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INFLUENCES OF ENTREPRENEURIAL COMPETENCIES ON PRODUCT DEVELOPMENT DECISION: LONGAN PROCESSING ENTERPRISES IN THAILAND

Abstract:

This research aims to evaluate the entrepreneurial competencies of longan processing entrepreneurs and analyze the impacts of entrepreneurial competencies on new product development decision. The 165 samples of longan processing entrepreneurs are selected by a purposive sampling method. The results of entrepreneurial competencies show that risk taking orientation and competitiveness orientation are the two lowest score competencies in which the longan processing entrepreneurs should be interested in. Moreover, the age of the entrepreneur and pro-activeness orientation of the entrepreneur have some negative impacts on the decision making probability of the new product development. The entrepreneurial competencies on risk taking, innovativeness and competitiveness have positive influences on new product development decision. The findings lead to a discussion about whether the longan processing entrepreneurs are ready to develop the new product, or not.

Keywords:

longan processing, entrepreneurial competencies, product development, composite index, logit model

JEL Classification: C25, M21, Q13

1. Introduction

In Thailand, many government and private agencies have supported the small and medium enterprise entrepreneurs in production technology and marketing strategy development for enhancing competitiveness via various research fundings. Although these studies have brought about the progress in product quality improvement and new product development, some enterpreneurs could access and use the benefits from the ideas of technologies and marketing strategies. The main reason for getting unachieved outcomes was in disregarding the real abilities and skills of the entrepreneurship.

Entrepreneurship has been an important factor in producing business achievement, as well as economic growth and development (Toma, Grigore & Marinescu 2014). Many economists and scholars have used its concept for doing widespread research. What is entrepreneurship? Entrepreneurship is an entrepreneurial orientation representing processes, practices, competencies, and decision making of activities to new ways of business operations (Wang 2008). Thus, the entrepreneurs are the crucial participants in innovative creation in product markets and being involved in the efficiency improvement of business operations.

This paper defined entrepreneurship as entrepreneurial competency that is considered as a vital driving force on the competitiveness and the success of an organization. The concept of entrepreneurial competency has been found not only in the literature of competence, but also in the entrepreneurship literature. There are many competencies associated with entrepreneurship and these competencies can be acquired and developed from various researchers and scholars such as Gibb & Hannon (2006); Gürol & Atsan (2006); Mitchelmore & Rowley (2010); Lans, Blok & Wesselink (2014); Robles & Rodríguez (2015); Hastuti et al. (2015); Mthanti & Ojah (2017); and Gursoy, Altinay & Kenebayeva (2017). This research summarizes the literature reviews and focuses on five orientations of the entrepreneurial competencies as followed:

Risk taking orientation: Risk taking means the stages of decision and practice under uncertainty situations or risk conditions that may occur. Risk taking orientation consists of risk taking concerning with the ability to tolerate ambiguity and uncertain situations and decide for the best in this situation (Gürol & Atsan 2006; Mthanti & Ojah 2017; Gursoy et al. 2017), displaying the ability within the dynamics to work hard and anticipating continuously for the changing situations (Robles & Rodríguez 2015; Mthanti & Ojah 2017), dealing with change management with regards to the ability for adapting to different situations quickly and appropriately (Gürol & Atsan 2006; Robles & Rodríguez 2015; Mthanti & Ojah 2017), and troubleshooting by associating with the ability to be flexible in unpredictable situations, overcome them, and handle the contradictions (Gursoy et al. 2017).

Innovativeness orientation: Innovativeness refers to the desire to support creativity and experimentation in order to present new products. This creativity reveals the creation of diverse and exotic ideas, whereas the innovation is the implementation of ideas to make more value of products. The innovativeness orientation is the communication format that demonstrates the ability to listen effectively, ask questions, express ideas and concepts (Robles & Rodríguez 2015), as well as innovation that has the ability to produce originally and appropriately new work to respond to the needs of the context (Robles & Rodríguez 2015; Mthanti & Ojah 2017, Gursoy et al. 2017).

