphum	127,873				12.98		90 (90)
Loei			58,196			6.55	41 (50)
Central	Mean 24,715 Households			Mean 24.64 (Rais/Household)			132 (150)
Suphan Buri		106,598		23.02			75 (80)
Ayutthaya			54,332	31.26			38 (40)
Sing Buri			27,353	23.52			19 (30)
Total	Mean 68,410 Households			Mean 18.62 (Rais/Household)			606 (630)

Notes: 1) Rai = 0.16 Hectare or 1 Hectare = 6.25 Rais

2) Major rice refers to the rice grown during May and October

3) Second crop rice refers to the rice grown during November and April of the following year

(Source: Author's calculations using data from OAE, 2015)

Target sampling size was 630; 746 questionnaires were actually collected from 3 main regions (north, north-east, central), 9 provinces, 13 districts, and 21 villages. 85 (11.4%) were rejected due to the large number of incomplete key questions and extreme

responses, giving a total of 661 valid responses. The sampling size and valid number of questionnaires of each province and village are shown in Table 3.3.

Table 3.3 Sample size and valid questionnaires in this study

Regions and Provinces	Sub-Districts /Villages	Sampling size	Incomplete questionnaires	Valid questionnaires
North		227	54	173
Chiang Rai		98	29	69
	Pha Ngam	50	14	36
	Huai So	48	15	33
Phayao	Huai Lan	77	10	67
Phrae	Rong Kwang	52	15	37
North-east		324	24	300
Ubon Ratchathani		182	18	164
	Na Kasem	85	8	77
	Thung Thoeng	31	1	30
	Mueang Det	66	9	57
Chaiyaphum		88	3	85
	Nai Mueang	38	1	37
	Na Siao	50	2	48
Loei		54	3	51
	Na Pong	20	1	19
	Mueang	34	2	32
Central		195	7	188
Suphan Buri		91	2	89
	Ban Krang	45	1	44
	Wang Yang	4	-	4
	Bang Ngam	7	-	7
	Mot Daeng	5	-	5
	Rai Rot	30	1	29
Ayutthaya	Ban Kum	54	2	52
Sing Buri		50	3	47
	Thon Samo	27	2	25
	Phikul Thong	6	-	6
	Pho Prachak	10	-	10
	Ban Paeng	7	1	6
Total		746 (100%)	85 (11.4%)	661 (88.6%)

(Source: Author's own, 2016)

2) Sampling methods/ techniques to target individual farmers

Ideally, a full list of rice farmers in each target village is obtained. A farm-size based stratified random sampling technique is then applied. This was deemed impossible. The agricultural extension officers suggested during the phase one interview that they would not be able to provide the list and they believed the that the most effective way was to work with the heads of villages. This means a census sampling technique would be used in each target village. That is, the head of village would inform all rice farmers in the village for an assembly. They would explain to the farmers the purpose, the time and venue of the assembly. Farmers' participation was completely voluntary.

In the end, two extension officers, three SAO officers, and seventeen heads of villages helped to gather farmers from the target villages. Target participants in this study were all adults over the age of 18 years and able to consent to participation. Due to lack of census data of number of rice farmers in each village, an actual response rate was not calculated. However, the number of responses from each village was presented.

3.6.4 Instrumentation and measurements

1) Design and format

The questionnaire was initially developed in English and then translated into Thai by the researcher. It was then back translated to check the equivalence of meanings. The design and format of the questionnaire was created in the form of a self-completion. Respondents were asked questions that applied or related to them.

The questionnaire used both open-ended and closed-ended questions, with the majority of the questions being closed-ended. Care was taken with the design to ensure that respondents would correctly interpret questions. Participants were given a consent form on the first page.

Questionnaire instructions were placed before questions, and the questions were carefully worded to ensure they were not too long, that their order had logic, and that the flow had a clear layout. The questionnaire was divided into three sections:

1) profile of respondents;
2) marketing channels used;
3) factors affecting marketing channel(s) selection and future intentions.

2) Measurements and variables in the study

The first research objective was to identify the main marketing channels for rice farmers in Thailand. The question to meet this objective was 'what channels did you use and how often did you use the channel(s) during the period of 2011 and February 2014 and after February 2014? The first period represented during the rice pledging scheme (RPS)

in operation from 2011 to 2014, and the second period related to channel use after the ending of RPS up to July 2016 when survey was conducted. Results were used to analyse differences in channel use before and after the RPS. However, it was recognised by the researcher that the time lapse was short which might affect the significance of the results. Six channels identified in phase one interviews were listed as options. Respondents could also identify other channels used by themselves.

The next objective was to identify factors affecting the choice of market channels by rice farmers in Thailand, drawing on the revised framework. Dependent variables in the study are the intention to choose marketing channels, and past behaviour (marketing channels used currently).

Marketing channel choice behaviour was defined as the selection of channel(s) for selling rice product(s). Classic TPB model would take a two-stage approach to collect information on intention and behaviour. However, this is often very difficult to achieve due to budget limits and time and the practical difficulty of accessing the same participants in both phases. Such concerns might have been one of the reasons that only 8.5% of empirical studies which applied TPB have measured both 'intention' and 'behaviour' (e.g., Asadi *et al.*, 2010; Sutherland and Holstead, 2014; Kazemi *et al.*, 2018). This study followed majority of studies (104 out of 153 articles, see Table 2.1 for details) to study "intention" as the dependent variable, assumed to be the antecedent of marketing channel choice behaviour.

There are eight categories of independent variables (i.e. potential influencing factors). These are the three components of TPB: 1) attitude toward the marketing channel choice, 2) subjective norm, and 3) perceived behavioural control, along with additional variables: 4) trust, 5) the channel relationship, 6) transaction specific variables, and 7) goals and values for selling, and 8) past behaviour. It was proposed that past behaviour may be affected by the preceding 7 variables too.

As mentioned earlier, the relativist and pragmatist view heavily influenced the development of some of the measures. Measures of the key factors related to the TPB used in the survey were adapted from those developed by Ajzen (2006). Measurements of other factors were developed extant literature and informed by the findings of phase one interviews (reflecting an integration of subjectivism into a quantitative approach). Seven-point Likert scales were used for rate respondents' opinions. Again, this researcher holds the view that such scale does not measure the 'absolute truth' and each individual's interpretation of a number within the scale is subjective and prone to bias. However, the ordinal scale does provide the opportunity to allow relative comparisons and statistical analysis of causal relationships. The statements of each variable, how to measure, and sources are presented in Table 3.4. A full list of questions in the questionnaire can be found in Appendix C.

Table 3.4 Statements used to measure in the survey

Variables	Statements	Sources
Dependent variables		
Intention Rate level of likelihood 1= Most unlikely to 7 = Most likely	1) Next crop, I intend to sell to market channel(s) as lists below?	Adapted from Ajzen, 2006; Phetvaroon, 2006
Marketing channel selection behaviour Rate level of frequency 1= Never to 7 =Frequently use>90 %	1) What channels did you use and how often did you use the channel(s) during the period of 2011 and February 2014 and after February 2014?	Adapted from Hansen *et al.*, 2004; Ajzen, 2006; Phetvaroon, 2006; Interviews, 2015
Independent variables		
Attitude toward the marketing channel choice Rate level of agreement 1 =Strongly disagree to 7 =Strongly agree	1) This channel is a good choice for me 2) Overall, I am satisfied or happy with this channel	Adapted from Ajzen, 2006; Phetvaroon, 2006
Subjective norm regarding marketing channel choice behaviour Rate level of agreement 1 =Strongly disagree to 7 =Strongly agree	1) Most of my friends who are rice farmers sell to this channel 2) My family thinks I should sell to this channel 3) Rice harvest machine drivers or truck drivers I am in contact with think I should sell to this channel 4) Government officers or head of village I am in contact with think I should sell to this channel 5) This channel was recommended by mass media	Adapted from Ajzen, 2006; Patcheep, 2011; Interviews, 2015
Perceived behavioural control over channel choice behaviour Rate level of agreement 1 =Strongly disagree to 7 =Strongly agree	1) I choose this channel because I do not have any choice) .Reverse(2) I can negotiate with this channel. (e.g. price, payment, grading) 3) I have to sell to this channel because I have a contract with them 4) I have to sell to this channel because I am in debt with them. (e.g. loan, repay farm inputs)	Adapted from Bamberg *et al.*, 2003; Ajzen, 2006; Interviews, 2015

Table 3.4 Statements used to measure in the survey (cont.)

Variables	Statements	Sources
Independent variables		
Trust Rate level of agreement 1 =Strongly disagree to 7 =Strongly agree	1) I choose this channel because I trust this channel 2) I choose this channel because I don't have to worry about being cheated on weighing scale 3) I choose this channel because I don't have to worry about being cheated on rice quality assessment 4) I choose this channel because this channel treated me fairly 5) I choose this channel because this channel had a good reputation 6) In general, I am sceptical of the information I received from this channel (Reverse)	Adapted from Kumar *et al.*, 1995; Interviews, 2015
The channel relationship Rate level of agreement 1 =Strongly disagree to 7 =Strongly agree	1) I have a good relationship with this market channel 2) I have been familiar with this channel	Tsourgiannis *et al.,* 2008; Interviews, 2015
Transaction specific **variables** Rate level of agreement 1 =Strongly disagree to 7 =Strongly agree	1) This channel offered me higher price 2) This channel offered me cash payment 3) It is cheaper to transport my product to this channel 4) This channel is easily accessible or convenient to me 5) This channel buys any quantity of rice. (buy all or small quantity) 6) This channel buys any type of rice 7) This channel offered me monetary incentives 8) This channel offered me non-monetary incentives or good services	Adapted from Kumar *et al.*,1995; Batt, 2003; Duarte & Davies, 2004; Phetvaroon, 2006; Ajzen, 2006; Zhang & Hu, 2011; Patcheep, 2011; Lu *et al.,* 2012; Yazdanpanah *et al.,* 2014; Interviews, 2015
Goals and values for selling Rate level of importance 1 =Not at all important to 7 =Extremely important	Goals of selling 1) Maximising profit by selling at a higher price 2) Maximising profit by minimising cost of selling 3) Enhancing cash flow Intrinsic 4) Having sense of achievement or self-fulfilment through selling 5) Independence- freedom for selling 6) Family's well-being Social values 7) Continuing the family tradition 8) Belonging to the farming community or farmer group	Adapted from Gasson, 1973; Interviews, 2015

(Source: Author's literature review and Interviews, 2015)

Three types of validity were assessed: content validity, concurrent validity and construct validity (Creswell, 2014). Content validity was partly addressed by using previously established indicators. The adaptations of those measures were only related to research context. Concurrent and convergent validity (Campbell & Fiske, 1959, cited in Creswell, 2014) were established through factor analysis and PLS-SEM outer model assessment. Reliability of the factors was assessed through Cronbach's coefficient alpha.

3.6.5 Survey procedure and challenges

Survey procedure followed a series of steps. After the approval of the ethics form and the budget, pilot test was conducted, and the questionnaire was revised accordingly. Before conducting the survey, the government officers, who were instrumental in the communications with potential respondents, were contacted.

The next process was the recruitment of survey personnel and fieldwork training. Surveys were conducted following the target sampling size of each village. Thus, possible biases and the challenges were identified. The details of the survey procedures are described in the following sections.

1) Pre-test and pilot survey

The questionnaire aimed to obtain the most complete and accurate information using words that are easy to understand and well organised. Pre and pilot tests were conducted to confirm the questionnaire's wording.

Pre-testing was conducted in June 2016 by five researchers in agricultural economics or marketing from Kasetsart University in Bangkok, Thailand and five rice farmers in Suphan Buri province (Central region). The questionnaire was revised using the results of pre-test. The meanings of some questions were clarified. Questions deemed to be irrelevant were identified and deleted. The sequence of questions was reordered.

After pre-testing, 30 pilot questionnaires were collected in Suphan Buri province in June 2016 to improve the wording and format of the questionnaire. This also helped the researcher to plan the actual survey as the pilot showed how many research assistants would be required in each village. Purposive and convenience sampling technique were used in the pilot study. Respondents selected in Suphan Buri were drawn from the sampling size frame and were broadly representative of the sampling size in the main survey (see Table 3.2 for more detail). However, all initial key measurement items were maintained in the actual survey, although some irrelevant items were discarded, and some scales were changed.

2) Survey administration

The face-to-face questionnaire survey was conducted in 21 villages from 9 provinces in 3 regions in Thailand during July-August 2016. Access to respondents at village level required full support from local communities. Local government officers ensured that participants were willing to engage with the survey. Letters were sent out and follow-up calls made to agricultural extension officers at the level of the sub-district administrative organisation (SAO).

Letters requested assistance with the survey and gave information on survey date, the number of respondents required, variety of marketing channels, different farm sizes, and offered a small token as an incentive for participation.

After follow-up letters, potential villages that matched requirements were identified by government officers. Officers sent the contact details of heads of villages so that appointments could be made. SAO officers and heads of villages assisted by organising an assembly of potential respondents to meet in village halls. In some cases, questionnaires were collected by the researcher at convenient times and places (homes, farms, shops). Table 3.5 presents the number of contact persons in each village.

A gift worth £1 was given to each respondent as an incentive to participate. This was budgeted for in the research expenses approved by the Director of Studies.

3) Recruitment of survey personnel and fieldwork training

Questionnaires were distributed and collected by the researcher and research assistants. Research assistants with a knowledge of rice farming were recruited, generally alumni of Kasetsart University, who were paid to work on a daily basis. The researcher trained research assistants before the survey so that all assistants understood the survey questions. The research assistants and researcher collected completed questionnaires. Table 3.5 shows the number of contact persons and research assistants of each village in this survey.

Table 3.5 The number of contact persons and research assistants in the survey

Regions	Provinces	Villages	Contact persons	Researcher and assistants
North	Chiang Rai	Pha Ngam	1 Extension officer, 1 Head of village	1 Researcher and 3 Research assistants
		Huai So	1 Head of village	1 Researcher and 3 Research assistants
	Phayao	Huai Lan	1 Head of village	1 Researcher and 3 Research assistants
	Phrae	Rong Kwang	1 SAO officer, 1 Head of village	1 Researcher and 3 Research assistants
North-east	Loei	Na Pong	1 Head of village	1 Researcher and 3 Research assistants
		Mueang	1 Head of village	1 Researcher and 3 Research assistants
	Chaiyaphum	Nai Mueang	1 SAO officer, 1 Head of village	1 Researcher and 3 Research assistants
		Na Siao	1 Head of village	1 Researcher and 3 Research assistants
	Ubon Ratchathani	Na Kasem	1 Extension officer, 1 Head of village	1 Researcher and 4 Research assistants
		Thung Thoeng	1 Head of village	1 Researcher and 4 Research assistants
		Mueang Det	1 Head of village	1 Researcher and 4 Research assistants
Central	Suphan Buri	Ban Krang	1 Head of village	1 Researcher and 1 Research assistants
		Wang Yang		1 Researcher
		Bang Ngam	1 Head of village	1 Researcher
		Mot Daeng		1 Researcher
		Rai Rot	1 Head of village	1 Researcher and 1 Research assistants
	Ayutthaya	Ban Kum	1 Head of village	1 Researcher and 2 Research assistants
	Sing Buri	Thon Samo	1 SAO officer, 1 Head of village	1 Researcher and 2 Research assistants
		Phikul Thong		1 Researcher and 2 Research assistants
		Pho Prachak	1 Head of village	1 Researcher and 2 Research assistants
		Ban Paeng		1 Researcher and 2 Research assistants

(Source: Author's own, 2016)

4) Possible biases, and the challenges

Questionnaires were completed by farmers with support from researchers and research assistants. At the end of most working days of the survey, the researcher checked through completed questionnaires for missing information and legibility.

As Table 3.3 shows, 85 questionnaires were rejected due to missing data. Incompletion was often the result of respondents failing to answer questions about personal profile and why they had chosen the channel(s).

Four possible biases were identified: (1) nonresponse bias, (2) leading questions bias, (3) acquiescence bias and (4) extreme responding.

Before conducting the survey, the researcher considered the issue of nonresponse bias and decided both to offer a small gift to respondents and to take advantage of the relationship that potential respondents had with government officers and heads of villages. Such people would encourage respondents to participate. In addition, respondents were willing participants who gave consent and confirmed their status as rice farmers who had sold rice. Non-response bias still occurred as a result of using government officers who could be biased in their selection of areas and respondents. Other nonresponse bias resulted from refusals, and because some respondents had chosen other types of marketing channels not listed as options.

Bias resulting from using leading questions could happen because some questions were asked because phase one interviews prompted them. Examples are: subjective norm regarding marketing channel choice behaviour and trust statements. However, respondents could indicate their level of agreement with trust statements as "strongly disagree" or "disagree".

Acquiescence bias and extreme responses such as answering 7 to all questions were found in survey results. Some respondents chose only positive connotation (7= strongly agree) indicating acquiescence bias; some respondents selected only the intermediate response (4= neutral). All questionnaires with such biases were rejected as in-complete responses.

3.6.6 Data inputting procedures

Three main steps of data recording procedures are presented in this section: before data entry, during data input, and after entering data.

Initially the researcher prepared data by scanning completed questionnaires and separating incomplete questionnaires, recording the response rate. A research assistant used Microsoft Access to design an efficient and accurate data entry process. Data recording was done by two research assistants with the experience in data entry and supervised by researcher. Lump sum payments were made to these assistants.

Logic checking of each questionnaire took place during data entry, checked by research assistants. Regular backup of data was done during this process.

The final step, after data entry, was to merge the data files from each research assistant using the same form and same codes for data recording. Completed questionnaires were kept safely so that raw data could re-checked if necessary. The final data file was converted into Microsoft Excel and then imported into Statistical Package for

the Social Sciences (SPSS) software version 24 for data analysis. The files were stored, using password protection, in the researcher's own laptop and the University's shared drive.

3.6.7 Data analysis and interpretation

Data analysis procedures, after preparation of the data file, required screening and cleaning the data file by checking and correcting errors. Variables were modified for further analysis. Then descriptive statistics were compiled and reported. Finally, multivariate data analysis was conducted to explore relationships and compare groups.

1) Preparing the data file

The data file was imported from Microsoft Excel into SPSS, defining the variables and values: for example, male =1, female =2. Records of codes were kept. After this, data screening was undertaken. Errors were checked by examining frequencies of each of variable for scores that were out of range. Data was sorted using ascending or descending values which helped to find and correct errors in the data file. Some errors were obvious: for example, the age of one respondent had been recorded as 600. In this example, reference back to raw data revealed that the respondent's answer was 60 not 600; the corrected value was entered.

Descriptive statistics used included the means, standard deviations (SD), and range of scores for each variable and to answer the research question 1 (Table 3.6). The results of descriptive statistics are presented in Chapter 5 in the profile of respondents and the main marketing channels used by respondents.

Before conducting multivariate analysis and further analysis, normality and outliers were assessed, and some variables were transformed due to skewed distribution. As the respondents might have been sold their rice to more than one channel, and the aim was to assess factors affecting channel choice decision, frequency of channel use was asked for each channel. This means that one respondent was recorded as one or two or three cases, depending on the number of channels he/she used. For example, respondent ID 001 sold to miller and local collector, this ID was recorded as two cases: case one sold to miller, case two sold to local collector.

Results from interviews and the survey showed that there were six main marketing channels used by respondents: miller, local collector, agricultural cooperative, central paddy market, farmer group, and direct selling. However, miller, local collector, and agricultural cooperative were the three marketing channels used for multivariate analysis due to low sample size for the other three channels. Sample size should more than 50 cases (VanVoorhis and Morgan, 2007; Pallant, 2016).

The total number of respondents was 661 and the total number of cases of three marketing channels was 697. However, 31 cases were dismissed due to missing value of the key dependent variable (intention), and 7 cases were deleted after checking outliers by

inspecting the Mahalanobis distance and Cook's Distance gathered from multiple regression initial analysis. A total of 659 cases were used.

Transformed variables were used for partial least squares structural equation modelling (PLS-SEM). Seven variables were transformed, due to most scores being at the high end or negatively skewed distribution, by using three forms of negatively skewed distribution transformations: reflect and square root, reflect and logarithm, and reflect and inverse (Pallant, 2016). Reflect and inverse was used for seven variables which were (1) intention, (2) past behaviour or frequency of current channel(s) use, (3) to receive cash payment, (4) channel buying all quantity of rice, (5) channel buying any type of rice, (6) channel being easily accessible and (7) achieving higher price.

Furthermore, two variables with positively skewed distribution were found or respondents answered with low scores. Three forms of positively skewed distribution transformations were used, namely square root, logarithm, and inverse. Consequently, logarithm was chosen for two variables which were total land size for growing rice (Rais) and market distance (Km).

2) Data analysis techniques

Paired samples t-test, multivariate analysis of variance (MANOVA), factor analysis, reliability of scale, and partial least squares structural equation modelling (PLS-SEM) were the statistical tests conducted in phase two of this study. Table 3.6 provides mapping of each test with each research question and hypothesis.

Table 3.6 Hypotheses and statistics for testing

Research questions	Hypotheses and Statistics for testing
1. What are the main marketing channels for rice farmers in Thailand?	Descriptive statistic: Frequency counts, Means, SD
2. Is there a difference in rice farmers' channel choice used from during the RPS to after RPS ended?	Statistical hypotheses: H1: There are significant differences in respondents' channel choice used between before and post RPS Paired samples t-test: if p value <0.05, there is a significant difference between two times

Table 3.6 Hypotheses and statistics for testing (cont.)

Research questions	Hypotheses and Statistics for testing
3. Is there a difference between profile of respondents, across different marketing channels, in terms of their past behaviours and intentions?	Statistical hypotheses: H2: There are significant differences between profile of respondents across different marketing channels on past behaviour and intention Multivariate ANOVA (MANOVA): Check the value of Pillai's Trace and significance level (Sig.), if the Sig level <0.05, there is a significant difference among groups of profile
4. What are the factors affecting the choice of marketing channels of rice farmers in Thailand?	Statistical alternative hypotheses: H3: Past behaviour or channel choice behaviour has a positive effect on the intention to sell to the marketing channel H4a: A attitude toward marketing channel has a positive effect on the intention to sell to the marketing channel H4b: A attitude toward marketing channel has a positive effect on channel choice past behaviour H5a: Subjective norm has a positive effect on the intention to sell to the marketing channel H5b: Subjective norm has a positive effect on channel choice past behaviour H6a: Perceived behavioural control or farmer's power has a negative effect on the intention to sell to the marketing channel. H6b: Perceived behavioural control or farmer's power has a negative effect on channel choice past behaviour H7a: Consideration of transaction specific cost has a positive effect on the intention to sell to the marketing channel. H7b: Consideration of transaction specific cost has a positive effect on channel choice past behaviour H8a: Consideration of channel accessibility has a positive effect on the intention to sell to the marketing channel H8b: Consideration of channel accessibility has a positive effect on channel choice past behaviour H9a: Personal relationship has a positive effect on the intention to sell to the marketing channel H9b: Personal relationship has a positive effect on channel choice past behaviour H10: Trust has a positive effect on attitude toward marketing channel

Table 3.6 Hypotheses and statistics for testing (cont.)

Research questions	Hypotheses and Statistics for testing
4. What are the factors affecting the choice of marketing channels of rice farmers in Thailand?	H11a: Integrity has a positive effect on trust this channel H11b: Fairness has a positive effect on trust this channel H11c: Reputation has a positive effect on trust this channel H11d: Reliable Information has a positive effect on trust this channel H12: Social value has a positive effect on subjective norm H13a: Goals of selling have a positive effect on consideration of transaction specific cost H13b: Goals of selling have a positive effect on consideration of channel accessibility H14: Intrinsic has a positive effect on goals of selling Partial least square method to structural equation modelling (PLS-SEM): the criteria of PLS-SEM model evaluation as shown in Table 3.5

(Source: Author's own, 2017)

2.1) Paired samples t-test

Paired samples t-test is used to compare the mean scores for the same person on two different occasions (Pallant, 2016). In this study, it was used to compare farmers' use of marketing channels in two periods of time: during RPS and post RPS. One categorical independent variable was time with two different levels: time 1 was during 2011-2014 and time 2 was during 2014-2016. One continuous dependent variable was the level of frequency used of each marketing channel. If the probability (p) value is less than 0.05, it concludes that there is a significant difference of farmers' use of marketing channels between the two periods of time (Pallant, 2016).

2.2) Multivariate analysis of variance (MANOVA)

Multivariate analysis of variance (MANOVA) is used to analyse variance when comparing more than one dependent variable (Pallant, 2016). MANOVA is used to in this study to test whether there is variance in marketing channel choice (past behaviour and intention) by different types of farmers as grouped by attributes such as gender, education, farm size etc. Therefore, the two dependent variables were past behaviour and intention of marketing channel use frequency (ordinal scale). The categorical independent variables were the choice of marketing channel and attributes of respondent.

Preliminary assumption testing was conducted and, it was found that the assumption was violated due to the large sample size and almost equal group sizes of some variables.

In this situation, Pillai's Trace is more suitable than the commonly used Wilks' Lambda statistic, and an alpha of 0.01 was considered as an additional level for determining significance of the variance (Pallant, 2016). If the sig level of Pillai's Trace is <0.05, there is a significant difference among attributes and the marketing channels used.

2.3) Exploratory factor analysis: Principal components analysis and reliability of scale

Factor analysis was used to analyse and summarise interrelationship between a large number of variables and to group the variables (Hair *et al.*, 1995; Pallant, 2016). Principal component analysis (PCA) is often used to reduce the number of dimensions (Nokels *et al.,* 2010). Further test of the reliability and validity of each dimension is recommended (Götz *et al.,*2010). In this study, exploratory factor analysis via PCA was used to explore the potential influencing factors and their underlying dimensions. The factors generated were then used in the subsequent partial least squares structural equation modelling (PLS-SEM) test.

Three criteria were used to determine the appropriateness of the data: Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) index that should more than 0.6 (Pallant, 2016), the value of Bartlett's test of Sphericity at the significant level of ($p<0.05$), and the acceptable total variance explained.

The consistency of measures for each factor was tested in terms of reliability of scale. Reliability of scale of each factor is analysed using Cronbach's Alpha (α). Cronbach's Alpha coefficient of scale (α) at 0.5 is acceptable if the items for each factor is less than ten. However, an Alpha of 0.7 is the more commonly accepted threshold (Pallant, 2016).

2.4) Partial least squares structural equation modelling (PLS-SEM)

Partial least squares structural equation modelling (PLS-SEM) is a second-generation technique of multivariate analysis (Lowry and Gaskin, 2014, Hair *et al.*, 2017). The example of the first-generation techniques are exploratory factor analysis, multiple regression, and analysis of variance. These techniques are unable to incorporate unobservable variables measured indirectly by indicator variables (Lowry and Gaskin, 2014, Hair *et al.*, 2017).

There are two types of SEM: covariance-based SEM (CB-SEM) and partial least squares (PLS-SEM) (Lowry and Gaskin, 2014, Hair *et al.*, 2017). PLS is a form of structural equation modelling (SEM) for causal modelling which integrates many statistical techniques, for example, t-values via bootstrapping, PCA, multiple regression, correlation, and multivariate analysis of variance via multi-group analysis (MGA) (Lowry and Gaskin, 2014). PLS-SEM was used to explore the causal networks between latent concepts, namely latent variables (LVs) measured by several observed indicators defined as manifest

variables (MVs) (Hair *et al.*, 2011) by using SmartPLS software version 3.0 developed by Ringle *et al.* (2015).

This study used PLS-SEM for the following reasons. First, PLS-SEM is more suitable for exploratory research while CB-SEM is used to confirm or reject theories (Lowry and Gaskin, 2014, Hair *et al.*, 2017). Second, PLS-SEM may run with low sample size with missing data whilst CB-SEM often cannot run with missing data (Lowry & Gaskin, 2014). Lastly, the assumption of CB-SEM is all indicators are reflective, whereas PLS-SEM is considered to comprise reflective and formative indicators (Lowry and Gaskin, 2014, Hair *et al.*, 2014). Therefore, PLS-SEM has become a popular statistical technique in social and behavioural sciences. Hair *et al.* (2012) reviewed 204 studies published during 1981-2010 in marketing area and found that non-normal data, small sample sizes, and formatively measured constructs were the top three reasons for using PLS-SEM.

There are two assessments of a PLS path model which are (1) the measurement or outer models and (2) the structural or inner model (Chin, 2010; Hair *et al.*, 2011; Garson, 2016). The assessment of the measurement or outer models is to examine the reliability and validity of the constructs within either a reflective or a formative model (Vinzi *et al.*, 2010). Endogenous and exogenous latent variables as well as reflective and formative models in the measurement models are determined based on principal component analysis (PCA) and reliability analysis. If the measurement or outer models are adequate, the next step is to assess the structural or inner model (Hair *et al.*, 2011).

The purpose of assessing of the structural or inner model is to measure the model's capability to predict and determine the level of significance of each path relationship (Hair *et al.*, 2011). The structural or inner model presents the relationship between the endogenous or dependent latent variables (LVs) and exogenous or independent LVs of which the endogenous LV is defined as the target variable or effect of independent variables, while the exogenous LV is not an effect of any other variable in the model or used to describe the other variables (Hair *et al.*, 2011; Garson, 2016).

These two assessments were conducted by running consistent PLS bootstrapping which randomly draw cases with the replacement from the original sample to create 5,000 bootstrap samples along with the PLS algorithm (Hair *et al.*, 2011; Garson, 2016).

Multi-group analysis (MGA) is used to test for the significance of difference between groups in the PLS model (Sarstedt *et al.*, 2011; Garson, 2016; Hair *et al.*, 2017). The standard approach of multi-group analysis in PLS-SEM is to test the difference in the path coefficients between two groups. If there are more than two groups, it should use two steps of comparing more than two groups as suggested by Hair *et al.* (2018).

The first step is to find the significant difference by using omnibus test of group differences (OTG) and the second step is to assess whether the path coefficient differs by using pairwise comparisons (Hair *et al.*, 2018). OTG approach developed by Sarstedt *et al.*

(2011), which aims to compare the parameter results in the PLS-SEM multi-group analysis with more than two groups and offers a possibility to control a Type I error or the familywise error rate. It combines bootstrapping, permutation, and random selection's asymptotic properties of which corresponds to the F test in regression or ANOVA (Sarstedt *et al.*, 2011; Hair *et al.*, 2018).

OTG cannot be calculated using SmartPLS 3.0 software. MG-PLS beta Excel formulas developed by Chan (2014) was adopted in this study. However, the formulas in Excel require a Monte-Carlo resampling procedure in the permutation process which may lead to reach statistical significance. Nevertheless, the OTG approach is the initial step to test whether at least one group's path coefficient differs from other groups. Hair *et al.* (2018) suggested that which groups differ from each other can be assessed by a pairwise comparison test.

The processes of PLS-SEM analysis using SmartPLS are shown in Figure 3.3. Table 3.7 presents the criteria of PLS-SEM model evaluation used in this study. Hypotheses H3 to H14 were tested in order to identify factors affecting marketing channels choice of Thai rice farmers. This led to the development of a new framework for understanding marketing channel selection behaviour.
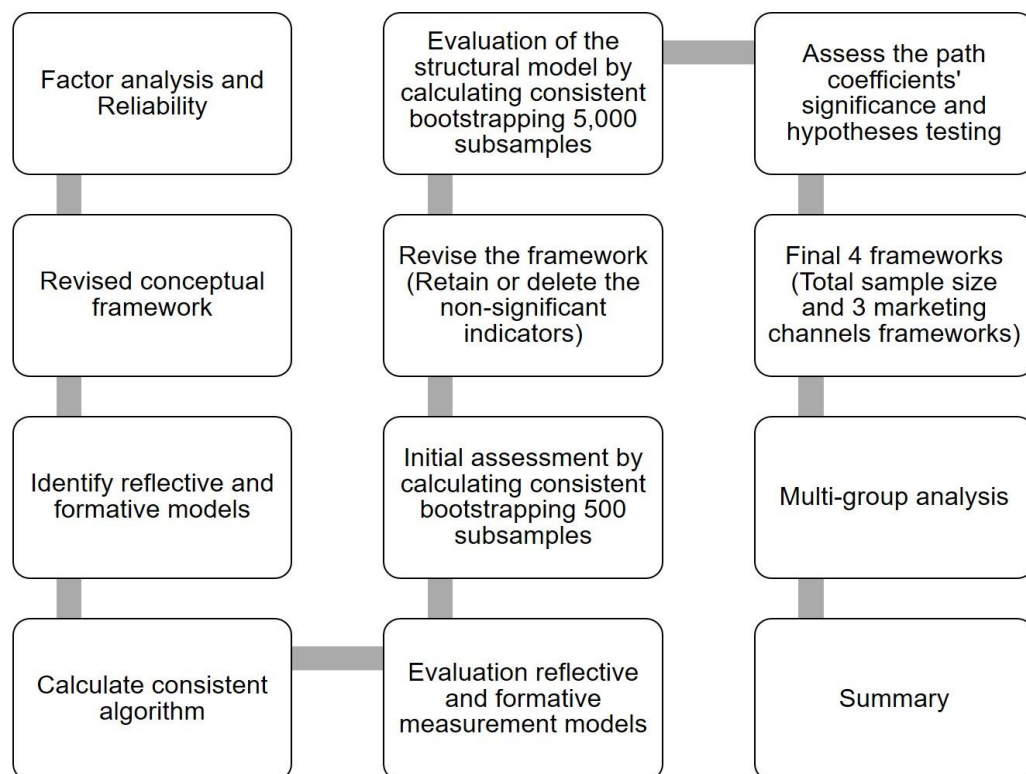
Figure 3.3 Processes of PLS analysis via SmartPLS software in this study

(Source: Author's own, 2017)

Table 3.7 The criteria of PLS-SEM model evaluation

Criteria	Conditions	Sources
The measurement model: Reflective measurement models		
-Internal consistency reliability	Composite reliability >0.80 for a good scale, >0.70 for an acceptable scale, and > 0.60 for exploratory research	Garson, 2016; Hair *et al.,* 2011
-Indicator reliability	Indicator loadings >0.70	Hair *et al.,* 2011
-Convergent validity	The average variance extracted (AVE) >0.50	Hair *et al.,* 2011
-Discriminant validity	"The AVE of each latent construct > the construct's highest squared correlation with any other latent construct" (Hair *et al.,* 2011: p 145) "An indicator's loadings > its cross loadings" (Hair *et al.,* 2011: p 145) - Heterotrait-monotrait ratio of correlations (HTMT) < 0.90	Chin, 2010; Götz *et al.*, 2010 Hair *et al.,* 2011: p 145
The measurement model: Formative measurement models		
-Validity	-Theoretical rationale and expert opinions are used to assess the formative models. -Face validity	Hair *et al.,* 2011; Garson, 2016
- Indicator's weight	After running the bootstrapping 5,000 samples, critical t-values for a two-tailed test are; ≥1.65 (90% significance), ≥1.96 (95% significance), and ≥ 2.58 (99% significance). It should keep the indicator which the weights are significance.	Hair *et al.,* 2011
-Multicollinearity	The indicator's variance inflation factor (VIF) value < 5	Hair *et al.,* 2011; Ringle *et al*., 2015
The structural model		
-R² values for endogenous latent variables in the structural model can be described as:	R² value 0.75 = Substantial R² value 0.50 = Moderate R² value 0.25 = Weak (Hair *et al.,* 2011) R² value 0.67 = Substantial R² value 0.33 = Moderate R² value 0.19 = Weak or Usefulness (Chin, 1998)	Chin, 1998; Hair *et al.,* 2011

Table 3.7 The criteria of PLS-SEM model evaluation (cont.)

Criteria	Conditions	Sources
The structural model		
-The path coefficients' significance	After running the bootstrapping 5,000 samples, critical t-values for a two-tailed test are; ≥1.65 (90% significance), ≥1.96 (95% significance), and ≥ 2.58 (99% significance).	Hair *et al.,* 2011
-Predictive relevance	After running the blindfolding and choose the omission distance d values between 5 and 10. "Q^2 values > 0.00 indicate that the exogenous constructs have predictive relevance for the endogenous construct under consideration"	Duarte & Raposo, 2010; Hair *et al.,* 2011; Garson, 2016; Hair *et al.,* 2017
-Heterogeneity	"If theory supports the existence of alternative groups of data, carry out PLS-SEM multi-group or moderator analyses"	Hair *et al.,* 2011 p 145
Multi-group Analysis (MGA)		
Path Relationships	The choice of significance level at which reject the null hypotheses H^0. $P < 0.05$ *, $P < 0.01$ **, $P < 0.001$***	Sarstedt *et al.,* 2011; Ringle *et al.,*2015; Garson, 2016;
Partial Least Squares Multi-Group Analysis (PLS-MGA)	A non-parametric significance test for the difference of group-specific results that builds on PLS-SEM bootstrapping results. If the p-value < 0.05 or > 0.95 for a certain difference of group-specific path coefficients, it is a statistically significant at the 5% probability of error level.	Sarstedt *et al.,* 2011; Ringle *et al.,* 2015; Garson, 2016
The Confidence Intervals (Bias Corrected)	If the path coefficient of another group value below on the confidence interval (lower and upper) of the first group, it represents that there is no difference in path coefficient between group 1 and group 2. If the path coefficient is no overlap, assume that there is a significantly different between group 1 and group 2 at the α = 0.05 level.	Sarstedt *et al.,* 2011; Ringle *et al.,* 2015; Garson, 2016

(Source: Author's own, 2017 summarised from Chin, 1998; Chin, 2010; Duarte & Raposo, 2010; Götz *et al.*, 2010; Hair *et al.*, 2011; Sarstedt *et al.*, 2011; Ringle *et al.*, 2015; Garson, 2016; Hair *et al.,* 2017)

3.7 Summary of this chapter

This chapter has outlined the researchers' ontological and epistemological positions and how they guided the design of research. Multi-method design was used. The purpose of phase one interviews, and phase two survey have been described. Interviews and survey design were planned in terms of sampling size, sampling techniques, data collection procedures and measurements.

The technique used in phase one interview was content analysis. Descriptive statistics, paired sample t-test, MANOVA, PCA, and PLS-SEM were the techniques used to test hypotheses

In conclusion, this chapter presents what, when, where, why and how the research was undertaken. The next chapter presents phase one interview results and the following chapter sets out phase two survey results. The hypotheses that were tested are discussed in the penultimate chapter and conclusions recorded in the final chapter.

Chapter 4 Phase one findings: Interviews

4.1 Introduction

As discussed in the previous chapter, this study adopted a two-stage sequential multi-method approach. This chapter presents the results of phase one interviews. Phase one aimed to explore rice farmers' selection of marketing channels and factors affecting the choice of marketing channel used by rice farmers in Thailand based on the conceptual framework by extending the Theory of Planned Behaviour (TPB).

Results in this chapter are divided into six sections. After the introduction, section 4.2 presents profiles of the farmers interviewed. This is followed by the description of the six main marketing channels used by interviewees: rice miller, local collector, agricultural cooperative, central paddy market, group direct selling and individual direct selling (Section 4.3). Factors influencing the marketing channel selection in general, and in each marketing channel, were summarised in section 4.4. Section five presents the findings regarding the impact of the rice pledging scheme on channel choice. Based on those findings, a modified framework was presented in the last section. This framework was then put into test in phase two survey.

