

IDENTIFYING THE PROCESS OF CRUCIAL TACTICAL FARM MANAGEMENT DECISION-MAKING AND ITS TYPES

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Keywords

farm management, tactical decisions, crucial farm management-decision making, farm business performance

Abstract

A significant amount of farm management decision-making (FMDM) research has been carried out in almost all areas of farm management for various purposes in many countries. However, it appears that there is a major deficiency in FMDM research in Korea. This is likely because the main interest of most researchers studying farm management is related to direct ways of improving farmers' business performance, such as the development of crop production technology and marketing skills. Therefore, there is a need for research aimed at better understanding how Korean farmers take into account external and internal factors in the process of farm management decision-making. Such research may contribute to the formation of effective government policies and extension services and improved financial performance at the individual farm level. This study aims to identify the types and characteristics of individual farmers' crucial tactical decision-making on farm management by employing the grounded theory approach and by analysing the data gained from a mail survey.

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I. Introduction

It is evident that the Korean farm economy has been fluctuating along with its dynamic operating environment. This changing operating environment has featured the deterioration of the agricultural economy, the pressure of trade liberalization, and the lack of labour force that has been caused by a rapid decrease in both the farm and rural populations. Although many government policies have been implemented to tackle these problems, the business performance of farm households has not improved, particularly in terms of real farm income (KREI 2008, 78-90).

The majority of the previous studies concerning farm management and farm business performance have focused mainly on economic viewpoints, for example, the estimation of farm income variation according to the change in economic or social situation (Kim et al. 2004; Hwang and Kang, 2006) and the identification of relationships between the farmer's management characteristics and business performance (Hwang and Moon, 2005; Park et al. 2005). For the most part, these studies have been conducted using statistical or secondary data and methods of statistical analysis. Therefore, despite their contribution to the research conducted in the area of farm management and farm economy, these previous studies are comparatively weak when considering farm management at the individual farm level, for example, how individual farm households respond to dynamic changes in the external environment in the process of farm management.

There are also a range of studies that argue that the ineffectiveness of government agricultural policies is directly related to the policies themselves, for example, the determination of targets and goals, the procedures of implementation, and the distribution of funds (Oh et al. 2001; Park et al. 2004; KREI, 2008). In addition to these matters, such policies are often less than successful because of a lack of understanding of the farmers' response to government policy and the farmers' objectives for their farms that may change as internal and external conditions change (Hollick, 1990; McGregor et al. 2001). Therefore, in order for government policies to have positive effects on improving farm management, policy makers need to be better informed about how individual farm managers make use of agricultural policies in the process of managing their farm businesses, and also what difficulties they encounter in this

process.

Therefore, there is a need for research aimed at better understanding how Korean farmers take into account external and internal factors in the process of farm management decision-making. Such research may contribute to the formation of effective government policies and extension services and improved financial performance at the individual farm level.

This study aims to identify the types and characteristics of individual farmers' decision-making and provide implications for the formation of better policies that can lead to improved business performance at the individual farm level.

II. Literature review on farm management decision-making

Since the understanding of how farm managers make their decisions is of great interest to many stakeholders including researchers, a significant amount of research on farm management decision-making(FMDM) research has been carried out in almost all areas of farm management(e.g. production, marketing, financial resource, environmental management and so on) for various purposes in many countries (Kim, 2009).

However, prescriptive decision research¹ and normative decision research² dominated FMDM research published in Korea, whereas descriptive decision research³ was found to be relatively scarce at the time this review was

¹ Prescriptive decision research is focused on how to help people to make good decisions or *how* to train people to make better decisions (Bell et al. 1988). One good example of a prescriptive study is the development of decision support systems (DSS).

² Normative decision research, which is usually studied in the context of economics, statistics and mathematics, is aimed at addressing the question of how people *ought to (should)* make decisions in given decision situations. (Bell et al. 1988; Einhorn and Hogarth, 1988).