Autonomy orientation: Autonomy is the requirement to independently operate or manage one‘s business. Independence in administration is an important aspect of successful entrepreneurs. The autonomy orientation includes self-determination which is the capacity for making decisions independently based on the possibilities and the responsibility (Robles & Rodríguez 2015; Hastuti et al. 2015). It is also about having self-confidence referring to the ability in addressing new challenges with confidence in one‘s own decisions or views (Gürol & Atsan 2006; Hastuti et al. 2015), integrity that has the ability to act abide by or handle situations considered important (Robles & Rodríguez 2015; Hastuti et al. 2015). Moreover, it’s on self-control dealing with the ability to control yourself and knowing your limitations (Mthanti & Ojah 2017), and taking responsibility associating with the ability to balance between actions and words and resolving their mistakes (Robles & Rodríguez 2015; Hastuti et al. 2015).

Pro-activeness orientation: Pro-activeness means introducing new products and services into the competition, as well as forecasting or thinking about the situation of a product and service demand in the future. The proactive work is characterized as a looking forward behavior seeking for market leadership and foreseeing opportunities. This research separates the determinants of pro-activeness orientation into five indicators, such as quality of work involving the ability to work for achieving the goals and seeking continuous improvement (Gürol & Atsan 2006; Robles & Rodríguez 2015), initiative in the willingness to take action, create opportunities and improve outcomes without any disrupting conditions (Mthanti & Ojah 2017, Gursoy et al. 2017), leadership which is having the ability to suggest groups to move foraward in a certain direction by creating an atmosphere of energy and commitment, setting goals, following up these goals and giving feedback (Robles & Rodríguez 2015), results orientation dealing with the ability to promote, guide and choose actions in order to achieve the goals (Hastuti et al. 2015), and teamwork revealing the ability to actively participate in the common goal achievement of the team (Robles & Rodríguez 2015).

Competitiveness orientation: Competitiveness deals with the responses for preventing the obstacles and overcoming competition to improve the business position or eliminate the barriers of competitors in the market. The competitiveness orientation associates with

search and analysis of information that has the ability to explore and share useful information for solving the problems, networking that involves the ability to create and maintain an association that are useful in achieving the goals, social mobility that is dealing with the ability to raise or lower the economic well-being position, and negotiation whereas the ability is to lead or manipulate a discussion creating collaboration and strengthening the relationship (Robles & Rodríguez 2015).

In terms of new product development (NPD), many relevant research works indicate that entrepreneurial competencies are the essential factors to achieve the goal of NPD (Rauch et al. 2009; Freitas et al. 2012; Martens et al. 2018). The ability to take risks of entrepreneurs involve in dealing with unknown or uncertain business ventures and ensuring that the resources have a positive effect on the firms‘ objective for success (Rauch et al. 2009; Freitas et al. 2012; Carvalho & Rabechini 2015). Its impact is close to the result of innovativeness that creates the firm's desire for new opportunities and innovations by engaging in creativity and experiment, as well as researching and making development to achieve the NPD (Rauch et al. 2009 ; Mu & Di Benedetto 2011; Mu et al. 2017; Martens et al. 2018). Proactive thinking is associated with predictability and opportunity acquisition (Mu & Di Benedetto 2011; Setiawan, Erdogan & Ogunlana 2015; Mu et al. 2017; Martens et al. 2018) and future expectation (Rauch et al. 2009). It is characterized as the firm's trend to move foreword in the competition when launching new products. In view of autonomy in the firms‘ operation, it features an independent action to bring a vision or idea to its achievement (Lumpkin, Cogliser & Schneider 2009). Finally, competitiveness level is related to the tendency to challenge the competition by improving the position of firms, such as NPD (Freitas et al. 2012; Martens et al. 2018) and so on. In addition, the entrepreneurial and production characteristics, namely age of entrepreneur, education level, experience of entrepreneur, and production capacity, are also the important factors detremining the NPD decision.

The longan processing enterprise is important for the SME in generating occupations and income for the local people in the northern region of Thailand. Although this business have been operated for over 30 years the varieties of longan processing products are have been minimal in production. Various entrepreneurs have not developed their products and have always abided by traditional production patterns and ignoring the market trend and innovation. The reason for not changing the way of producing is due to most of the entrepreneurs having a high degree of doubtfulness in their competencies and mentally being uncertain with the market. This situation brings about a continuous loss of market share and the decline of longan processing enterprise quantities. Consequently, this paper aims to evaluate the entrepreneurial competencies of longan processing entrepreneurs and analyze the impacts of entrepreneurial competencies on making a NPD decision. The contributions of this paper are beneficial for the longan processing entrepreneurs to develop their competencies, develop their

products and expand their marketing channels. The rest of this paper are structured as followed: Section 2 describes the theoretical background. Section 3 represents the methodology used to analyze the entrepreneurial competencies and the relationships between entrepreneurial competencies and NPD decision. Section 4 displays the empirical results, and section 5 summarizes the study's findings and a discussion.