4.2 Profile of the interviewees

Face-to-face interviews were conducted in June 2015 with 33 farmers from three provinces in three main rice production regions in Thailand. A semi-structured interviewing schedule was used using open-end questions. All transcripts, comprising a total of 35 hours, were imported into NVivo 10 software package for analysis. Content analysis was used to identify channel usage and factors that influence the channel choice of rice farmers in Thailand.

The profile includes a summary of socio-demographics of interviewees, divided into two main parts (Table 4.1). Firstly, a profile of farmers is provided, including location in region, age, gender, level of education and household size. Then a farming profile is given: land size for growing rice, land ownership, farming experience, types of production, types of rice, family members working on farm, in-debt, group membership and access to information.

Eleven farmers from each of the three regions in Thailand were interviewed. About half of them were under 55 years. There were slightly more male respondents (n = 19). Almost four out of five of interviewees (78.8%) were married. Of the 33 interviewees, 24 reported that the highest level of educational attainment was primary school (year 1-6). About one third of the respondents had a household size of more than four persons. All interviewees confirmed that they were either heads of their household or involved in decision-making in their household.

Table 4.1 Profile of the interviewees

Profile (Total 33 interviewees)	Number of interviewees
Region	
Central	11
North	11
North-east	11
Farmers profile	
Age groups	
< 55 years old	17
≥ 55 years old	16
Gender	
Male	19
Female	14
Marital status	
Married	26
Not married (Single, Divorced, and Widowed)	7
Level of education	
No formal education	1
Primary year 1-6	24
Secondary year 1-6	6
Bachelor's degree & higher	2
Household size	
1 - 4 Persons	23
>4 Persons	10
Farming profile	
Land size	
1-12 Rai (1-2 ha)	15
13-20 Rai (2.1-3.2 ha)	18
Land ownership	
Owner	16
Rent	7
Owned by government	10
Rice farming experience	
<22 Years	9
22–42 Years	14
> 42 Years	10

Table 4.1 Profile of the interviewees (cont.)

Profile (Total 33 interviewees)	Number of interviewees
Types of production	
Organic rice production	5
Non-toxic or pesticide residue free rice production	4
Conventional production	24
Types of rice (More than 1)	
Thai Hom Mali 105 or Jasmine rice	22
Sticky rice Khao Kho 6 or 14	21
White rice (Khao Kho rice:31,41,47, 57 and Phitsanulok 2)	7
Thai Pathumthani Fragrant Rice	5
Other (Riceberry Black, Red-Brown and Vessantara rice)	4
Family members working on farm when compared with household size	
1-50 %	16
51-99 %	10
All	7
In-debt	
Yes	24
No	9
Other sources of income (More than 1)	
No	2
Other agricultural products (e.g. Rubber, Fruit, Mung bean, Poultry)	17
Casual agricultural labourer	6
Non-agricultural jobs (e.g. teacher, barber, drivers and retailers)	9
Group membership	
No	6
Yes (More than 1)	27
(e.g. BAAC= 19, The village fund = 9, Farmers group =8	
Agricultural cooperative= 7, Local women group= 1)	
Access to information (More than 1)	
By myself	21
Friends/ Neighbours/ Other rice farmers	18
Rice harvest machine drivers or truck drivers	9
Other (Group of rice farmers=5, My family =1, Head of village =1)	5

(Source: Author's own, 2015)

The farming profile of the interviewees showed that they were all small-scale farmers. All the interviewees had less than 3.2 hectares of land and nearly half of them had less than 2 hectares (45.5%). Half of them (51.5%) did not own their land; they rented either from private landowners or from the government via the Sor Por Kor 4-01 land scheme which allocates land to poor farmers. In this scheme farmers cannot sell or transfer the rented land to other persons during lifetime; the rented land can be passed to an heir.

In terms of type of rice production, interviewees from the north-east and part of the north regions could only grow a crop once per year in the wet season. All interviewees from north and north-east regions grow both Jasmine and sticky rice. Interviewees from the central region reported that they could produce crops more than once a year. They tend to grow Thai Pathumthani fragrant rice and other white rice such as Khao Kho rice:31,41,47, 57 and Phitsanulok 2. They were more likely to sell those rice for income and also to buy Jasmine rice for their own consumption.

All interviewees had at least half of their family members working on farm. Most of interviewees (n = 24) were in-debt (lack of working capital for the next crop season). Interviewees indicated that income and profit from rice production was insufficient, partly due to the cost of hiring labour and machinery. Nine out of ten interviewees (94%) had to earn money from other sources or products, such as rubber, fruit, poultry, casual agricultural labourer and off-farm income.

Most interviewees (81.8%) stated that they belonged to group(s). The most mentioned reason to join the group was that they need to access credit such as Bank for Agriculture and Agricultural Cooperatives (BAAC) farmers group, the village fund, a local farmers group and agricultural cooperatives.

Most interviewees stated that market information was gathered by themselves. For instance, they called or asked an agent in the channel or they checked a price from notice board provided by one of the marketing channels available. Friends, neighbours, rice harvest machine drivers and truck drivers were other sources of information.

4.3 The main marketing channels used by interviewees

The interviews showed that there were six main marketing channels which fall into two broad categories. The first category is direct channels which include group direct selling and individual direct selling. The other category is indirect channels including rice miller, local collector, central paddy market and agricultural cooperative.

The number of interviewees using each channel is shown in Figure 4.1. Some interviewees used more than one channel. Of the 33 interviewees, 26 sold through only one channel, 6 sold through two channels (i.e. 2 persons sold to miller and central paddy market, 2 persons sold to miller and agricultural cooperative, 1 person sold to miller and individual

direct selling and 1 person sold to miller and local collector) and 1 sold through three channels (miller, local collector and agricultural cooperative).
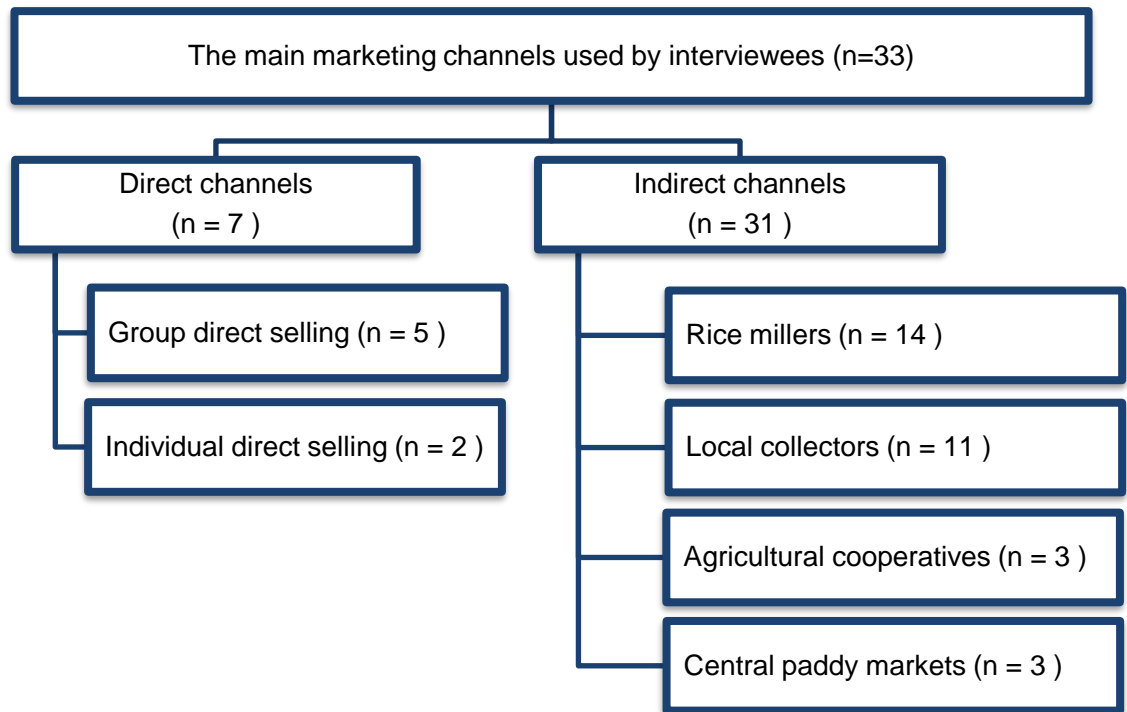
Figure 4.1 Main marketing channels used by interviewees

(Source: Author's own, 2015)

Firstly, direct channels involve individual direct selling and group direct selling. Individual direct selling is identified by interviewees as the channel where individual farmers sell their milled rice direct to consumers or end users at retail price in small quantities such as 1 or 5 kilograms per pack. Group direct selling is where farmers form a group and pool their unmilled rice (paddy rice). The group then completes the milling, packaging, and marketing to sell to consumers or end users such as restaurants. Group direct selling is similar to the way agricultural cooperatives operate; however, it is done by farmers themselves in an informal way.

The other category of channel for the sale of unmilled rice is indirect. There were four main intermediaries: rice millers, local collectors, central paddy market and agricultural cooperatives. Rice miller was the main intermediary channel used by interviewees (n = 14). Local collector was the second most popular channel. The local collectors may buy unmilled rice at local purchase stations or collect at farm gates, especially in remote areas. Central paddy market was a market centre where there are many agents operating. Services and facilities provided include weighing, moisture metering, labour, warehouses and loans, provided either by the private sector or by the government agency which is the Bank for

Agriculture and Agricultural Cooperatives (BAAC). Finally, agricultural cooperatives normally collect unmilled rice from members and then sell the rice to local collectors and rice millers although some agricultural cooperatives may be involved in milling, marketing and selling directly to consumers or end users.

4.4 Factors influencing the marketing channel selection by interviewees

Deductive and inductive content analysis techniques were adopted to analyse the transcripts of the interviews. Four major categories of factors were identified to have influenced farmers' decision in marketing channel selection. These are: 1) transaction specific factors, 2) relationship dynamics, 3) influencers, and 4) types of rice production. Detailed description of factors in these categories will be presented in the following section (section 4.4.1), while section 4.4.2 shows how those factors play out for each of the six main marketing channels used by interviewees. The exemplar quotes of factors to consider when choosing the channels from interviewees are presented in Appendix B Table B1.

4.4.1 Summary of factors influencing marketing channel selection

1) Transaction specific factors

Transaction specific factors were identified as the one of the determinant factors affecting marketing channel selection by interviewees. There were five factors in this category: (1) channel(s) buying capability, (2) terms of payment, (3) transportation cost, (4) price and (5) incentives and benefits. Table 4.2 presents the five factors in the transaction specific category with exemplar quotes.

The 'buying capability' refers to the marketing channel being able to buy all units of their rice, or any type of rice produced by farmers. Interviewees mentioned that the quantity to be sold was the most significant factor to consider when choosing a marketing channel. There was always the risk of not being able to sell all their rice produced, situation farmers would like to avoid. It would help to reduce the risk of unsold rice if a channel could buy all the unmilled rice.

'Cash payment' refers to farmers receiving cash when they sell their rice. Cash payment was the second dominant factor that interviewees identified. For cash poor farmers, they would rather receive a lower price from other channels in favour of channels which offered cash payment. This is related to having to repay debt or pay interest after harvest. Not all farmers were in this situation. Those who could afford to wait would obviously prefer selling at a higher price.

Table 4.2 Transaction specific factors and exemplar quotes

Transaction specific factors	n (total =33)	Exemplar quotes
1. Channel(s) buying capability	32	I usually sell to rice miller, but I have sold sticky rice to local collector because of miller did not buy a small quantity of rice'
2. Cash payment	29	'I usually sell to agricultural cooperative, even though rice millers will give a higher price 2 Baht per Kg, because miller offers credit payment'
3. Transportation cost	29	'I have sold to this rice miller because it is near my farm and transportation cost is low'
4. Price	20	'I received a higher price from direct selling. I can set my own pricing'
5. Incentives and membership benefits	15	'Agricultural cooperative offers credit for 3 months to members and sells inputs such as rice seeds, fertilisers, pesticides and herbicides and provides truck for transport rice to it'

(Source: Author's own, 2015)

'Transportation cost' is another factor. Although many interviewees owned a vehicle, the vehicle might not be suitable to transport unmilled rice. They had to hire trucks to transport rice to the market. Alternatively, a marketing channel might collect unmilled rice or consumers would buy milled rice at the farm gate. Farmers would compare the offer price and cost of transport and then made a selling decision. Many (n= 18) mentioned that if the price is the same, they prefer to sell to the nearest location or the channel which is easy to access.

'Incentives and membership benefits' were also important. This is particularly the case among interviewees who used group direct selling and agricultural cooperatives. Example of membership benefits are higher prices than the market price achieved through collective power, availability of loans, dividend yields, health and welfare benefits, and shared payment for members who work for the group. Other intermediaries such as rice millers and local collectors also offer incentives to farmers including collection of unmilled rice at farm gate, loans, gifts and sharing the cost of transport.

In summary, although the purpose of selling is to maximise profit by achieving a good price, or to minimise cost of selling, price is not the most important factor when choosing the marketing channel. Nearly all interviewees (n=32) indicated that they

considered other factors in addition to price. For instance, will the channel buy all units of rice or any type of rice, pay in cash, share cost for transportation or offer any other benefits.

2) Relationship dynamics

Relationship dynamics factors include personal relationship, bargaining power and trust were identified by interviewees (Table 4.3). Some interviewees (n=4) mentioned that their past experiences with the channel also affected their decision-making to choose the channel.

'Personal relationship' was found to be an important factor affecting farmers' selection of channels. Personal relationship refers to the close connections between people who work in the channels, including both owners and staff, with interviewees and their families. Interviewees who sold to intermediaries (n = 31), for example rice millers and local collectors, decided to sell to these channels because they have done so for many years. A close personal relationship may lead to an increase in price offered to farmers or other benefits, such as a loan or quick cash payment.

Table 4.3 Relationship dynamics factors and exemplar quotes

Relationship dynamics factors	n (total =33)	Exemplar quotes
1. Personal relationship	23	'Good relationship with rice miller because I have sold to them for 10 years'
2. Power of negotiation	21	'I can negotiate with local collector. In the past, I got a higher price 50 Baht per 1,000 kg'
3. Trust	20	'I trust in weighing instruments at BAAC's Central paddy market more than other channels'

(Source: Author's own, 2015)

'Bargaining power' is another factor considered by the interviewees. Bargaining power varied. Some farmers formed a group to enhance their bargaining power. This way, they could negotiate for a higher price when selling to rice millers or local collectors. Interviewees who sold to agricultural cooperatives said that they could not negotiate because the price was set beforehand in accordance with the quality of unmilled rice. One of the interviewees stated that although she could not negotiate directly with agricultural cooperatives it was possible to suggest a new agreement at the annual meeting of an agricultural cooperative. Other interviewees with small farms believed that they did not have any choice but to accept any price offered given the low quantity of rice sold.

The extent of 'trust' in a marketing channel was identified by interviewees by reference to trust in weighing the rice, quality assessment (grading) of the product, the reputation of the channel, whether the channel is fair to sellers, and reliability of the information it provides. All interviewees who sold directly to agricultural cooperative said they trusted this channel. They mentioned seeing every step in the sale process and could check or control by themselves. Interviewees identified trusted channels and indicated they would continue to sell to such channels.

3) Advice from influencers

'Influencers' (people who influence the farmers' choice of marketing channel) emerged from interviews as a significant factor. Although most interviewees stated that they were able to make decisions for themselves, they generally asked or found market information from other people. These 'influencers' are: farmer groups, friends, neighbours, individual rice farmers, rice harvest machine drivers, truck drivers, and their family members. For example, one of the interviewees said: '*I will ask truck driver and neighbours before selling*'.

4) Types of production

'Types of production' can be classified using rice type and the methods of growing and harvesting rice. All interviewees who chose direct selling grew special high value rice types, such as organic, non-toxic or pesticide residue free rice. However, some changed the type of production in order to sell through an intermediary as shown by this quote '*I planted organic rice, but rice miller will buy at the same price as other types of rice. I have changed to conventional farming.*'

As presented above, the interviews revealed ten distinct factors which influenced interviewees' decision making. It is possible that the relative importance of each factor may vary according to the channel farmers used. The next section will explore into this against each marketing channel.

4.4.2 Factors influencing the selection of each marketing channel

This section looks at how the ten influencing factors played out against each of the six marketing channels. Table 4.4 shows the number of interviewees who mentioned the reasons for choosing each marketing channel.

Table 4.4 Factors influencing the marketing channel selection identified by interviewees

Factors	Rice millers	Local collectors	Agricultural cooperatives	Central paddy market	Group direct selling	Individual direct selling
Transaction specific factors						
1. Channel(s) buying capability	14	11	2	3	5	1
2. Payment	11	10	3	3	5	2
3. Transportation cost	12	9	3	3	3	2
4. Price	10	7	1	0	5	2
5. Incentives	8	2	3	2	5	0
Relationship dynamics factors						
6. Personal relationship	12	6	2	3	5	0
7. Power of negotiation	9	8	1	2	5	1
8. Trust	8	5	3	3	5	1
9. Influencers	9	7	2	3	5	1
10. Production	6	4	0	0	5	2
Total number of interviewees	14	11	3	3	5	2

(Source: Author's own, 2015)

1) Rice miller

Rice miller is the largest intermediary in the rice market system; there are many rice millers around the areas of rice production. Some of them have many branches or send agents to buy rice from other channels. Because of this, farmers can easily access them and do not incur high transport costs. Buying capability was the most important factor when choosing this channel (Figure 4.2) as shown by one of the interviewees:

'As agricultural cooperative didn't buy rice in dry season and buy small quantity of rice, I have sold to rice millers'

Other factors causing interviewees to move to rice millers were that millers tend to buy all types and any quantity of rice from farmers. All interviewees who usually sold to agricultural cooperatives transferred to rice millers because agricultural cooperatives did not buy rice in the dry season. Furthermore, they could negotiate with millers on the quality grading of rice.

Trust was another factor that some interviewees considered when changing to rice millers because they put more trust in the accuracy of their weighing scales compared with the scales used by local collectors.
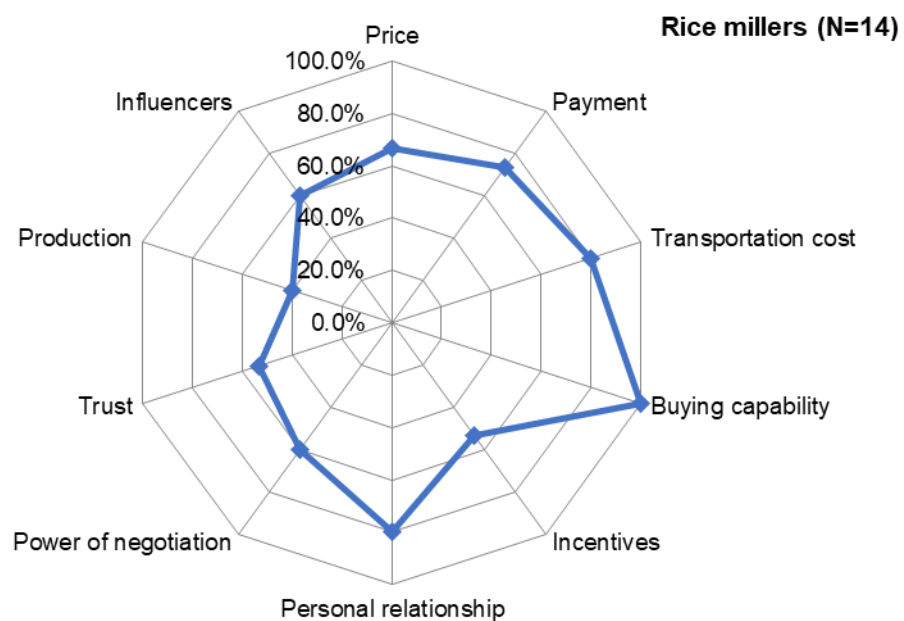
Figure 4.2 Factors influencing interviewees when choosing rice miller

(Source: Author's own, 2015)

2) Local collector

Buying capability, meaning that the collector will buy all the unmilled rice the farmers wish to sell, was the main factor determining choice of this channel, followed by interviewees receiving cash payments from this channel, as shown in Figure 4.3. Generally, local collectors are located near farms and some of them, by collecting unmilled rice at the farm gates, offer a service that eliminates transport which is a cost to farmers. This is the most important factor influencing the choice of local collectors.

'It's located opposite my house'

'Location when compared with transport cost is the important factor for me. Hire truck 400-500 Baht per time at my rice field to local collector, but if I sell to rice miller, I have to hire truck 250 Baht per 1,000 kg or 2,250 Baht for 9,000 kg'

Some local collectors offered a higher price in order to encourage farmers to sell to them. This might follow from personal relationships and power of negotiation. In addition, truck drivers and neighbours may influence farmers who consider changing from other channels to local collectors. Trust appeared to be a less important factor for interviewees when choosing this channel, probably explained by a lack of trust in the weighing scales used in this channel.
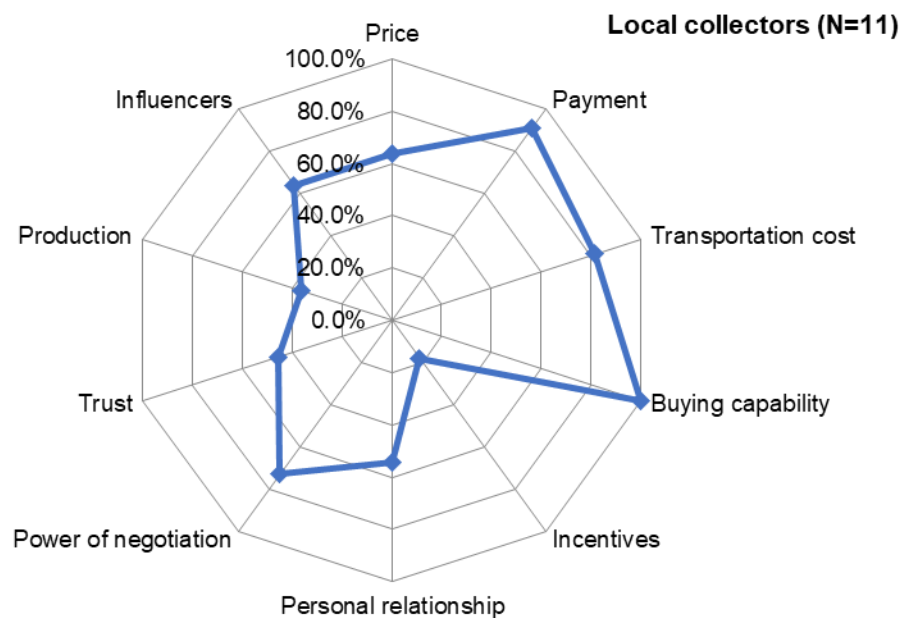
Figure 4.3 Factors influencing interviewees when choosing local collector

(Source: Author's own, 2015)

3) Agricultural cooperative

Trust, terms of payment, transportation cost and incentives/membership benefits are the leading factors underpinning decisions to sell to agricultural cooperatives, as shown in Figure 4.4. Such factors influenced interviewees to change to agricultural cooperatives. All interviewees indicated that cash payments, lower cost of transport and the incentives/membership benefits which they received from agricultural cooperatives were the reasons why they chose an agricultural cooperative.

'I have sold to agricultural cooperative because they have paid cash'

"I usually sell to agricultural cooperative because I am a member.
The benefits of agricultural cooperative are;
1) Loan. If I have a good credit rating, I can get a lower interest rate,
2) Price discount on rice seed, fertilisers, pesticides and herbicide,
3) Higher price for member,
4) It returns a dividend 'share of the profits' to members of agricultural cooperative when I buy products or sell rice'

Some interviewees indicated they were more likely to sell to agricultural cooperatives because members received a higher price, could buy supplies more cheaply, gained bargaining power through collective action, and generally trusted agricultural cooperatives more than rice millers. Interviewees stated that members were given an offer price for unmilled rice from agricultural cooperatives that was higher than the market price by approximately 0.5 Baht per kilogram or 500 Baht (10 GBP) per 1,000 kilograms.
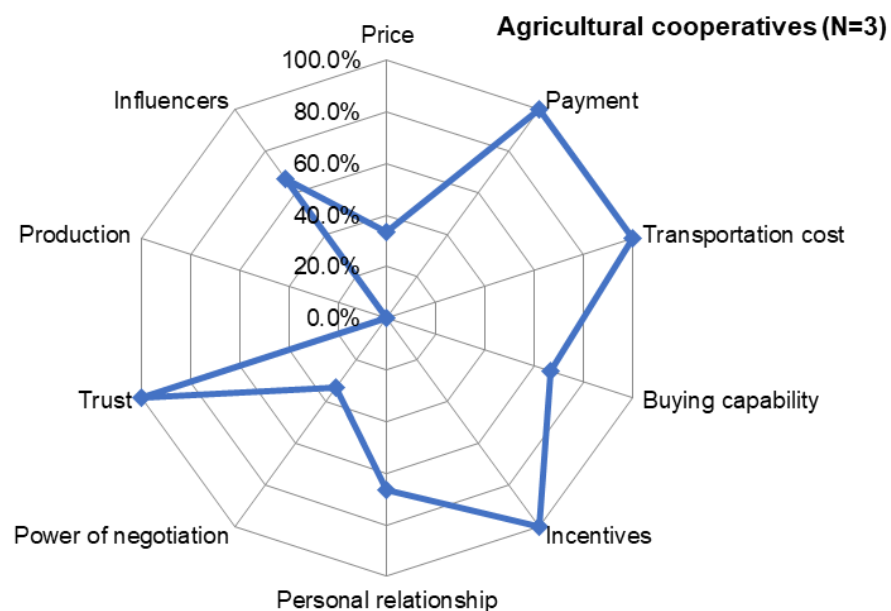
Figure 4.4 Factors influencing interviewees when choosing agricultural cooperative

(Source: Author's own, 2015)

4) Central paddy market

Interviewees stated that buying capability, transportation cost, and influencers were key factors when interviewees chose central paddy markets (Figure 4.5). All interviewees commented that if the central paddy market is located near their farms the cost of transportation was relatively low. They also checked the price from friends and neighbours who recently sold to this channel.

As mentioned earlier, central paddy market is the place where farmers can get services such as weighing system provided by the government and quality grading provided by the agents. Some interviewees switched to sell via central paddy market because they had had a negative experience of being cheated by rice millers at the weighing scales.

Reasons for changing to this channel were dissatisfaction with credit payment, the refusal to purchase by the previous channel, and distrust of weighing procedures.

'I trust in weighing instruments at BAAC's Central Paddy market more than other channels'

'I think standards for weighing instruments is important for small-scale rice farmers like me because I have had low volume of rice'
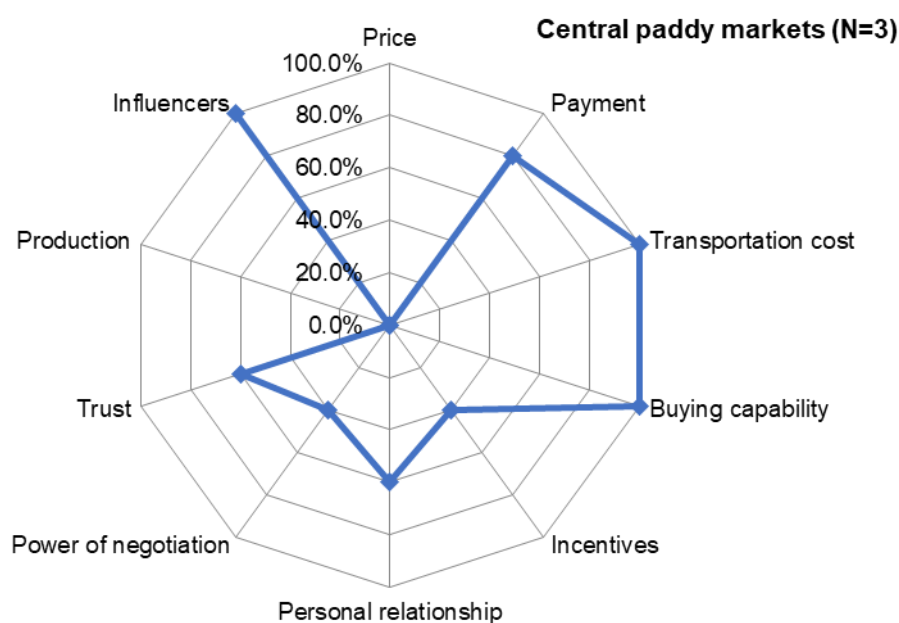
Figure 4.5 Factors influencing interviewees when choosing central paddy market

(Source: Author's own, 2015)

5) Group direct selling

Interviewees who chose to sell directly to groups considered nearly all the factors to be important. The only factor which was rated slightly less important was transportation cost as shown in Figure 4.6. Of these ten factors, price, incentives and membership benefits, power of negotiation and trust were identified as the predominant factors influencing the choice of this channel.

Some interviewees had had a negative experience with rice millers or local collectors, including cheating. Positive pull factors prompting change of channel choice to group direct selling were incentives and membership benefits as shown by the quotes below.

'Member benefits;

- *Higher price 1 Baht/ kg than market price*
- *Members' savings account 1 Baht/kg., for example, I sold 10,000 kg of unmilled rice, price 15 Baht/kg, I received 150,000 Baht and I must deposit into my saving accounts 10,000 Baht, interest rate of 5%/ year.*
- *Loan without interest rate; limit not more than saving balance.*
  If I can't pay loan on time, I can't sell rice to group for 1 year
- *Share of payment and held to members who work for group.*
- *Health welfare for stay in hospital 200 Baht/time, not more than 10 times/year.*
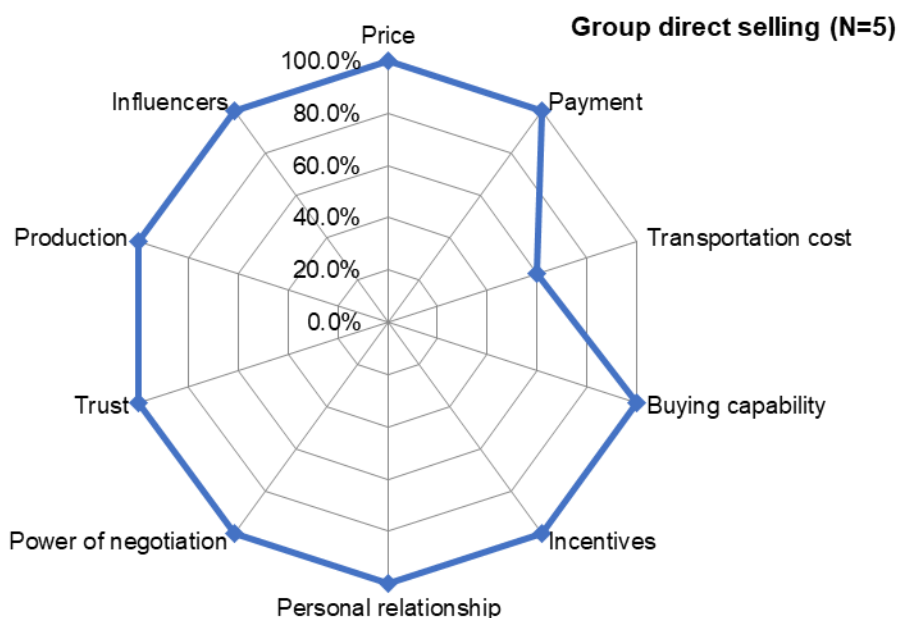
Figure 4.6 Factors influencing interviewees when choosing group direct selling

(Source: Author's own, 2015)

6) Individual direct selling

Price, terms of payment, types of production and transportation cost were the key influential factors when choosing individual direct selling as shown in Figure 4.7. Of the four factors, price was the most important reason that interviewees changed to direct selling. Both interviewees commented that they received a higher price by direct selling and one of them pointed out he did not want intermediaries to force the price down.

Direct selling gives farmers more power in negotiation with their customers in terms of price and terms of payment. Another reason was past experience of being cheated by rice millers, hence lack of trust in rice millers, was also given by one respondent as the reason he changed to direct selling.

Type of rice production was the reason that respondent chose this channel: interviewees who used organic farming methods were more likely to sell their rice directly to consumers.

> 'My product is non-toxic rice that I control everything such as the use of chemicals and pesticide and I don't use chemical fertiliser. ...I have grown rice for my own consumption and I want my consumers to eat rice as good as I eat'
>
> 'In the past, I didn't plan to be a commercial rice farmer. My happiness is to become a non-toxic rice farmer. I'm satisfied when consumer bought and consumed my product'
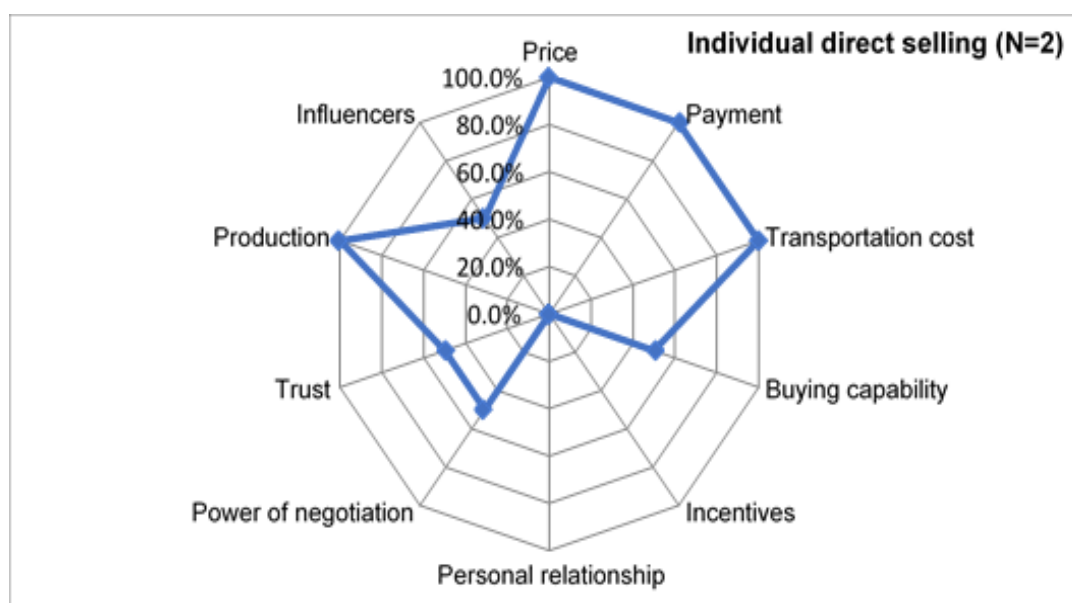
Figure 4.7 Factors influencing interviewees when choosing individual direct selling

(Source: Author's own, 2015)

The results showed that farmers chose different marketing channels for a different combination of reasons. Whilst transaction cost and price were most important across the board, respondents chose rice millers for their buying capacity, local collectors for convenience, cooperatives and group selling for trust and collective power. Those who produced specialty rice and wanted to have more control of their farming business chose direct selling.

4.5 The impact of the rice pledging scheme on channel choice

Under the rice pledging scheme, farmers could sell to the government as much unmilled rice as they wished and at a higher than market price. Almost two-thirds of the interviewees said that they used this scheme.

However, one third of the interviewees did not apply for this scheme as shown in Figure 4.8 below. The reasons for interviewees not using this scheme were identified as: received higher prices from the channel used, distrust or dislike of the scheme, received credit payment from this scheme, small quantity of rice, did not own land, and cost of transport.
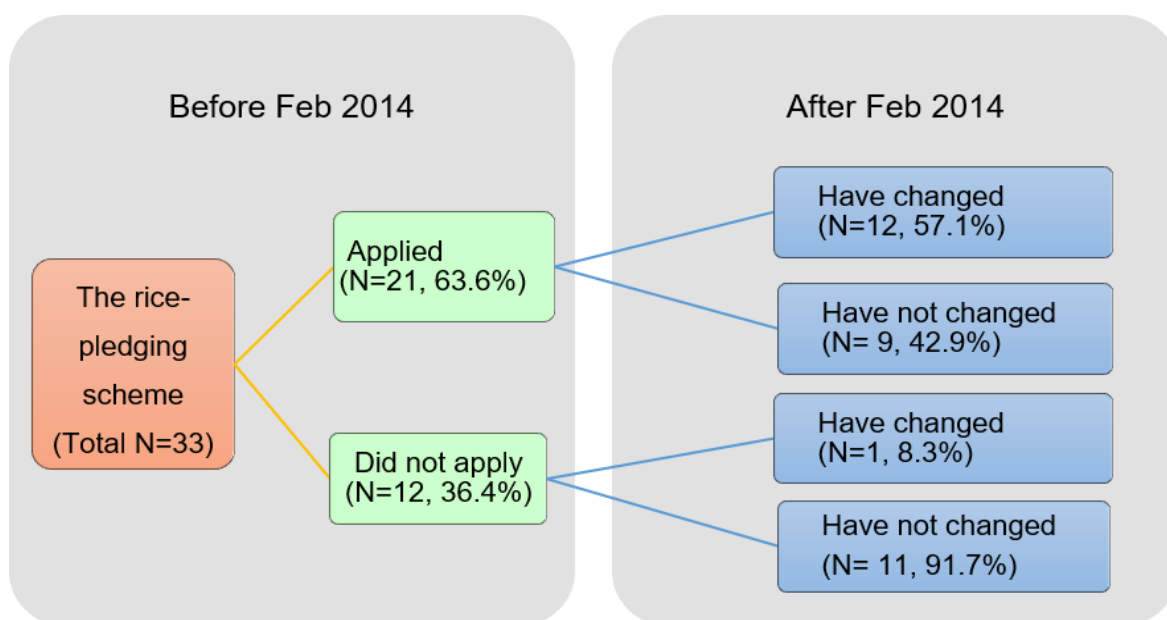
Figure 4.8 The impact of rice pledging scheme on channel choice

(Source: Author's own, 2015)

Most interviewees who had not changed their marketing channel since this scheme ended gave the reasons that they continued to receive higher prices and cash payment from the channels used during the scheme. Interviewees also generally preferred a marketing channel that was close to their farms so that the cost of transport was low. Only one respondent changed marketing channel since the end of the scheme, because he received cash payments from the new marketing channel which was also located near his farm.

Nearly half of the interviewees (N=9) who applied to this scheme have changed their marketing channel in order to achieve a higher price, cash payment, and incentives and membership benefits from the new channels.

Overall, the rice pledging scheme has influenced the decision making of many but not all rice farmers. In some cases, farmers already received a higher price from direct selling. Interviewees who sold to indirect markets could have received a higher price in credit payment from this scheme, but distrust or dislike of the scheme and receiving cash payment from the channels were more important to some farmers than just the price.

4.6 Developing the framework and generation of the hypotheses

Phase one interviews aimed to identify the main marketing channels and to explore factors affecting the choice of marketing channels. Six main marketing channels were identified which are categorised into two groups: direct and indirect markets. Some characteristics of farmers and farms such as age, gender, education, location, how to access information, and type of rice may affect their choice of marketing channel.