³ Descriptive decision research deals with questions pertaining to how people really *do* make decisions. Descriptive decision research begins with observations of how decision makers (e.g. farmers selected to be observed) make choices in given situations (e.g. financial issues that need to be tackled) and attempts to describe systematically

conducted. Many FMDM studies conducted in Korea have dealt with the development of decision support systems (DSS) and software (prescriptive decision research) to assist farmers' decision-making and risk management (Chung and Kim, 1997; Kim and Kim, 2002; Park et al. 2002; Choi and Moon, 2003). For example, a risk management system for stabilising vegetable farmers' income was developed through econometric and mathematical programming approaches (Kim and Kim, 2002), and a software program for helping fruit farmers to make decisions on investment was also developed in this way (Park et al. 2002).

In normative decision research, game theory was applied in one study to analyse decisions that were related to the uncertainty of agricultural production by using annual data on barley production (Lee, 1970). In another study, the factors affecting the adoption of agricultural information systems by pig farmers were analysed using statistical methods (logistic regression) and decision trees (Lee et al. 2005). However, these studies relied on secondary statistical data rather than data gathered by conducting interviews with farmers in person.

With regard to descriptive decision research, women's participation in decision-making in farm management was studied (Lee, 1977; Cho, 2002). In a more recent study, Cho (2002) concluded that although women's involvement in the decision-making process among family members had expanded into almost all areas of farm management, their decision-making power was relatively minor compared with their contribution to farm labour.

Consequently, it appears that there is a major deficiency in FMDM research, especially descriptive decision research, in Korea. This is likely because the main interest of most researchers studying farm management is related to direct ways of improving farmers' business performance, such as the development of crop production technology and marketing skills. It has also been considered necessary to develop computer systems or software to provide better ways of supporting farmers' decision-making as the use of computers and the Internet among farmers has increased.

Therefore, it can be argued that there is a great need for undertaking research concerning farm management so as to provide a better understanding

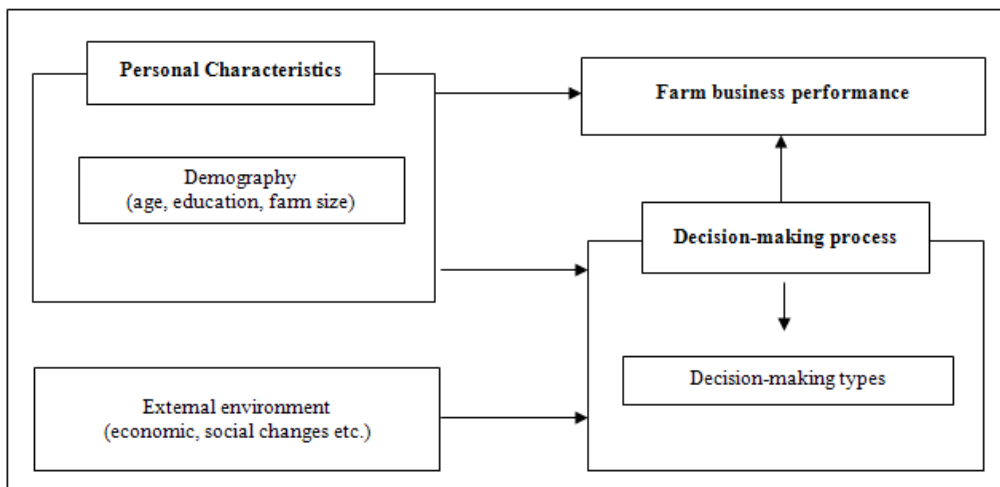
(inductively) the decision processes or social phenomena resulting from their decisions.

of farmers' decision-making processes. Otherwise, the policies, technologies and computer systems that are developed for the purpose of improving farmers' business performance may be of limited value or even useless.

III. Research framework and research methods

A conceptual research framework has been developed based on the literature review and the farm management model (Justus et al. 1968; Willock et al. 1999) shown in Figure 1. This framework illustrates the schematic relationships among farmers' personal characteristics, the decision-making process and farm business performance.