2. Methodology

2.1 Sample Selection and Data Collection

The population used in this research are the longan processing entrepreneurs in Chiang Mai and Lamphun provinces. The 165 samples are selected by purposive sampling and using a database of entrepreneur lists from the Provincial Agricultural Extension Office and Provincial Commercial Office of Thailand. In addition, the data used for analyzing are collected by using the structural questionnaires.

2.2 Research Method

To address the research purposes, composite index method is used for evaluating the indicators of entrepreneurial competency mentioned in section 1 and binary logit model is employed for analyzing the impact of entrepreneurial competencies on product development decision.

1) Composite index generating

Composite index is a mathematical aggregation of individual indicator set that measure multi-dimensional concepts (Nardo et al. 2005; Carayannis & Provance 2008). It mainly transforms quantitative data into the indices that serves as a benefit for comparability (Booysen 2002). There are various aspects for analyzing entrepreneurial competencies. Thus, the composite index method is valuable for integrating multi-dimensions into one value. The composite index used in this paper is applied from the Human Development Index (HDI) of the UNDP. The procedures to construct the index are as follow:

Step 1: Selecting of crucial variables

The indicators dealing with entrepreneurial competency index evaluation consist of five crucial dimensions, such as risk taking orientation, innovativeness orientation, autonomy orientation, pro-activeness orientation, and competitiveness orientation shown in Table 1.

Table 1: Entrepreneurial competency indices and indicators used in composite index evaluation

Indices	Indicators	
Risk taking orientation (RISK)	• Risk taking • Dynamism	• Change management • Troubleshooting
Autonomy orientation (AUTO)	• Self- determination • Self- confidence • Integrity	• Self-control • Responsibility
Innovativeness orientation (INNO)	• Communication	• Innovation
Pro-activeness orientation (PRO)	• Quality of work • Initiative • Leadership	• Results orientation • Teamwork
Competitiveness orientation (COM)	• Networks • Search and analysis of information	• Social mobility • Negotiation

Step 2: Normalization

When the variables in a data set have different measurement units and different ranges, normalization is required prior to data aggregation via putting all variables on a common basis before aggregating (Nardo et al. 2005). Several techniques can be used to normalize variables such as ranking, z-scores, re-scaling, categorical scales, etc. In this paper, re-scaling method is used for calculating. The formula is as follow:

$$I_{iv} = \frac{S_{iv} - S_v^{\min}}{S_v^{\max} - S_v^{\min}} \quad (1)$$

where I_{iv} is the v^{th} index the i^{th} respondent, S_{iv} is the v^{th} score of the i^{th} respondent, and $S_v^{\min}$, $S_v^{\max}$ are the minimum and maximum of the v^{th} scores, respectively.

Step 3: Aggregation of individual index into the composite index

Because the principle and database of each index are different causing the variance in the data, the sum and average methods could not be applicable to the total index calculation. Hence, we apply Human Poverty Index (HPI) evaluation of UNDP that utilize the cubic equation for reducing data variation in the following way:

$$C = \left[\frac{\sum_{v=1}^{V} I_v^3}{V} \right]^{\frac{1}{3}} \quad (2)$$

where C is the composite index, and I_v is the vth index.

Step 4: Determination of the criterions of entrepreneurial competency levels

The criterions of entrepreneurial competency levels can be expressed in Table 2.

Table 2: Criterions of competency levels

Index score	Levels of competency
$\bar{x} - S.D. >$ Index scores	Low
$\bar{x} - S.D. <$ Index scores $< \bar{x} + S.D.$	Moderate
Index scores $> \bar{x} + S.D.$	High

Note: $\bar{x}$ is average score and $S.D.$ represents standard deviation.

2) Binary logit model analyzing

In terms of longan processing with the entrepreneurs' decision making of product development, the appropriate tool for estimating the impacts of the independent variables to the binary choice dependent variable (1 = develop and 2 = don't develop) is the binary logit model.