Factors influencing marketing channel selection by rice farmers were explored. Ten distinctive factors were found to have affected rice farmer's channel choice decision-making. Some rice farmers had changed their channels since the rice pledging scheme ended. In addition to those factors, the interviews also suggested that socio-demographic factors played a role in farmers' decision making. For example, smaller farms chose to sell to agricultural cooperative or form groups to achieve collective power. Those who have participated in higher education may produce more specialty rice and sell directly to consumers.

The results from the interviews suggest that the conceptual framework (Figure 2.5) presented in Chapter 2 is largely confirmed. Minor modifications need to be made as shown in Figure 4.9. The categories stayed the same. But the interviews helped to develop more specific indicators for each factor. For example, who are the influencers, the detail of transaction specific factors (i.e., cash payment, incentives). However, this was based on a small sample of small-scale farmers. This framework was therefore tested on a more representative sample nationwide during phase two study.
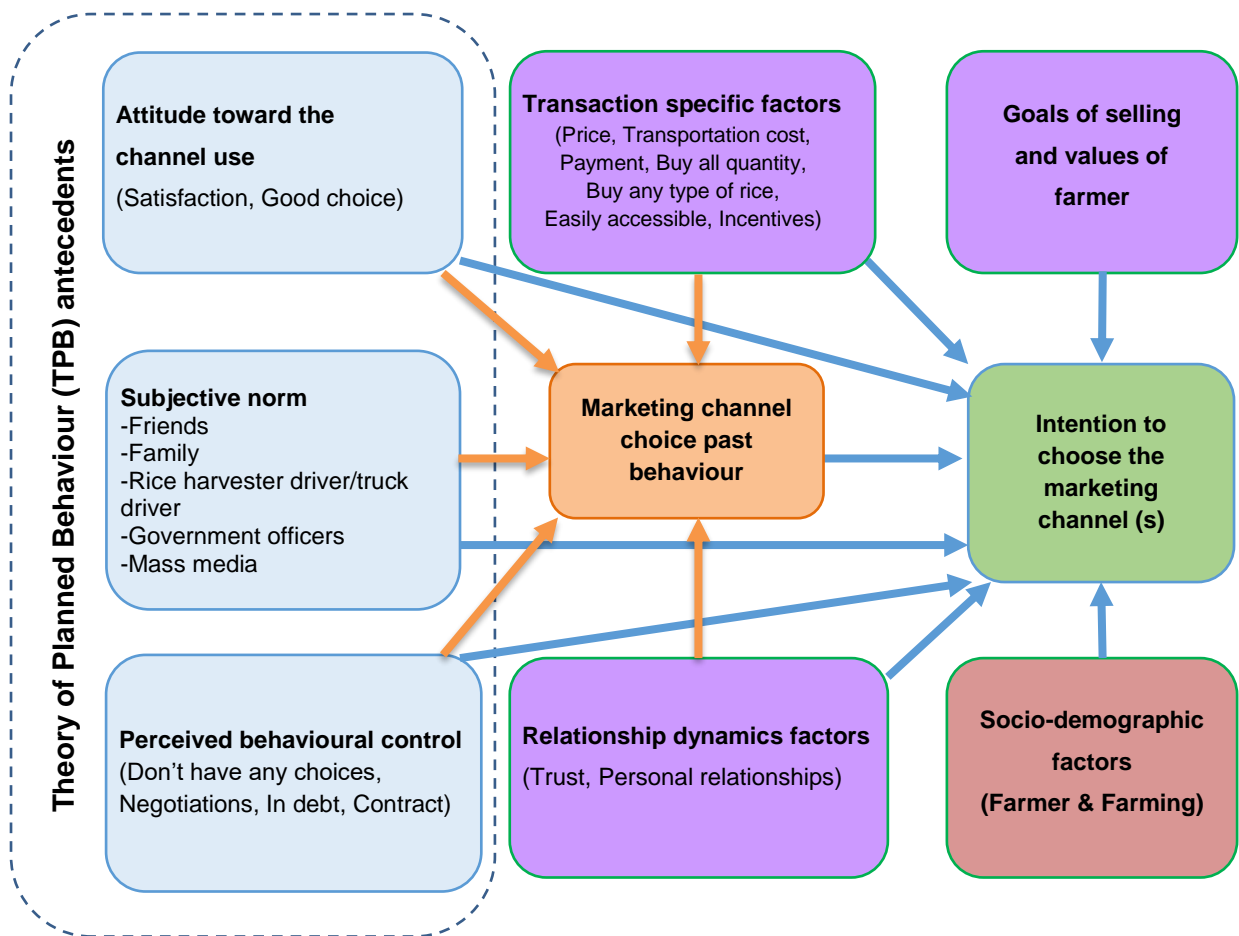
Figure 4.9 The revised framework to be tested in phase two survey

(Source: Author's own, 2016)

4.7 Summary of this chapter

This chapter presents the results of phase one interviews with 33 farmers which was designed to explore the marketing channels used and factors affecting the choice of marketing channels. It was found that farmers had a choice of six marketing channels: rice millers, local collectors, cooperatives, central paddy market, group direct selling and individual direct selling. Ten distinctive factors stood out to have influenced farmers' selection of channels although different channels had different merits. The end of government's rice pledging scheme in 2014 did not seem to have caused major changes of marketing channels.

Results from the interviews informed the modification of the conceptual framework, which was put to test across a wider population of rice farms in Thailand in phase two survey. The next chapter presents the findings from the large-scale questionnaire survey.

Chapter 5 Phase two findings: Questionnaire survey

5.1 Introduction

This chapter presents the results of phase two study, using quantitative data analysis from the questionnaire survey. The presentation is in six main parts. It starts by describing the profile of respondents. Section 5.3 shows the descriptive of marketing channels used by the respondents. Section 5.4 compared the use of channels by the profile of respondents. Section 5.5 presents the descriptive of all indicators of key variables. Section 5.6 is the results of exploratory factor analysis of the indicators. The final section presents the testing of the modified framework using partial least squares method to structural equation modelling (PLS-SEM).

5.2 Profile of respondents

In total 661 completed and valid questionnaires were collected in three main regions of rice production in Thailand, 173 (26.2%) from the north region, 300 (45.4%) from the north-east region, and 188 (28.4%) from the central region. The profile of respondents is divided into two main parts. The first part presents the details of the demographic profile of respondents. This is followed by farming profiles: (1) farm size and ownership; (2) financial situation; (3) types of rice production and own consumption; (4) access to market; (5) group membership and sources of information.

5.2.1 Demographic profile of respondents

The demographics collected in the survey demonstrate the profile of the respondents in terms of gender, age groups, marital status, level of education, rice farming experience, household size and household status. Table 5.1 presents the details.

The respondents' age ranged between 18 and 84 years old with an average age of 53. Over half respondents (54 %) were below 55 years of age. Of the three regions, respondents in the North regions were the youngest with an average age of 50 and 63% aged below 55. Central region represents the oldest with an average age of 54 and 46% below 45. This sample is somewhat older than the farmers' profile in Thailand as shown by the agricultural census which reported that 74.9% of farmers were in the range of age groups less than 55 years (National Statistical Office: NSO, Thailand 2013).

Table 5.1 Demographics of respondents

Demographics	Total		North		North-east		Central	
	Count	%of total	Count	% region	Count	% region	Count	% region
Age groups (Mean= 53 years, Mode= 55 years, SD = 10.7, Min-Max = 18-84 years)								
< 55 years old	354	53.6%	113	65.3%	155	51.7%	86	45.7%
≥ 55 years old	307	46.4%	60	34.7%	145	48.3%	102	54.2%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%
Gender								
Male	264	39.9 %	84	48.6%	91	30.3%	89	47.3%
Female	397	60.1 %	89	51.4%	209	69.7%	99	52.7%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%
Marital status								
Married	532	80.5 %	138	79.8%	253	84.3%	141	75.0%
Not married	129	19.5 %	35	20.2%	47	15.7%	47	25.0%
(Single, Divorced, and Widowed)								
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%
Level of education								
No formal education	10	1.5 %	6	3.5%	4	1.3%	0	0.0%
Primary P1-7	469	71.0 %	91	52.6%	242	80.7%	136	72.3%
Secondary S1-6	142	21.5 %	64	37.0%	43	14.3%	35	18.6%
Vocational	19	2.9 %	5	2.9%	5	1.7%	9	4.8%
Bachelor's degree & higher	21	3.2 %	7	4.0%	6	2.0%	8	4.3%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%
Rice farming experience (Mean = 31.7 years, Mode =30 years, SD =15.4, Min-Max = 2-69 years)								
<22 Years	196	29.7%	89	51.4%	57	19.0%	50	26.6%
22–42 Years	293	44.3%	66	38.2%	141	47.0%	86	45.7%
> 42 Years	172	26.0%	18	10.4%	102	34.0%	52	27.7%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%
Household size (Mean = 4.4 or 4 persons, SD total = 1.69, Min-Max= 1-12 persons)								
1 - 4 Persons	378	50.2 %	106	61.2%	147	49.0%	125	66.50%
>4 Persons	283	42.8 %	67	38.7%	153	51.0%	63	33.5%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%
Head of household								
Yes	231	50.5%	53	34.4%	112	52.1%	66	75.0%
-Male	140	60.6%*	39	73.6%**	60	53.6%**	41	62.1%**
-Female	91	39.4%*	14	26.4%**	52	46.4%**	25	37.9%**
No	226	49.5%	101	65.6%	103	47.9%	22	25.0%
Total Valid N	457	100.0%	154	100.0%	215	100.0%	88	100.0%
Missing data	204		19		85		100	

(Source: Author's own, 2017)

The gender balance of the sample of study deviates slightly from the agricultural census data. Among the 661 respondents, 397 (60.1%) were female and 264 (39.9%) were

male. The proportion of female respondents in all three regions were slightly higher than male respondents. A comparison with the census of gender found that private agricultural holders were more commonly male (63.7%) than female however, the proportion of female holders (36.3 %) has increased in the last two decades (NSO, 2013). One explanation for the gender imbalance in data collection may be attributed to convenience sampling whereby female respondents were more available to participate in the period of this survey. However, the researcher and data collectors asked the respondents to confirm that they were in decision-making positions about selling rice before completing the questionnaire.

Overall, respondents had been educated for an average of 6.5 years, with 71% having had primary school education for years 1-6. Only 3.2% had any college or higher education. This is largely consistent with national census data which reports that most people who work in agriculture (64.8%) have received education only at the primary level (NSO, 2013). Respondents in the north region had a slightly higher educational level (Table 5.1).

Rice farming experience varied widely. The average was 32 years, but the range was from 2 years. Of the three regions, respondents in the north regions were the lowest with an average experience of 24. North-east region represents the highest with an average experience of 36. Furthermore, respondents in this region were higher experience than the work of Chouichom & Yamao (2010) who found that the average experience of rice farmers in the north-east region at 21 years.

The average household size of respondents was three to four persons consistent with data obtained from the national census (NSO, 2013). Household size in the north-east region was higher than other regions (Table 5.1). Half of the total respondents (50.5%) were head of household and 20% of them were female. The percentage of households headed by females in the north-east region was slightly higher than other regions.

5.2.2 Farming profile

Five types of data were collected to understand the farming profiles of respondents: (1) farm size and ownership, (2) financial situation, (3) type of rice production and consumption, (4) access to market and (5) group membership and sources of information. These attributes represented the profile of inputs and output of farms.

5.2.2.1 Farm size and ownership

The respondents' farm size profiles were presented in terms of total land size, land size for growing rice, and land ownership. Total average land area of the households was 20.5 Rais or 3.28 Hectares (1 Rai = 0.16 Hectare or 0.4 Acre) while the average land size of respondents in the central region at 34.4 Rais or 5.5 Hectares was higher than other regions as shown in Table 5.2.

Table 5.2 Farm size and ownership profile

Farming profiles	Total		North		North-east		Central	
	Count	%of total	Count	% region	Count	% region	Count	% region
Total land size (Mode = 10 Rais, Total Min-Max = 2-240 Rais)								
1 - 12 Rais *	191	28.9%	100	64.9%	73	34.0%	18	20.5%
> 12 Rais	266	58.2%	54	35.1%	142	66.0%	70	79.5%
Total Valid N	457	100.0%	154	100.0%	215	100.0%	88	100.0%
Missing data	204							
Mean (Rais)	20.5	SD 19.7	12.9	SD 11.1	20.3	SD 14.2	34.4	SD 31.9
Total land size for growing rice (Mode = 10 Rais, SD = 17.2, Total Min-Max = 2-240 Rais)								
1 - 12 Rais	331	50.1%	129	74.6%	151	50.3%	51	27.1%
> 12 Rais	330	49.9%	44	25.4%	149	49.7%	137	72.9%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%
Mean (Rais)	17.4	SD 17.2	10.1	SD 8.7	15.2	SD 9.7	27.6	SD 25.6
Land ownership for growing rice (Rais) (Allow more than 1 answer) (Total Min-Max = 1-197 Rais)								
Owned	602	91.1 %	164	94.8%	290	96.7%	148	78.7%
Mean (Rais)	13.1	SD 10.1	8.5	SD 7.7	14.1	SD 8.9	16.1	SD 12.6
Rented	191	28.9 %	39	22.5%	43	14.3%	109	58.0%
Mean (Rais)	19.0	SD 20.4	8.9	SD 6.7	11.1	SD 7.9	25.7	SD 24.1
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%

Note: * 1 Rai = 0.16 Hectare or 0.4 Acre

(Source: Author's own, 2017)

The average farm size for growing rice was 17.4 Rais (2.8 Hectares) (Table 5.2). Half of the respondents (52.9%) were small-scale rice farmers who had less than 2 Hectares or 12.5 Rais. These can be referred to as subsistence farms who mainly grow rice for own consumption, selling surplus rice stocks to market. In the north and north-east regions, respondents' farms were largely small-scale with an average rice farm size at 10.1 Rais (1.6 Hectares) and 15.2 Rai (2.4 Hectares) respectively (Table 5.2). However, the average rice farm size in the central region was much larger with an average size of 27.6 Rais (4.4 Hectares). One tenth of respondents in this region had more than 50 Rais (8 Hectares), enough to become a small commercial farm. Survey results for size of land holdings are consistent with the agricultural census in Thailand (2013) which found that half of agricultural holders (50.7%) had landholdings of 10-39 Rais (1.6-6.2 Hectares), and that 51.3 % of total land holding in Thailand is used for growing rice.

Most respondents owned their land (90.8%), however; it was not enough for many. Nearly one third rented more land for growing rice. The highest land rental was 197 Rais (31.5 Hectares); the highest combination of owned and rented land was 240 Rais (38.4 Hectares). More than half of respondents (58%) in the central region rented land for growing rice, higher than other regions.

5.2.2.2 Financial situation

Most respondents (90%) were in debt as shown in Table 5.3. Two thirds (67%) of respondents had an average of two persons in the household and had income from off-farm work. This was particularly so in the north-east, and the north regions. Above half of respondents (54.5%) in the central region had no off-farm worker in the household. One explanation could be that the respondents in this region were small commercial farmers who have larger land holdings for growing rice (See Table 5.2).

On average, income from off-farm work in total was 38.6 % of total income. However, more than half of respondents (54.5%) in the central region, and nearly half of respondents (42.9%) in the north region had no off-farm income. Respondents mentioned that they earned income from other agricultural activities or producing other types of agricultural goods such as horticulture, cash crops, husbandry and poultry.

Table 5.3 Financial situation

Financial situation	Total		North		North-east		Central	
	Count	%of total	Count	% region	Count	% region	Count	% region
Debt								
Yes	595	90.0%	159	91.9%	276	92.0%	160	85.1%
No	66	10.0%	14	8.1%	24	8.0%	28	14.9%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%
Off-farm workers in household (Mean =2 persons, SD =1.2, Min-Max = 0-7 persons)								
No off-farm worker	151	33.3%	66	42.9%	37	17.2%	48	54.5%
1 - 2 Persons	248	54.3%	82	53.2%	131	60.9%	35	39.8%
> 2 Persons	58	12.4%	6	3.9%	47	21.9%	5	5.7%
Total Valid N	457	100.0%	154	100.0%	215	100.0%	88	100.0%
Missing data	204		19		85		100	
% Income from off-farm work (Mean = 38.6%, SD = 20.6, Min-Max = 5-90%)								
No off-farm income	150	33.0%	66	42.9%	36	16.9%	48	54.5%
1 - 50 %	255	56.0%	73	47.4%	148	69.5%	34	38.6%
> 50 %	50	11.0%	15	9.7%	29	13.6%	6	6.9%
Total Valid N	455	100.0%	154	100.0%	213	100.0%	88	100.0%
Missing data	206		19		87		100	

(Source: Author's own 2017)

5.2.2.3 Type of rice and whether production partly for own consumption

Sticky or glutinous rice (63.9%) and Jasmine rice (39.8%) were the predominant types of rice, as shown in Table 5.4. Most respondents who grow these types of rice are in the north-east region. Over 40% of respondents (41.1%) cultivated both Jasmine and sticky rice. Respondents in these two regions stated that they usually grow sticky and Jasmine rice, with sticky rice being produced partly for their own consumption.

Other types of rice included long grain and Pathumthani. They were grown in the central region. A few respondents grew another type of rice, namely Riceberry rice. Most respondents in the central region cultivated only one type of rice, while respondents in the north-east region cultivated more than one type of rice. Most respondents reported that rice was grown using conventional farming method.

In terms of production partly for own consumption, half of the total respondents (361 out 661 respondent) cultivated rice partly for own consumption and sold surplus to markets. Those respondents were mainly located in the north-east and north regions (Table 5.4). In comparison, respondents in the central region were commercial rice farmers. They cultivated Pathumthani and long grain rice and sold all the rice they harvested.

Table 5.4 Types of rice produced and partly for own consumption

Rice production	Total		North		North-east		Central	
	Count	%of total	Count	% region	Count	% region	Count	% region
Type of rice growing (Allow more than 1 answer)								
Sticky rice	421	63.9%	166	97.1%	252	84.0%	2	1.1%
Jasmin rice	328	49.8%	65	38.0%	261	87.0%	3	1.6%
Long grain	146	22.2%	2	1.2%	1	0.3%	142	75.5%
Pathumthani	63	9.6%	-	-	-	-	63	33.5%
Riceberry	5	0.8%	4	2.3%	2	0.7%	-	-
Total Valid N	659		171		300		188	
Missing data	2		2		-		-	
Number of types of rice growing								
1 Type	354	53.7%	106	62.0%	84	28.0%	164	87.2%
>1 Type	305	46.3%	65	38.0%	216	72.0%	24	12.8%
Total Valid N	659	100.0%	171	100.0%	300	100.0%	188	100.0%
Missing data	2		2		-		-	
Partly own consumption								
Yes	361	54.6%	145	83.8%	214	71.3%	2	1.1%
No	300	45.4%	28	16.2%	86	28.7%	186	98.9%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%

(Source: Author's own, 2017)

5.2.2.4 Access to market

The average distance between the nearest local market and the respondents' farm was 7.8 kilometres, as shown in Table 5.5. The market distance in the north-east region varied widely with the average distance being 10.4 kilometres, the highest average when compared to the other regions. One third of respondents stated that the distance to the market was below 2 kilometres. Half of respondents (55.2%) in the north region answered that the distance was below 2 kilometres, however half of the respondents in the central region (50%) reported between 6 and 10 kilometres as the market distance.

Hired vehicles were generally used to transport rice to market (64%) because of the weight and volume of paddy rice, usually sold in bulk. About one third of respondents (28.4%) used their own vehicle for transportation. Respondents mentioned that the reason to use their own vehicle because they marketed lower quantities of paddy rice and could save on transport costs. This was particularly the case for respondents in the north-east region. Other types of transportation were collection by the buyer (e.g. millers, local collectors, agricultural cooperatives, and direct consumers), and by post if direct selling to consumers.

Table 5.5 Access to market

Items	Total		North		North-east		Central	
	Count	%of total	Count	% region	Count	% region	Count	% region
Market distance (km) (Mode = 1, Min-Max = 1-70 km)								
< 2 Km	150	32.8 %	85	55.2%	63	29.3%	2	2.3%
3-5 Km	112	24.5 %	63	40.9%	28	13.0%	21	23.9%
6-10 Km	93	20.4 %	5	3.2%	44	20.5%	44	50.0%
11-20 Km	68	14.9 %	1	0.6%	56	26.0%	11	12.5%
> 20 Km	34	7.4 %	0	0.0%	24	11.2%	10	11.4%
Total Valid N	457	100.0%	154	100.0%	215	100.0%	88	100.0%
Missing data	204							
Mean (km)	7.8	SD 8.8	2.9	SD 2.1	10.4	SD 10.8	10.0	SD 6.6
Types of transport for rice products (Allow more than 1 answer)								
Hired	423	64.0 %	80	46.2%	173	57.7%	170	90.4%
Owned Vehicle	188	28.4 %	72	41.6%	100	33.3%	16	8.5%
Other e.g. buyer picked up at farm gate and by post	62	9.4 %	28	16.2%	30	10.0%	4	2.1%
Total Valid N	661	100.0%						

(Source: Author's own, 2017)

5.2.2.5 Group membership and sources of information

Most respondents were members of a community group, with nearly half of them (45.4%) belonging to more than one group and 64.4% of total respondents belonging to the Bank for Agriculture and Agricultural Cooperatives (BAAC) followed by the village fund (41.8%), and agricultural cooperative (24.2%) (Table 5.6). Furthermore, nearly 70% of respondents in the north-east region were members of BAAC. Most groups that rice farmers belong to focus on giving financial support.

Table 5.6 Group membership and sources of information

Socio-demographic	Total		North		North-east		Central	
	Count	%of total	Count	% region	Count	% region	Count	% region
Name of group membership (Allow answer more than 1 group) (Mode=1 group, SD = 1.0, Min-Max = 0-6 groups)								
BAAC	426	64.4 %	105	60.7%	209	69.7%	112	59.6%
The village fund	276	41.8 %	75	43.4%	127	42.3%	74	39.4%
Ag-coop	160	24.2 %	55	31.8%	62	20.7%	43	22.9%
Farmer group	124	18.8 %	32	18.5%	41	13.7%	51	27.1%
Local women group	73	11.0 %	25	14.5%	38	12.7%	10	5.3%
Credit union	40	6.1 %	4	2.3%	7	2.3%	29	15.4%
Non-agri group	7	1.1 %	2	1.2%	3	1.0%	2	1.1%
No group	36	5.4 %	5	2.9%	22	7.3%	9	4.8%
Number of group membership								
1 Group	326	49.3%	86	49.7%	152	50.7%	88	46.9%
More than 1 group	299	45.4%	82	47.4%	126	42.0%	91	48.3%
No group	36	5.4%	5	2.9%	22	7.3%	9	4.8%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%

(Source: Author's own, 2017)

In the central region, friends and neighbours of respondents were providers of information about price and market, but in the north and north-east regions millers were more important as information sources. Respondents in the central region identified transport truck drivers as sources of information (Table 5.7). They were rarely seen as such in the other regions.

The main source of mass media for market information and government policies was television followed by radio and newspapers. However, fewer than one out of ten respondents used modern technology such as internet and social media with the respondents in the central region reporting higher usage, relatively speaking.

It is most common for rice farmers to access information about price and market from the marketing channels they used such as miller, local collector, agricultural cooperative, and central paddy market. Notably two in ten (21.5%) respondents accessed market information from their social networks, for example, friends, neighbours, truck drivers, farmer group, cousin and head of village (Table 5.7).

Table 5.7 Sources of information

Socio-demographic	Total		North		North-east		Central	
	Count	%of total	Count	% region	Count	% region	Count	% region
Using mass media (Allow more than 1 answer)								
TV	616	93.2 %	156	90.2%	276	92.0%	184	97.9%
Radio	277	41.9 %	104	60.1%	106	35.3%	67	35.6%
Newspapers	128	19.4 %	75	43.4%	19	6.3%	34	18.1%
Magazines	12	1.8 %	7	4.0%	2	0.7%	3	1.6%
Internet	32	4.8 %	4	2.3%	8	2.7%	20	10.6%
Social media	25	3.8 %	6	3.5%	10	3.3%	9	4.8%
No media	18	2.7 %	7	4.0%	8	2.7%	3	1.6%
Total Valid N	661		173		300		188	
Main sources of information about price and market (Allow more than 1 answer)								
Millers	239	52.3 %	84	54.5%	126	58.6%	29	33.0%
Local collectors	163	35.7 %	71	46.1%	92	42.8%	0	0.0%
Coops	63	13.8 %	23	14.9%	26	12.1%	14	15.9%
Central paddy market	23	5.0 %	0	0.0%	3	1.4%	20	22.7%
Friends/Neighbours	86	18.8 %	9	5.8%	47	21.9%	30	34.1%
Truck Drivers	20	4.4 %	3	1.9%	0	0.0%	17	19.3%
Other [Farmers group (2)	7	1.5 %	5	3.2%	1	0.5%	1	1.1%
Cousin (1), Head of village (1), Websites (3)]								
Total Valid N	457		154		215		88	
Missing data	204							
Number of sources of information (Mean 2 sources, SD = 1.01)								
No source	5	0.8%	1	0.6%	3	1.0%	1	0.5%
1 Source	134	20.2%	15	8.7%	56	18.7%	63	33.5%
>1 Sources	522	79.0%	157	90.7%	241	80.3%	124	66.0%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%

(Source: Author's own, 2017)

In summary, the respondents of this study were largely representative of the rice farming sector in Thailand, although there were more old and female respondents than in the national census. To understand whether there was any structural difference in marketing channel selection, 16 attributes were used for analysis of variance in intention and past behaviour of channel selection in Section 5.4. They included seven farmers' attributes and nine farming attributes.

The seven farmer attributes were:

(1) regions

(2) age

(3) gender

(4) education

(5) rice farming experience

(6) household size

(7) head of household

The nine farming attributes were:

(1) land size for growing rice

(2) off-farm workers in household

(3) percentage of income from off-farm work

(4) number of types of rice growing

(5) keeping part of rice for their own consumption

(6) market distance

(7) hired vehicle

(8) membership of groups

(9) number of information sources

5.3 Selection of marketing channels by respondents

Selection of marketing channels by respondents were examined from two perspectives: 1) past behaviour of channel used, and 2) intention of channel selection for the next crop.

5.3.1 Use of marketing channels in the past

Respondents were asked which marketing channel(s) was used during two periods of time: 1) 2011-2014 (the latest RPS period), and 2) 2014 – 2016 (i.e., end of RPS to the time of survey). Respondents were asked to rate the level of frequency of channel use against each of the six marketing channels: 1 means rarely used, 6 means frequently used. Details are presented in Table 5.8.

The survey showed that all six marketing channels were used by the respondents. However, the number of famers using direct channels (direct selling and group selling) was negligible (n = 2 before 2014 and n = 3 after 2014). Central paddy market usage was also low (n = 33 and 49 respectively for the two periods) with most being used by respondents in the central region. Those in the north and north-east regions were negligible (i.e., no more than 3). *Due to the low usage of these three channels, no further description will be provided in the text which follows. No further analysis will be conducted on the three channels in the subsequent sections either.*

Explanation will thus be focused on the three main marketing channels: miller, local collector and agricultural cooperative (Agri-coop).

Table 5.8 Marketing channels and level of frequency used in 2011-16

Channels used	Total N=661		North N=173		North-east N=300		Central N=188	
	Count	Mean	Count	Mean	Count	Mean	Count	Mean
	(% of total)	(SD)	(% of region)	(SD)	(% of region)	(SD)	(% of region)	(SD)
Channels used during 2011-14 (Allow more than 1 channel)								
Millers	395	5.7	80	5.3	177	5.8	138	5.8
	(59.8%)	(0.8)	(46.2%)	(1.1)	(59.0%)	(0.7)	(73.4%)	(0.6)
Local collectors	177	5.8	59	5.9	83	5.8	35	5.7
	(26.8%)	(0.7)	(34.1%)	(0.5)	(27.7%)	(0.7)	(18.6%)	(0.7)
Agricultural cooperatives	117	5.3	50	5.3	32	5.3	35	5.3
	(17.7%)	(1.1)	(28.9%)	(1.2)	(10.7%)	(1.2)	(18.6%)	(0.9)
Central paddy markets	33	5.4	2	6.0	1	6.0	30	5.4
	(5.0%)	(0.7)	(1.2%)	(0.0)	(0.3%)	(0.0)	(16.0%)	(0.7)
Farmers groups	4	5.8	2	5.5	2	6.0	0	-
	(0.6%)	(0.5)	(1.2%)	(0.7)	(0.7%)	(0.0)	(0.0%)	
Direct selling	2	6.0	2	6.0	0	-	0	-
	(0.3%)	(0.0)	(1.2%)	(0.0)	(0.0%)		(0.0%)	
Total Valid N	661		173		300		188	
Channels used during 2014-16 (Allow more than 1 channel)								
Millers	371	5.7	71	5.2	181	5.8	119	5.8
	(56.1%)	(0.9)	(41.0%)	(1.3)	(60.3%)	(0.8)	(63.3%)	(0.7)
Local collectors	204	5.8	60	5.9	105	5.9	39	5.7
	(30.9%)	(0.6)	(34.7%)	(0.4)	(35.0%)	(0.5)	(20.7%)	(0.9)
Agricultural cooperatives	122	5.4	55	5.3	23	5.9	44	5.2
	(18.5%)	(1.1)	(31.8%)	(1.2)	(7.7%)	(0.5)	(23.4%)	(1.0)
Central paddy markets	49	5.5	2	6.0	3	3.3	44	5.6
	(7.4%)	(0.9)	(1.2%)	(0.0)	(1.0%)	(0.6)	(23.4%)	(0.7)
Farmers groups	4	5.5	2	5.5	1	5.0	1	6.0
	(0.6%)	(0.6)	(1.2%)	(0.7)	(0.3%)	(0.0)	(0.5%)	(0.0)
Direct selling	3	5.0	2	6.0	1	5.0	0	-
	(0.5%)	(1.7)	(1.2%)	(0.0)	(0.3%)	(0.0)	(0.0%)	
Total Valid N	661		173		300		188	
	(100.0%)		(100.0%)		(100.0%)		(100.0%)	

(Source: Author's own, 2017)

'Miller' was the main channel through which respondents chose to sell their rice in both periods. However, this choice decreased by 4% post RPS. 'Miller' was the main channel for respondents to sell paddy rice during the RPS, but some respondents moved to another channel. The number of respondents choosing to sell paddy rice via other indirect channels, namely 'local collector' and 'agricultural cooperative' increased moderately after the RPS was discontinued in 2014. Although 'miller' was the most used channel in all three regions, respondents in the north region used 'local collector' and 'agriculture cooperative' slightly more than those in the other two regions. 'Local collector' was the main channel available in the north region.

The majority of respondents (85.3%) chose only one marketing channel in 2014-16 (Table 5.9). 13.3% of respondents chose to sell via more than one channel. Those who selected two channels for selling stated that they mainly chose 'miller' plus another channel. All respondents who sold through three channels chose 'miller' plus two other channels.

Table 5.9 Number of channels used in 2011-16 and channels availability in the area

Number of channels used	Total		North		North-east		Central	
	Count	%of total	Count	% region	Count	% region	Count	% region
Channels used during 2011-14 (During RPS)								
Did not sell	23	3.5%	0	0.0%	19	6.3%	4	2.1%
1 Channel	557	84.3%	151	87.3%	268	89.3%	138	73.4%
> 1 Channel	81	12.2%	22	12.7%	13	4.4%	46	24.5%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%
Channels used during 2014-16 (Post RPS)								
Did not sell	9	1.4%	1	0.6%	8	2.7%	0	0.0%
1 Channel	564	85.3%	152	87.9%	275	91.7%	137	72.9%
>1 Channel	88	13.3%	20	11.6%	17	5.6%	51	27.1%
Total Valid N	661	100.0%	173	100.0%	300	100.0%	188	100.0%
Channels availability (Allow more than 1)								
Millers	364	55.1 %	119	68.8%	157	52.3%	88	46.8%
Local collectors	236	35.7 %	133	76.9%	99	33.0%	4	2.1%
Agricultural cooperatives	165	25.0 %	34	19.7%	62	20.7%	69	36.7%
Central paddy markets	51	7.7 %	0	0.0%	0	0.0%	51	27.1%
Farmers groups	4	0.6 %	2	1.2%	2	0.7%	0	0.0%
Total Valid N	661		173		300		188	

(Source: Author's own, 2017)

5.3.2 The changing of marketing channels after the RPS ended

Before statistical hypotheses testing in the first sub-section, descriptive statistics are used to describe the marketing channels used during the two periods of time and how respondents changed their choice. According to data in Table 5.8 and Figure 5.1 below, the change of channels after the RPS ended in February 2014 (81.1%) was minimal. About 80% of those who used either 'Miller' or 'Local collector' continued to use the same channel.
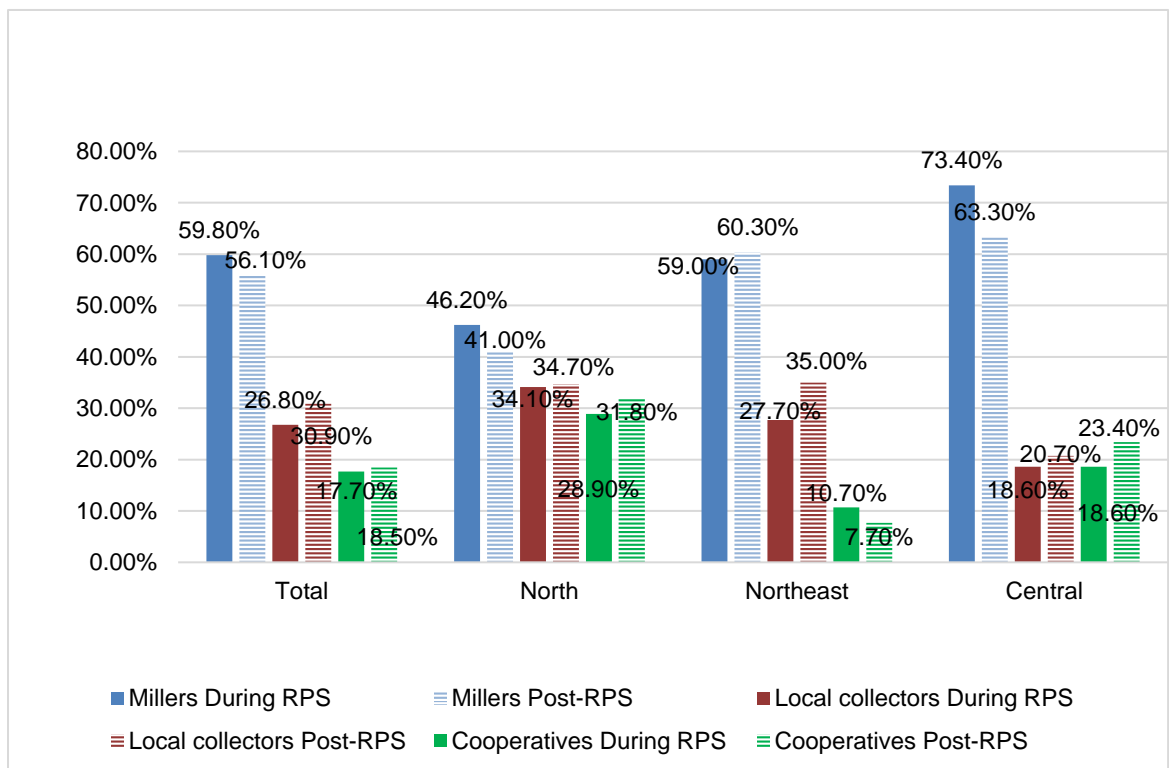
Figure 5.1 Percentage of respondents that used the three marketing channels during and post RPS

(Source: Author's own, 2017)

Table 5.10 Channels changed after the RPS ended

Channels used	Total (N=661)		North (N=173)		North-east (N=300)		Central (N=188)	
	Count	%of total	Count	% region	Count	% region	Count	% region
Not changed (0) %of total in the channel								
Millers	339	79.4%	67	79.8%	156	77.2%	116	82.3%
Local collectors	171	81.4%	58	95.1%	79	72.5%	34	85.0%
Agri-coops	93	63.7%	46	78.0%	18	48.6%	29	58.0%
Central markets	33	67.3%	2	100.0%	1	33.3%	30	68.2%
Farmers groups	2	33.3%	2	100.0%	-	-	-	-
Direct selling	2	66.7%	2	100.0%	-	-	-	-
Move to this channel (+) % of respondents in total and each region								
Millers	32	4.84%	4	2.31%	25	8.33%	3	3.41%
Local collectors	33	4.99%	2	1.16%	26	8.67%	5	5.68%
Agri-coops	29	4.39%	9	5.20%	5	1.67%	15	17.05%
Central markets	16	2.42%	-	-	2	0.67%	14	15.91%
Farmers groups	2	0.30%	-	-	1	0.33%	1	1.14%
Direct selling	1	0.15%	-	-	1	0.33%	-	-
Move away from this channel (-) % of respondents in total and each region								
Millers	56	8.47%	13	7.51%	21	7.00%	22	25.00%
Local collectors	6	0.91%	1	0.58%	4	1.33%	1	1.14%
Agri-coops	24	3.63%	4	2.31%	14	4.67%	6	6.82%
Central markets	-	-	-	-	-	-	-	-
Farmers groups	2	0.30%	-	-	2	0.67%	-	-
Direct selling	-	-	-	-	-	-	-	-

(Source: Author's own, 2017)

There is evidence that the ending of RPS was to the benefit of 'local collector'. About 5% of respondents moved to this channel (4.99%, n = 33). In particular, respondents in the north-east region showed this tendency (Table 5.10). Whilst nearly 5% (n = 32) of the total moved to 'Miller', similar to data for 'local collector', there were 56 respondents (8.47%) who moved away from 'Miller'. Less than 1% moved away from 'local collectors'.

Respondents were most likely to move away from 'miller' and 'agricultural cooperative'. A possible explanation for this is that both channels were registered with the government as the channel where rice farmers could sell their paddy rice to via the RPS. When RPS ended some respondents changed their choice of marketing channel and avoided channels with government connections. Nevertheless, the percentage of respondents who changed their choice was below 20% and the overall situation was one of continuity and no change.

5.3.2.1 Comparing the use of marketing channels during and post RPS

The previous section looked at the choice of channels. This section will explore the frequency of channel usage for the two periods. The statistical alternative hypothesis in this research question is whether *'there are significant differences in respondents' channel choice used between before and after RPS ended'*. A paired samples t-test was used to compare the mean scores of the level of frequency channel used between two-time periods during and post the RPS and to test these hypotheses. Sub-hypotheses (H1.1-1.3) are that there is a significant difference between the mean frequency of (H1.1) miller, (H1.2) local collector and (H1.3) agricultural cooperative.

There was statistically significant increase in the level of frequency of channel used for local collector (p value =0.03), while there was significant decrease for coop (p value =0.03) after the RPS ended as shown in Table 5.11.