FIGURE 1. The conceptual research framework underlying the development of this study



Source: Based on Justus *et al.*(1968) and Willock *et al.*(1999)

In this conceptual research framework, farmers' decision-making is connected with personal characteristics and environmental factors. Farmers' business performance also depends on the decision-making processes and personal factors. Although external factors also have an impact on farm business (Willock et al. 1999), this study does not connect these factors with farm busi-

ness performance because it is difficult to examine these relationships at the individual farm level. Instead, these external factors are considered in the study of the decision-making processes.

The first phase of this study, as depicted in Figure 1, aims to identify the typology of farm management decisions and the factors that are related to understanding the decision-making processes. The second phase is related to assessing the relationships between farm managers' decision-making types and the demographic characteristics and business performance.

Therefore, this study employs different research methods in two different phases of study. In the first phase, the grounded theory approach is used for identifying processes and types of farmers' decision-making on farm management. Quantitative data, which is gained from a mail survey, is used for the second phase of this study.

1. Research method used in the first phase of study: the grounded theory approach

Developing a better understanding of various farmers' decision-making can be achieved by describing (descriptive study) every element (e.g. internal and external environments faced by farmers when they decide upon crucial issues on strategic or tactical farm management) and by categorising the processes pertaining to farmers' decisions (theoretical study). This process of categorisation transforms description into conceptual analysis by analytically and theoretically specifying the properties that have been observed. The grounded theory approach is well suited to areas of study that require theoretical development, such as farmers' decision-making processes, especially in the Korean context. This approach can also contribute to better understanding of decision-making processes because new or revised concepts, the relationships between them, and the substantive theory generated through the grounded theory approach can be useful tools for explaining and systematically interpreting various settings and farmers' behaviour (Strauss and Corbin, 1994; Charmaz, 2006).

The grounded theory approach, which was first introduced by Glaser and Strauss in *The Discovery of Grounded Theory* published in 1967, is a qualitative method that relies upon a systematic set of procedures to develop an inductively derived theory about a phenomenon that is 'grounded' or based in the data gathered. As a result, theory emerges from the data that has been system-

atically gathered and analysed rather than from *apriori* assumptions, other research or existing theoretical frameworks (Glaser and Strauss, 1967; Corbin and Strauss, 1990; Strauss and Corbin, 1990, 1994, 1998; Parry, 1998; Charmaz, 2006).

In the grounded theory approach, there are specific analysis procedures including the systematic asking of generative and concept-related questions, theoretical sampling, coding procedures, and so on (Corbin and Strauss, 1990; Strauss and Corbin, 1990, 1998). Data collection and theoretical analysis occur simultaneously, and data are usually collected until no further new information is found (Corbin and Strauss, 1990; Strauss and Corbin, 1994; Charmaz, 2006). By contrast, other qualitative researchers tend to collect much of their data prior to starting systematic analysis (Corbin and Strauss, 1990). In this process, the grounded theory researcher attempts to saturate categories through the constant comparative method of analysis and through theoretical sampling that leads to the development of categories. These procedures enhance the conceptual density of the theory that refers to the richness of concept development and the relationships, variation and conceptual integration. Conceptual density is different from 'thick description', which emphasises description rather than conceptualisation (Strauss and Corbin, 1994).

The fieldwork to conduct the in-depth interviews was held during April ~ May 2009, and after the mail survey had been completed. As a result of the mail survey, 49 farmers identified that they had made a crucial decision. Among these farmers, 41 agreed to a face-to-face interview and they were selected as the original sample for in-depth interviewing. According to theoretical sampling, a total of 28 farmers were interviewed from the 41 farmers identified in the original sample group.

2. Research method used in the second phase of study

A mail survey was designed with the general purpose of gathering ample data and also as a preliminary survey for the design of in-depth interviews within the grounded theory approach.

The first purpose of the mail survey is to collect qualitative data by using open-ended questions and some quantitative data. Qualitative data includes farmers' farming objectives and goals, and their decision-making on tactical farm management. Quantitative data includes farmers' biographical charac-

teristics, managerial characteristics (e.g. farm size, farm activities) and business performance. Qualitative data collected from the mail survey are used to complement the analysis of the data collected from in-depth interviews.

The second purpose for designing the mail survey is to prepare for the in-depth interviews. Before going into the field to conduct in-depth interviews and following the grounded theory approach, two issues must necessarily be considered: (1) which groups of farmers am I going to interview? and (2) what kinds of decisions am I going to ask about? The first issue is related to the selection of the original sample for a grounded theory approach, and the second is related to what the tactical farm management decisions are.

The mail survey was carried out in February 2009, prior to commencing the fieldwork to conduct in-depth interviews. As a result, 295 farmers who were farming in the research area (i.e. the four western provinces of *Gyeonggi-do*, *Chungcheongnam-do*, *Jeollabuk-do*, and *Jeollanam-do*) were selected from the informant pool managed by Korea Rural Economic Institute (KREI) and 145 farmers responded to the questionnaire.

IV. Major findings

1. Crucial tactical decision-making process and types

1.1. Definition of crucial tactical decisions

Farm management can be classified, in terms of both the time period of performance and its importance to the business, as strategic and tactical farm management, which can further be defined as charting the long term course of the farm business and short run actions respectively (Kay et al. 2008). Therefore, decisions are classified into two types on the basis of this dichotomy: decisions on strategic management and decisions on tactical management.

Among various decisions that farm managers make on a regular or irregular basis, the focus of this study is on crucial decisions relating to tactical farm management. Crucial decisions are defined as those that have the largest (or the most important) effect on farming activities and thus, the farm business, or those that are most difficult to make among the full range of farm manage-

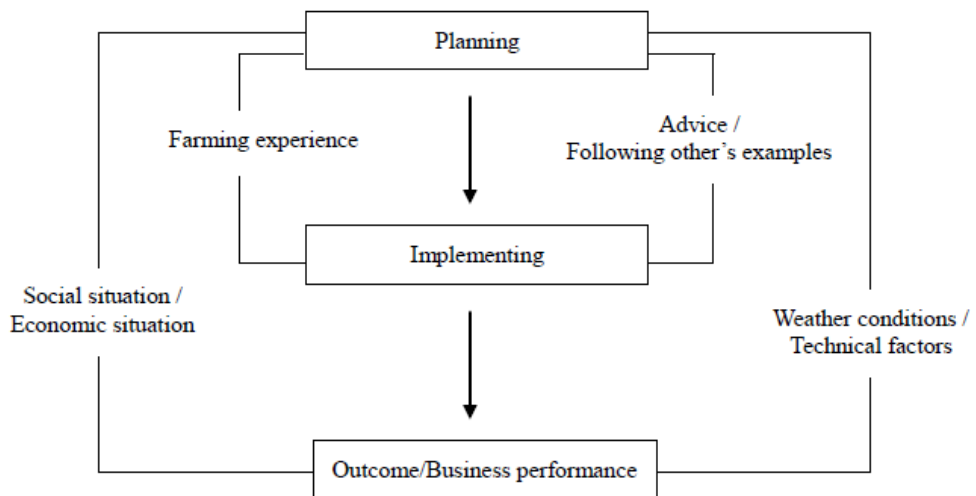
ment decisions.

Consequently, crucial tactical decisions (TD) are defined as the most difficult (or the most important) decisions among those on various routine farming activities (e.g. selecting crop varieties, hiring labour and buying farm materials).

1.2. The crucial tactical decision-making process

As shown in Figure 2, crucial tactical decisions were mainly based on farm managers' experience or advice received from neighbours. This was found to be the case all the way through the process from the planning stage to the implementing stage. The factors (i.e. social, economic, natural and technical) were also found to affect both the tactical decisions made and their outcomes (or business performance).