Table 5.11 Results of paired samples t-test comparison of the means of the frequency channel used during and after the RPS ended

Descriptive statistics of channels used	During RPS			After RPS ended		
	Mean	SD	N	Mean	SD	N
Miller	5.69	0.79	339	5.69	0.84	339
Local collector	5.80	0.63	171	5.88	0.40	171
Agricultural cooperative	5.44	0.98	93	5.28	1.14	93
Paired samples t-test	Paired Differences					Sig.
	Mean	SD	N	t	df	(2-tailed)
Pair 1 Miller during - after RPS ended	0.00	0.50	339	0.00	338	1.00
Pair 2 Local collector during - after RPS ended	-0.09	0.53	171	-2.17	170	0.03*
Pair 3 Coop during - after RPS ended	0.16	0.70	93	2.23	92	0.03*

Note: * $p < 0.05$

(Source: Author's own, 2017)

5.3.2.2 The impact of the RPS on channel choice behaviour

Under the RPS in 2011/14, rice farmers could sell their unmilled rice at a higher than market price to the government to a total that did not exceed 350,000 Baht per person (Poapongsakorn *et al.*, 2014). More than two-thirds (68.4 %) of respondents joined the RPS during 2011-14 (Table 5.12). Respondents were asked whether they applied for this scheme and to rate the level of importance on a 7-point scale.

Half of the respondents (49.9%) agreed that the RPS was extremely important in their choice of marketing channel. The total mean score was 4.92 because respondents who did not apply to the RPS rated the RPS as not at all important to their channel selection. Focusing only on respondents who applied the RPS, it was found that respondents agreed that the RPS influenced their marketing channel choice (mean score 5.90).

Table 5.12 The importance of the RPS on channel choice behaviour

Applied RPS\ Level of importance	1	2	3	4	5	6	7	Total
Yes	46	4	9	24	24	44	301	452
(% of total)	(7%)	(0.6%)	(1.4%)	(3.6%)	(3.6%)	(6.7%)	(45.5%)	(68.4%)
No	118	5	6	29	16	6	29	209
(% of total)	(17.9%)	(0.8%)	(0.9%)	(4.4%)	(2.4%)	(0.9%)	(8.8%)	(31.6%)
Total	164	9	15	53	40	50	330	661
	(24.8%)	(1.4%)	(2.3%)	(8%)	(6.1%)	(7.6%)	(49.9%)	(100%)

Note: 1= Not at all important to 7= extremely important

(Source: Author's own 2017)

5.3.3 Marketing channel choice intention

The respondents' marketing channel choice behavioural intention is given in Table 5.13. Of the study sample size, 413 respondents (62.5% of total the respondents) intended to sell to miller, while local collector was in second place (n = 226), followed by agricultural cooperative (Agri-coop). All three have high mean scores of 6 and above.

Table 5.13 Intended marketing channel

Statements	Total		North		North-east		Central	
	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N
Intention: Next crop, I intend to use								
Millers	6.1 (1.6)	413	5.8 (1.7)	66	6.5 (1.3)	197	5.8 (1.8)	150
Local collectors	6.3 (1.4)	226	6.7 (0.9)	57	6.1 (1.6)	127	6.4 (1.2)	42
Agricultural cooperatives	6.0 (1.4)	181	6.3 (1.3)	68	5.7 (1.7)	44	5.9 (1.3)	69
Central paddy markets	5.7 (1.6)	59	5.0 (1.7)	3	4.6 (2.6)	9	6.0 (1.3)	47
Farmers groups	4.6 (2.4)	15	6.5 (0.7)	2	4.3 (2.5)	13	-	0
Direct selling	3.0 (2.6)	9	6.3 (1.2)	3	1.3 (0.5)	6	-	0

Note: 1 = Most unlikely to 7 = Most likely

(Source: Author's own, 2017)

To identify differences between past behaviour and intention, the level of likelihood of intentions were compared to the level of frequency channel used currently or after the RPS ended, as presented in Table 5.14. The majority of respondents did not intend to change channel. Miller had the highest percentage in total (43.3%), 51.7% in the north-east region and 47.3% in the central region. Local collector had the highest percentage in the north region at 28.9% (Table 5.14).

Respondents were more likely to increase their intentions to choose miller in the north and the north-east regions. Respondents in the central regions were more likely to choose agricultural cooperative than miller.

If respondents wished to change to a new channel, they were most likely to move to an agricultural cooperative (9.7%). Second place was taken by miller (8.6%) and local collector was third (5.0%) (Table 5.14). Respondents in the north-east region were most likely to move to local collector; miller was the channel that respondents in the central region were most likely to move to. Considering the data for the channel moving away from, miller was highest followed by local collector, and then agricultural cooperative (Agri-coop). Nonetheless, the percentage who intended to change channel was small.

Table 5.14 The change in the intention to use the marketing channels after RPS ended

Intention	Total (N=661)		North (N=173)		North-east (N=300)		Central (N=188)	
	Count	%of total	Count	% region	Count	% region	Count	% region
Not changed level of frequency (0)								
Millers	286	43.3%	42	24.3%	155	51.7%	89	47.3%
Local collectors	165	25.0%	50	28.9%	84	28.0%	31	16.5%
Agri-coops	87	13.2%	41	23.7%	17	5.7%	29	15.4%
Central paddy markets	23	3.5%	1	0.6%	-	-	22	11.7%
Farmer groups	2	0.3%	2	1.2%	-	-	-	-
Direct selling	1	0.2%	1	0.6%	-	-	-	-
Increase intention (0+)								
Millers	21	3.2%	7	4.1%	8	2.7%	6	3.2%
Local collectors	4	0.6%	1	0.6%	2	0.7%	1	0.5%
Agri-coops	15	2.3%	5	2.9%	1	0.3%	9	4.8%
Central paddy markets	7	1.1%	-	-	1	0.3%	6	3.2%
Farmer groups	1	0.2%	-	-	1	0.3%	-	-
Direct selling	-	-	-	-	-	-	-	-
Decrease intention (0-)								
Millers	49	7.4%	14	8.1%	13	4.3%	22	11.7%
Local collectors	24	3.6%	5	2.9%	14	4.7%	5	2.7%
Agri-coops	15	2.3%	7	4.0%	4	1.3%	4	2.1%
Central paddy markets	15	2.3%	-	-	-	-	15	8.0%
Farmer groups	-	-	-	-	-	-	-	-
Direct selling	2	0.3%	1	0.6%	1	0.3%	-	-
Move to this channel (+)								
Millers	57	8.6%	3	1.7%	21	7.0%	33	17.6%
Local collectors	33	5.0%	1	0.6%	27	9.0%	5	2.7%
Agri-coops	64	9.7%	15	8.7%	22	7.3%	27	14.4%
Central paddy markets	14	2.1%	2	1.2%	8	2.7%	4	2.1%
Farmer groups	12	1.8%	-	-	12	4.0%	-	-
Direct selling	6	0.9%	1	0.6%	5	1.7%	-	-
Move away from this channel (-)								
Millers	15	2.3%	8	4.6%	5	1.7%	2	1.1%
Local collectors	11	1.7%	4	2.3%	5	1.7%	2	1.1%
Agri-coops	5	0.8%	2	1.2%	1	0.3%	2	1.1%
Central paddy markets	4	0.6%	1	0.6%	2	0.7%	1	0.5%
Farmer groups	1	0.2%	-	-	-	-	1	0.5%
Direct selling	-	-	-	-	-	-	-	-

(Source: Author's own, 2017)

5.4 The comparison of attributes with intention and past behaviour

This section looks at whether farmers' and farms' attributes would make any difference in farmers' selection of marketing channels. Multivariate analysis (MANOVA) by SPSS software was used to compare groups of respondents' attributes across different marketing channels on two dependent variables: past behaviour and intention. The independent variables were three marketing channels; miller (N=354), local collector (N=190) and agri-coop (N=115) combined with 16 attributes: (1) regions, (2) age, (3) gender, (4) education, (5) rice experience, (6) household size, (7) head of household, (8) number of group belonging, (9) number of sources of information, (10) land size for growing rice, (11) off-farm workers, (12) % income off-farm work, (13) partly for own consumption, (14) number of types of rice growing, (15) hired vehicle for carriage of rice for selling and (16) market distance.

Table 5.15 presents the MANOVA results of attributes across three marketing channels on intention and past behaviour (see the descriptive statistics of attributes for MANOVA in greater detail in Appendix D, Table D1).

Table 5.15 MANOVA results of profile of respondents on intention and past behaviour

Independent variables	Pillai's Trace	F	P value	Partial Eta Squared
Channels * Regions (North, NE, Central)	0.048	4.006	0.000**	0.024
Channels * Age (<55, ≥55 years old)	0.005	0.853	0.491	0.003
Channels * Gender (Male, Female)	0.008	1.356	0.247	0.004
Channels * Education (≤ Primary, > Primary)	0.016	2.589	0.035*	0.008
Channels * Experience (< 22, 22-42, >42 years)	0.005	0.375	0.934	0.002
Channels * Household Size (1-4, >4 persons)	0.002	0.376	0.826	0.001
Channels * Head of household (Yes, No)	0.012	1.294	0.271	0.006
Channels * Group belonging (1, >1 groups)	0.007	1.102	0.354	0.004
Channels * Source of information (1, >1)	0.015	2.412	0.047*	0.007
Channels * Land Size (1-12, >12 Rais)	0.008	1.349	0.250	0.004
Channels * Off-farm workers (1-2, >2 persons)	0.007	0.544	0.703	0.004
Channels * % Income off-farm work (1-50,>50%)	0.013	0.950	0.435	0.006
Channels * Partly for own consumption (Yes, No)	0.031	5.143	0.000**	0.016
Channels * Types of rice (1, >1)	0.016	2.650	0.032*	0.008
Channels * Hired vehicle (Yes, No)	0.017	2.850	0.023*	0.009
Channels * Market Distance (1-4, 4-7, >7 Km)	0.065	3.694	0.000**	0.032

Note: *= Significant differences at 0.05, **= Significant differences at 0.01

(Source: Author's own, 2017)

As shown in Table 5.15, there were statistically significant differences in intention and past behaviour in seven out of the sixteen attributes tested. They were: (1) regions, (2) education, (3) source of information, (4) the number of types of rice growing, (5) partly for own consumption, (6) hired vehicle and (7) market distance.

Firstly, there was a statistically significant interaction effect between regions and channel used on the two dependent variables: intention and past behaviour, F = 4.006, p = .000; Pillai's Trace = 0.048; Partial Eta Squared = 0.024 or 2.4% of the variance in the dependent variables explained by regions and channel used (Table 5.15). For respondents in the north region, local collector was and will be the most favoured channel. For farmers in the north-east region, local collector and agri-coop were used more than rice millers. However, the trend seemed to have favoured miller slightly for the next crop. For farmers in the central region, miller was the most frequently used channel and agri-coop the least used channel, however for the next crop, farmers seemed to have preferred to use more agri-coop and less rice miller.

Education is another factor which seemed to have made a difference in channel used. Significant multivariate effect was found for two groups of education level and channel used at 5% level as the p value was 0.035, the Pillai's Trace was 0.016 with F value of 2.589 and Partial Eta Squared = 0.008 or only 0.8% of the variance in the dependent variables explained by education and channel used (Table 5.15). It was found that respondents who had primary school or less education participation chose and intended to sell to local collector more than other channels whilst those with higher education favoured miller and agri-coop.

The number of sources of information was another factor linked to the variances of channel used in the past and intended use for the next crop (F = 2.412, p = 0.047, and Partial Eta Squared = 0.007) (Table 5.15). The difference was mainly related to their intended use of channels for the next crop (F = 4.527, p = 0.011, and Partial Eta Squared = 0.014). Respondents who relied on a single source of information were more likely to sell to miller and least likely to sell to agri-coop.

It was found that the there was a statistically significant interaction effect between types of rice and channel used (F = 2.605, p = 0.032, and Partial Eta Squared = 0.008) although only 0.8% of the variance in the dependent variables explained by types of rice growing and channel used (Table 5.15). Respondents who grew more than one type of rice used and intended to use local collector more than other two channels. Agri-coop was the least used. Those who grew only one type of rice used miller and local collector more, but more intended to move to agri-coop. However, the effect of variances was very small.

In terms of the divide between commercial farmers and subsistence farmers, farmers were asked whether they kept part of their rice for own consumption or not. There was significant multivariate effect for 'partly for own consumption' and 'channel used' (both past behaviour and intention), (F = 5.143, p = 0.000, and Partial Eta Squared = 0.016). This divide explained 1.6 % of the variance in the dependent variables (Table 5.15). Respondents who kept part of their rice for own consumption chose and intended to sell to local collector. Their second choice was agri-coop, it indicated respondents used this channel to enhance their bargaining power due to small quantity. Commercial farmers (those who answered 'no') were and would be more likely to sell to miller, and least likely to agri-coop.

Respondents were also asked whether they hired vehicle for transporting rice to market. This test showed a statistically significant variance in channel used between those who hired and who didn't hire vehicle (the Pillai's Trace is 0.017 with F value of 2.850, p=0.023, and Partial Eta Squared = 0.009) (Table 5.15). Respondents who didn't hire vehicle ('no' group) were more likely to rely on local collector or put it in another way, those who used local collectors didn't have to hire vehicle.

Lastly, market distance category was divided into three groups (1-4, 4-7, >7 Km) on account of the mean score of three channels and total sample size; mean of miller = 10.46 Km, mean of local collector = 3.97 Km., mean of agri-coop= 6.68 Km., and total mean = 7.70 Km. There was significantly different for market distance and channel used with intention and past behaviour, F= 3.694, p = 0.000, and Partial Eta Squared = 0.032 or 3.2 % of the variance in the dependent variables explained by market distance and channel used (Table 5.15). Respondents who located less than 4 Km from market were more likely and intended to sell to local collector than other channels.

MANOVA was used to test the statistical alternative hypothesis H2: *There are significant differences between profile of respondents across different marketing channels on past behaviour and intention.* The alternative hypothesis was partially accepted. Of the 16 attributes, 7 attributes were associated with variances of past and future intended use of channels.

Overall, it seemed that local collector was the favoured option for farmers with less capabilities (subsistence farmers, single rice type, less educated, located in the north region and not hiring vehicles) whilst miller was most likely to be used by commercial farmers who could afford to hire vehicle. Agricultural cooperative became a more popular in the next crop amongst those located in the central region, were more educated, and moderately distanced from the market.

Drawing upon the first research question, the results indicated that the six marketing channels were used by respondents in the current crop when the survey was conducted. A total of 661 respondents was divided as follows (Table 5.8, Table 5.16), respondents chose more than one channel:

- 371 (56.1%) respondents sold to millers
- 204 (30.9%) respondents sold to local collectors
- 122 (18.5%) respondents sold to agricultural cooperatives
- 49 (7.4%) respondents sold to central paddy markets
- 4 (0.6%) respondents sold to farmer groups
- 3 (0.5%) respondents chose direct selling

This section demonstrated some structural variances in farmers' marketing channel use. The next step aims to find out key factors affecting farmers' decision. This is done in two sections. Section 5.5 aims to present descriptive statistics of the factors investigated in this study (independent variables) against the top three channels. Section 5.6 will present the results of the inferential statistics (PLS-SEM).

5.5 Descriptive statistics of factors influencing the channel choice (independent variables)

As shown in the revised conceptual framework, seven groups of independent variables related to factors affecting the choice of marketing channels of rice farmers in Thailand were investigated in this study. They are (1) transaction specific factors; (2) trust; (3) personal relationship; (4) attitude toward the marketing channel choice; (5) subjective norm regarding marketing channel choice; (6) perceived behavioural control over marketing channel choice; and (7) goals and values of farmers. They were all measured with multiple items as presented in Table 5.16. Therefore, principal component factor analysis (PCA) was performed for each variable followed by a reliability test for each component of the variable (section 5.5.2).

All items were measured against the individual channel the respondent used for their previous crop. Respondents were asked to indicate their level of agreement with the importance of each item in their decision of channel choice on a scale of 1-7. Table 5.16 presents the means scores of each item of measurement against the top three marketing channels. Full information for all six channels can be found in Appendix D, Table D2.

Table 5.16 Descriptive statistics for level of agreement regarding channels selection

Items	Millers			Local collectors			Agri-Coops		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
1. Transaction specific variables									
Price	5.62	1.51	371	5.16	1.67	204	5.62	1.42	122
Transport cost	4.88	1.88	371	5.95	1.67	204	4.99	1.84	122
Cash Payment	6.47	1.01	371	6.75	0.81	204	5.98	1.32	122
Ease of access/convenience	6.31	1.10	371	6.62	0.90	204	6.34	1.14	122
Channel buys all the rice to be sold	6.34	1.25	371	6.53	1.02	204	6.28	1.22	122
Channel buys all types of rice	5.99	1.62	371	6.45	1.21	204	6.19	1.42	122
Monetary Incentive offered by the channel	4.91	1.53	161	4.52	1.52	91	5.63	1.39	80
Services provided by the channel	3.45	2.11	371	4.41	2.36	204	4.32	2.10	122
2. Trust									
Overall trust	5.97	1.36	236	6.51	0.97	150	6.19	1.24	93
Trust weigh scale	5.23	1.63	371	5.68	1.55	204	5.47	1.49	122
Trust grading	5.06	1.67	371	6.02	1.51	204	5.59	1.49	122
Fairly treated	6.03	1.44	236	6.55	0.97	150	6.25	1.24	93
Reputation	6.25	1.13	236	6.55	0.95	150	6.62	0.81	93
Reliable information	4.29	2.32	236	5.07	2.20	150	4.67	2.10	93
3. Personal relationship									
Good relationship with the channel	4.51	1.86	371	5.53	1.71	204	4.76	1.80	122
Be familiar with the channel	5.51	1.82	371	5.83	1.65	204	5.70	1.70	122
4. Attitude toward marketing channel choice									
Good channel	5.78	1.45	371	5.96	1.40	204	5.89	1.41	122
Satisfied	6.02	1.34	371	6.20	1.27	204	6.16	1.17	122
5.Subjective norm regarding marketing channel choice									
Norm friends	6.16	1.33	371	5.97	1.54	204	5.98	1.33	122
Norm family	5.83	1.66	371	6.07	1.58	204	5.60	1.86	122
Norm drivers	4.76	2.05	371	4.13	1.82	204	5.08	1.99	122
Norm government officers	4.10	2.41	198	3.50	2.49	92	5.09	2.43	70
Norm media	3.14	2.34	174	2.01	1.89	82	4.39	2.58	67
6. Perceived behavioural control over marketing channel choice									
Having choices	2.61	2.05	371	3.60	2.41	204	3.63	2.40	122
Negotiation	3.53	2.17	371	3.62	2.18	204	4.42	2.21	122
No tie-in contract	3.13	1.31	67	3.36	2.08	28	3.20	1.63	25
Not in debt with channel	3.20	1.47	51	3.35	2.12	26	3.11	1.50	27

Note: Highlight =the highest mean scores of total items in the channel

(Source: Author's own, 2017)

Transaction specific factors were measured with eight items. 'Cash payment' offered to farmers stood out as the most important factor when choosing 'millers' and 'local collectors'. 'Ease of access/convenience', 'channel buys all the rice to be sold' and 'channel buys all types of rice' ranked highly for all three channels.

Trust was measured with six items (i.e., trust the channel, fairly treated, good reputation, reliable information, accurate measurement of weight and reliable rice grade assessment). Reputation of the channel, fairness and overall trust were seen as most important in choosing a channel.

Good relationships and familiarity with the channel were used to measure relationships between farmers and the channel. Mean scores for personal relationships are highest for local collectors.

To assess attitude, two items were used: good or bad choice, and satisfied or dissatisfied with the channel. Local collectors scored higher than the other two channels on both items.

Friends and family seemed to be the key influencers of farmers' decision making. They were ranked the highest for all three channels.

Perceived behavioural control over marketing channel choice behaviour was measured with four items. Of the four, 'being able to negotiate with the channel' was deemed to be the most important by all respondents regardless of channel they used. Another factor considered by the farmers was 'having choices'.

As shown in Table 5.16, some items received low number of responses. They are: (1) monetary incentive, (2) norm media, (3) no tie-in contract, (4) not in debt with channel. Many respondents stated that these variables were irrelevant to their choice. Therefore, those items will be excluded from principal component analysis in the next section.

5.6 Principal component analysis (PCA)

Exploratory factor analysis via principal component analysis (PCA) is used to reduce the number of dimensions and refine the groups of variables into the smaller groups (Nokels *et al.*, 2010). This study used PCA to analyse and summarise interrelationship between seven groups of variables. The key independent variables explored in previous section were: (1) transaction specific variables; (2) trust; (3) subjective norm; (4) attitude; (5) perceived behavioural control; (6) personal relationship and (7) goals and values of farmers.

Three criteria were used to assess the appropriateness of the data in PCA:(1) Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) index that should more than 0.6; (2) the value of Bartlett's test of Sphericity at the significant level of <0.05, and (3) the acceptable total variance explained (Pallant, 2016). Furthermore, the number of component to consider is based on an eigenvalue of over 1. The eigenvalue of a factor is the accumulated variance explained by the variables associated with the factor which should be greater than any individual variable. Any of the factors with an eigenvalue of less than 1 would show a negative variance (Pallant, 2016).

The consistency of measures for each factor was tested in terms of reliability of scale. Reliability of scale of each factor is analysed using Cronbach's Alpha (α). Cronbach's Alpha coefficient of scale (α) at 0.5 is acceptable if the items for each factor is less than ten; however, an Alpha of 0.7 is the more commonly accepted threshold (Pallant, 2016).

The factors generated from PCA and reliability of scale were then used to identify which indicators would be better suited for reflective models and which for formative models in partial least squares method to structural equation modelling (PLS-SEM) in section 5.7.

Detailed explanation of the differences between reflective model and formative model are provided in the section 5.7.1. The principle is that variables measured with items with high internal consistency (i.e., high Cronbach's alpha score) will be suited for reflective models and those with low alpha scores will be more suited for formative models. The rationale is that indicators in formative models do not necessarily correlate highly with each other. For example, a person who is heavily influenced by others could be either influenced by friends or by government officers. However, the two types of influences do not necessarily correlate with each other.

5.6.1 Transaction specific factors

Seven items of transaction specific factors against each channel were subjected to PCA. This generated two components with eigenvalues exceeding 1 (KMO = 0.68, p <0.05) (Table 5.17). The items loaded on the first component were (1) channel buys all the rice to be sold, (2) channel is easily accessible, (3) channel purchases all types of rice and (4) cash payment. The items loaded on component two were (1) transport cost, and (2) services offered by the channel. However, reliability test on the component 2 didn't show acceptable level of reliability.

Therefore, using 'alpha score when item was deleted' method, it was decided that 'cash payment' should be removed from component one which was relabelled as 'consideration of channel accessibility' (CA). Re-analysed with PCA revealed the KMO of these variables was 0.64 with eigenvalues exceeding 1, explaining 56.59% and reached significance (p value <0.05). This means that of the seven items used to measure transaction specific factors, three items were loaded to CA. The other four items were related to 'consideration of transaction specific cost' (CT). They will be used in formative model in the subsequent PLS analysis.

Table 5.17 Factor loading of transaction specific variables

Variables	Factor Loadings		Communalities Extraction	Mean N=659	SD
	Component 1	Component 2			
Consideration of channel accessibility (CA) Cronbach's Alpha (α) = 0.77					
-Channel buys any quantity of rice (CAQ)	0.71	-0.24	0.57	6.42	1.11
-Channel buys any type of rice (CAT)	0.62	-0.14	0.41	6.15	1.49
-Channel is easily accessible or convenient (CAA)	0.75	-0.06	0.57	6.42	1.03
Consideration of transaction specific cost (CT) Cronbach's Alpha (α) = 0.26					
-Channel offered higher price (CTP)	0.18	0.06	0.04	5.49	1.54
-Channel offered cash payment (CTC)	0.62	-0.15	0.40	6.48	1.03
-Cheaper to transport to the channel (CTT)	0.31	0.69	0.58	5.24	1.85
-Channel offered incentives/services (CTS)	0.21	0.76	0.62	3.88	2.21
Total Variance Explained					45.38%
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)					0.68
Bartlett's Test of Sphericity		Approx. Chi-Square			395.375
		df			21
		Sig.			0.00

(Source: Author's own, 2017)

5.6.2 Trust

Trust was measured with six items: (1) trust the accuracy of the weighing scale, (2) trust of rice grade assessment, (3) fair treatment, (4) good reputation, (5) reliable information and (6) overall trust in the channel.

PCA revealed two components with eigenvalues exceeding 1 with total variance explained being 63.37% (KMO =0.69, p <0.05) as shown in Table 5.18. Two items loaded on component one (relabelled as 'integrity') were trust in weighing scale and trust in rice grading with an alpha (α) value of 0.82. Component two was consisted of four items: (1) reputation (TR), (2) overall trust (T), (3) fairness (TF), and (4) reliable information (TS). The alpha (α) value was 0.53. Due to the low alpha score of component two, the four items should be used in a formative way in the subsequent PLS analysis. However, 'trust' was only one variable that had the overall score. As a result, the other three items ('reputation, 'fairness' and 'reliable information') were defined as the antecedents of trust in the PLS analysis rather than use in a formative way as usual.

Table 5.18 Factor loading of trust variables

Variables	Factor Loadings		Communalities Extraction	Mean N=659	SD
	Component 1	Component 2			
Integrity (TI) Cronbach's Alpha (α) = 0.82					
-Trust in weighing scale (TIW)	0.91		0.84	5.44	1.57
-Trust in rice grading (TIG)	0.88		0.81	5.43	1.64
Trust (T) Cronbach's Alpha (α) = 0.53					
-Trust this channel (T)	0.42	0.73	0.72	6.16	1.26
-Channel had a good reputation (TR)		0.75	0.56	6.40	1.05
-Channel treated me fairly (TF)	0.44	0.71	0.70	6.20	1.32
-Reliable information (TS)		0.41	0.12	4.60	2.25
Total Variance Explained					63.37%
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)					0.69
Bartlett's Test of Sphericity		Approx. Chi-Square			768.000
		df			15
		Sig.			0.00

(Source: Author's own, 2017)

5.6.3 Subjective norm regarding marketing channel choice

Four items were found to be indicative of subjective norm regarding marketing channel choice behaviour were identified based on phase one interviews. They are (1) friends who are rice farmers, (2) family, (3) rice harvest machine drivers or truck drivers, and (4) government officers or head of village. PCA generated two components with eigenvalues exceeding 1, explaining 51.11% and 25.25% of the variance or total explained 76.36%. The KMO was 0.62 and Bartlett's test of Sphericity reached significance (p value <0.05) as presented in Table 5.19.

Component one relabelled as 'other influencers' (SO) included 'rice harvest machine drivers or truck drivers' (SD), and 'government officers or head of village' (SG) with the alpha (α) value was 0.70. The two items loaded on component two were 'friends' (SFR) and 'family' (SF) with the alpha (α) value was 0.66. In subsequent PLS analysis, these items were used in a formative way as they represent different subjective norm roles.

Table 5.19 Factor loading of subjective norm

Variables	Factor Loadings		Communalities Extraction	Mean N=659	SD
	Component 1	Component 2			
Other influencers (SO) Cronbach's Alpha (α) = 0.70					
-Government officers (N=333) (SG)	0.88		0.79	4.08	2.48
-Rice harvester driver or truck driver (SD)	0.85		0.76	4.64	1.99
Friends & Family (S) Cronbach's Alpha (α) = 0.66					
-Friends (SFR)		0.87	0.77	6.12	1.34
-Family (SF)		0.84	0.74	5.89	1.65
Total Variance Explained					76.36%
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)					0.62
Bartlett's Test of Sphericity		Approx. Chi-Square			255.62
		df			6
		Sig.			0.00

(Source: Author's own, 2017)

5.6.4 Attitude, perceived behavioural control over channel choice and personal relationship

Three variables were measured with two items for each. This means PCA is not necessary. However, to assess the reliability of the measurement scale, a Cronbach's alpha test was run for each variable. The three variables are: (1) attitude toward marketing channel choice, (2) perceived behavioural control (PBC) over marketing channel choice, and (3) personal relationship.

To assess attitude toward marketing channel choice, two items were measured in the following forms: 1) good or bad choice, and 2) satisfied or dissatisfied with channel. Cronbach alpha coefficient was 0.84 as shown in Table 5.20, indicating high internal consistency.

The two items used to measure perceived behavioural control (PBC) are 1) having choices, and 2) being able to negotiate. The alpha coefficient was very low at 0.09. Personal relationships were measured with two items: 1) 'good relationship' (RG) and 2) 'familiarity with the channel' (RF). The alpha value was 0.62. Due to the low internal consistency, all four items will be used in a formative way in the PLS analysis subsequently.

Table 5.20 Reliability of the scales of attitude, perceived behavioural control and personal relationship

Variables	Cronbach's Alpha (α)	Mean N=659	SD
Attitude toward marketing channel choice (A)	**0.84**		
-This channel is a good choice (AG)		5.88	1.40
-Overall, Satisfied or happy with this channel (AS)		6.10	1.28
Perceived behavioural control over channel choice (PBC)	**0.09**		
-Choosing this channel because do not have any choice (Reverse) (PBCC)		3.05	2.27
-Can negotiate with this channel (PBCN)		3.68	2.19
Personal relationship (R)	**0.62**		
-Having a good relationship with this market channel (RG)		4.85	1.83
-Have been familiar with this channel (RF)		5.63	1.75

(Source: Author's own, 2017)

5.6.5 Goals and values of farmers

Goals and values of farmers variables were measured with eight statements. They were generic and not measured against each specific marketing channel. As explained in the methodology section, the eight items were adapted from Gasson's statements of farmers' values and goals (Gasson, 1973) to the context of rice farmers' goals of using marketing channels.

The results with varimax rotation revealed the three components with eigenvalues exceeding 1, with component one contributing 39.2%, component two 14.1%, and component three 12.5%. The total variance explained was 65.7%. The KMO value was 0.81 and Bartlett's test of Sphericity was 1242.17 and reached significance (p value <0.05) as shown in Table 5.21.

Table 5.21 Factor loading of goals and values of farmers

Variables	Factor Loadings Components			Communalities Extraction	Mean N=659	SD
	1	2	3			
Intrinsic (IN) Cronbach's Alpha (α) = 0.81						
-Having sense of achievement or self-fulfilment through selling (IS)	0.84			0.74	6.30	1.19
-Independence- freedom for selling(IF)	0.79			0.69	6.31	1.20
-Family's well-being (IW)	0.74			0.68	6.42	0.99
Goals of selling (G) Cronbach's Alpha (α) = 0.55						
-Maximising profit by minimising cost (GC)		0.80		0.73	6.23	1.21
-Maximising profit by selling at a higher price (GP)		0.67		0.55	6.22	1.22
-Enhancing cash flow (GF)		0.57		0.52	6.24	1.23
Social Values (SV) Cronbach's Alpha (α) = 0.45						
-Belonging to the farming community or farmer group (SVG)			0.83	0.73	4.86	2.07
-Continuing the family tradition (SVF)			0.64	0.62	5.68	1.77
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)						0.81
Total Variance Explained						65.71%
Bartlett's Test of Sphericity		Approx. Chi-Square				1242.17
		df				28
		Sig.				0.00

(Source: Author's own, 2017)

Reliability of scale of the items in each component were analysed using Cronbach's Alpha (α). Normal threshold score of an Alpha is 0.7 (Pallant, 2016). The reliability of component one (relabelled as 'intrinsic value') had an alpha score of 0.81 while the alpha of component two and the component three were 0.55 and 0.45 respectively.

Due to the low reliability score of component 2 and component 3, the items loaded to these two components (i.e., minimising cost (GC), higher price (GP), enhancing cash flow (GF), belonging to the farming community (SVG), continuing the family tradition (SVF)) will be used in formative models of measurement for subsequent PLS-SEM analysis.

In sum, the PCA was conducted on seven independent variables measured with multiple items: (1) transaction specific variables, (2) trust, (3) subjective norm, (4) attitude, (5) perceived behavioural control, (6) personal relationship and (7) goals and values of farmers.

The PCA and reliability tests showed that items for 'attitude' (A), 'consideration of channel accessibility' (CA), 'integrity' (TI), and 'intrinsic value' (IN) had high internal consistency (i.e., high alpha score) and can be used in reflective models in PLS analysis. Other variables were measured with items with low internal consistency and will be used in formative models in PLS analysis.

5.7 Model testing with Partial least squares (PLS) method to structural equation modelling (SEM)

Partial least squares method to structural equation modelling (PLS-SEM) is used to analysing the cause-effect relations between latent variables (LVs) and aims to predict and theory development (Hair *et al.*, 2011). A latent variable cannot be measured directly, it needs a manifest variable assigned to it as an indicator for a latent variable (Galbraith *et al.*, 2002).

The latent variables (LVs) were measured by manifest or observed variables (MVs) in this study are presented in Table 5.22 and the framework model is shown in Figure 5.2. The framework in Figure 5.2 was modified based on the revised conceptual framework presented at the end of Chapter 4. 'Intention' is the ultimate dependent variable. 'Past behaviour' is also a dependent variable. It is an independent variable (antecedent) in relation to 'intention'. All other variables are independent variables hypothesised as factors affecting the two behavioural variables (past behaviour and intention).

PLS is a form of structural equation modelling (SEM) for causal modelling which integrates many statistical techniques, for example, t-values via bootstrapping, PCA, multiple regression, correlation, and multivariate analysis of variance via multi-group analysis (MGA) (Lowry & Gaskin, 2014). This study used SmartPLS software version 3.0 developed by Ringle *et al.* (2015).

Two types of models coexist in this framework: (1) the measurement or outer models (indicated by rectangular boxes related to oval shaped latent variables), and (2) the structural or inner model (indicated by the oval shaped independent variables in relation to oval shaped dependent variables) (Hair *et al.,* 2011; Garson, 2016). Details of how the models were configured and the results are explained in the next section.

The structural or inner model presents the relationship between the endogenous LVs and exogenous LVs. The endogenous LV is defined as the target variable or effect of other variables, while the exogenous LV is not an effect of any other variable in the model or used to describe the other variables (Hair *et al.*, 2011; Garson, 2016).

There are 8 endogenous variables (i.e., 'Intention', 'Past behaviour', 'Attitude', 'Subjective norm', 'Trust', 'Consideration of transaction specific cost', 'Consideration of channel accessibility' and 'Goals of selling') and 8 exogenous variables ('Farmers' power', 'Integrity', 'Fairness', 'Reputation', 'Reliable information', 'Relationship', 'Intrinsic values' and 'Social Values') were measured in this study (Table 5.22).

Table 5.22 Latent and manifest variables of the framework model in this study

Latent variables (LVs)	Manifest variables (MVs)
Intention (I) *(Endogenous)*	1. Intention to sell to the channel (I)
Attitude (A) *(Reflective, Endogenous)*	2.1 This channel is a good choice (AG) 2.2 Overall, Satisfied with this channel (AS)
Subjective norm (S) *(Formative, Endogenous)*	3.1 Friends (SFR) 3.2 Family (SF) 3.3 Rice harvester driver or Truck driver (SD) 3.4 Government officers or head of village (SG)
Perceived behavioural control or Farmers' power (PBC) *(Formative, Exogenous)*	4.1 Having choices to choose to sell (PBCC) 4.2 Can negotiate with this channel (PBCN)
Trust (T) *(Endogenous)*	5. Trust the channel (T)
Integrity (TI) *(Reflective, Exogenous)*	6.1 Trust rice grade assessment (TIG) 6.2 Trust weighing scale (TIW)
Fairness (TF) *(Exogenous)* Reputation (TR) *(Exogenous)*	7. The channel treated with fairness (TF) 8. Channel had a good reputation (TR)
Reliable information (TS) *(Exogenous)*	9. Reliable information received (TS)
Consideration of transaction specific cost (CT) *(Formative, Endogenous)*	10.1 To receive higher price (CTP) 10.2 To receive cash payment (CTC) 10.3 Cheaper to transport to the channel (CTT) 10.4 Channel offered non-monetary incentives or services (CTS)
Consideration of channel accessibility (CA) *(Reflective, Endogenous)*	11.1 Channel buy any quantity of rice (CAQ) 11.2 Channel buy any type of rice (CAT) 11.3 Channel is easily accessible (CAA)
Relationship (R) *(Reflective, Exogenous)*	12.1 Having a good relationship with the channel (RG) 12.2 Have been familiar with this channel (RF)
Goals of selling (G) *(Formative, Endogenous)*	13.1 Maximising profit by selling at a higher price (GP) 13.2 Maximising profit by minimising cost (GC) 13.3 Enhancing cash flow (GF)
Intrinsic values (IN) *(Reflective, Exogenous)*	14.1 Having sense of achievement or self-fulfilment through selling (IS) 14.2 Independence - freedom for selling (IF) 14.3 Family's well-being (IW)
Social Values (SV) *(Formative, Exogenous)*	15.1 Belonging to the farming community or farmer group (SVG) 15.2 Continuing the family tradition (SVF)
Past behaviour (P) *(Endogenous)*	16. Frequency of current channel(s) use (P)

(Source: Author's own, 2017)
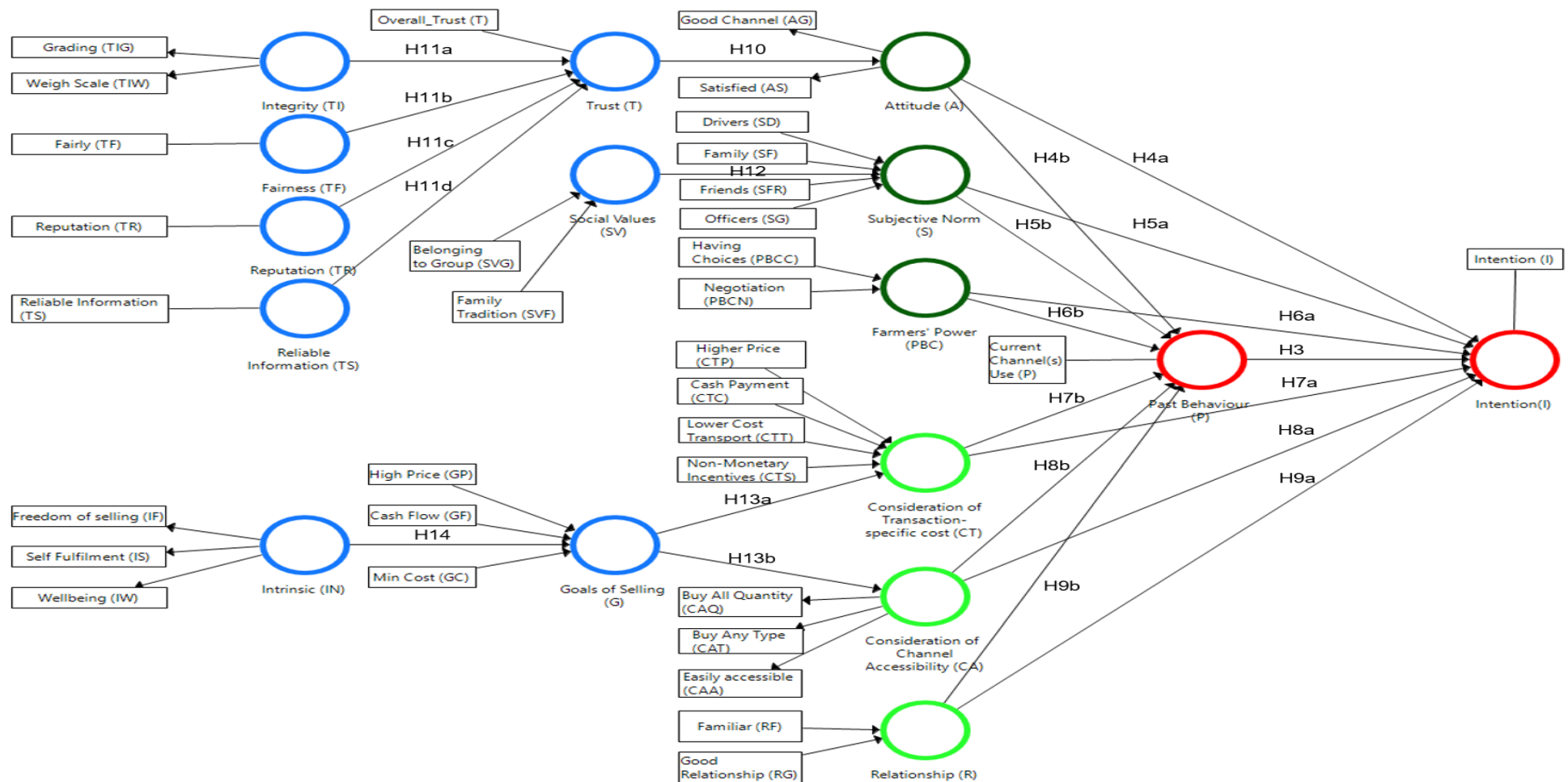
Figure 5.2 PLS-SEM Framework model in this study

(Source: Author's own, 2018)

5.7.1 The measurement or outer model results

The assessment of the measurement model (Hair *et al.,* 2011; Wong, 2013; Garson, 2016) aims to investigate the reliability and validity of the measures used to represent each latent variable. Two types of measurement models are used in PLS: formative and reflective measurement models (Chin, 2010; Hair *et al.,* 2011).

Reflective indicators represent the variables or indicators that are inferred to be an effect of a latent variable or single-headed arrows pointing from the latent variables outward to the indicator variables (Hair *et al.,* 2011; Lowry and Gaskin, 2014). For example, 'good channel' (AG) and 'satisfied with channel' (AS) are indicators of positive 'attitude toward the channel' (i.e. the latent variable) as shown in Figure 5.2. In reflective model, the indicators are expected to correlate with each other and show high internal consistency. In other words, if one feels positive about the channel, it is more likely this person will rate highly on both AG and AS. Reflective models are assessed by checking reliability and validity.

Formative indicators serve as the variables which are assumed to cause the latent variable (Hair *et al.,* 2011). They are represented as the single-headed arrows pointing from the indicator variables outward to the latent variables. An example is the model to measure PBC. This was indicated by 'having choices' (PBCC) and 'being able to negotiate' (PBCN) as presented in Figure 5.2. The presence of either one of the two indicators is an indicator of presence of farmers' power (PBC). The indicator's weight and multicollinearity are used to assess the formative measurement models (Hair *et al.,* 2011; Wong, 2013; Lowry and Gaskin, 2014; Garson, 2016).

1) Reflective measurement models

Reliability and validity approaches are the two main assessments of reflective models (Hair *et al.,* 2011; Garson, 2016). To assess the reliability, internal consistency reliabilities and indicator reliability are measured using the composite reliability, Cronbach's Alpha, and indicator loadings. The composite reliability and Cronbach's Alpha values should be more than 0.70, or 0.60 in the case of exploratory research. The indicator loadings value of 0.70 or above is more appropriate (Hair *et al.,* 2011; Garson, 2016). The composite reliability and Cronbach's Alpha scales for the four reflective models are shown in Table 5.23. The scales of four factors, attitude, consideration of channel accessibility, integrity, and intrinsic value were all higher than 0.70, which are consistent with the Cronbach's Alpha (α) reliability values presented in section 5.6.

Table 5.23 Reliability and validity of the reflective models

Latent variables	Composite Reliability	Cronbach's Alpha
Attitude (A)	0.842	0.841
Consideration of channel accessibility (CA)	0.768	0.768
Integrity (TI)	0.849	0.819
Intrinsic (IN)	0.808	0.809

(Source: Author's own, 2018)

Convergent and discriminant validity are the two assessments of validity for reflective measurement models. The average variance extracted (AVE), used to test convergent validity, should be greater than 0.50. The results, shown in Table 5.24, indicated that these four latent variables explained more than half of the variance of their respective indicators.

Fornell-Larcker criterion and cross loadings are the two criteria to assess discriminant validity (Hair *et al.*, 2011; Garson, 2016). The Fornell–Larcker criterion is appropriate if the square root of AVE is higher than the construct's highest squared correlation with any other latent variables (Hair *et al.,* 2011; Garson, 2016).

The square roots of AVE (in bold) of the four variables were all higher than the numbers of correlations below them which suggests there is discriminant validity in each case (Table 5.24). Table D3 in the Appendix D provides Fornell-Larcker criterion of all the latent variables and Table D4 presents the correlations of all manifest variables in more details.

Table 5.24 Fornell-Larcker criterion of the reflective models

Latent Variables	Average Variance Extracted (AVE)	Fornell-Larcker Criterion			
		Attitude	Channel accessibility	Integrity	Intrinsic
Attitude (A)	0.728	**0.853**			
Consideration of channel accessibility (CA)	0.527	0.388	**0.726**		
Integrity (TI)	0.744	0.416	0.143	**0.863**	
Intrinsic (IN)	0.585	0.246	0.423	0.104	**0.765**

(Source: Author's own, 2018)

Cross loadings are used for assessing the discriminant validity if the indicator loading is higher than all of its cross loading (more than 0.6-0.7) (Garson, 2016). It is apparent from Table 5.25 that the indicator loadings (in bold) were higher than 0.6 and greater than other cross loadings, which implies that this model was appropriate in terms of the discriminant validity.

Table 5.25 Cross loadings of the reflective models

Cross Loadings	Attitude (A)	Consideration of channel accessibility (CA)	Integrity (TI)	Intrinsic (IN)
Good channel (AG)	**0.820**	0.387	0.306	0.207
Satisfied with this channel (AS)	**0.885**	0.280	0.401	0.213
Easily accessible (CAA)	0.292	**0.757**	0.172	0.329
Buy any quantity of rice (CAQ)	0.276	**0.787**	0.034	0.319
Buy any type of rice (CAT)	0.281	**0.623**	0.111	0.270
Trust rice grade assessment (TIG)	0.372	0.129	**1.008**	0.123
Trust weighing scale (TIW)	0.355	0.121	**0.688**	0.045
Freedom for selling(IF)	0.216	0.384	0.056	**0.781**
Self-fulfilment through selling (IS)	0.183	0.301	0.061	**0.693**
Family's well-being (IW)	0.167	0.286	0.119	**0.816**

(Source: Author's own, 2018)

Although, Fornell-Larcker criterion and cross-loadings are the main approaches used to evaluate discriminant validity, Hair *et al.* (2015) suggested another criterion, namely heterotrait-monotrait ratio of correlations (HTMT). They compared the new approach to these two approaches using means of a Monte Carlo simulation, the mathematical technique used to understand the sample distribution and evaluate its behaviour in random samples and helps to explain the effect of risk and uncertainty in models (Mooney, 1997). They found that these two approaches may not reliably detect the lack of discriminant validity. They recommended HTMT criterion when the value is below 0.90 to assess discriminant validity. This is also suggested by Ringle *et al.* (2015). Table 5.26 illustrates that the HTMT ratios were less than 0.9, thus discriminant validity of the reflective models was established between the reflective variables.

Table 5.26 Heterotrait-Monotrait Ratio (HTMT) of the reflective models

Latent Variables	Attitude	Consideration of channel accessibility	Integrity	Intrinsic
Attitude (A)				
Consideration of channel accessibility (CA)	0.394			
Integrity (TI)	0.436	0.153		
Intrinsic (IN)	0.247	0.423	0.100	

(Source: Author's own 2018)

2) Formative measurement models

A different perspective on the measurement or outer model is a formative model in which each indicator variable does not necessarily correlate with others, it represents the latent variable as an individual variable with different dimensions (Hair *et al.,* 2011). Therefore, the criteria of reflective measurement models, such as composite reliability and AVE, are not compatible with the assessment of formative models. Hair *et al.* (2011) suggest that theoretical rationale and expert opinions be used to assess the formative models in conjunction with an indicator's weight and multicollinearity results generated by SmartPLS.

The first assessment of formative models is to evaluate the indicators' relevance to provide the content of their constructs by face validity (Garson, 2016) and to check the significance of the indicators (Hair *et al.,* 2011; Garson, 2016). To establish face validity, the indicator variables should represent or be relevant to the meaning of the latent variables (Garson, 2016). In this study, there are five formative models. They are: subjective norm (S), perceived behavioural control/farmers' power (PBC), consideration of transaction specific cost (CT), goals of selling (G), and social values (SV). Details of the indicators in these models are shown in Table 5.22. The indicators in these constructs were initially identified from the reviewed literature and analysis of the interviews with rice farmers during phase one study.

The significance of each formative indicator's weight and loading was determined by using the bootstrap procedure of 5,000 resamples (Hair *et al.,* 2011). The results in Table 5.27 indicate that most of the indicators reached significance. Garson (2016) suggested that indicators with non-significant paths in formative models may affect the significance of other paths in the model. Therefore, for indicators with non-significant paths, test run of model should be undertaken by dropping one indicator at a time. After re-running the model, two indicators, namely 'officers' (SG) and 'drivers' (SD), were dropped. After dropping those two indicators, the other two indicators 'belonging to group' (SVG), 'negotiation' (PBCN)) became significant and therefore were still retained in the final model testing.

Table 5.27 Formative indicator's loadings, weights, T, and P Value

Formative indicators	Loading	T	P Values	Weight	T	P Values
Family (SF) -> Subjective norm (S)	0.791	13.473	0.000	0.475	5.248	0.000
Friends (SFR) -> Subjective norm (S)	0.922	22.315	0.000	0.721	9.269	0.000
Drivers (SD) -> Subjective norm (S)	0.190	1.714	0.087	-0.124	0.810	0.418 [N]
Officers (SG) -> Subjective norm (S)	0.144	1.380	0.167 [N]	-0.069	0.388	0.698 [N]
Family Tradition (SVF) -> Social Values (SV)	1.000	30.586	0.000	1.002	13.151	0.000
Belonging to Group (SVG) ->Social Values (SV)	0.289	1.475	0.140 [N]	-0.006	0.029	0.977 [N]
Having Choices (PBCC) ->Farmers' Power (PBC)	0.986	19.875	0.000	0.978	17.131	0.000
Negotiation (PBCN) -> Farmers' Power (PBC)	0.215	1.174	0.240 [N]	0.168	0.925	0.355 [N]
Higher Price (CTP) -> Transaction cost (CT)	0.382	4.890	0.000	0.308	3.887	0.000
Cash Payment (CTC) -> Transaction specific cost (CT)	0.876	17.423	0.000	0.847	15.937	0.000
Lower Cost Transport(CTT) ->Transaction specific cost (CT)	0.365	4.551	0.000	0.343	4.257	0.000
Non-Monetary Incentives (CTS) ->Transaction specific cost (CT)	-0.072	0.915	0.360 [N]	-0.212	2.702	0.007
High Price (GP) -> Goals of Selling (G)	0.915	29.029	0.000	0.739	11.966	0.000
Min Cost (GC) -> Goals of Selling (G)	0.543	7.556	0.000	0.151	1.932	0.053
Cash Flow (GF) -> Goals of Selling (G)	0.640	10.460	0.000	0.377	4.879	0.000
Good Relationship (RG) -> Relationship (R)	0.861	6.525	0.000	0.601	2.549	0.011
Familiar (RF) -> Relationship (R)	0.845	6.163	0.000	0.572	2.364	0.018

Notes: N = non-significant,

Highlight = items were dropped after re-running the model

(Source: Author's own, 2018)

Multicollinearity demonstrates the degree to which a variable can be explained by the other variables and if multicollinearity rises, it explains there are interrelationships between variables which heightens the difficulty of determining the effect of a single variable (Hair *et al.*, 1995). Multicollinearity is the second assessment of the formative model conducted by examining the indicator's variance inflation factor (VIF) value. The low value of VIF indicates low correlation among variables, and less than 5 is recommended (Hair *et al.,* 2011; Ringle *et al.*, 2015;).

The inner VIF values represent the values for endogenous latent variables (Garson, 2016), such as 'intention' (I), which are predicted from 'subjective norm' (S), 'perceived behavioural control/farmers' power' (PBC) and 'consideration of transaction specific cost' (CT), while outer VIF values show the VIF coefficients for the formative models of which the latent variables were predicted by their indicators (Garson, 2016). For example, 'subjective norm' (S) was predicted by 'family' (SF) and 'friends' (SFR). The results, as shown in Table 5.28, indicated that the inner and outer VIF values of all formative indicators were less than 5, suggesting that the validity of the formative models was appropriate with no multicollinearity. The inner and outer VIF values in Table 5.28 showed only formative models because the reflective models were assessed with other measurements as shown in the previous section.

Table 5.28 Inner and outer VIF values for formative indicators

Inner VIF Values	I	P	CA	CT	S
Subjective norm (S)	1.362	1.338			
Social values (SV)					1.000
Perceived behavioural control (PBC)	1.104	1.093			
Consideration of transaction specific cost (CT)	1.329	1.288			
Goals of selling (G)			1.000	1.000	
Relationship (R)	1.108	1.107			

Outer VIF Values	VIF
Family (SF)	1.422
Friends (SFR)	1.365
Family tradition (SVF)	1.095
Having choices (PBCC)	1.002
Negotiation (PBCN)	1.002
Cash payment (CTC)	1.013
Higher Price (CTP)	1.007
Non-monetary incentives (CTS)	1.049
Lower cost transport (CTT)	1.049
Min cost goal (GC)	1.220
Cash flow goal (GF)	1.126
High price goal (GP)	1.260
Good Relationship (RG)	1.260
Familiar (RF)	1.260

(Source: Author's own, 2018)

5.7.2 The assessment of the structural model

The structure or inner model assessed the extent of the relationships between the latent variables to test the hypotheses (Duarte and Raposo, 2010). Hair *et al.* (2011) summarised the four rules of thumb in evaluating the structural model: (1) R^2 value; (2) the path coefficients' significance; (3) predictive relevance; and (4) heterogeneity.

1) R-square (R^2) and adjusted R^2

The first criterion of the goodness of fit for structural models is coefficient of determination or R-square (R^2) (Duarte and Raposo, 2010; Garson, 2016). Defined as the level of the independent variables, R^2 can explain the dependant variable by measuring its proportion of the variance (Hair *et al.*, 1995). The R^2 value usually lies in a number between 0 and 1 which will assume that the greater the value of R^2, the better explained it is. However, R^2 could be negative when the model is a poor fit and then independent variables in the model should be eliminated or revised (Hair *et al.*, 1995).

The adjusted R^2 is a version of R^2 modified for the number of independent variables in the regression equation model. The adjusted R^2 will increase if the variables added

improve the model, while adjusted R^2 decreases when the added variables enhance the model less than what is predicted by chance (Hair *et al.*, 1995).

The R^2 value criterion can be categorised into three levels of strength which are 0.75, 0.50, and 0.25 to be substantial, moderate and weak, respectively (Hair *et al.,* 2011). Chin (1998) identified the value of R^2 at 0.67, 0.33, and 0.19 as substantial, moderate and weak, respectively. However, it has been argued that the judgement of what R^2 value defined as high depends on the disciplines of the research (Hair *et al.,* 2011; Garson, 2016).

Hair *et al.* (2011) indicated that R^2 value at 0.20 might be considered as high in consumer behaviour and 0.75 would be substantial in marketing research. However, the lowest acceptable level of R^2 to the author's knowledge is 0.1 (Falk & Miller, 1992). As such, the value of R^2 in this study is defined as acceptable if at 0.1-0.19, weak if at 0.20-0.33, moderate if at 0.34-0.67, and substantial if at >0.67.

The R^2 values of eight endogenous latent variables were all positive. Intention, trust and goals of selling were at the moderate level, past behaviour and attitude variables were at weak level, and other variables were at the low level. As shown in Table 5.29, the R^2 value of intention was at 0.449 and past behaviour at 0.281, meaning that 45% and 28.1% of the variance of the intention and past behaviour variables were explained by the model.

Table 5.29 R^2 and adjusted R^2 of endogenous latent variables

Latent variables	R^2	Adjusted R^2	Level
Intention (I)	0.449	0.444	Moderate
Past behaviour (P)	0.281	0.276	Weak
Attitude (A)	0.192	0.191	Weak
Subjective norm (S)	0.071	0.068	Low
Consideration of transaction specific cost (CT)	0.027	0.025	Low
Consideration of channel accessibility (CA)	0.161	0.160	Acceptable
Trust (T)	0.472	0.469	Moderate
Goals of selling (G)	0.338	0.337	Moderate

(Source: Author's own, 2018)

2) The path coefficients' significance

To assess the significance of the path coefficients and testing hypotheses H3-H14, the framework was analysed using the 5000 consistent PLS bootstrap samples with two-sided significance test. Consistent PLS bootstrapping was chosen because this combined bootstrapping with the PLS algorithm (Garson, 2016). Table 5.30 and Figure 5.3 showed that 22 hypotheses were tested. 19 out of the 22 hypotheses were supported, of which 14 paths were highly significant at the 99% level (P ≤ 0.01), 4 paths were significant at the 95% level (P ≤ 0.05), and 1 path was significant at the 90% level (P ≤ 0.10).

'Intention' was affected by five latent variables: (1) 'past behaviour', (2) 'attitude', (3) 'subjective norm', (4) 'farmers' power' (PBC) and (5) 'consideration of transaction specific cost' (Table 5.30, Figure 5.3). The three main components of TPB, which are attitude, subjective norm, and perceived behaviour control (PBC), were significant to intention. The additional components had a significant relationship with intention, namely past behaviour at 99% level, and consideration of transaction specific cost at 90% level. (See more details of indirect effects in Appendix D, Table D5).

'Past behaviour' was significantly affected by five latent variables: (1) 'attitude', (2) 'subjective norm', (3) 'farmers' power' (PBC), (4) 'consideration of transaction specific cost' and (5) 'consideration of channel accessibility'.

'Trust' was originally seen as a direct predictor of the behaviour. However, test runs showed that trust influenced behaviour indirectly, through attitude toward the channel. Trust itself was a latent variable of 'integrity', 'fairness', 'reputation' and 'reliable information'.

'Goals and values' were also originally seen as direct predictors of behaviour. Test runs showed some hierarchical relationship between the components and they exerted indirect influence on behaviour and intention. More specifically, goals and values were composed of three components: 'social values', 'intrinsic values' and 'goals of selling rice'.

'Social values' affected 'past behaviour' and 'intention' indirectly via subjective norm. This means that social values determined how much the respondents followed the advice of the influencers. 'Goals of selling' influenced by 'intrinsic value', affected the behaviour indirectly via the respondents' consideration of transaction costs and channel accessibility.

Table 5.30 Path coefficients and hypotheses testing of the framework

Path Relationships	Path Co.	T	P Values	Hypotheses	Results
Past behaviour (P) -> Intention (I)	0.485	10.300	0.000***	H3	Supported
Attitude (A) -> Intention (I)	0.115	2.418	0.017**	H4a	Supported
Attitude (A) -> Past behaviour (P)	0.166	3.788	0.000***	H4b	Supported
Subjective norm (S) -> Intention (I)	0.086	2.155	0.024**	H5a	Supported
Subjective norm (S) -> Past behaviour (P)	0.126	3.178	0.002**	H5b	Supported
Farmers' power (PBC) -> Intention (I)	-0.096	2.532	0.010**	H6a	Supported
Farmers' power (PBC) -> Past behaviour (P)	-0.091	2.709	0.006***	H6b	Supported
Transaction specific cost (CT) -> Intention (I)	0.066	1.740	0.083*	H7a	Supported
Transaction specific cost (CT)-> Past behaviour (P)	0.172	4.267	0.000***	H7b	Supported
Channel accessibility (CA) -> Intention (I)	0.064	1.261	0.191	H8a	Not supported
Channel accessibility (CA) -> Past behaviour (P)	0.245	4.503	0.000***	H8b	Supported
Relationship (R) -> Intention (I)	0.044	1.397	0.212	H9a	Not supported
Relationship (R) -> Past behaviour (P)	-0.016	0.347	0.621	H9b	Not supported
Trust (T) -> Attitude (A)	0.530	8.953	0.000***	H10	Supported
Integrity (TI) -> Trust (T)	0.126	3.822	0.000***	H11a	Supported
Fairness (TF) -> Trust (T)	0.514	8.517	0.000***	H11b	Supported
Reputation (TR) -> Trust (T)	0.179	3.516	0.000***	H11c	Supported
Reliable information (TS) -> Trust (T)	0.080	2.749	0.006***	H11d	Supported
Social values (SV) -> Subjective norm (S)	0.264	5.481	0.000***	H12	Supported
Goals of selling(G)->Transaction specific cost(CT)	0.163	3.146	0.001***	H13a	Supported
Goals of selling (G)->Channel accessibility (CA)	0.402	8.409	0.000***	H13b	Supported
Intrinsic (IN) -> Goals of selling (G)	0.582	14.019	0.000***	H14	Supported

Note: *** = P Values Significant at ≤ 0.01, **= P Values Significant at ≤ 0.05, *= P Values Significant at ≤ 0.10

(Source: Author's own, 2018)

Figure 5.3 PLS-SEM model with R-Square of total respondents

Note: The bolder lines show higher path coefficient values (P value) and R-Square values in the circle

(Source: Author's own, 2018)

3) The predictive relevance

The Stone-Geisser's Q^2, introduced by Stone (1974) and Geisser (1974), was the next assessment used to evaluate the cross-validated predictive relevance of the PLS path model by using Blindfolding in SmartPLS software (Hair *et al.*, 2011; Hair *et al.*, 2017). If model with Q^2 value is more than 0, it indicates that the exogenous indicators have predictive relevance for the endogenous latent variables (Duarte and Raposo, 2010; Hair *et al.*, 2011; Garson, 2016; Hair *et al.*, 2017). Garson (2016) cited Cohen (1988) suggesting that Q^2 value at 0.35, 0.15, and 0.02 represents a high, medium, and small effect size, respectively.

After running Blindfolding in SmartPLS software with omission distance at default 7 (Garson, 2016), cross-validated redundancy results of the endogenous latent variables are shown in Table 5.31. All Q^2 values greater than 0 indicated that the PLS path model had predictive relevance for these endogenous variables. 'Intention' and 'trust' represented high effect size; 'attitude' and 'goals of selling' had medium effect size, while 'consideration of channel accessibility', 'subjective norm' and 'consideration of transaction specific cost' had small effect size. Thus, the model had a degree of predictive relevance.

Table 5.31 Blindfolding result of cross-validated redundancy in the endogenous variables

Endogenous latent variables	Q^2
Intention (I)	0.423
Past behaviour (P)	0.243
Attitude (A)	0.132
Subjective norm (S)	0.029
Consideration of transaction specific cost (CT)	0.007
Consideration of channel accessibility (CA)	0.080
Trust (T)	0.456
Goals of selling (G)	0.137

(Source: Author's own, 2018)

4) Heterogeneity

The last measurement of structural model is heterogeneity. According to Hair *et al.* (2011), heterogeneity can measure by using multi-group analysis. This study used the multi-group analysis (MGA) to determine whether the model is different in the context of different channel use.

5.7.3 Multi-group analysis (MGA)

Three steps of comparing more than two groups were presented in the multi-group analysis (MGA) for testing the significant difference between groups in the PLS model (Sarstedt *et al.*, 2011; Garson, 2016; Hair *et al.*, 2017). The first step is to conduct an omnibus test of group differences (OTG) familywise. The second step is to test the path relationship for each group (i.e., each channel in this study). The final step is to test statistical significance of each model by using pairwise comparisons (Hair *et al.*, 2018).

1) Omnibus test of group differences test (OTG)

Omnibus test of group differences test (OTG) was run against each channel. The OTG results, as shown in Table 5.32, indicated that there were at least one marketing channel's path coefficient differ significantly from other two marketing channels. Nevertheless, the OTG approach is the initial step to indicate that at least one group's path coefficient differs from other groups. The next step was to assess which groups differ from each other by using pairwise comparisons test generated in SmartPLS.

Table 5.32 F_R and P Values of each path relationship

Path Relationships	F_R	P
Past behaviour (P) -> Intention (I)	1840.77	0.000
Attitude (A) -> Intention (I)	4270.00	0.000
Attitude (A) -> Past behaviour (P)	11638.27	0.000
Subjective norm (S) -> Intention (I)	261.66	0.000
Subjective norm (S) -> Past behaviour (P)	2155.38	0.000
Farmers' power (PBC) -> Intention (I)	1648.53	0.000
Farmers' power (PBC) -> Past behaviour (P)	55.42	0.000
Consideration of transaction specific cost (CT) -> Intention(I)	8050.16	0.000
Consideration of transaction specific cost (CT) ->Past behaviour (P)	241.10	0.000
Consideration of channel accessibility (CA) -> Intention (I)	24780.63	0.000
Consideration of channel accessibility (CA) -> Past behaviour (P)	1956.51	0.000
Trust (T) -> Attitude (A)	16870.81	0.000
Integrity (TI) -> Trust (T)	1243.67	0.000
Fairness (TF) -> Trust (T)	2130.20	0.000
Reputation (TR) -> Trust (T)	7536.37	0.000
Reliable information (TS) -> Trust (T)	45615.61	0.000
Social values (SV) -> Subjective norm (S)	5711.73	0.000
Goals of selling(G)-> Consideration of transaction specific cost (CT)	19690.17	0.000
Goals of selling (G)-> Consideration of channel accessibility (CA)	13066.37	0.000
Intrinsic (IN) -> Goals of selling (G)	18508.82	0.000

(Source: Author's own, 2018)

2) Path relationship for each of the three marketing channels

The results shown in Table 5.30 suggested that three paths 'relationship' (R) to 'intention' (R -> I), 'relationship' (R) to 'past behaviour' (R -> P) and 'consideration of channel accessibility' (CA) to 'intention' (I) (CA -> I) were not significant. That result was based on the total sample. When the model was run on each individual channel, 'relationship' (R) to 'intention' (R -> I) and 'relationship' (R) to 'past behaviour' (R -> P) were still non-significant, however consideration of channel accessibility' (CA) to 'intention' (I) (CA -> I) was significant in the model for agricultural cooperative. Therefore, 'relationship' (R) to 'intention' (R -> I) and 'relationship' (R) to 'past behaviour' (R -> P) were deleted in the revised model for all three channels. The new models are shown in Figures 5.4-5.6. The details of level of significance of the path relationship are presented in Table 5.33.

The model in Figure 5.4 shows the factors affecting 'intention to sell to miller'. The R^2 value on intention was 0.401. Five variables which had direct significant effect on 'intention' (I) are: 'past behaviour' (P), 'attitude' (A), 'subjective norm'(S), 'farmers' power (PBC) and 'consideration of transaction specific cost' (CT). 'Intention' (I) was also indirectly affected by 'attitude' (A), 'subjective norm' (S), 'consideration of transaction specific cost' (CT) and 'consideration of channel accessibility' (CA) through 'past behaviour' (P). 'Attitudes' (A) was affected by 'trust' (T). The antecedents of trust were 'integrity' (TI), 'fairness' (TF), 'reputation' (TR) and 'reliable information' (TS). 'Subjective norm' (S) was affected by 'social values' (SV). 'Consideration of transaction specific cost' (CT) and 'consideration of channel accessibility' (CA) were both affected by 'goals of selling' (G), which was affected by 'intrinsic value' (IN). The detailed statistics of indirect effects can be found in Appendix D, Table D5. This model is very similar to the model for the total sample.

The model in Figure 5.5 shows the factors affecting 'intention to sell to local collector'. The R^2 value on intention was 0.379. Only 'past behaviour' (P) had significant effect on 'intention' (I). 'Subjective norm' (S) and 'consideration of channel accessibility' (CA) affected 'past behaviour' (P). 'Consideration of channel accessibility' (CA) was affected by 'goals of selling' (G), which was affected by 'intrinsic value' (IN). However, it was not possible to identify the extent of indirect effect because the model could not calculate due to there were many non-significant indicators.

Figure 5.6 shows the model related to 'intention to sell to coop'. The R^2 value on 'intention' was 0.765. 'Intention' (I) was directly affected by 'past behaviour' (P) and 'consideration of transaction specific cost' (CT). 'Past behaviour' (P) was affected by 'attitude' (A) and 'consideration of transaction specific cost' (CT). 'Attitude' (A) was affected by 'trust' (T). 'Consideration of transaction specific cost' (CT) was affected by 'goals of selling' (G), which was affected by 'intrinsic value' (IN). Likewise, the model could not calculate the indirect effect for this channel.

Table 5.33 Path relationship of three marketing channels

Path Relationships		Miller (M)			Local Collector (L)			Agri-Coop (C)		
		Path Co.	T	P	Path Co.	T	P	Path Co.	T	P
P	-> I	0.43	6.53	0.00	0.54	5.26	0.00	0.48	4.79	0.00
A	-> I	0.14	2.02	0.04	-0.01	0.15	0.88	0.13	1.07	0.28
A	-> P	0.12	2.16	0.03	0.12	1.43	0.15	0.40	2.33	0.02
S	-> I	0.09	1.61	0.10	0.10	1.40	0.16	0.06	0.63	0.53
S	-> P	0.09	1.87	0.06	0.22	2.62	0.01	0.17	1.26	0.21
PBC	-> I	-0.12	1.90	0.06	-0.10	0.81	0.42	-0.11	1.15	0.25
PBC	-> P	-0.05	0.89	0.37	-0.04	0.52	0.60	-0.03	0.30	0.76
CT	-> I	0.17	3.01	0.00	-0.01	0.13	0.89	0.06	0.83	0.41
CT	-> P	0.19	2.92	0.00	0.15	1.39	0.16	0.20	2.43	0.01
CA	-> I	-0.06	0.77	0.44	0.06	0.64	0.52	0.30	2.71	0.01
CA	-> P	0.22	2.80	0.01	0.25	1.97	0.05	0.11	0.65	0.52
T	-> A	0.66	8.82	0.00	0.34	3.16	0.00	0.28	2.05	0.04
TI	-> T	0.14	3.10	0.00	0.07	n/a	n/a	0.10	n/a	n/a
TF	-> T	0.56	7.04	0.00	0.46	n/a	n/a	0.39	n/a	n/a
TR	-> T	0.21	3.30	0.00	0.23	n/a	n/a	0.05	n/a	n/a
TS	-> T	0.08	2.35	0.02	-0.07	n/a	n/a	0.29	n/a	n/a
SV	-> S	0.34	5.56	0.00	0.22	0.93	0.35	0.36	3.76	0.00
G	-> CT	0.23	3.09	0.00	0.31	2.46	0.01	0.49	6.78	0.00
G	-> CA	0.39	5.48	0.00	0.33	3.44	0.00	0.61	7.65	0.00
IN	-> G	0.52	8.93	0.00	0.56	6.18	0.00	0.76	9.94	0.00
N				354			190			115
R2 (Intention)				0.401			0.379			0.765
R2 Adjusted (Intention)				0.391			0.359			0.752
R2 (Past behaviour)				0.227			0.276			0.507
R2 Adjusted (Past behaviour)				0.216			0.257			0.485

Notes: Highlight = non-significant at P value ≤ 0.10

n/a = model could not calculate due to there were many non-significant indicators

(Source: Author's own, 2018)
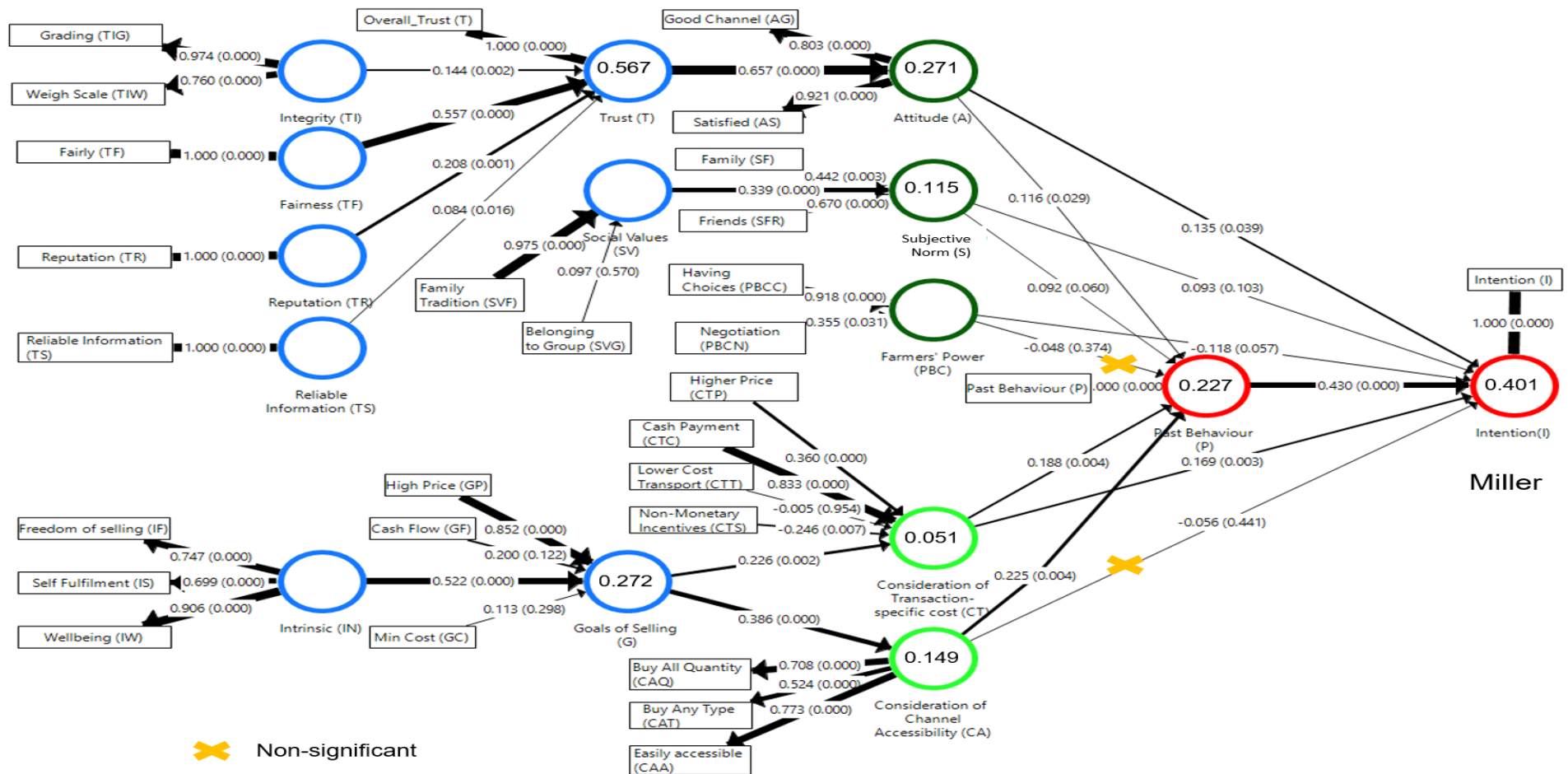
Figure 5.4 Path relationships with R-Square of miller

Note: The bolder lines show higher path coefficient values (P value) and R-Square values in the circle

(Source: Author's own, 2018)

Figure 5.5 Path relationships with R-Square of local collector

Note: The bolder lines show higher path coefficient values (P value) and R-Square values in the circle

(Source: Author's own, 2018)
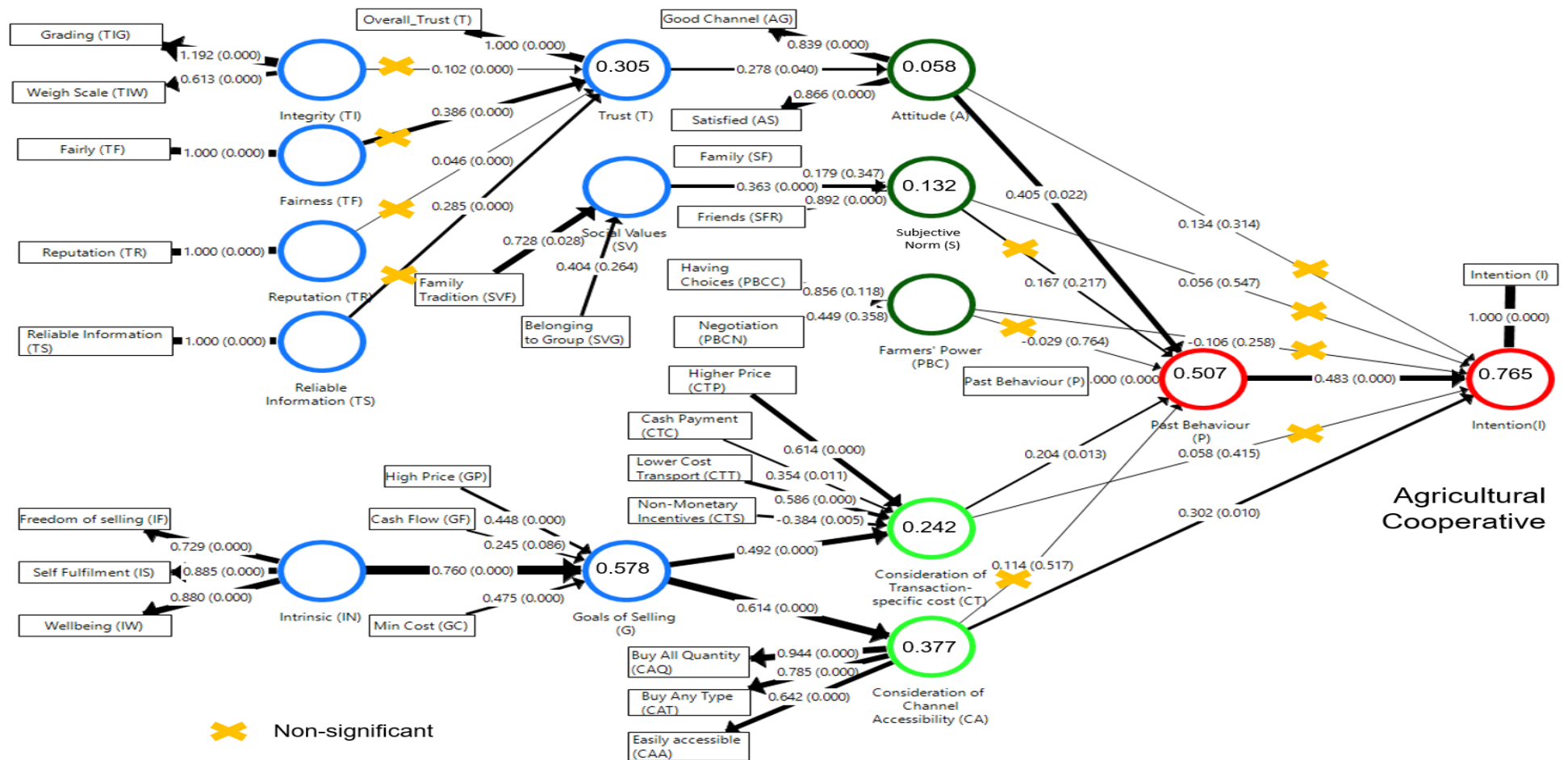
Figure 5.6 Path relationships with R-Square of agricultural cooperative

Note: The bolder lines show higher path coefficient values (P value) and R-Square values in the circle

(Source: Author's own, 2018)

3) Multi-group analysis output of three marketing channels

This section was to test whether the differences were statistically significant by comparing the models in pairs. Two multi-group analysis (MGA) measurements were calculated by bootstrapping subsamples at 5,000 via SmartPLS. They are: 1) testing for difference between groups, and 2) the confidence intervals and comparison of three marketing channels.