FIGURE 2. The tactical decision-making process and factors affecting the process



In the planning stage, in which farm managers establish their plans for tactical decisions, they mainly tended to decide on how to implement these decisions based on their farming experience or other farm managers' advice. For example, farmers who had previously needed to hire farm hands in a busy season decided not to hire extra help. Instead, they decided to do more of the farm work themselves and with the assistance of other family members, as their pre-

vious experience suggested they would have a hard time finding workers to hire (social situation) and even if they did find available farm hands, the cost of employing them would be high (economic situation).

However, some farm managers had no alternatives available to them and so they decided to hire farm hands or machinery as they had done in previous seasons despite the social and economic situation. In other cases, farmers decided to hire a combine and an operator instead of hiring farm hands based on a neighbour's advice, who had successfully done the same thing.

Farm managers tended to implement tactical decisions in the same way as they had done in previous seasons or in other cases, by following the examples of other farmers. Because of dynamic changes in the social and economic situation, however, the implementation of tactical decisions was increasingly difficult and the outcome of these decisions directly affected business performance. Many of the farm managers, who were interviewed therefore complained that they had little idea of what to do when faced in these difficult situations from season to season.

However, the first nature of tactical decision processes is that tactical decision-making is not based on 'consideration' of whether or not to make a particular decision. This is because tactical decisions should be implemented for as long as farm managers want to maintain their farm business. In other words, tactical decision-making involves deciding *what to do* rather than deciding on whether to continue or quit what the farm manager *would like to do*. This is because decision makers tend to already know what they are going to do based on their prior experience of implementing tactical decisions. For example, in decisions about hiring farm hands, farmers knew from experience when they needed farm hands, as long as they did not change farm size or enterprises. The matter of greatest concern is how (or where) to find the necessary farm hands required given the shortage of the labour force and the high costs of hiring additional help.

Second, it is difficult to separate the tactical decision-making process into explicitly defined stages as occurred with the identification of the two stages in the strategic decision-making process (the decision-considering stage and decision-implementing stage) as suggested by Kim (2010). This is the case even though farmers tend to start their tactical decision-making with setting up plans and following through implementation to reach their final outcome as depicted in Figure 3. The problem with making clear distinctions between these

activities is that the planning stage of the tactical decision-making process could easily form part of the implementing stage. In some cases, farmers go straight into the implementing stage depending on their own prior experience or by simply by following a course of action that they had previously taken without the need to consider any alternatives in the planning stage. For example, regarding decisions about hiring farm hands, some farmers decided to undertake extra farm work themselves or hired farm machinery from their neighbours because they had done these things before.

1.3. Types of crucial tactical decision-making

The factors making tactical decisions difficult to implement in the decision-making process are emerged through the coding procedures of the grounded theory approach: social, economic, natural, and technical factors. Social factors (e.g. shortage of farm hands, ageing, lack of farm machinery to hire) come from the social situation, especially in rural society. Economic factors are related to factors concerning economic situation (e.g. increase in labour cost, high cost in hiring farm machiner). Natural factors and technical factors are related to undesirable natural factors (e.g. development of blight and harmful insect, weather disaster) and relating to technical issues (e.g. frequent breakdowns of machinery).

Table 2. Description of crucial tactical decision-making types

Types of tactical decision-making	Description	Examples of decisions	Frequency (%)
TDT-SE	Tactical decisions constrained by social and economic factors	- Hiring farm hands - Hiring farm machinery - Buying farm materials - Financing	77 (69.4)
TDT-NA	Tactical decisions constrained by natural factors	- Managing disease or insects - Coping with natural disaster	17 (15.3)
TDT-TE	Tactical decisions constrained by technical issues	- Fixing machinery - Selecting crops or varieties - Irrigating	17 (15.3)

Note: The total number of tactical decision cases in the respondent group was 111

In this section, crucial tactical decision-making is categorised by considering these external factors. As shown in Table 2, three types of tactical decision-making (i.e. TDT-SE, TDT-NA and TDT-TE) are identified in order to characterise individual farm managers facing different kinds of difficulties in performing these crucial tactical decisions. In total, 111 identified cases of tactical decisions among the respondent group of the mail survey can be classified into these three types.