Partial least squares multi-group analysis (PLS-MGA) is a non-parametric significance test to find a difference of path coefficients between groups. Garson (2016) suggested that:

"This non-parametric significance test finds a difference to be significant if the p-value is smaller than 0.05 or larger than 0.95 for the difference of group-specific path coefficients" (Garson, 2016, p.180)

The results of PLS-MGA of three marketing channels are shown in Table 5.34.

Table 5.34 PLS-MGA of three marketing channels

Path Relationships		Path Co.-diff (|Miller - Local|)	p-Value (Miller vs Local)	Path Co.-diff (|Miller - Coop|)	p-Value (Miller vs Coop)	Path Co.-diff (|Local - Coop|)	p-Value (Local vs Coop)
P	-> I	0.109	0.821	0.081	0.758	0.029	0.409
A	-> I	0.127	0.064	0.012	0.543	0.138	0.916
A	-> P	0.001	0.504	0.223	0.976**	0.221	0.968**
S	-> I	0.009	0.535	0.003	0.473	0.012	0.445
S	-> P	0.124	0.901	0.072	0.698	0.052	0.354
PBC	-> I	0.023	0.530	0.025	0.571	0.002	0.528
PBC	-> P	0.028	0.629	0.004	0.512	0.024	0.404
CT	-> I	0.172	0.033**	0.109	0.104	0.063	0.742
CT	-> P	0.045	0.347	0.009	0.531	0.054	0.667
CA	-> I	0.092	0.833	0.295	0.999**	0.203	0.971**
CA	-> P	0.045	0.646	0.028	0.415	0.073	0.317
T	-> A	0.307	0.005**	0.356	0.009**	0.049	0.368
TI	-> T	0.065	0.188	0.024	0.388	0.041	0.672
TF	-> T	0.110	0.202	0.186	0.145	0.076	0.340
TR	-> T	0.028	0.598	0.157	0.128	0.185	0.113
TS	-> T	0.149	0.017**	0.203	0.990**	0.352	1.000**
SV	-> S	0.121	0.450	0.024	0.587	0.145	0.619
G	-> CT	0.087	0.777	0.266	0.994**	0.179	0.928*
G	-> CA	0.029	0.389	0.241	0.991**	0.270	0.990**
IN	-> G	0.022	0.600	0.234	0.996**	0.212	0.982**

Note: *= Significant differences at 0.10: **= Significant differences at 0.05

(Source: Author's own, 2018)

The results in Table 5.34 showed some significant differences pairwise. Between 'Miller' and 'Local collector', significant differences were found in 3 paths. Between 'Miller' and 'Coop' 7 paths were significantly different. 6 paths were significantly different for 'Local collector' and 'Coop'. For the latter pairing, the path between 'trust' (T) and 'attitude' (A) was also different. All significant different paths were highlighted in shaded text in the table.

The subsequent output from multi-group analysis (Table 5.35) was the confidence intervals (Bias Corrected 95%) which, if there is an overlap between lower and upper level, it demonstrates that there is no difference in path coefficients between channels. For example, 'past behaviour' (P) to 'intention' (I) path relationship for miller had confidence intervals value from 0.302 lower to 0.554 upper. This is compared to that of local collector which ranged from 0.332 lower to 0.736 upper. The comparison showed the confidence intervals overlapped, meaning there is no difference in the path from 'past behaviour' (P) to 'intention' (I) between miller and local collector.

Table 5.35 Confidence Intervals and comparison of three marketing channels

Path Relationships		Confidence Intervals (Bias Corrected 95%)						Comparisons Significance		
		Miller		Local Collector		Coop		Miller vs. Local	Miller vs. Coop	Local vs. Coop
		Lower	Upper	Lower	Upper	Lower	Upper			
P	-> I	0.302	0.554	0.332	0.736	0.352	0.726	N	N	N
A	-> I	0.005	0.242	-0.111	0.117	-0.019	0.305	N	N	N
A	-> P	0.021	0.208	-0.010	0.247	0.139	0.537	N	N	N
S	-> I	-0.014	0.207	-0.028	0.255	-0.043	0.269	N	N	N
S	-> P	0.020	0.210	0.072	0.407	-0.027	0.431	N	N	N
PBC	-> I	-0.236	0.003	-0.276	0.132	-0.225	0.081	N	N	N
PBC	-> P	-0.156	0.046	-0.166	0.100	-0.186	0.109	N	N	N
CT	-> I	0.051	0.273	-0.162	0.133	-0.067	0.196	N	N	N
CT	-> P	0.095	0.340	-0.030	0.378	0.086	0.386	N	N	N
CA	-> I	-0.146	0.064	-0.086	0.219	0.121	0.409	N	S	N
CA	-> P	0.056	0.292	0.023	0.433	-0.060	0.374	N	N	N
T	-> A	0.471	0.739	0.113	0.481	0.034	0.524	N	N	N
TI	-> T	0.055	0.225	-0.053	0.182	-0.030	0.247	N	N	N
TF	-> T	0.406	0.700	0.243	0.657	0.084	0.695	N	N	N
TR	-> T	0.084	0.331	0.062	0.414	-0.190	0.311	N	N	N
TS	-> T	0.014	0.148	-0.180	0.047	0.124	0.438	N	N	S
SV	-> S	0.213	0.449	-0.256	0.417	0.146	0.515	N	N	N
G	-> CT	0.067	0.360	-0.084	0.459	0.314	0.611	N	N	N
G	-> CA	0.194	0.439	0.106	0.449	0.377	0.689	N	N	N
IN	-> G	0.356	0.571	0.327	0.625	0.561	0.835	N	N	N

Note: N = No difference in path coefficients, S= Significant differences at 0.05

(Source: Author's own, 2018)

Overall, in terms of significant differences test by the bias-corrected 95% confidence intervals, Table 5.35 showed that two path relationships were significantly different. The first path was 'consideration of channel accessibility' (CA) to 'intention' (I) between miller and coop, and the second path was 'reliable information' (TS) to 'trust' (T) between local collector and agri-coop which is partly consistent with the result from PLS-MGA.

To sum up, the tests of MGA showed that 'past behaviour' is the only significant predictor of 'intention' for all three channels (i.e., non-significant results in pairwise comparisons, but significant path coefficient in the model for each channel). Although the model test for each channel showed that the path relationships between 'trust' (T) and 'attitude' (A), 'goal of selling' (G) to 'consideration of transaction specific cost' (CT), 'goal of selling' (G) to 'consideration of channel accessibility' (CA), and 'intrinsic value' (IN) to 'goal of selling' (G) were all significant across the three channels, the MGA tests showed that there were significant differences pairwise.

5.8 Summary of survey findings

This chapter presents findings from the questionnaire survey. The sample is largely representative of rice farmers in Thailand in terms of education, farm size, but there were more females and older farmers in this sample. The six marketing channels identified in phase one were all used by this sample. However, there were only three dominant ones which were: miller, local collector and agricultural cooperative. The end of RPS did not cause any major changes of channel use with the acknowledgement of a short time lapse of two years only. However, there were some significant movements away from those who used local collectors and agricultural cooperatives.

Of the three main channels, millers were more likely to be used by respondents who were commercial farmers and had a single source of information, in particular in the central region. Local collectors were favoured by respondents especially in the north region who had less education participation, selling the surplus after meeting their own consumption and located near this channel. Agricultural cooperatives were chosen by respondents who had higher education and had accessed to more sources of information specially respondents in north-east region.

The model of factors affecting the choice of marketing channels proposed after phase one study was further modified after some initial factor analysis. The updated model was then tested using PLS-SEM for the total sample and for each channel. Multi-group analysis was also conducted on the models for the three channels. This generated a definitive result which showed partial confirmation of the model.

The analyses showed that the model predicted 45% of the variance of the intention to choose the marketing channel in the next crop. 'Intention' was directly affected by 'past behaviour', 'attitude', 'subjective norm', 'farmers' power' (PBC) and 'consideration of

transaction specific cost', and indirectly by 'consideration of channel accessibility' through 'past behaviour'. 'Past behaviour' was also influenced by 'attitude', 'subjective norm', 'farmers' power' and 'consideration of transaction specific cost'.

Results from phase one interviews suggested that each channel was chosen for a different combination of reasons. The survey partly confirmed this. The most consistent predictor of 'intention of channel choice' across the three main channels (miller, local collector and agricultural cooperative) was 'past behaviour'. 'Past behaviour' was only one significant factor for choosing local collector. Intention to choose 'miller' was affected by 'past behaviour', 'attitude', 'subjective norm', farmers' power, and consideration of transaction specific cost'. Those who intend to choose 'agricultural cooperative' were influenced by an additional factor 'consideration of channel accessibility'.

Chapter 6 Discussion

6.1 Introduction

The previous chapter presented the survey findings and testing of hypotheses. This chapter presents the interpretations of findings and discusses their significance in light of existing literature. It begins with an overview of the study in terms of aim and objectives. The subsequent sections present answers to each of four main research questions which derived from the research objectives and the interpretation of the results.

6.2 Research aim and objectives

The aim of this research is to identify factors affecting marketing channel choices by rice farmers in Thailand. This aim was expanded into four research objectives, as follows:

- to identify the main marketing channels used by rice farmers in Thailand;
- to compare marketing channels used before and after the rice pledging scheme (RPS);
- to determine factors influencing the marketing channel selection;
- to examine the socio-demographics of rice farmers across different marketing channels in terms of past behaviours and intentions to choose the marketing channel(s).

6.3 The main marketing channels used by rice farmers in Thailand

The first research question: was 'What are the main marketing channels for rice farmers in Thailand?' The results from phase one interviews, and phase two survey identified six main marketing channels used by respondents with the first three being more predominant. These are:

- miller
- local collector
- agricultural cooperative (agri-coop)
- central paddy market
- individual direct selling
- group direct selling

This listing is similar to Wiboonpongse and Chaovanapoonphol (2001) and Titapiwatanakun (2012) who reported on the use of direct and indirect marketing channels for rice distribution in Thailand. Although prices are lower through intermediaries than in direct markets, most respondents had been selling their products through indirect channels such

as rice millers and local collectors. This finding concurs with Abebe *et al.* (2016) who found that middlemen play an important role in agricultural chains in developing countries. A possible explanation for this might be that direct selling requires farmers to have marketing skills and knowledge.

6.4 The farmers' use of marketing channels before and after the end of RPS

Since the end of the rice pledging scheme (RPS) rice farmers have faced a more competitive market environment and have been able to access a greater number of alternative marketing channels. This prompts the second research question: 'Have rice farmers changed their channels since the rice pledging scheme was ended? This question was concerned with the marketing channel used by rice farmers in two periods of time: before the RPS ended in February 2014 and the channel used at the time of the survey (July 2016).

A paired samples t-test was used to compare the mean scores of the level of frequency channel used between two-time periods and to test these hypotheses. This study did not find significant difference between the use of millers, central paddy markets, farmers' groups direct selling and individual direct selling before and after RPS ended. However, this 'no change' results should be interpreted with caution due to the short time lapse (2 years only). Interestingly, there were statistically significant increases in use of local collectors and significant decrease in use of agricultural cooperatives.

There are several possible explanations for these results. Firstly, after the RPS ended respondents were most likely to move away from millers and agricultural cooperatives to other channels because these were the top two channels where respondents sold their paddy rice during the RPS. However, there was no statistically significant difference between millers before and after RPS ended. The majority of respondents (79.4%) still chose to sell to millers. Some respondents were more likely to sell to local collectors located near their farms when the RPS ended due to the lower cost of transport.

Another explanation, from the researcher's observation and survey responses, is that some market channels, such as farmers' groups and central paddy markets, shut down during the RPS because such channels could not match the higher prices available through RPS. In addition, some agricultural cooperatives changed their roles to be collectors rather than processors. This concurs with Isvilanonda (2010) who reported that the rice miller channel played an increasing role in the decade since the RPS was launched, consequently causing the closure of many central paddy markets in, for example, Phitsanulok, Nakhon Sawan and Suphan Buri provinces in the central region of Thailand.

The aim of the RPS was to improve rice farmers' living standards in terms of income, however only half of the respondents agreed that the RPS was extremely important in their

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choice of marketing channel and one-third of respondents did not apply for the RPS. Possible explanations for these results, as given by respondents, are that they did not apply for this scheme because they still received a higher price from other channels, in particular by direct selling (although the numbers were very small). Many respondents preferred cash payment at a lower price from the channel rather than waiting for many months for payment at a higher price via the scheme.

After the disbandment of RPS, there was no real evidence (at least within the two-year period) to suggest that respondents reverted to their original channel or shifted to others and this would suggest that the change of policy did not make a significant impact on the marketing channel choice of respondents in the short term. The findings observed in this study corroborate those of Attavanich (2015) who studied the impacts of Thailand's rice pledging scheme on the economic performance and viability of rice farming. This study showed that the RPS enhanced the economic performance of rice farming less than expected, especially for small-scale farms with a small quantity of rice to be sold. Such farms, if located far away from purchasing points, would have incurred high transport cost if they enrolled on this scheme. These results provide evidence that understanding the characteristics of rice farmers and their decision making, particularly small-scale farmers, would help government agencies in policy formation to improve income for Thai rice farmers.

6.5 Differences between the types of farmers and farms in their choice of marketing channels

The third research question in this study sought to determine any significant differences between the types of farmers and farms and their choice of marketing channels. Multivariate analysis of variance (MANOVA) was used to analyse and answer this question by comparing different types of farmer sand farms across different marketing channels on two dependent variables: past behaviour and intention. Only three marketing channels were compared: miller, local collector and agricultural cooperative (agri-coop). Other channels were not analysed due to low sample size numbers.

The summary results in Table 6.1 show that there were significant differences between types of farmers and farms across different marketing channels on past behaviour and intention in seven categories: (1) regions, (2) education, (3) source of information, (4) the number of types of rice growing, (5) partly for own consumption, (6) hired vehicle for transporting rice and (7) market distance.

Table 6.1 Summary of significant differences between types of farmers and farms in using
marketing channels

Types of farmers and farms		Results
Channels * Regions	(North, NE, Central)	√
Channels * Age	(<55, ≥55 years old)	X
Channels * Gender	(Male, Female)	X
Channels * Education	(≤ Primary, > Primary school)	√
Channels * Experience	(< 22, 22-42, >42 years)	X
Channels * Household Size	(1-4, >4 persons)	X
Channels * Head of household	(Yes, No)	X
Channels * Group belonging	(1, >1 group)	X
Channels * Source of information	(1, >1 source)	√
Channels * Land Size	(1-12, >12 Rais)	X
Channels * Off-farm workers	(1-2, >2 persons)	X
Channels * % Income off-farm work	(1-50,>50%)	X
Channels * Types of rice	(1, >1 type)	√
Channels * Partly for own consumption	(Yes, No)	√
Channels * Hired vehicle	(Yes, No)	√
Channels * Market Distance	(1-4, 4-7, >7 Km)	√

Notes: √ = Significant differences at P Values ≤ 0.10

X = Not Significant differences at P Values > 0.10

(Source: Author's own, 2018)

Firstly, respondents in the three regions were significantly different in their past behaviour and intention. In the north region, respondents were more likely to choose to sell to local collector and intended to use their services to sell their next crop. They were less enamoured with millers than farmers located in other regions. A possible explanation for these results may be that they live in remote areas, some respondents identified that there is only local collector in their village and the local collector arranged to pick up their rice from their house or farm. However, if they would like to sell to millers they had to hire vehicle to transport rice to that channel, in common with some locations in the north-east region.

Nonetheless, there was a higher number of millers in the north-east region due to this region accounting for the largest rice production in Thailand; the difference of past behaviour and intention across three marketing channels in the north-east region was not highly significant.

More respondents in the central region chose miller, however they were more likely to intend to switch to other channels for the next crop. These results in the regional factor

seem to be consistent with other research which found that location influences in the choice of marketing channels (Park & Lohr, 2006; Chirwa, 2009; Bardhana *et al.*, 2012). For example, maize farmers in the central region in Malawi were more likely to sell to private traders and less likely to sell to local markets due to the high number of private traders in the region (Chirwa, 2009).

Secondly, education level of respondents was a significant difference in using the channels. Respondents who had less than primary education selected and intended to continue to sell to local collectors in preference to other channels. In contrast, respondents with more than primary education, showed the lowest intention to sell their next crop to local collector. This finding seemed to suggest that those with a low level of education were less adventurous and less likely to use more modern channels. However, this factor needs to be considered together with other related issues such as farm size. It concurs with a finding reported by Chirwa (2009), who found that maize farmers in Malawi who attained a primary-level qualification were more likely to sell to private traders.

Corroborating the previous finding, it was found that agricultural cooperatives were least preferred by respondents with less than primary education. This result may be explained by the fact that respondents with less than primary education did not want to participate in the activities of an agricultural cooperative. They were more likely to choose local collector due to the ease of selling (no paperwork and a simple procedure). This result is consistent with Maina *et al.* (2015) who found that the more educated small-scale mango farmers in Kenya chose to sell to direct selling and marketing groups' channels, while small scale farmers who were less educated used brokers. However, some other studies (Monson *et al.*, 2008; Arinloye *et al.*, 2015; Soe *et al.*, 2015) found that the differences in education levels did not influence farmers' choice of marketing channel.

Thirdly, the extent of information about marketing channels was a significant variable. Respondents who had only a single source of information intended to sell to millers more than to other channels. Respondents with more than one source of information were more likely to intend to sell to agricultural cooperative than to other channels. However, if the intention is to sell to a local collector, awareness of other choices appears to make no significant difference. This may be because local collectors are located nearby respondents' farms. Respondents who sold their rice at the farm gate to this channel avoid the cost of transport. It appeared that having more information made no difference when choosing this channel. This finding concurs with that of Soe *et al.* (2015) and Mabuza *et al.* (2014). These researchers found that paddy rice farmers in Myanmar, and mushroom farmers in Swaziland, were likely to sell at the farm gate because they lacked accurate and up-to-date market information. Sellers were unaware of prevailing prices in other markets. In addition, Mburu *et al.* (2007) found that dairy farmers in Kenya who sold to cooperatives were likely to access more sources of information than other farmers.

Fourthly, another interesting finding is that respondents who grew more than one variety of rice preferred to sell to a local collector but were less likely to sell to the agricultural cooperative in the future. It seems that local collectors usually buy all kinds of rice, while other channels, such as miller and agricultural cooperative, may limit the varieties they buy. However, the evidence of this research, in contrast to previous studies, is that growing more than one kind of rice is because the farm is producing rice partly for own consumption. Respondents mostly grew two types of rice (Jasmine and sticky) with one or both retained partly for household consumption.

Fifthly, there was a statistically significant relationship between subsistence farmers and commercial farmers (as indicated by whether rice was produced partly for own consumption) and channel used (both past behaviour and intention). Respondents who kept part of rice for their own consumption chose and intended to sell to local collector more than to other channels. Respondents in the north and north-east region, in particular, explained that they would rather keep rice, notably Jasmine and sticky rice, for their partly own consumption with any surplus then sold to a market. Some respondents did not have a large quantity to sell. Therefore, the local collector was a good choice of marketing channel due to the lower cost of transport. However, respondents in the central region were commercial farmers and mostly sold all their rice, buying milled rice for home consumption.

Finally, respondents who were located less than 4 Km from market were more likely to sell to local collectors rather than to other channels. If respondents owned vehicles, it was likely that they owned a car or pick-up car, although some respondents owned a truck for rice transport. They were likely to transport small quantities of rice for sale, using their own vehicle, or in certain case, to sell to the local collector who provided transport services. This finding concurred with the findings of Soe *et al.* (2015) who found that rice farmers in Myanmar, where there was a lack of transport, preferred to sell at the farm gate rather than to rice mills in a nearby town.

In contrast with previous studies as summarised in Chapter 2, this study did not find a significant difference between some categories, such as age, gender, rice farming experience and farm size. There are several possible explanations for these results. First, most respondents were at least 55 years old with rice farming experience of at least 30 years. Second, respondents were mostly married and decisions about marketing channel were made at the household level with gender ignored. Lastly, small-scale farming, with landholding below 20 Rais, is most often for subsistence and draw their income from off-farm works; particularly in the north and north-east regions.

This study differs from previous studies because it has not, as those studies did examine the socio-demographic factors as one of the independent factors affecting the marketing channel choice(s). This study separated out these factors in order to understand different types of farmers and different types of farms in using marketing channels. The

reason for this, was that the aim of this research was to understand firstly, the psychological factors that drove a choice of marketing channel(s), and secondly whether there were any distinctions between different types of farmers and farms and their choice. From these results, recommendations to policy makers and managers within the buyer organisations can be made.

6.6 Factors affecting farmers' selection of marketing channel

In the review of literature on factors influencing marketing channel choice by farmers very little was found that related directly to the rice sector in Thailand. The last and key research question of this study aims to fill knowledge gaps in this field. The question was: Why do Thai rice farmers choose a particular marketing channel?

The integrated findings of multi-method research in this study reconfirmed and extended the Theory of Planned Behaviour (TPB) and the findings from previous studies in this area. As a result, new frameworks for determining factors affecting marketing channel selection by rice farmers in Thailand were established. Of the six marketing channels used by respondents, three were more dominant. There were miller, local collector and agricultural cooperative. Factors affecting the selection of the three marketing channels were analysed as a whole and separately for each channel by using partial least squares–structural equation modelling (PLS-SEM) and multi-group analysis in the PLS-SEM.

The revised hypotheses testing results of the total sample size and the three marketing channels: miller, local collector and agricultural cooperative are presented in Table 6.2. Furthermore, factors influencing the decision to choose the other three marketing channels, which are central paddy market, farmers groups direct selling and individual direct selling, were described by using descriptive statistics as they were excluded from inferential statistics analysis due to the small sample size.

Table 6.2 Summary of hypotheses test results of three marketing channels

H	Path Relationships		Total (N=659)	Miller (N=354)	Local collector (N=190)	Agri-Coop (N=115)
H4	Past behaviour	-> Intention	√	√	√	√
H5a	Attitude	-> Intention	√	√	X	X
H6a	Subjective norm	-> Intention	√	√	X	X
H7a	Farmers' power (PBC)	-> Intention	√	√	X	X
H8a-1	Transaction specific cost	-> Intention	√	√	X	X
H8a-2	Channel accessibility	-> Intention	X	X	X	√
H5b	Attitude	-> Past behaviour	√	√	X	√
H6b	Subjective norm	-> Past behaviour	√	√	√	X
H7b	Farmers' power (PBC)	-> Past behaviour	√	X	X	X
H8b-1	Transaction specific cost	-> Past behaviour	√	√	X	√
H8b-2	Channel accessibility	-> Past behaviour	√	√	√	X
	Trust	-> Attitude	√	√	√	√
	Social values	-> Subjective norm	√	√	X	√
	Goals of selling	-> Transaction specific cost	√	√	√	√
	Goals of selling	-> Channel accessibility	√	√	√	√
	R^2 (Intention)		0.449	0.401	0.379	0.765
	R^2 (Past behaviour)		0.281	0.227	0.276	0.507

Notes: H = Alternative hypotheses

√ = Supported the hypothesis based on a level of significance at P Values ≤ 0.10

X = Not supported the hypothesis based on a level of significance at P Values > 0.10

(Source: Author's own, 2018)

To begin with the overall results of the marketing channels by using PLS-SEM, the findings clearly show that there is a distinction between the existing literature and the resulting framework of this study. Firstly, the two dependent variables in this study were intention and past behaviour. Intention is used to predict a human behaviour in the Theory of Planned Behaviour (TPB) (Ajzen, 1991). Intention to sell to the marketing channel choice in the next rice crop was identified as one of the dependent variables in this study. The other dependent variable was past behaviour/past decision-making about marketing channel. This variable is consistent with those of other studies in the reviewed literature in which the marketing choice (i.e. direct or indirect channels) emerged as the dependent variable.

On the question of the factors affecting marketing channel selection, the results confirmed (Table 6.2) that intention was influenced by six main factors: (1) past behaviour, (2) attitude, (3) subjective norm, (4) perceived behaviour control/farmers' power, (5) consideration of transaction specific cost and (6) consideration of channel accessibility.

Intention and past behaviour were substantially affected by the three components of Theory of Planned Behaviour (TPB): attitude, subjective norm and perceived behaviour control. In this case, this study identified the terms of these three components in more detail:

1) attitude (H5a-b) represents good channel choice and satisfaction;
2) friends and family represent the subjective norm (H6a-b) of rice farmers;
3) perceived behaviour control related to farmers' power (H7a-b) in two dimensions: perceived having choice and negotiation.

Past behaviour provided the largest positive significant effect on intention: respondents were more likely to intend to choose the marketing channel that they used before. This is supported by analysis of whether channel choice was changed between the two periods of time: most respondents did not change channel. This result agrees with the findings of other studies, in which the frequency of selling (De Bruyn *et al.*, 2001) and the repeat selling to the channel (Chirwa, 2009) had a positive significant relationship with the farmers' channel choice. However, this study differs from some published studies, (Park & Lohr, 2006; Huang *et al.*, 2012; Arinloye *et al.*, 2015; Gelaw *et al.*, 2016), which found that farmers' experience with the channel in terms of having been rejected or refused and cheating had negative influence on the marketing channel choice.

Positive attitude toward the marketing channel had a positive significant direct effect on intention and past behaviour. Attitude also had an indirect effect on intention through past behaviour. Previously there has been no reliable evidence from relevant literature that measures attitude or satisfaction with the channel as one of the independent variables.

Trust had a strong influence on attitude and had a positive indirect effect on intention and past behaviour through attitude. Although trust had a significant direct impact on the intention as the results in the previous framework show, this would be a more appropriate level of explanation for understanding attitude in the revised framework.

Previous studies (Woldie & Nuppenau, 2009; Escobal & Cavero, 2012; Milford, 2014; Maina *et al.*, 2015) have examined the effect of trust on the channel choice of farmers but they did not examine how trust occurred. This study has demonstrated that trust was stemming from integrity, fairness, reputation and reliability of information provided. Integrity derives from trust in the weighing scale and the reliability of the rice grade assessment of the channel.

How distrust occurs was explained by the respondents who said that some channels had been recording sales of a lower than actual quantity by adjusting weighing scales. Respondents have become aware of these problems through their own experience and word of mouth from friends who had made comparisons between and noted the differences between quantities recorded by two channels. Their evaluation led them to question the integrity of specific marketing channels. Dawe *et al.* (2008) has indicated similar findings

and suggested that the possible way to reduce the opportunities for defrauding rice farmers in Thailand is to improve the credibility of traders' weighing scales. His view is corroborated by Musemwa *et al.* (2007) who found that distrust the grading system of abattoirs was the main reason cattle farmers in the Eastern Cape province, South Africa did not sell to abattoirs.

Fairness and reliability indicators results are consistent with Gelaw *et al.* (2016) who found that provision of valid market information by a channel has a significant influence on marketing channel choice. Whilst some studies have investigated trust as loyalty (Tsourgiannis *et al.*, 2008; Tsourgiannis *et al.*, 2012), this study differs from previous studies by examining the good reputation of the channel used as an indicator of trust in the channel.

Subjective norm variable is another component in TPB that had a positive significant direct impact on past behaviour and intention, with indirect effect on intention via past behaviour. There are five indicators of subjective norm identified by phase one interviews: 1) friends/neighbours, 2) family, 3) rice harvest machine drivers/ truck drivers, 4) government officers/head of village and 5) mass media. However, only friends/neighbours and family had a positive effect on the channel choice. The influence by friends/neighbours and family was underpinned by two social value indicators: continuing the family tradition and belonging to the farming community or farmer group.

Choice of marketing channel(s) was influenced by information from family and friends about price, reputation, service offers and trustworthiness of the channel(s). This finding confirms previous findings by Srinivas *et al.* (2014) that friends and neighbours of farmers were the main sources of market information. Other potential influencers such as drivers, government officers and mass media were not found to directly affect the selection of channels. Instead, they were perhaps treated as sources of market information, such as price and types of rice demanded in the market as phase one respondent explained.

These results are richer than results from previous studies because they provide important insights into the subjective norm of rice farmers. There has been very little research focused on the impact of influencers on farmers' decision-making.

Findings suggest that farmers perceived that they lacked negotiation power vis-a-vis their marketing channel. Their lack of purchasing power could be seen to be due to a high number of small-scale farms as well as the limited availability of alternative marketing channels.

Some respondents believed they could negotiate where their paddy rice achieved or exceeded the specified quality standards, for features like moisture content, organic and inorganic extraneous matter, and milling quality. The results are consistent with those of Ferto & Szabó (2002), Mabuza *et al.* (2014) and Arinloye *et al.* (2015) who found that farmers' bargaining power increased if they had a choice of marketing channels.

Where farmers do not have much choice, they are relatively powerless in negotiation. Half of respondents worked on small-scale farms and the channels available in their areas are limited. However, some respondents could negotiate if their paddy rice reached quality factors (such as moisture content, organic and inorganic extraneous matter). The results are consistent with those of Ferto & Szabó (2002), Mabuza *et al.* (2014) and Arinloye *et al.* (2015).

Results in Table 6.2 supported the further extension of the TPB related to transactional specific factors in two main components: consideration of transaction specific cost and consideration of channel accessibility. First, of these four indicators of transaction specific cost; (1) to receive higher price, (2) to receive cash payment, (3) lower cost of transport and (4) non-monetary incentives/services offers, the cash payment variable played significant roles in past behaviour and intention which corroborate the findings of existing studies (Blandon *et al.*, 2010; Maina *et al.*, 2015; Soe *et al.*, 2015; Abebe *et al.*, 2016). However, some respondents still sold to the channels where they had experienced late payments, as in payments from millers and agricultural cooperatives. This could be because millers offered a higher price for late payment and a lower price for cash or immediate payment, whilst agricultural cooperatives simply took a longer time to process payment.

After harvest, rice farmers are faced with the dilemma of whether to sell immediately and receive a lower price due to a lower quality standard or a surplus of supply or to retain produce and go through the process of drying and storing on their farm, waiting for a higher price before supplying to marketing channels. Little paddy rice passes through this latter pathway because the market price is generally insufficient to cover the higher costs of drying and subsequent transport costs. This study found that farmers, who sold paddy rice tended to sell immediately after harvesting in order to repay debts and were unable to risk the accumulation of greater costs/debts. Respondents in the central region particularly made this point. These results and explanations agree with Soe *et al.* (2015) whose' findings showed rice farmers in Myanmar had to sell soon after harvesting as a result of an urgent need for cash to pay loans and household expenses.

Finally, past behaviour was found to have been affected by the consideration of channel accessibility which was measured by three items: (1) this channel easily accessible, (2) this channel buys any quantity and (3) this channel buys any type of rice. However, 'consideration of channel accessibility' was not a significant direct predictor of intention. Instead, it had an indirect effect on intention through past behaviour.

Whilst it might be anticipated that "goals of selling", "social values" and "intrinsic components" as part of goals and value of farmers would have a direct effect on intention and past behaviour, this did not prove to be so. However, the revised framework showed that these factors were the antecedents of other factors. For example, goals of selling had

a positive significant influence on consideration of transaction specific cost and consideration of channel accessibility, while intrinsic was also significantly and positively related to goals of selling and social values had a positive effect on subjective norm.

Although the personal relationships variable was not a significant predictor of intention and past behaviour, differing from some other studies (Tsourgiannis *et al.*, 2008; Schipmann & Qaim, 2011; Tsourgiannis *et al.*, 2012; Ndoro *et al.*, 2015; Gelaw *et al.*, 2016) these studies did identify the personal relationship as one of the significant factors influencing the marketing channel choice by farmers. This can be explained in terms of lower transaction specific cost and higher levels of trust, which are apparent in strong relationship, in addition, good relationships build up greater trust. For example, some members of the respondents' family identified that they had a good relationship with the channel, in particular miller and local collector agents or they are members of the agricultural cooperative and, for this reason, they received a higher price, money support for transportation cost, discounts, dividends or other financial supports. Whilst personal relationships factor has been investigated to understand its influence on intention and past behaviour, there is further potential for research, as suggested by Krafft *et al.* (2015). There is insufficient research into the influence of networks and relationships within marketing channels.

The findings presented earlier are based on the analysis of all cases when all channels were combined. The next section summarises factors affecting decision-making in choosing each channel.

Miller was the most popular channel according to the respondent. There were five main factors influencing intention to sell to millers. These were: (1) past behaviour, (2) attitude, (3) subjective norm, (4) farmers' power and (5) consideration of transaction specific cost (Table 6.2). Although consideration of channel accessibility had no direct impact on intention, there was an indirect effect on intention through past behaviour. Furthermore, farmers' power was not a significant influence on past behaviour, the reason for this might be that this was the only channel near their farms, leading to a lack of negotiation power.

Local collector was the second most popular choice amongst the respondents. An intention to sell to this channel was directly influenced by past behaviour, which was influenced by subjective norm and consideration of channel accessibility. Subjective norm and consideration of channel accessibility had an indirect effect on intention through past behaviour (Table 6.2). Firstly, the channel accessibility of local collectors is high with easy access and lower transport costs. Secondly, local collectors may have built a long-term relationship with friends and family members of the respondents who were likely to recommend this channel. Phase one interviews suggested that some local collectors were more relaxed on quality grading and placed high trust on respondents in weighting of rice. Local collectors also allowed more flexibility in terms of timing and quantity. Respondents

could sell a small quantity of rice at any time. In contrast, some channels (i.e., miller, agricultural cooperative) opened only for a short period in order to reduce operating costs.

Agricultural cooperative was the third most frequently used channel. PLS-SEM analysis showed that past behaviour and consideration of channel accessibility had a significant direct impact on intention, while attitude and consideration of transaction specific cost had a significant direct influence on past behaviour and an indirect effect on intention through past behaviour (Table 6.2). Noticeably, consideration of channel accessibility was the only factor that had a direct influence on intention when compared other channels. However, consideration of channel accessibility had no significant effect on past behaviour. Past behaviour was affected by attitude and the consideration of transaction specific cost. The reasons for this could be that members of the agricultural cooperatives normally receive membership benefits for the purchase of inputs for production and dividend share of the profits to members.

Factors affecting the choice of other three marketing channel, i.e. central paddy markets, farmer groups direct selling and individual direct selling, were summarised using descriptive statistics. Firstly, the most important reason for choosing a central paddy market, whether operated by the Bank for Agriculture and Agricultural Cooperatives (BAAC), agricultural cooperatives or private agents, was the good reputation of this channel relating to trust and fairness. Apart from reputation and trust, respondents were very likely to be satisfied with this channel in terms of cash/immediate payment, ease of access, and flexibility of the contract that allowed members to supply all quantities and varieties of rice.

Direct marketing channels including farmers' group and individual direct selling were used by respondents to sell milled rice direct to end users. Contrary to expectations, the higher price for direct selling was not the most important factor; trust was identified as the most significant factor when choosing these channels. A possible explanation is that respondents knew their consumers, allowing the management of sales without involving middlemen. Some respondents who chose to sell direct to consumers also had, at the same time, chosen to sell to indirect channels. However, it was not possible to establish the statistical significance of the influencing factors because the sample was too small.

6.7 Summary of this chapter

This study employed an exploratory sequential multi-method approach to develop the framework and instruments in order to identify factors affecting marketing channel choice(s). This chapter presented a summary and discussion of empirical results based on the four main research questions.

The answer to the first research question is that six marketing channels were used by the respondents with miller, local collector and agricultural cooperative being the more dominant channels. Following this, the answer to the second research question, using paired samples t-test, was that the end of RPS did not end up with a significant change of channel uses overall although this finding is constrained by the short time lapse between the end of the scheme and the time when the data were collected.

The third research question about how different types of farmers and farms might differ in their choice of marketing channel was answered using analysis through MANOVA. There were significant differences between types of farmers and farms across three different marketing channels on past behaviour and intention. The results showed that there were differences in the selection of marketing channels in terms of geographical regions, farmer's level of education, access to information, types of rice and market distance. Commercial farmers were more likely to use millers and subsistence farmers were more likely to use local collectors.

The fourth and main research question was about the factors influencing marketing channel selection. Results of the PLS-SEM analysis showed that past behaviour, attitude, subjective norm, transaction specific cost and farmers' power were the main influencing factors, particularly when applied to the selection of millers. Channel accessibility exerted indirect influence on intention through past behaviour. Results of multi-group analysis showed that factors influencing the selection of each of the three main channels were slightly different.

The next and final chapter of this study presents the theoretical and methodological contribution of this thesis to knowledge, together with the implications and recommendations for practice and policy. Limitations and suggestions for future research are also addressed in the concluding chapter.

Chapter 7 Conclusion

7.1 Introduction

The purpose of this study was to identify factors affecting marketing channel selection by rice farmers in Thailand. Rice is an important crop in Thailand: the national staple food. Furthermore, Thailand is one of the world's largest rice-exporting countries and rice makes a considerable contribution to the national GDP. It is seen by the Thai Government to be a potential source of economic growth.

Most Thai rice farmers are smallholders with an average farm size of 15.81 rai, (2.5 hectares) with small-holders located mainly in the north-east and north regions.

This chapter provides a summary of the study and a synthesis of key findings that contribute to both theoretical and methodological knowledge. In addition, the managerial implications are discussed from the perspectives of rice farmers, agents in the marketing channels and the government. Finally, the limitations of the study and suggestions for future research are discussed.

7.2 Summary of the key findings

There are four stages in the framework development process in this study. The initial framework (Framework 1) was drawn from key literature on factors influencing farmers' marketing channel selection (Chapter 2, Figure 2.5).

The results from phase one interviews largely confirmed framework 1. More specific indicators for each factor were developed and incorporated in framework 2 (Chapter 4, Figure 4.9). Framework 2 was tested across a wider population of rice farms in Thailand in phase two survey.

After principal component analysis (PCA) and reliability analysis were conducted, framework 2 was further adapted, leading to the generation of framework 3 (Chapter 5, Figure 5.2). Framework 3 was tested with PLS-SEM. The results of this analysis led to the definitive model the definitive model as shown in Figure 7.1. The model shows factors underpinning two of the original three psychological influencing factors of TPB. It shows that attitudes are affected by trust, and trust is underpinned by integrity, fairness, reputation, and information reliability. Subjective norm is influenced by farmers' social values.