Crucial tactical decisions that are mainly constrained by social factors (e.g. lack of labour force) and economic factors (e.g. high cost of hiring labour and price of farming materials) are categorised into the TDT-SE type. This type includes decisions about hiring labour or farm machinery, buying farm materials, and financing.

The TDT-NA type includes crucial tactical decisions that are constrained by natural conditions such as decisions about coping with natural disasters, and managing crop diseases and harmful insects. The third type of tactical decisions, TDT-TE, is defined as those that are constrained by technical factors. This type includes decisions about repairing machinery, selecting crops or varieties, and irrigation. The majority of tactical decision cases identified in the respondent group fell into the TDT-SE type (69%), followed by TDT-TE (15%) and TDT-NA (15%).

In summary, crucial tactical decisions were planned and implemented mainly on the basis of farming experience and other farm managers' advice. These decisions were also affected by a range of various other factors, which were the basis for identifying the types of crucial tactical decisions.

2. Characteristics of crucial tactical decision-making types

2.1. *Demographic characteristics of tactical decision-making types*

Tactical decision-making types are significantly associated with biographical and managerial variables, as shown in Table 3. Farm managers whose crucial tactical decisions were related to the social and economic environment (the TDT-SE type) were found to be the oldest (mean age = 69 years), whereas those whose crucial tactical decisions were related to the natural environment (TDT-NA type) were found to be the youngest (mean age = 62.5 years), followed by those with the TDT-TE type (mean age = 64 years) (F-value = 6.76,

p<0.01). The education level of farm managers with the TDT-SE type was the lowest (mean score = 2.29), whereas that of farm managers whose crucial tactical decisions were related to technical issues (TDT-TE type) was the highest (mean score = 2.88) (F-value = 3.28, p<0.05)

Table 3. Farm managers' demographic characteristics by tactical decision-making types

Demographic variables	Tactical decision-making types			F-value ¹
	TDT-SE (N= 77)	TDT-NA (N= 17)	TDT-TE (N= 17)	
	Mean	Mean	Mean	
Biographical variables				
Age	69.0	62.5	64.0	6.76**
Education level	2.29	2.37	2.88	3.28*
Managerial variables				
Family members involved in farming	1.88	2.06	2.20	2.34
Farm size (ha)	2.09	2.49	3.55	3.31*

Note: 1. One-way analysis of variance (ANOVA), ** p<0.01, * p<0.05

With respect to managerial variables, farm managers with the TDT-TE type had many more family members involved in farming (mean = 3.6 people) compared to those with the TDT-SE type (mean = 1.9 people), although the difference was not statistically significant. In addition, there were significant differences in farm size between the different tactical decision-making types (F-value = 3.31, p<0.05). Farm managers with the TDT-TE type managed the largest areas of farmland (mean size = 3.5 ha), while those with the TDT-SE type managed the smallest areas (mean size = 1.99 ha)

Consequently, it can be concluded from these results that the tactical decisions related to social and economic factors, such as the shortage of farm hands and the high price of hiring labour and farm machinery (the TDT-SE type), appeared to be the crucial decisions and also the most difficult to implement for farm managers who were older, less educated and ran smaller farms. In contrast, the tactical decisions related to technical issues, such as fixing machinery and selecting varieties (the TDT-TE type), appeared to be the most crucial decisions for those who were younger, more educated and ran larger farms.

2.2. Associations between tactical decision-making types and business performance

Farm managers' business performance is examined with respect to the three key areas of earnings, farming efficiency, and financial stability.

Among the range of business performance indicators, farm business profit can be considered as a measure of financial performance (Kay et al. 2008). It is difficult to precisely calculate net farm income, which is one of the measures of profitability, at the individual farm level because according to previous studies (e.g. Lee, 1995), the majority of Korean farm managers tend not to keep detailed records of their financial or asset flows (e.g. income statements or cash flow statements). Therefore, in terms of reporting earnings rather than profitability, farm cash income, which can be simply calculated by subtracting total cash costs from total cash receipts, is used as a measure of farm business income.