The model also integrates transaction specific and economic factors. It shows that 'goals of selling' has a positive effect on both 'consideration of transaction specific costs' and 'consideration of channel accessibility'. The goals appeared to be underpinned by farmers' 'intrinsic values'.
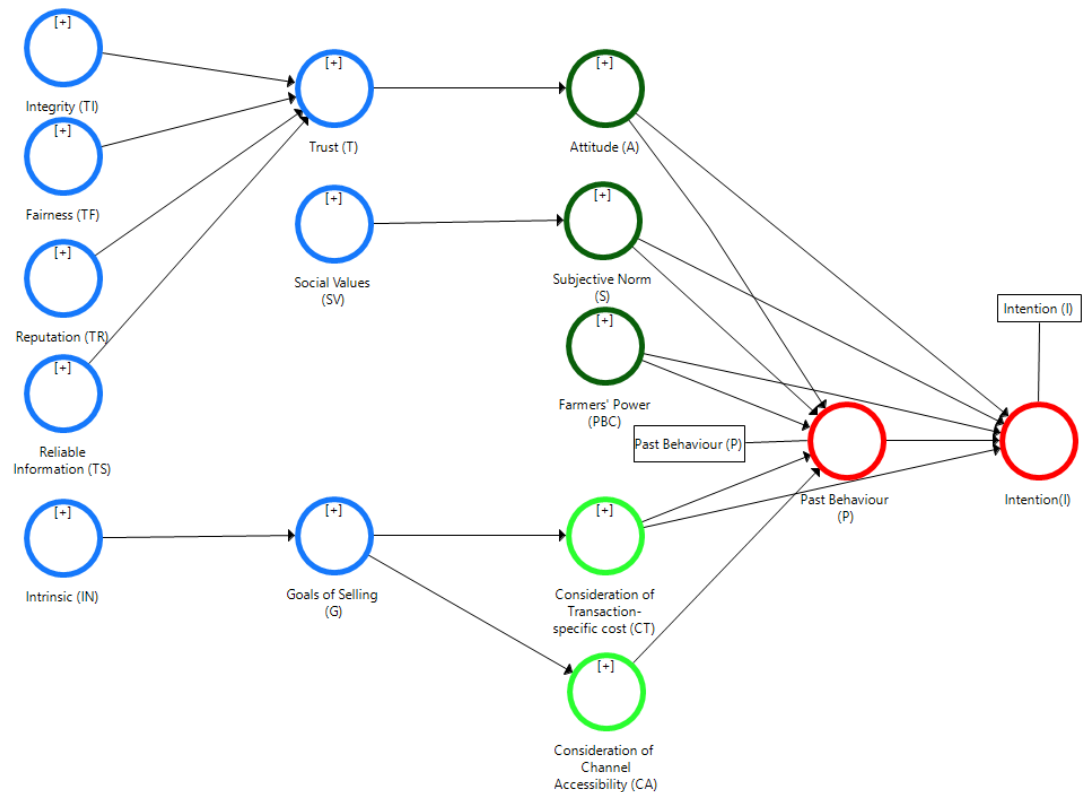
Figure 7.1 Definitive model of factors affecting Thai rice farmers' selection of marketing channels

(Source: Author's own, 2018)

Attitude, subjective norm, perceived behaviour control/farmer's power, consideration of transaction specific cost and consideration of channel accessibility explain 28% of the variation in past behaviour (past choice of channels). When all factors, including past behaviour, are taken together, the model explains 45% of the variation in intentional choice of marketing channel.

Another key finding is that Thai rice farmers mainly relied on three main marketing channels to sell rice. The channels, in order of popularity, were rice miller, local collector and agricultural cooperative. Rice millers were more popular in central region, amongst commercial farmers or by those who did not have much access to market information. Local collectors were favoured by those in the north region. They were used more by farmers who were less educated and only partly commercial. They were seen as a convenient channel.

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Agricultural cooperatives were more popular in the north-east region. They were favoured by farmers with higher level of education who were able to access more market information.

In terms of why farmers chose or intended to choose a particular channel, past behaviour was found to be the most powerful predictor consistently for all three channels. Multi-group analysis showed that factors affecting the choice of each individual channel varied. The choice of miller was influenced by all predicting factors with the exception of channel accessibility. The use of local collectors was directly affected only by past behaviour, and indirectly affected by channel's accessibility and recommendation by friends and family through past behaviour. The choice of agricultural cooperative was directly affected by past behaviour and channel accessibility, and indirectly affected by attitude and transaction specific cost through past behaviour.

7.3 Contribution to knowledge

This study makes several noteworthy contributions to literature on both marketing channel research and the Theory of Planned Behaviour (TPB). From the results yielded from the first conceptual model based on the existing literature on the farmer's marketing channel choice decision-making and TPB, this thesis has development and refined the theory based on the data collected through the two phases of data collection and analysis. The final framework has been applied to identify the factors affecting the marketing channel choice selection in different channels, it has been possible to provide the theoretical and methodological contributions to the existing knowledge on marketing channel.

7.3.1 Contributions to marketing channel choice research

Although there is a growing body of literature on marketing channel choice, behaviour studies of marketing channel selection by rice farmers have been limited. The findings from this study add to a growing body of literature on marketing channel choice behaviour. First, this study fills gaps in the literature on the marketing channel selection by rice farmers. To the best knowledge of the researcher, to date, only two studies of marketing channel choice of rice farmers have been undertaken, these concern Myanmar and Vietnam.

Soe *et al*. (2015) study was based on 196 paddy rice farmers survey in Myanmar. There were three main channels used by respondents: (1) the brokers/commission men at the farm gate, (2) the collectors/traders at the farm gate and (3) rice millers. The results from Multinomial Logit Model showed that respondents who located far from a market were more likely to sell at the farm gate, while the large-scale farmers who had own storages and vehicles and could had access to market information were likely to sell to rice millers.

Another study conducted by Cazzuffi and McKay (2012), was based on rural panel surveys of 1,411 households in 2006, 2008 and 2010 by using Probit model. These panel surveys were collected by the Vietnam Access to Resources Household Survey (VARHS). They found that farm size and low cost of transportation were significant factors to choose traders or enterprises, whereas inadequate access to transport infrastructure was the key factor to sell at the farm gate.

While those two studies have provided some initial insights into factors affecting marketing channels by rice farmers, they did not examine the psychological factors as well as past behaviour and other transaction-costs factors.

This study is the first to consider factors affecting marketing channel selection by rice farmers in Thailand. Furthermore, this research has explored whether rice farmers changed marketing channels after the ending of the rice pledging scheme (RPS).

Second, factors influencing the choice of marketing channel by farmers of different products and in various countries studied previously maybe grouped into four main categories: socio-demographic, transaction specific, relationship dynamics, and 'other factors'. Previous research, however, failed to consider the integration of factors. This study confirms and strengthens the conclusions of previous findings and provides additional evidence. More importantly, this study goes further to suggest that the intention of marketing channel selection is influenced by past behaviour, psychological (i.e. attitude, subjective norm and perceived behaviour control) and transaction specific factors (transaction specific cost and channel accessibility).

Third, this study has several practical applications. It shows how trust develops in the context of the rice market system. Integrity in weighting and grading, fairness, reputation and reliable information from the channel agents underpin trust, which then influences attitude toward the marketing channel. Subjective norm assists the understanding of the roles of friends/neighbours and family in supporting the marketing channel selection. This study also contributes to existing knowledge of transaction costs by identifying the dimensions or components of transaction specific factors. Alongside price, there are also other factors such as transportation cost, mode of payment, cash payment preference, non-monetary incentives, ease of access to the channel, whether the whole crop can be sold and how easy to access the channel.

This study advances knowledge in relation to farmers' decision-making and the literature on farmers' choice of marketing channels. Specifically, the study sought to assess the impact of the TPB components: attitude, subjective norm and perceived behaviour control, along with the potential additional components which are transaction specific cost, relationship dynamics, goals and values of farmer and socio-demographic factors. Figure 7.1 shows how the findings differ from the initial conceptual model (Figure 2.5) based on the literature review.

To conclude, the model is the first of its kind to provide a comprehensive framework in understanding factors affecting rice farmers' marketing channel selection, integrating both psychological and economic factors. The significant evidence of the power of past behaviour in predicting future intention and acting as a mediating variable is particularly interesting.

7.3.2 Methodological contribution

This study makes several methodological contributions. It employed an exploratory sequential multi-method approach. However, there has been little use of a multi-method approach in research related to marketing channel selection in Thailand. Therefore, this study makes a distinctive contribution to the existing methodological literature in the study of marketing channel selection, particularly for rice product in Thailand.

Phase one exploratory interview was proved to be a very useful method in informing the design of the large-scale survey. Results of the interviews informed the design of the questionnaire, particularly in deciding the wording of the key measures. The process of identifying respondents and discussions with the rice farmers helped the researcher to identify a very effective approach to reach the respondents for phase two survey.

Phase two survey enabled data collection from a more representative sample. A face-to-face questionnaire survey was conducted in three main rice production regions covering a total of 9 provinces, 13 districts, and 21 villages. 746 questionnaires were collected. To the best knowledge of this researcher, this face-to-face survey is one of the largest surveys conducted in marketing channel choice research of this type. This made it possible to use a more rigorous statistical analysis of the causal paths to explore the factors affecting marketing channel selection.

Another innovative method adopted in this study was the complementary use of principal components analysis (PCA) and partial least squares–structural equation modelling (PLS-SEM). PLS-SEM was chosen to analyse the causal paths of factors influencing marketing channel selection by rice farmers. A very important step was to establish how the underpinning factors should be presented. PLS-SEM distinguishes reflective indicators from summative indicators as explained in Chapter 3 and 5. The researcher used PCA and assessment of scale reliability assist the decision on reflective or summative models in PLS-SEM. This proved to be an effective preparatory work.

Despite the growing number of studies using PLS-SEM in marketing research (Hair *et al.*, 2011) and behavioural causal theory (Lowry and Gaskin, 2014), only a few studies have employed multi-group analysis (MGA) (Al-Hajla, 2014; Aubele, 2014) to examine differences in the group-specific parameter estimates. In the field of marketing channel choice, use of PLS-SEM with MGA is rare. This study showed how PLS-SEM allowed the

development of an integrated model and the MGA made it possible to identify which factors matter more in selection of each marketing channel.

7.4 Implications and recommendations

Previous studies have identified factors affecting choice of marketing channel by farmers in both developed and developing countries. Evidence from this study established a new framework to understand how rice farmers choose distribution channels. This is of interest to stakeholders such as (1) rice farmers and farmers group; (2) agents in the marketing channels; (3) policy makers; and (4) other relevant institutions.

Rice farmers may or may not understand their own channel choice behaviours. Results from this study support the idea that price is not the only consideration when selling rice. There are several psychological factors (i.e. power, trust) and related farmers characteristics (i.e., access to information, education) to consider. The findings of this study indicated that most rice farmers did not have many choices and lacked power in negotiation. To enhance the power of rice farmers, collective action is needed. Forming farmers groups can help to increase negotiating power and facilitate their access to more reliable market information. Examples of information rice farmers can obtain from such groups includes market price, reliability (or trustworthiness) of a particular channel, cash payment offers, non-monetary benefits and specific channel offers. Working in groups also helps to reduce costs (e.g. in production and transportation). It may also be important for rice farmers to regularly review their past choice of channels in order to enhance their own position.

Agents can make important changes to address issues or problems. Prompt and clear communication will build the trust and respect that rice farmers have in a marketing channel. Communities or groups can establish ethical standards and honest behaviours for quality certification, regular performance review of members of the group, and provide a wider range of support services. The predictive power of past behaviour is particularly relevant to channel agents as keeping existing suppliers would be easier than finding new suppliers.

This study also reveals an important practical issue. Each channel develops its own strengths. Miller is the leading channel for rice distribution. Those who chose to sell to millers tend to be affected by both psychological and economic factors. Mangers or owners of millers need to consider how to enhance their reputation and improve their offering to farmers such as mode and length of payment, and their willingness to buy different types of rice and the whole crop.

Local collectors' strength is their proximity to farms and their provision of a higher level of service (i.e., collection of rice at the farm gate, the provision of loans, and better contractual terms). Agricultural cooperatives also offer benefits to members, but are seen to have less integrity, are trusted less, have a poor reputation, are considered unfair and

present incomplete or inaccurate information. If they can build more trust in these areas of concern, it may create and preserve the relationships with rice farmers and lead to the positive attitude to these channels.

Agricultural cooperatives should play an important role, however some respondents identified problems of management and governance as the key challenges faced by this channel. A reasonable approach to tackle such issues would be to ensure observance of the eight principles set out by United Nations (UNESCAP, 2009): (1) participation, (2) rule of law, (3) consensus oriented, (4) equity and inclusiveness, (5) transparency, (6) accountability, (7) responsiveness, and (8) effectiveness and efficiency.

Although the other three marketing channels (central paddy market, farmers group and individual direct selling) were used by a small number of participants, interview discussions suggested these channels may become realistic alternative channel choices for rice farmers. It is suggested that the Bank for Agriculture and Agricultural Cooperatives (BAAC), or other cooperatives, could invest and open a new central paddy market in many areas. Respondents commented that they trusted the weighing scales managed by these institutions.

This study also provides information that could be used by policy makers to develop specific government intervention and support for rice farmers. The average age of farmers (over 55) aligns with the agricultural census. This study suggests that farming succession poses a challenge to the future of farming. Policy formation must consider how to support younger rice farmers so that they remain in farming and become more proactive in marketing.

Policy needs to address issues of the reliability of the weighing process and grading. Reliability of weighing scales and grading from channels may be enhanced by providing the certifications and standards frameworks and mechanism for enforcement. Reliable and timely information should be made easy to access by rice farmers. Many respondents stated that information received from mass media such as TV or government websites was much less reliable than the information provided by marketing channels. For example, TV announcements of paddy rice prices are for the price of the highest grade and rice farmers can never reach this grade. Providing real time prices in different locations would help rice farmers decide where to sell or what type of rice to grow in the next crop.

Finally, educational institutions and NGOs may wish to use this study as a basis for understanding the choices rice farmers make. Other researchers may benefit from the integrated framework developed in this study when researching marketing channel selection.

7.5 Limitations of this study and suggestions for further research

Although there are limitations to this research, it is recommended that further work be undertaken based on the findings of this study. The most important limitation of this study is that it considers relationships between independent and dependent variables based on data collected in Thailand in 2016. It would be interesting to compare the rice sector of other leading rice exporter or producers' countries. The scope of this study is inevitably limited by time, sector and country contexts.

A theoretical limitation is that this study only looked at intentional behaviour whilst the original TPB suggest that intention is a predictor of actual behaviour. Ideally, the same respondents could be asked twice. The first survey was to find out their intentions and the second survey to find out whether they carried through with their intentions (i.e., actual behaviour) with the first time. However, it was not possible to implement this method due to limited control over access to the same respondents. Time and costs constraints were other challenges faced by the researcher. Future studies can look at measuring all three behavioural indicators: past behaviour, intention and actual behaviour. Such studies may require a qualitative approach based on a much smaller sample.

Although there was a sufficiently large sample size for data analysis, there were low response rates in some channels, in particular the direct marketing channels. It is suggested that influencing factors for direct marketing channels are investigated in future studies.

The model explains about 45% of the variation of rice farmers' intentional choice of marketing channel. It is possible that intention and past behaviour could be affected by other variables or not included in this study. Balancing between comprehensive data, costs, and time, it was not possible to include every potential variable. Further research may explore new factors and the possible interrelationships between variables. Future studies into other influencing variables will help to develop a deeper understanding of marketing channel selection of rice farmers in Thailand. As these findings might lack generalisability to other countries and sectors, further research in the marketing channel choice is needed to evaluate, integrate or adapt these factors in other contexts.

This study provides a strong foundation for further research on marketing channel selection of rice farmers in Thailand. Factors affecting the channel selection were identified in this study. However, how each factor exerts its influence and what underpins each factor deserve studies in greater depth. Qualitative interviews and real-life observations may provide greater insights into understanding of the channel choice behaviour as well as key influencing factors.

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Appendices

Appendix A: Interview Questions

Appendix B: The details of interviews results

Appendix C: Questionnaire

Appendix D: The details of survey results

Factors affecting the choice of marketing channel of rice farmers in Thailand

Objective 1   To identify the main marketing channels for rice farmers in Thailand.

Objective 2   To identify the factors affecting the choice of marketing channels by rice farmers in Thailand.

Objective 3   To examine the relationship between the factors and channel selection.

Guide for the interview: Open-end Questions

Transactions-specific

1. How do you plan your marketing? (Obj1)
   a. Where do you sell rice products?
   b. What is the main channel? Why?
   c. How frequently?
   d. What worked well? Please elaborate.
   e. Satisfaction?   How?   Why or why not?
   f. What are your future plans?

2. Location? How far from market and main road?
   How do you access market and type of transportation? (Obj1)

3. How does government support you? (Obj2)

4. Have you changed channels since the rice pledging programme ended? Why? (Obj1)
   a. What are the factors affecting your choice? (Obj2)

5. Which of these factors would you consider to be main influence on your channel selection? Please explain. (Obj2)
   a. Price? (Average, Higher, Lower) Are you satisfied? Why or why not?
   b. Quantity/ year/ crop
   c. What type of payment?   Which one do you prefer?
   d. What kind of service does this channel provide?
   e. Are there any grading, standards or regulations that this channel requires? Please explain
   f. Having a written contract or not?
   g. Days / office hours of this channel?
   h. Cost of entry to sell through this channel?
   i. Barriers to quitting or exiting from the transaction relationship?

6. What recommendations do you have for this channel? (Obj2)

Relationship dynamics

7. How do you negotiate or bargain when you sell your products? (Obj3)

8. How is your relationship with each channel?

   Current and in the past. How is it maintained? (Obj3)

9. Do you trust this channel or main channel?　　(Obj3)

10. Do you think you will continue using this main channel? (Obj3)

11. Who are your competitors? (Obj2)

   a. How do you respond to them and what strategies do you employ?

Socio-demographic factors: Characteristics of farms

12. Total farm land size and land allocated to rice farming. Owned by?　Rent? (Obj2)

13. What are the other products you grow? (Obj2)

14. What is your total annual income and income from rice? (Obj2)

15. What is the volume of rice produced per harvest / per crop? Yield (kg/Rai) (Obj2)

16. What kind of technology is used in your farms? (Obj2)

17. How do you harvest rice? (Obj2)

18. How much does rice production cost? (Obj2)

19. What do you think about your farm infrastructure? (Obj2)

20. How do you access information on market channels? (Obj2)

21. Do you have your own vehicle?　(Obj2)

22. What would you say is the reputation of your farm? (Obj2)

23. Labour used.　Family members working on farm?　(Obj2)

24. Debt level and how do you access credit? (Obj2)

Socio-demographic factors: Characteristics of farmers

25. What type of rice and production do you utilise on your farm?　(Obj2)

26. Who has influenced you the most in channel selection? (Obj2)

27. How much farming and rice farming experience do you have? (Obj2)

28. Do you belong to any groups? If so, what kind? (Obj2)

29. Household size (Obj2)

30. House owner　(Obj2)

31. Marital status　(Obj2)

32. Education (Obj2)

33. Age (Obj2)

34. Gender (Obj2)

Appendix B: The details of interviews results

Table B1 Exemplar quotes from phase one interviews

Factors	Individual direct selling	Group direct selling	Agricultural cooperatives	Central paddy Market	Local collectors	Rice millers
1. Channel(s) buying capability	Last year, I grew rice for own consumption but now I want to sell more. This year I have planned to increase rice farm size from 2 Rai to 7 Rai. But I am not sure quantity of rice will be enough for selling because of drought problem.	Buy all units of rice. After meeting own consumption, I can sell unmilled rice left to group.	Buy all units of rice. Agricultural cooperative will collect data of quantity of rice from member. They will set a quota of quantity of rice for member; the excess quota will get a market price.	I usually sell to rice miller but last year rice miller didn't buy rice. I sold to Central paddy market.	Sell to local collector 5-10 bags of unmilled rice per time after meeting own consumption because it is a small amount of rice. I usually sell to rice miller but I have sold sticky rice to mobile local collector after meeting the own consumption because of small quantity of rice.	As Agricultural Cooperative doesn't buy rice in dry season and buy small quantity of rice, I have sold to rice millers.
2. Terms of payment	I receive cash payment from buyers who will transfer money to my bank account after that I will bring rice to the mill, pack and post it to them.	I have received cash payment for unmilled rice and our group has received cash payment for milled rice from buyers.	I have sold to agricultural cooperative because they have paid cash. I usually sell to agricultural cooperative, even though rice millers will give a higher price 2 Baht per Kg, but they offer credit payment.	Last year, I sold my rice to BAAC's Central Paddy market because of cash payment. If I sell to rice miller, I will receive credit payment. I prefer cash payment.	Received cash payment	Previously, I sold to another channel near my house, they paid 16,000 Baht per 1,000 kg. by credit payment 1-2 months. But I prefer cash payment.

Table B1 Exemplar quotes from phase one interviews (cont.)

Factors	Individual direct selling	Group direct selling	Agricultural cooperatives	Central paddy Market	Local collectors	Rice millers
3. Transportation cost	Consumers usually come to my house and buy my product by themselves or they call me, and I send my rice to them by post.	Our group has vehicle that I can use and only pay for petrol. If I sell to rice miller, I have to pay for transportation.	For wet season, if I would like to sell my rice, I will contact the agri-coop and ask price first. They will send a truck to pick up my rice at my house. If I transport my paddy rice by myself, agri-coop will pay for 50 Baht /1,000 Kg. Agri-coop is located 2 Km from my farm. However, Issara rice miller is located 25 Km from my farm.	I have sold to BAAC's Central Paddy market because it is near my farm. Cost of transport to BAAC's Central Paddy market per 1,000 kg. of unmilled rice is 100 Baht. I have sold to this channel because it is near my farm.	It's located opposite my house. Location when compared with transport cost is the important factor for me. Hire truck 400-500 Baht per time at my rice field to local collector, but if I sell to rice miller, I have to hire truck 250 Baht per 1,000 kg or 2,250 Baht for 9,000 kg.	I have sold to this rice miller because it is near my farm and transportation cost is low. It is near my house and easy to access. If I sell to co-op close to town centre, it not easy to transport in the area of town centre.
4. Influencers	My son has encouraged me to grow Riceberry for direct selling. My daughter and son have sold it for me.	Our group is one of my influencers because price and quantity of rice will be set together by us via group agreement.	Consult with my husband and ask neighbours for the price of rice and market situation.	Check price from friends and neighbours who sell their rice. I have bad experience when I believed truck drivers and then I sold to rice miller. However that rice miller was cheated on weight scale. Now, I don't believe truck driver. Check price from friends and neighbours.	I will ask truck driver and my landowner before I sell. I have changed channels for selling. I will ask truck driver and neighbours before selling.	Check price from truck drivers, friends and neighbours.

Table B1 Exemplar quotes from phase one interviews (cont.)

Factors	Individual direct selling	Group direct selling	Agricultural cooperatives	Central paddy Market	Local collectors	Rice millers
5. Personal relationship	-Not mentioned-	Great relationship. We have worked together as a family team.	Good relationship. I have been the agricultural cooperative member since 2522 (1979), totalling 36 years.	Good relationship with some agents who have sold via BAAC's Central Paddy market.	Good relationship because I have known him for a long time. Normally, I have sold to rice miller for many years. But I changed to sell to this local collector last year because my husband has known the owner of this channel for many years.	Good relationship with rice miller because I have sold to them for 10 years. When I sell rice to this rice miller, I will receive money more quickly than other millers. Great relationship because I have worked with the owner for many years. If I don't have relationship with him, I will receive the average price.
6. Power of negotiation	I can negotiate with my consumer on issues such as quantity of product. I know intermediaries will force the price down which I can negotiate with my consumer.	We can negotiate with our consumer. I don't want rice miller to force price down. I have more bargaining power via group direct selling.	Cannot directly negotiate. We can negotiate by Agri-coop's annual meeting such as life insurance fee, dividend shares, and decrease in interest rates.	I can negotiate with agent at BAAC's Central Paddy market 100 Baht per 1,000 kg.	I can negotiate with local collector. In the past, I got a higher price 50 Baht per 1,000 kg. Sometimes, other rice millers will check more standard of quality of rice than this local collector.	I can negotiate with rice miller. He offered to give me 8,000 Baht per 1,000 kg, I asked him to pay 8,500 Baht. I can't negotiate with Agri-cooperative, but I can negotiate with rice miller, it depends on the quality of rice.

Table B1 Exemplar quotes from phase one interviews (cont.)

Factors	Individual direct selling	Group direct selling	Agricultural cooperatives	Central paddy Market	Local collectors	Rice millers
7. Price	I received a higher price from this channel. I can set my own pricing. I know intermediaries will force the price down .	Higher price than other channels. In the past, I sold to rice miller; I got only 8,000 Baht per 700 kg. Now, I have received higher price than rice millers at least 1 Baht per kg.	Higher than other 0.5 Baht per kg for member. Non-member will get lower price than member.	-Not mentioned-	Higher 100 Baht/ 1,000 kg. Average price is 12,800 Baht/ 1,000 kg, but I got 12,900 Baht/1,000 kg. Higher price. I received 11.67 Baht per kg. If I sell to rice miller, I will receive 10.83 Baht/kg.	Higher 100-200 Baht per 1,000 kg. Higher price than co-op 100-200 Baht per 1,000 kg
8 Trust	I can trust buyers because they have to transfer money to me first and after that I will post my rice to them. Consumers trust me because they have known me; they have seen what I was doing. I think they trust and respect me because I am a teacher. How I can trust weighing instruments. I don't trust weighing instruments. Rice millers have cheated rice farmers by dishonest scale. Truck drivers told me.	Trust. I have seen every process and we can check together. Treat like we were family. We have own accounting income and financial statements. In the past, I sold to rice millers, but I thought them dishonest on weighing instruments.	Trust because we have chosen the board of directors and operation staff. I trust weighing instruments. Trust agri-coop 100% but trust rice miller only 70-80 %.	I trust in weighing instruments at BAAC's Central Paddy market more than other channels. I think standards for weighing instruments is important for small-scale rice farmer like me because I have had low volume of rice.	I think standards for weighing instruments in this local collector is better than other channels.	Trust. Owner of this rice miller is sub-district headman, and I can trust him. I sold to mobile local collector, he cheated with weigh scales. I lose at least 10 kg of unmilled rice per bag.

Table B1 Exemplar quotes from phase one interviews (cont.)

Factors	Individual direct selling	Group direct selling	Agricultural cooperatives	Central paddy Market	Local collectors	Rice millers
9. Incentives and membership benefits	-Not mentioned-	Member benefits; -Higher price 1 Baht/ kg than market price -Members' savings account 1 Baht/kg., for example, I sold 10,000 kg of unmilled rice, price 15 Baht/kg, I received 150,000 Baht which I have to deposit money into my saving accounts 10,000 Baht, interest rate 5% per year. -Loan without interest rate; limit not more than saving balance. If I can't pay loan on time, I can't sell rice to group for 1 year -Share of payment and held to members who work for group. -Health welfare for stay in hospital 200 Baht/time, not more than 10 times/year.	I usually sell to Agricultural Cooperative because I am member. The benefits of agricultural cooperative are; 1) Loan. If I have a good credit rating, I can get a lower interest rate. 2) Price discount on rice seed, fertilisers, pesticides, and herbicide. 3) Higher price for member. 4) It returns a dividend 'share of the profits' to members of Agri-coop when I buy products or sell rice. Agri-coop sells inputs and offer credit for 3 months to members such as rice seeds, fertilisers, pesticides and herbicides and provides truck for transport rice to it.	BAAC's Central Paddy market provided document of selling. I usually sell to Agricultural cooperative but this year I will sell to BAAC's Central Paddy market. I would like to apply for the life insurance with BAAC, in the event of my death; my family will receive 190,000 Baht. But my family will receive only 80,000 Baht from Agri-coop life insurance.	Owner of local collector will come to pick up rice at my house by truck. He offers commission to me if I tell him there are other rice farmers want to sell rice, I will get commission 100-200 Baht per time.	Rice miller will pay money back for transportation cost 30 Baht per 1,000 kg. I used to sell to coop, but they didn't buy after that I sold to rice miller. I would not sell to co-op, they give a lower price and sell higher fertilisers price and other.

Table B1 Exemplar quotes from phase one interviews (cont.)

Factors	Individual direct selling	Group direct selling	Agricultural cooperatives	Central paddy Market	Local collectors	Rice millers
10. Type of production	My product is non-toxic rice that I control everything relate with chemical and pesticide and don't use chemical fertiliser. …I have grown rice for my own consumption and I want my consumers to eat rice as good as I eat. In the past, I didn't think to be a commercial rice farmer. My happiness is to become a non-toxic rice farmer. I'm satisfied when consumer bought and consumed my product.	I want to produce quality rice. I have planted organic rice and I want consumer to be assured of the safety of the rice. Our group sells only organic rice. Cost of organic production is cheaper than chemical production. For example, I have bought organic fertilisers via group only 280 Baht per bag, but price of chemical fertilisers is 800-900 Baht per bag.	I don't want to sell packaged rice directly to consumers.	I have planned to grow rice seeds and sell to agri-coop which will receive a higher price.	-Not mentioned-	I planted organic rice, but not enough quantity and rice miller will buy same price of organic or chemical rice. I have changed to chemical production. Agri-cooperative doesn't buy in dry season which is why I have to sell to rice millers.

(Source: Author's own, 2015)

Appendix C: Questionnaire

Consent Form for Anonymous Survey

Dear Participants,

My name is Nithicha Thamthanakoon, I am Ph.D. student in the Land, Farm and Agribusiness Management Department at Harper Adams University, UK. The survey is part of an investigation of factors affecting the choice of marketing channels by rice farmers in Thailand. The findings of this research will enable the researcher to make suggestions at a policy level in relation to developing an effective marketing channel structure in Thailand and in reconsideration of the support for rice farmers.

Your participation in this survey is entirely voluntary and you have the right to withdraw from participation at any time. The survey will ask you about what you think and do in terms of marketing channel selection. There is no right, or wrong answer and your responses are completely anonymous. No individual respondent is identifiable in the data collected and the report.

This survey will take you about 40 minutes to complete.

The survey instrument has been approved by the Research Ethics Committee at Harper Adams University and has met all the ethical requirements. If you have any questions regarding this research, please contact me. My contact information is provided below.

Thank you for your consideration, and participation in this survey.

Best regards,
Nithicha Thamthanakoon
Ph.D. Student at Harper Adams University
Land, Farm and Agribusiness Management Department
E-mail: nthamthanakoon@harper-adams.ac.uk
Phone: +66 817043230

If you agree to participate in this survey, please could you fill in this questionnaire. Please be reminded that you have the right to withdraw from the survey.

Page 1

Instruction: Please read each question carefully and mark your answer by putting (√) in the space between brackets, or by writing answer on the line provided.

Section 1 Profile of respondent

Q1. Location of respondent

    ☐ 1. North Region

        ☐ 1.1 Chiang Rai Province

            ☐ 1.1.1 Pha Ngam Village   ☐ 1.1.2. Huai So Village

        ☐ 1.2 Phayao Province, Huai Lan Village

        ☐ 1.3 Phrae Province, Rong Kwang Village

    ☐ 2. North-east Region

        ☐ 2.1 Ubon Ratchathani Province

            ☐ 2.1.1 Na Kasem Village   ☐ 2.1.2 Thung Thoeng Village

            ☐ 2.1.3 Mueang Det Village

        ☐ 2.2 Chaiyaphum Province

            ☐ 2.2.1 Nai Mueang Village   ☐ 2.2.2 Na Siao Village

        ☐ 2.3 Loei Province

            ☐ 2.3.1 Na Pong Village   ☐ 2.3.2 Mueang Village

    ☐ 3. Central region

        ☐ 3.1 Suphan Buri Province

            ☐ 3.1.1 Ban Krang Village   ☐ 3.1.2 Wang Yang Village

            ☐ 3.1.3 Bang Ngam Village   ☐ 3.1.4 Mot Daeng Village

            ☐ 3.1.5 Rai Rot Village

        ☐ 3.2 Ayutthaya Province, Ban Kum Village

        ☐ 3.3 Sing Buri Province

            ☐ 3.1.1 Thon Samo Village   ☐ 3.1.2 Phikul Thong Village

            ☐ 3.1.3 Pho Prachak Village ☐ 3.1.4 Ban Paeng Village

Q2. Age   ………………………… years

Q3. Gender   ☐ 1. Male   ☐ 2. Female

Q4. Marital status   ☐ 1. Single   ☐ 2. Married ☐ 3. Divorced ☐ 4. Widowed

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Q5. Highest level of education

☐ 1. No formal education   ☐ 2.Primary school year   ☐ 3.Primary school year 6

☐ 4. Secondary school year 3 ☐ 5.Secondary school year 6 ☐ 6.Vocational certificate

☐ 7. High Vocational Certificate ☐ 8.Bachelor's degree   ☐ 9. Master degree or higher

☐10. Other……………………..

Q6. Rice growing experience   ……………years

Q7. Household size including yourself…………… persons

Q8. What kinds of groups do you belong to?

☐ 1. BAAC   ☐ 2. Farmers group   ☐ 3. Agricultural cooperative

☐ 4. The village Fund   ☐ 5. Non-agricultural group ☐ 6. Women local community

☐ 7. Credit Union   ☐ 8. No   ☐ 9. Other……….………………

Q9. Are you the head of household? ☐ 1. Yes   ☐ 2. No

Q10. How many family members earned money from off-farm activities? …………persons

Q11. What proportion of household income came from off-farm activities? …..…………%

Q12. Are you in debt?   ☐ 1. No   ☐ 2. Yes

Q13. What is the total land size for farming?   …………………… (Rais)

Q14. What is the total land size for growing rice?   …………………… (Rais)

       ☐ 1. Owner How many?   …………………… (Rais)

       ☐ 2. Rent How many?   …………………… (Rais)

       ☐ 3. Owned by Government How many?   …………………… (Rais)

Q15. What kinds of marketing channels are available in your area and how far is it from your house/farm to market? …………………… (Km)

………………………………………………………………………………………………...

………………………………………………………………………………………………...

Q16. Rice production and marketing during the last 2 years (2014-2016)

	16.1 Type of production	16.2 Total own consumption (Kg)	16.3 Which market channel did you use to sell this type of rice?	16.4 Main source of information about price and market
1. Jasmine rice				
2. Sticky rice				
3. Thai Pathumthani Fragrant rice				
4. Long grain rice				
5. Riceberry rice				
6. Other………..				

Q17. How do you transport your product to market channel(s)? (Multiple answers)

☐1. Hire ☐ 2. By own/family vehicle

☐ 4. Intermediaries/Consumer pick paddy rice at farm/house ☐ 4. Other……….

Q18. What type of mass media do you use most often? (Multiple answers)

☐ 1. TV ☐ 2. Radio ☐ 3. Newspapers (online and paper)

☐ 4. Magazines (online and paper) ☐ 5. Internet/blogger/government websites

☐ 6. Social media (e.g. Facebook, Line, Twitter) ☐ 7. No

Q19. Did you apply for the Rice Pledging Scheme during 2011-2014? ☐ 1. Yes ☐ 2. No

Whether you applied or did not apply for this scheme please answer this question

To what extent did the Rice Pledging Scheme influence my decision to choose market channel (s)	1= Not at all important ->7=Most important						
	1	2	3	4	5	6	7

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Section 2 The main marketing channel used and intention

Q20-21 What channels did you use and how often did you use the channel(s) during the period of 2011 to February 2014 and after February 2014 until now (2016)?

Please rate ONE the level of frequency by circle O the selecting one of the numbers.

1 = Did not sell to this channel

2 = Rarely, in less than 10% of transactions

3 = Occasionally, in about 30% of transactions

4 = Sometimes, in about 50% of transactions

5 = Frequently, in about 70% of transactions

6 = Usually, in about 90% of transactions

7 = Frequently use, in more than 90% of transactions

Put (√) only channel(s) did you use and circle O the level of frequency	1= Did not use --> 7= Frequently use						
20. What channels did you use and how often did you use the channel(s) during the period of 2011 and February 2014?							
1. Rice miller	1	2	3	4	5	6	7
2. Local collector	1	2	3	4	5	6	7
3. Agricultural Cooperative	1	2	3	4	5	6	7
4. Central Paddy Market	1	2	3	4	5	6	7
5. Farmer group	1	2	3	4	5	6	7
6. Direct to consumer	1	2	3	4	5	6	7
7. Other. Please specify…………….	1	2	3	4	5	6	7
21. What channels did you use and how often did you use the channel(s) after February 2014 until now (2016)?							
1. Rice miller	1	2	3	4	5	6	7
2. Local collector	1	2	3	4	5	6	7
3. Agricultural Cooperative	1	2	3	4	5	6	7
4. Central Paddy Market	1	2	3	4	5	6	7
5. Farmer group	1	2	3	4	5	6	7
6. Direct to consumer	1	2	3	4	5	6	7
7. Other. Please specify……………..	1	2	3	4	5	6	7

Q22 Please rate ONE level of likelihood by circling ◯ one of the numbers.

1 = Most unlikely   2 = Unlikely   3 = Somewhat unlikely   4 = Neutral

5 = Somewhat likely   6 = Likely   7 = Most likely

Statements	1= Most unlikely --------> 7= Most likely						
Q22. Next crop, I intend to sell to market channel(s) as lists below? Please answer any channel(s) that you want to use.							
1. Rice miller	1	2	3	4	5	6	7
2. Local collector	1	2	3	4	5	6	7
3. Agricultural Cooperative	1	2	3	4	5	6	7
4. Central Paddy Market	1	2	3	4	5	6	7
5. Farmer group	1	2	3	4	5	6	7
6. Direct to consumer	1	2	3	4	5	6	7
7. Other. Please specify:	1	2	3	4	5	6	7

Section 3 Factors affecting the choice of marketing channel (s).

Goals and values of selling

Q23. What are your goals for selling rice?

Please rate the level of importance by circling ◯ one of the numbers.

1 = Not at all important,   2 = Low importance, 3 = Slightly important,   4 = Neutral,

5 = Moderately important, 6 = Very important,   7 = Extremely or most important

Goals and Values of farmers	1= Not at all important ->7=Most important						
1) Maximising profit by selling at a higher price	1	2	3	4	5	6	7
2) Maximising profit by minimising cost of selling	1	2	3	4	5	6	7
3) Enhancing cash flow	1	2	3	4	5	6	7
4) Having sense of achievement or self-fulfilment through selling	1	2	3	4	5	6	7
5) Independence- freedom for selling	1	2	3	4	5	6	7
6) Family's well-being	1	2	3	4	5	6	7
7) Continuing the family tradition	1	2	3	4	5	6	7
8) Belonging to the farming community or farmer group	1	2	3	4	5	6	7

Instructions Q24-50

Please answer the questions follow by the market channel(s) that you use now.

If you use more than one channel, could you please answer these questions related to that channel.

      For example, if you sell to 2 marketing channels: miller and coop. Could you please write MILLER at the name of channel and answer these questions in the page 8 and do the same by writing COOP and answer these questions in the next page?

      If you sell to 4 channels, please could answer 4 pages as follows.

Please rate ONE level of the agreement that best reflects your opinion based on only market channel(s) that you choose currently by circling ◯ one of the numbers.

    1 = Strongly disagree

    2 = Disagree

    3 = Somewhat disagree,

    4 = Neutral

    5 = Somewhat agree

    6 = Agree

    7 = Strongly agree

    N/A = Not applicable, Not available, No answer, or Not relevant

Sell to (please write)………………..……..	1= Strongly disagree→7= Strongly agree							N/A
24. This channel offered me higher price	1	2	3	4	5	6	7	
25. This channel offered me cash payment	1	2	3	4	5	6	7	
26. It is cheaper to transport my product to this channel	1	2	3	4	5	6	7	
27. This channel is easily accessible/convenient to me	1	2	3	4	5	6	7	
28. This channel buys any quantity of rice	1	2	3	4	5	6	7	
29. This channel buys any type of rice	1	2	3	4	5	6	7	
30. This channel offered me monetary incentives.	1	2	3	4	5	6	7	
31. This channel offered me non-monetary incentives or good services	1	2	3	4	5	6	7	
32. I choose this channel because I trusted this channel.	1	2	3	4	5	6	7	
33. I choose this channel because I don't have to worry about being cheated on weighing scale.	1	2	3	4	5	6	7	
34. I choose this channel because I don't have to worry about being cheated on rice grade assessment.	1	2	3	4	5	6	7	
35. I choose this channel because this channel treated me fairly.	1	2	3	4	5	6	7	
36. I choose this channel because this channel had a good reputation	1	2	3	4	5	6	7	
37. In general, I am sceptical of the information I received from this channel	1	2	3	4	5	6	7	
38. I choose this channel because I don't have any choice	1	2	3	4	5	6	7	
39. I can negotiate with this channel. (e.g. price, payment, grading)	1	2	3	4	5	6	7	
40. I have to sell to this channel because I have a contract with them	1	2	3	4	5	6	7	
41. I have to sell to this channel because I am in debt with them (e.g. loan, repay farm inputs)	1	2	3	4	5	6	7	
42. I have a good relationship with this market channel	1	2	3	4	5	6	7	
43. I have been familiar with this channel	1	2	3	4	5	6	7	
44. Most of my friends who are rice farmers sell to this channel	1	2	3	4	5	6	7	
45. My family thinks I should sell to this channel	1	2	3	4	5	6	7	
46. Rice harvest machine drivers or truck drivers I am in contact with think I should sell to this channel	1	2	3	4	5	6	7	
47. Government officers or head of village I am in contact with think I should sell to this channel	1	2	3	4	5	6	7	
48. This channel was recommended by mass media	1	2	3	4	5	6	7	
49. This channel is a good choice for me	1	2	3	4	5	6	7	
50. Overall, I am satisfied or happy with this channel	1	2	3	4	5	6	7	

Q51. What recommendations do you have for developing market channel?

………………………………………………………………………………………………….
………………………………………………………………………………………………….
………………………………………………………………………………………………….

Thank you very much for your kind cooperation.

Sell to (please write)……………….…........	1= Strongly disagree→7= Strongly agree							N/A
24. This channel offered me higher price	1	2	3	4	5	6	7	
25. This channel offered me cash payment	1	2	3	4	5	6	7	
26. It is cheaper to transport my product to this channel	1	2	3	4	5	6	7	
27. This channel is easily accessible/convenient to me	1	2	3	4	5	6	7	
28. This channel buys any quantity of rice	1	2	3	4	5	6	7	
29. This channel buys any type of rice	1	2	3	4	5	6	7	
30. This channel offered me monetary incentives.	1	2	3	4	5	6	7	
31. This channel offered me non-monetary incentives or good services	1	2	3	4	5	6	7	
32. I choose this channel because I trusted this channel.	1	2	3	4	5	6	7	
33. I choose this channel because I don't have to worry about being cheated on weighing scale.	1	2	3	4	5	6	7	
34. I choose this channel because I don't have to worry about being cheated on rice grade assessment.	1	2	3	4	5	6	7	
35. I choose this channel because this channel treated me fairly.	1	2	3	4	5	6	7	
36. I choose this channel because this channel had a good reputation	1	2	3	4	5	6	7	
37. In general, I am sceptical of the information I received from this channel	1	2	3	4	5	6	7	
38. I choose this channel because I don't have any choice	1	2	3	4	5	6	7	
39. I can negotiate with this channel. (e.g. price, payment, grading)	1	2	3	4	5	6	7	
40. I have to sell to this channel because I have a contract with them	1	2	3	4	5	6	7	
41. I have to sell to this channel because I am in debt with them (e.g. loan, repay farm inputs)	1	2	3	4	5	6	7	
42. I have a good relationship with this market channel	1	2	3	4	5	6	7	
43. I have been familiar with this channel	1	2	3	4	5	6	7	
44. Most of my friends who are rice farmers sell to this channel	1	2	3	4	5	6	7	
45. My family thinks I should sell to this channel	1	2	3	4	5	6	7	
46. Rice harvest machine drivers or truck drivers I am in contact with think I should sell to this channel	1	2	3	4	5	6	7	
47. Government officers or head of village I am in contact with think I should sell to this channel	1	2	3	4	5	6	7	
48. This channel was recommended by mass media	1	2	3	4	5	6	7	
49. This channel is a good choice for me	1	2	3	4	5	6	7	
50. Overall, I am satisfied or happy with this channel	1	2	3	4	5	6	7	

Q51. What recommendations do you have for developing market channel?

…………………………………………………………………………………………………….
…………………………………………………………………………………………………….
…………………………………………………………………………………………………….

Thank you very much for your kind cooperation.

Appendix D: The details of survey results

Table D1 Descriptive Statistics of attribute variables for MANOVA

Dependent variables	Channels	Profile		Mean	SD	N	Dependent variables	Channels	Profile		Mean	SD	N
Intention	Miller	Regions	North	5.84	1.62	62	Past Behaviour	Miller	Regions	North	5.16	1.32	62
			North-east	6.69	0.90	175				North-east	5.75	0.76	175
			Central	6.25	1.46	117				Central	5.76	0.73	117
			Total	6.39	1.29	354				Total	5.65	0.90	354
	Local Collector		North	6.73	0.75	56		Local Collector		North	5.88	0.38	56
			North-east	6.59	1.10	97				North-east	5.87	0.51	97
			Central	6.46	1.26	37				Central	5.70	0.85	37
			Total	6.61	1.04	190				Total	5.84	0.56	190
	Coop		North	6.19	1.44	52		Coop		North	5.35	1.10	52
			North-east	6.62	0.67	21				North-east	5.86	0.48	21
			Central	6.33	0.90	42				Central	5.26	0.99	42
			Total	6.32	1.15	115				Total	5.41	0.99	115
	Total		North	6.24	1.38	170		Total		North	5.45	1.07	170
			North-east	6.65	0.96	293				North-east	5.80	0.67	293
			Central	6.31	1.32	196				Central	5.64	0.83	196
			Total	6.44	1.20	659				Total	5.66	0.85	659
Intention	Miller	Age (Years)	<55	6.25	1.38	185	Past Behaviour	Miller	Age (Years)	<55	5.50	1.06	185
			≥55	6.55	1.16	169				≥55	5.81	0.65	169
			Total	6.39	1.29	354				Total	5.65	0.90	354
	Local Collector		<55	6.37	1.32	103		Local Collector		<55	5.74	0.73	103
			≥55	6.89	0.42	87				≥55	5.95	0.21	87
			Total	6.61	1.04	190				Total	5.84	0.56	190
	Coop		<55	6.26	1.17	69		Coop		<55	5.32	1.10	69
			≥55	6.41	1.13	46				≥55	5.54	0.78	46
			Total	6.32	1.15	115				Total	5.41	0.99	115
	Total		<55	6.29	1.32	357		Total		<55	5.54	0.99	357
			≥55	6.63	1.01	302				≥55	5.81	0.60	302
			Total	6.44	1.20	659				Total	5.66	0.85	659
Intention	Miller	Gender	Male	6.28	1.41	141	Past Behaviour	Miller	Gender	Male	5.62	0.88	141
			Female	6.47	1.20	213				Female	5.67	0.91	213
			Total	6.39	1.29	354				Total	5.65	0.90	354

Table D1 Descriptive Statistics of attribute variables for MANOVA (cont.)

Dependent variables	Channels	Profile		Mean	SD	N	Dependent variables	Channels	Profile		Mean	SD	N
	Local Collector		Male	6.66	0.80	65		Local Collector		Male	5.85	0.40	65
			Female	6.58	1.15	125				Female	5.83	0.63	125
			Total	6.61	1.04	190				Total	5.84	0.56	190
	Coop		Male	6.22	1.19	54		Coop		Male	5.22	1.16	54
			Female	6.41	1.12	61				Female	5.57	0.78	61
			Total	6.32	1.15	115				Total	5.41	0.99	115
	Total		Male	6.36	1.25	260		Total		Male	5.59	0.88	260
			Female	6.49	1.17	399				Female	5.71	0.82	399
			Total	6.44	1.20	659				Total	5.66	0.85	659
Intention	Miller	Education	≤ Primary	6.34	1.35	265	Past Behaviour	Miller	Education	≤ Primary	5.62	0.91	265
			> Primary	6.55	1.07	89				> Primary	5.73	0.86	89
			Total	6.39	1.29	354				Total	5.65	0.90	354
	Local Collector		≤ Primary	6.68	0.95	155		Local Collector		≤ Primary	5.88	0.51	155
			> Primary	6.29	1.34	35				> Primary	5.63	0.73	35
			Total	6.61	1.04	190				Total	5.84	0.56	190
	Coop		≤ Primary	6.15	1.20	62		Coop		≤ Primary	5.24	1.13	62
			> Primary	6.53	1.07	53				> Primary	5.60	0.77	53
			Total	6.32	1.15	115				Total	5.41	0.99	115
	Total		≤ Primary	6.42	1.23	482		Total		≤ Primary	5.66	0.86	482
			> Primary	6.49	1.12	177				> Primary	5.67	0.81	177
			Total	6.44	1.20	659				Total	5.66	0.85	659
Intention	Miller	Rice experience (Years)	< 22	6.13	1.36	96	Past Behaviour	Miller	Rice experience	< 22	5.36	1.16	96
			22-42	6.49	1.28	159				22-42	5.73	0.80	159
			> 42	6.49	1.20	99				> 42	5.80	0.68	99
			Total	6.39	1.29	354				Total	5.65	0.90	354
	Local Collector		< 22	6.44	1.13	54		Local Collector		< 22	5.65	0.78	54
			22-42	6.59	1.17	85				22-42	5.91	0.50	85
			> 42	6.80	0.63	51				> 42	5.92	0.27	51
			Total	6.61	1.04	190				Total	5.84	0.56	190
	Coop		< 22	6.06	1.43	52		Coop		< 22	5.25	1.12	52
			22-42	6.55	0.85	44				22-42	5.52	0.90	44
			> 42	6.53	0.70	19				> 42	5.58	0.77	19
			Total	6.32	1.15	115				Total	5.41	0.99	115

Table D1 Descriptive Statistics of attribute variables for MANOVA (cont.)

Dependent variables	Channels	Profile		Mean	SD	N	Dependent variables	Channels	Profile		Mean	SD	N
	Total		< 22	6.19	1.33	202		Total		< 22	5.41	1.07	202
			22-42	6.53	1.19	288				22-42	5.75	0.75	288
			> 42	6.59	1.01	169				> 42	5.81	0.61	169
			Total	6.44	1.20	659				Total	5.66	0.85	659
Intention	Miller	Household size (persons)	1-4	6.45	1.17	195	Past Behaviour	Miller	Household size	1-4	5.70	0.85	195
			> 4	6.32	1.42	159				> 4	5.59	0.96	159
			Total	6.39	1.29	354				Total	5.65	0.90	354
	Local Collector		1-4	6.61	1.07	100		Local Collector		1-4	5.83	0.59	100
			> 4	6.60	1.01	90				> 4	5.84	0.54	90
			Total	6.61	1.04	190				Total	5.84	0.56	190
	Coop		1-4	6.30	1.21	77		Coop		1-4	5.38	1.04	77
			> 4	6.37	1.02	38				> 4	5.47	0.89	38
			Total	6.32	1.15	115				Total	5.41	0.99	115
	Total		1-4	6.46	1.15	372		Total		1-4	5.67	0.85	372
			> 4	6.41	1.26	287				> 4	5.66	0.85	287
			Total	6.44	1.20	659				Total	5.66	0.85	659
Intention	Miller	Head of household	No	6.05	1.55	104	Past Behaviour	Miller	Head of household	No	5.37	1.24	104
			Yes	6.22	1.49	118				Yes	5.69	0.78	118
			Total	6.14	1.52	222				Total	5.54	1.03	222
	Local Collector		No	6.51	1.13	72		Local Collector		No	5.82	0.59	72
			Yes	6.81	0.65	69				Yes	5.94	0.24	69
			Total	6.66	0.93	141				Total	5.88	0.45	141
	Coop		No	6.25	1.21	48		Coop		No	5.48	1.07	48
			Yes	6.49	0.97	39				Yes	5.38	1.07	39
			Total	6.36	1.11	87				Total	5.44	1.06	87
	Total		No	6.24	1.37	224		Total		No	5.54	1.05	224
			Yes	6.45	1.23	226				Yes	5.71	0.75	226
			Total	6.34	1.30	450				Total	5.62	0.91	450
Intention	Miller	Group belonging (Groups)	1	6.44	1.34	169	Past Behaviour	Miller	Group belonging	1	5.75	0.84	169
			>1	6.34	1.25	171				>1	5.53	0.98	171
			Total	6.39	1.30	340				Total	5.64	0.92	340
	Local Collector		1	6.65	1.04	98		Local Collector		1	5.85	0.58	98
			>1	6.59	0.95	79				>1	5.89	0.36	79

Table D1 Descriptive Statistics of attribute variables for MANOVA (cont.)

Dependent variables	Channels	Profile		Mean	SD	N	Dependent variables	Channels	Profile		Mean	SD	N
			Total	6.63	1.00	177				Total	5.86	0.49	177
	Coop		1	6.51	1.08	49		Coop		1	5.53	0.82	49
			>1	6.18	1.19	61				>1	5.30	1.12	61
			Total	6.33	1.15	110				Total	5.40	1.00	110
	Total		1	6.52	1.22	316		Total		1	5.75	0.77	316
			>1	6.37	1.18	311				>1	5.57	0.92	311
			Total	6.44	1.20	627				Total	5.66	0.85	627
Intention	Miller	Land Size (Rais)	1-12	6.41	1.20	139	Past Behaviour	Miller	Land Size (Rais)	1-12	5.59	0.98	139
			>12	6.38	1.34	215				>12	5.69	0.85	215
			Total	6.39	1.29	354				Total	5.65	0.90	354
	Local Collector		1-12	6.68	0.92	114		Local Collector		1-12	5.83	0.56	114
			>12	6.50	1.21	76				>12	5.84	0.57	76
			Total	6.61	1.04	190				Total	5.84	0.56	190
	Coop		1-12	6.46	1.19	59		Coop		1-12	5.56	0.90	59
			>12	6.18	1.10	56				>12	5.25	1.07	56
			Total	6.32	1.15	115				Total	5.41	0.99	115
	Total		1-12	6.52	1.11	312		Total		1-12	5.67	0.84	312
			>12	6.37	1.28	347				>12	5.65	0.85	347
			Total	6.44	1.20	659				Total	5.66	0.85	659
Intention	Miller	Off-farm workers (persons)	1-2	6.10	1.50	120	Past Behaviour	Miller	Off-farm workers	1-2	5.48	1.12	120
			>2	6.44	1.31	34				>2	5.71	0.68	34
			Total	6.18	1.46	154				Total	5.53	1.04	154
	Local Collector		1-2	6.61	0.96	85		Local Collector		1-2	5.86	0.54	85
			>2	6.76	0.70	21				>2	5.90	0.30	21
			Total	6.64	0.92	106				Total	5.87	0.50	106
	Coop		1-2	6.14	1.17	36		Coop		1-2	5.19	1.19	36
			>2	6.75	0.50	4				>2	6.00	0.00	4
			Total	6.20	1.14	40				Total	5.28	1.15	40
	Total		1-2	6.29	1.30	241		Total		1-2	5.57	0.99	241
			>2	6.58	1.09	59				>2	5.80	0.55	59
			Total	6.34	1.27	300				Total	5.61	0.93	300
Intention	Miller	Income off-farm work (%)	1-50%	6.09	1.51	133	Past Behaviour	Miller	Income off-farm work	1-50%	5.49	1.09	133
			>50%	6.71	0.90	21				>50%	5.76	0.62	21

Table D1 Descriptive Statistics of attribute variables for MANOVA (cont.)

Dependent variables	Channels	Profile		Mean	SD	N	Dependent variables	Channels	Profile		Mean	SD	N
			Total	6.18	1.46	154				Total	5.53	1.04	154
	Local Collector		1-50%	6.65	0.89	78		Local Collector		1-50%	5.83	0.57	78
			>50%	6.58	1.03	26				>50%	5.96	0.20	26
			Total	6.63	0.92	104				Total	5.87	0.50	104
	Coop		1-50%	6.21	1.15	39		Coop		1-50%	5.26	1.16	39
			>50%	6.50	0.71	2				>50%	6.00	0.00	2
			Total	6.22	1.13	41				Total	5.29	1.15	41
	Total		1-50%	6.28	1.32	250		Total		1-50%	5.56	0.99	250
			>50%	6.63	0.95	49				>50%	5.88	0.44	49
			Total	6.34	1.27	299				Total	5.61	0.93	299
Intention	Miller	Types of rice (Types)	1	6.42	1.28	178	Past Behaviour	Miller	Types of rice (Types)	1	5.75	0.74	178
			>1	6.37	1.30	174				>1	5.57	0.98	174
			Total	6.39	1.29	352				Total	5.66	0.87	352
	Local Collector		1	6.62	1.05	92		Local Collector		1	5.74	0.74	92
			>1	6.59	1.04	98				>1	5.93	0.30	98
			Total	6.61	1.04	190				Total	5.84	0.56	190
	Coop		1	6.46	1.04	81		Coop		1	5.51	0.87	81
			>1	6.03	1.36	33				>1	5.24	1.17	33
			Total	6.33	1.15	114				Total	5.43	0.97	114
	Total		1	6.48	1.17	351		Total		1	5.69	0.78	351
			>1	6.40	1.24	305				>1	5.65	0.87	305
			Total	6.45	1.20	656				Total	5.67	0.82	656
Intention	Miller	Partly for own consumption	No	6.52	1.18	195	Past Behaviour	Miller	Partly for own consumption	No	5.78	0.76	195
			Yes	6.23	1.40	159				Yes	5.48	1.03	159
			Total	6.39	1.29	354				Total	5.65	0.90	354
	Local Collector		No	6.42	1.31	53		Local Collector		No	5.64	0.92	53
			Yes	6.68	0.92	137				Yes	5.91	0.31	137
			Total	6.61	1.04	190				Total	5.84	0.56	190
	Coop		No	6.26	1.13	58		Coop		No	5.24	0.96	58
			Yes	6.39	1.18	57				Yes	5.58	1.00	57
			Total	6.32	1.15	115				Total	5.41	0.99	115
	Total		No	6.45	1.20	306		Total		No	5.66	0.85	306
			Yes	6.43	1.21	353				Yes	5.67	0.84	353
			Total	6.44	1.20	659				Total	5.66	0.85	659

Table D1 Descriptive Statistics of attribute variables for MANOVA (cont.)

Dependent variables	Channels	Profile		Mean	SD	N	Dependent variables	Channels	Profile		Mean	SD	N
Intention	Miller	Market Distance (Km)	< 4	6.37	1.29	63	Past Behaviour	Miller	Market Distance (Km)	< 4	5.57	0.96	63
			4 - 7	5.34	2.01	44				4 - 7	4.93	1.52	44
			> 7	6.32	1.31	115				> 7	5.75	0.71	115
			Total	6.14	1.52	222				Total	5.54	1.03	222
	Local Collector		< 4	6.88	0.50	101		Local Collector		< 4	5.93	0.29	101
			4 - 7	6.31	1.20	16				4 - 7	5.63	1.02	16
			> 7	5.96	1.57	24				> 7	5.83	0.38	24
			Total	6.66	0.93	141				Total	5.88	0.45	141
	Coop		< 4	6.14	1.39	21		Coop		< 4	5.14	1.31	21
			4 - 7	6.46	1.03	41				4 - 7	5.56	0.95	41
			> 7	6.36	0.99	25				> 7	5.48	1.00	25
			Total	6.36	1.11	87				Total	5.44	1.06	87
	Total		< 4	6.62	0.99	185		Total		< 4	5.72	0.78	185
			4 - 7	5.95	1.63	101				4 - 7	5.30	1.27	101
			> 7	6.27	1.31	164				> 7	5.72	0.73	164
			Total	6.34	1.30	450				Total	5.62	0.91	450
Intention	Miller	Hired vehicle	No	6.26	1.43	85	Past Behaviour	Miller	Hired vehicle	No	5.39	1.20	85
			Yes	6.43	1.24	269				Yes	5.73	0.77	269
			Total	6.39	1.29	354				Total	5.65	0.90	354
	Local Collector		No	6.76	0.86	109		Local Collector		No	5.91	0.44	109
			Yes	6.40	1.22	81				Yes	5.74	0.69	81
			Total	6.61	1.04	190				Total	5.84	0.56	190
	Coop		No	6.25	1.18	36		Coop		No	5.31	1.19	36
			Yes	6.35	1.14	79				Yes	5.46	0.89	79
			Total	6.32	1.15	115				Total	5.41	0.99	115
	Total		No	6.50	1.17	230		Total		No	5.62	0.95	230
			Yes	6.41	1.22	429				Yes	5.68	0.78	429
			Total	6.44	1.20	659				Total	5.66	0.85	659

Table D1 Descriptive Statistics of attribute variables for MANOVA (cont.)

Dependent variables	Channels	Profile		Mean	SD	N	Dependent variables	Channels	Profile		Mean	SD	N
Intention	Miller	Number of source of information (Sources)	1	6.83	0.60	86	Past Behaviour	Miller	Number of source of information (Sources)	1	5.79	0.78	86
			>1	6.24	1.42	264				>1	5.60	0.94	264
			Total	6.39	1.29	350				Total	5.65	0.91	350
	Local Collector		1	6.78	0.48	36		Local Collector		1	5.83	0.38	36
			>1	6.56	1.13	153				>1	5.84	0.60	153
			Total	6.60	1.04	189				Total	5.84	0.56	189
	Coop		1	5.94	1.61	16		Coop		1	5.13	0.96	16
			>1	6.38	1.06	99				>1	5.45	0.99	99
			Total	6.32	1.15	115				Total	5.41	0.99	115
	Total		1	6.71	0.80	138		Total		1	5.72	0.75	138
			>1	6.36	1.28	516				>1	5.64	0.87	516
			Total	6.44	1.21	654				Total	5.66	0.85	654

(Source: Author's own, 2017)

Table D2 Descriptive statistics for level of agreement regarding channels selection

Items	Miller			Local collector			Agri-Coop			Central paddy market			Group direct			Individual direct		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
1. Transaction specific variables																		
Higher price	5.62	1.51	371	5.16	1.67	204	5.62	1.42	122	4.88	1.20	49	5.00	0.82	4	5.00	0.00	3
Lower cost of transport	4.88	1.88	371	5.95	1.67	204	4.99	1.84	122	4.29	1.26	49	4.75	2.22	4	3.33	3.22	3
Cash Payment	6.47	1.01	371	6.75	0.81	204	5.98	1.32	122	6.63	0.88	49	5.25	1.50	4	6.33	0.58	3
Easy to access	6.31	1.10	371	6.62	0.90	204	6.34	1.14	122	6.82	0.60	49	6.00	0.82	4	6.67	0.58	3
Buy all quantity	6.34	1.25	371	6.53	1.02	204	6.28	1.22	122	6.82	0.67	49	6.00	1.16	4	3.67	2.52	3
Buy any type of rice	5.99	1.62	371	6.45	1.21	204	6.19	1.42	122	6.71	0.79	49	5.25	1.50	4	4.33	2.89	3
Monetary incentives	4.91	1.53	161	4.52	1.52	91	5.63	1.39	80	4.50	1.26	10	5.00	2.16	4	4.00	2.82	2
Non-monetary incentives/Services	3.45	2.11	371	4.41	2.36	204	4.32	2.10	122	4.69	1.29	49	4.75	2.63	4	3.00	2.65	3
2. Trust																		
Overall trust	5.97	1.36	236	6.51	0.97	150	6.19	1.24	93	5.81	1.55	42	7.00	-	2	7.00	-	1
Trust weigh scale	5.23	1.63	371	5.68	1.55	204	5.47	1.49	122	5.88	1.25	49	3.50	1.29	4	4.00	3.00	3
Trust grading	5.06	1.67	371	6.02	1.51	204	5.59	1.49	122	5.47	1.36	49	4.50	1.29	4	3.67	3.06	3
Fairly treated	6.03	1.44	236	6.55	0.97	150	6.25	1.24	93	6.07	1.50	42	7.00	-	2	1.00	-	1
Reputation	6.25	1.13	236	6.55	0.95	150	6.62	0.81	93	6.93	0.34	42	7.00	-	2	7.00	-	1
Reliable information	4.29	2.32	236	5.07	2.20	150	4.67	2.10	93	5.55	1.52	42	7.00	-	2	4.00	-	1

Table D2 Descriptive statistics for level of agreement regarding channels selection (cont.)

Items	Miller			Local collector			Agri-Coop			Central paddy market			Group direct			Individual direct		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
3. Personal relationship																		
Good relationship	4.51	1.86	371	5.53	1.71	204	4.76	1.80	122	4.55	1.52	49	5.25	1.26	4	3.33	3.22	3
Familiar	5.51	1.82	371	5.83	1.65	204	5.70	1.70	122	6.43	1.17	49	4.25	0.50	4	5.00	2.65	3
4. Attitude toward marketing channel choice																		
Good channel	5.78	1.45	371	5.96	1.40	204	5.89	1.41	122	6.16	1.23	49	6.25	0.96	4	6.00	1.00	3
Satisfied	6.02	1.34	371	6.20	1.27	204	6.16	1.17	122	6.33	0.97	49	6.00	2.00	4	6.00	1.00	3
5. Subjective norm regarding marketing channel choice																		
Norm friends	6.16	1.33	371	5.97	1.54	204	5.98	1.33	122	6.51	1.10	49	5.50	0.58	4	2.33	1.53	3
Norm family	5.83	1.66	371	6.07	1.58	204	5.60	1.86	122	5.27	2.01	49	4.50	2.52	4	2.67	2.08	3
Norm drivers	4.76	2.05	371	4.13	1.82	204	5.08	1.99	122	5.27	1.64	49	4.00	2.94	4	2.33	1.53	3
Norm government officers	4.10	2.41	198	3.50	2.49	92	5.09	2.43	70	3.00	2.37	11	4.50	2.38	4	3.33	2.52	3
Norm media	3.14	2.34	174	2.01	1.89	82	4.39	2.58	67	1.25	0.46	8	3.00	1.83	4	3.67	1.53	3
6. Perceived behavioural control over marketing channel choice																		
Having choices	2.61	2.05	371	3.60	2.41	204	3.63	2.40	122	6.02	1.80	49	3.75	2.22	4	6.00	1.73	3
Negotiation	3.53	2.17	371	3.62	2.18	204	4.42	2.21	122	4.73	1.93	49	4.25	1.50	4	4.33	2.08	3
No tie-in contract	3.13	1.31	67	3.36	2.08	28	3.20	1.63	25	3.67	1.37	6	4.00	2.00	3	3.50	3.54	2
No in debt with channel	3.20	1.47	51	3.35	2.12	26	3.11	1.50	27	3.43	1.40	7	3.00	2.65	3	6.00	-	1

(Source: Author's own, 2017)

Table D3 Fornell-Larcker criterion of the all latent variables

Latent Variables	I	P	A	CT	CA	TF	PBC	G	TI	IN	R	TS	TR	S	SV	T
Intention(I)	1.00															
Past Behaviour (P)	0.63	1.00														
Attitude (A)	0.38	0.36	0.85													
Consideration of Transaction specific cost (CT)	0.35	0.37	0.31													
Consideration of Channel Accessibility (CA)	0.39	0.43	0.39	0.42	0.73											
Fairness (TF)	0.16	0.08	0.45	0.10	0.01	1.00										
Farmers' Power (PBC)	-0.20	-0.15	-0.06	-0.13	-0.01	-0.01										
Goals of Selling (G)	0.26	0.34	0.17	0.16	0.40	0.04	0.10									
Integrity (TI)	0.16	0.08	0.42	0.32	0.14	0.36	-0.06	-0.03	0.86							
Intrinsic (IN)	0.28	0.29	0.25	0.17	0.42	0.09	0.07	0.58	0.10	0.77						
Relationship (R)	0.16	0.12	0.24	0.15	0.20	0.12	0.09	0.17	0.23	0.12						
Reliable Information (TS)	-0.17	-0.11	0.01	-0.10	-0.24	0.15	0.25	0.04	0.06	-0.08	0.22	1.00				
Reputation (TR)	0.20	0.20	0.37	0.15	0.18	0.38	0.04	0.16	0.10	0.10	0.14	0.05	1.00			
Subjective norm (S)	0.36	0.35	0.31	0.29	0.40	0.14	-0.22	0.20	0.22	0.19	0.20	-0.04	0.20			
Social Values (SV)	0.13	0.11	0.13	0.08	0.14	0.20	-0.01	0.20	0.08	0.40	0.11	-0.04	0.02	0.26		
Trust (T)	0.20	0.05	0.44	0.12	-0.05	0.65	0.03	0.04	0.36	0.13	0.13	0.17	0.39	0.14	0.13	1.00

(Source: Author's own, 2018)

Table D4 The correlations matrix for manifest variables in this study

Manifest variables	I	P	SVG	CAQ	CAT	GF	CTC	SD	CAA	TF	RF	SF	SVF	IF	SFR	AG	RG	TIG	PBCC	GP	CTP	CTT	GC	PBCN	CTS	SG	T	TS	TR	AS	IS	TIW	IW
Intention (I)	1.00																																
Past behaviour (P)	0.63	1.00																															
Belonging to group (SVG)	0.07	0.10	1.00																														
Buy all quantity (CAQ)	0.28	0.35	0.00	1.00																													
Buy any type (CAT)	0.28	0.23	0.03	0.59	1.00																												
Cash flow (GF)	0.15	0.24	0.04	0.13	0.14	1.00																											
Cash payment (CTC)	0.28	0.34	-0.13	0.34	0.31	0.12	1.00																										
Drivers (SD)	0.05	0.01	-0.04	-0.07	-0.04	0.14	-0.06	1.00																									
Easily accessible (CAA)	0.28	0.34	-0.08	0.53	0.46	0.18	0.39	0.04	1.00																								
Fairly (TF)	0.19	0.10	0.30	-0.02	0.05	0.02	-0.02	-0.08	0.01	1.00																							
Familiar (RF)	0.14	0.10	-0.07	0.12	0.15	0.22	0.11	0.32	0.24	0.03	1.00																						
Family (SF)	0.28	0.25	0.08	0.18	0.19	0.03	0.15	0.32	0.20	0.29	0.20	1.00																					
Family Tradition (SVF)	0.13	0.11	0.29	0.13	0.10	0.08	0.00	0.13	0.08	0.24	0.14	0.23	1.00																				
Freedom of selling (IF)	0.28	0.27	0.20	0.28	0.27	0.28	0.10	-0.02	0.29	0.14	0.13	0.10	0.33	1.00																			
Friends (SFR)	0.33	0.32	0.05	0.30	0.23	0.09	0.19	0.26	0.30	0.04	0.23	0.51	0.23	0.12	1.00																		
Good channel (AG)	0.31	0.31	0.05	0.29	0.28	0.05	0.17	0.05	0.28	0.43	0.15	0.24	0.11	0.18	0.26	1.00																	
Good relationship (RG)	0.14	0.10	0.00	0.06	0.10	0.14	0.10	0.18	0.08	0.22	0.45	0.18	0.06	0.01	0.12	0.26	1.00																
Grading (TIG)	0.15	0.07	0.05	0.03	0.11	0.05	0.14	-0.05	0.15	0.44	0.13	0.23	0.08	0.08	0.12	0.27	0.26	1.00															
Having choices (PBCC)	-0.20	-0.14	-0.12	0.03	0.04	0.14	-0.05	-0.06	-0.05	-0.04	0.03	-0.16	-0.04	0.09	-0.23	-0.08	0.04	-0.03	1.00														
High price (GP)	0.24	0.30	0.15	0.34	0.25	0.30	0.19	0.07	0.28	0.04	0.18	0.13	0.20	0.42	0.21	0.13	0.02	-0.06	0.03	1.00													
Higher price goal (CTP)	0.17	0.13	0.21	-0.03	0.02	-0.03	0.08	0.17	-0.02	0.20	-0.02	0.23	0.16	0.05	0.15	0.27	0.07	0.21	-0.19	0.00	1.00												
Lower cost transport (CTT)	0.15	0.13	0.07	0.04	0.08	0.07	0.06	0.08	0.12	0.24	0.19	0.20	0.09	0.04	0.16	0.18	0.35	0.32	0.00	-0.02	0.05	1.00											
Min cost (GC)	0.11	0.19	0.25	0.14	0.10	0.25	0.04	0.06	0.10	0.12	0.05	0.16	0.16	0.24	0.12	0.07	-0.03	0.04	0.03	0.40	0.17	0.03	1.00										
Negotiation (PBCN)	-0.01	-0.07	0.11	-0.10	-0.03	0.15	-0.19	0.35	-0.04	0.14	0.26	0.07	0.16	0.01	0.04	0.10	0.25	0.06	0.05	0.03	0.16	0.20	0.12	1.00									
Non-monetary incentives (CTS)	-0.06	-0.02	0.02	0.05	0.04	0.12	0.07	0.16	0.09	0.04	0.18	0.11	0.03	0.02	0.04	0.07	0.39	0.13	0.06	0.01	0.02	0.21	-0.04	0.21	1.00								
Officers (SG)	0.10	-0.02	0.09	-0.08	0.02	0.01	-0.05	0.65	-0.06	0.16	0.28	0.28	0.07	0.00	0.22	0.17	0.37	0.06	-0.08	-0.02	0.31	0.07	0.10	0.26	0.25	1.00							
Overall trust (T)	0.24	0.06	0.28	-0.10	0.04	0.04	-0.03	-0.06	-0.04	0.65	-0.01	0.30	0.16	0.19	0.05	0.42	0.26	0.44	0.01	0.03	0.27	0.26	0.08	0.17	0.02	0.22	1.00						
Reliable information (TS)	-0.20	-0.13	0.05	-0.26	-0.24	0.19	-0.18	0.17	-0.15	0.15	0.18	0.02	-0.05	-0.13	-0.04	-0.01	0.26	0.12	0.26	-0.03	-0.03	0.25	-0.07	0.30	0.21	0.12	0.17	1.00					
Reputation (TR)	0.24	0.24	0.07	0.11	0.18	0.09	0.14	-0.01	0.20	0.38	0.12	0.24	0.03	0.09	0.18	0.41	0.17	0.14	0.04	0.18	0.09	0.15	0.16	0.03	0.05	0.15	0.39	0.05	1.00				
Satisfied (AS)	0.33	0.30	0.09	0.19	0.20	0.10	0.13	0.00	0.22	0.49	0.08	0.22	0.11	0.19	0.20	0.73	0.20	0.36	-0.07	0.14	0.28	0.19	0.12	0.13	0.01	0.10	0.48	0.02	0.37	1.00			
Self-fulfilment (IS)	0.22	0.19	0.14	0.24	0.21	0.32	0.08	0.04	0.21	0.04	0.12	0.11	0.29	0.59	0.14	0.17	0.02	0.07	0.01	0.34	0.13	0.04	0.22	0.04	0.01	0.05	0.09	-0.04	0.06	0.15	1.00		
Weigh scale (TIW)	0.12	0.07	0.04	0.03	0.07	-0.03	0.19	-0.03	0.16	0.31	0.07	0.24	0.07	0.01	0.12	0.26	0.19	0.69	-0.10	-0.05	0.24	0.29	0.02	0.02	0.10	0.07	0.30	-0.02	0.06	0.34	0.04	1.00	
Wellbeing (IW)	0.16	0.20	0.17	0.22	0.15	0.34	0.13	0.04	0.25	0.06	0.12	0.10	0.29	0.55	0.15	0.13	0.06	0.14	0.05	0.40	0.08	0.07	0.34	0.03	0.01	0.04	0.08	-0.05	0.11	0.15	0.61	0.06	1.00

(Source: Author's own, 2018)

Table D5 Total indirect effects

Total Indirect Effects	Total sample			Miller		
	Original Sample	T Statistics	P Values	Original Sample	T Statistics	P Values
Attitude (A) -> Intention(I)	0.08	3.60	0.00	0.05	2.13	0.03
Consideration of Transaction-_specific cost (CT) -> Intention(I)	0.08	3.88	0.00	0.08	2.48	0.01
Consideration of _Channel Accessibility (CA) -> Intention(I)	0.12	4.15	0.00	0.10	2.51	0.01
Fairness (TF) -> Attitude (A)	0.27	5.49	0.00	0.37	4.63	0.00
Fairness (TF) -> Intention(I)	0.05	3.03	0.00	0.07	2.18	0.03
Fairness (TF) -> Past Behaviour (P)	0.04	3.23	0.00	0.04	1.99	0.05
Farmers' Power (PBC) -> Intention(I)	-0.05	2.69	0.01	-0.02	0.86	0.39
Goals of Selling (G) -> Intention(I)	0.10	3.57	0.00	0.07	1.96	0.05
Goals of Selling (G) -> Past Behaviour (P)	0.13	4.14	0.00	0.13	2.99	0.00
Integrity (TI) -> Attitude (A)	0.07	3.60	0.00	0.09	3.24	0.00
Integrity (TI) -> Intention(I)	0.01	2.49	0.01	0.02	2.00	0.05
Integrity (TI) -> Past Behaviour (P)	0.01	2.57	0.01	0.01	1.79	0.07
Intrinsic (IN) -> Consideration of Transaction-_specific cost (CT)	0.09	2.98	0.00	0.12	2.72	0.01
Intrinsic (IN) -> Consideration of _Channel Accessibility (CA)	0.23	6.76	0.00	0.20	4.42	0.00
Intrinsic (IN) -> Intention(I)	0.06	3.30	0.00	0.04	1.82	0.07
Intrinsic (IN) -> Past Behaviour _(P)	0.07	3.75	0.00	0.07	2.66	0.01
Reliable Information (TS) -> Attitude (A)	0.04	2.65	0.01	0.06	2.32	0.02
Reliable Information (TS) -> Intention(I)	0.01	2.11	0.04	0.01	1.65	0.10
Reliable Information (TS) -> Past Behaviour (P)	0.01	2.14	0.03	0.01	1.53	0.13
Reputation (TR) -> Attitude (A)	0.09	3.27	0.00	0.14	3.46	0.00
Reputation (TR) -> Intention(I)	0.02	2.44	0.01	0.03	2.07	0.04
Reputation (TR) -> Past Behaviour (P)	0.02	2.45	0.01	0.02	1.74	0.08
Subjective norm (S) -> Intention(I)	0.06	2.93	0.00	0.04	1.80	0.07
Social Values (SV) -> Intention(I)	0.04	3.25	0.00	0.04	2.21	0.03
Social Values (SV) -> Past Behaviour (P)	0.03	2.95	0.00	0.03	1.78	0.07
Trust (T) -> Intention(I)	0.11	3.41	0.00	0.12	2.46	0.01
Trust (T) -> Past Behaviour (P)	0.09	3.58	0.00	0.08	2.14	0.03

(Source: Author's own, 2018)