It is also important for the analysis of farm business performance to consider how efficiently farm managers use their resources (Olson, 2004; Kay et al. 2008). In this respect, farming efficiency is examined by considering only farm income per unit of resources, such as farm size and family members, due to limitations with regard to the data collected. However, this can also be examined using a range of other measures such as looking at the productivity of labour, the amount of production per unit of farming cost, or financial efficiency (Olson, 2004). Farm income per unit (ha) of farm size (FINCOME_SIZE) and farm income per unit (person) of farm family members engaged in farming (FINCOME_MANAGER) are considered as the variables representing farming efficiency in this study.

As shown in Table 4, there are statistically significant associations between tactical decision-making types and total income (F-value = 13.09, $p < 0.001$) and farm income (F-value = 6.71, $p < 0.01$). Farm managers with the TDT-TE type earned the highest total income and farm income, whereas those with the TDT-SE type earned the lowest total income and farm income.

Table 4. Association between tactical decision-making types and business performance

Business performance	Tactical decision-making types			F-value ¹
	TDT-SE (N = 77)	TDT-NA (N= 17)	TDT-TE (N= 17)	
	Mean (\$)	Mean (\$)	Mean (\$)	
Earnings				
TINCOME	19384	34000	52066	13.09***
FINCOME	15007	22705	29933	6.71**
Farming efficiency				
FINCOME_SIZE	8821	16798	10676	3.02
FINCOME_MANAGER	8865	12531	15678	2.61
Financial stability				
DEBT	18504	46588	46357	4.10*
ASSET	1735096	23406	218181	0.85
EQUITY	1536610	18560	186454	0.33
EQUITY_ASSET (%)	86.8	78.7	82.0	1.15

Note: 1. One-way analysis of variance (ANOVA), *** p<0.001, ** p<0.01, * p<0.05

Meanwhile, farming efficiency did not seem to be significantly associated with the tactical decision-making types, although TDT-TE and TDT-NA types earned more farm income per farm size and per family member, when compared to the TDT-SE type. Therefore, it is not statistically appropriate to conclude in this study that farm managers with TDT-TE and TDT-NA types ran their farm businesses more efficiently than those with the TDT-SE type.

There are also no significant differences in financial stability between the tactical decision-making types except for the DEBT variable. It was found that farm managers with TDT-TE and TDT-NA types had more farm debt than those with the TDT-SE type.

V. Implications and conclusion

Tactical decision making process was identified according to the coding procedures of the grounded theory approach. In this decision process, tactical decision-making was found to be related to deciding *what to do* and was usually based on experiences from previous farming activities or other farmers' advice. However, tactical decision-making appeared to be heavily influenced by the ex-

ternal environment (i.e. social and economic factors, the natural environment and technical matters). These external factors constrained tactical decision-making and thus made tactical decisions difficult to implement.

It was also found that tactical decision-making types were significantly associated with business performance and demographic characteristics. These relationships appeared to be very similar to the conceptual research framework depicted in Figure 1. Better tactical decision-making types were also found to be TDT-NA and TDT-TE types in terms of business performance. This implies that farmers who are younger or run larger farm businesses, seem to be more concerned with tactical decisions regarding the natural environment (e.g. coping with natural disaster and managing crop disease or harmful insects) or technical issues (e.g. fixing machinery and selecting crops or varieties).

Therefore, in order to help farmers implement better tactical decisions, different extension programs (or policies) need to be targeted to these different farmer groups. For example, a specialised training program (or policy) regarding farm labour management needs to be set up for old farmers or small-scale farmers and a program (or policy) targeting young or large-scale farmers needs to focus on controlling disease and operating farm machinery.

This study has provided a range of knowledge about Korean farmers' farm management decision-making that will be useful for policy makers and researchers who are interested in developing better ways of enhancing farmers' business performance. Now, it is time to prepare a blueprint for the future of Korean rural society and agriculture, which is responsive to the existing conditions of the continuing decrease in the farm population and the emergence of an ageing society.

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