Binary logit model is suitable for analyzing the qualitative dependent variable that has two binary choices in this research: develop or don't develop the new products. The data distribution of binary choices of dependent variable is logistic distribution. Thus, the estimation of dependent variables is in the form of the probability of situation occurrences with the value in the range (0, 1). The general model of logistic regression that has the vector of independent variables, x_i , to interpret the probability of occurrences in longan product development decision of the entrepreneur, y_i , is shown in equation (3) (Neupane, Sharma & Thapa 2002; Greene 2008; Gujarati & Porter 2009).

$$P(y_i \mid x_i) = \frac{e^{x_i'\beta}}{1+e^{x_i'\beta}} = \frac{1}{1+e^{-x_i'\beta}} \quad (3)$$

The binary logit model is constructed by transforming the equation (3) to a logarithm of odd ratio, as expressed in equation (4). The approach used to estimate the logit model is maximum likelihood estimator (MLE).

$$L_i = \ln\left(\frac{P(y_i \mid x_i)}{1-P(y_i \mid x_i)}\right) = x_i'\beta \quad (4)$$

From the above theoretical concept, the decision making of the processed longan entrepreneurs in NPD are determined by many explanatory variables. Consequently, this research has classified the explanatory variables affecting the product development decision into two groups consisting of 1) entrepreneur characteristics consist of age of entrepreneurs (AGE), education levels (EDU), experience (EXP) and production capacity (CAP), and 2) entrepreneurial competencies, such as risk taking orientation (RISK), innovativeness orientation (INNO), autonomy orientation (AUTO), pro-activeness orientation (PRO), and competitiveness orientation (COM).

Binary logit models used for analyzing are expressed in equation (5).

$$\ln\left(\frac{P(NPD_i)}{1-P(NPD_i)}\right) = \beta_1 + \beta_2 AGE_i + \beta_3 EDU + \beta_4 EXP_i + \beta_5 CAP_i + \beta_6 RISK_i + \beta_7 INNO_i + \beta_8 AUTO_i + \beta_9 PRO_i + \beta_{10} COM_i \quad (5)$$

The variables used in binary logit model, equation (5), and their impact directions of the independent variables on the dependent variable are summarized in Table 3. The approach for estimating equations (5) is the maximum likelihood (Greene 2008; Gujarati & Porter 2009).

Table 3: Variables and definitions for binary logit model

Variable	Definition	Types of measure	Direction of effect
Dependent variables:			
NPD	New product development decision of entrepreneur	1 = willing to develop, 0 = otherwise	-
Independent variables:			
AGE	Age of an entrepreneur	In years	-
EDU	Number of years in school of the entrepreneur	In years	+
EXP	Producing experience of the entrepreneur	In years	+
CAP	Production capacity	In no. of ovens	+
RISK	Risk taking orientation	1 = poor,	+
INNO	Innovativeness orientation	2 = fair,	+
AUTO	Autonomy orientation	3 = average,	+
PRO	Pro-activeness orientation	4 = good,	+
COM	Competitiveness orientation	5 = excellent	+

3. Empirical Result and Discussion

3.1 Longan Processing Entrepreneurial Competencies

The average scores of longan processing entrepreneurial competency indices in Table 4 reveal that the pro-activeness orientation index (PRO) has the highest average score, and followed by innovativeness orientation index (INNO), autonomy orientation index (AUTO), competitiveness orientation index (COM) and risk taking orientation index (RISK), respectively. These results represent that the entrepreneurs should enhance their competencies especially in risk taking orientation and competitiveness orientation, which are the two lowest scores. Moreover, considering the amount of entrepreneurs in each level of entrepreneurial competencies indices expressed in Table 4, the result shows that over 50% of the entrepreneurs have capabilities in the moderate level. This finding displays the readiness of longan processing entrepreneurs in Thailand being in acceptance with innovation or relevant to NPD programs that are supported and encouraged by government and private agencies.

Table 4: Percentages of entrepreneurs in each level of longan processing entrepreneurial competency indices

Dimensions of indices	Percentages of competency levels		
	High	Moderate	Low
RISK	13.94	63.64	22.42
INNO	17.58	70.91	11.52
AUTO	12.73	64.24	23.03
PRO	18.18	66.67	13.33
COM	9.70	76.97	11.52

Source: Calculated.

3.2 Influences of Entrepreneurial Competencies on New Product Development Decision

Summary statistics of variables that determine the NPD decision by longan processing entrepreneurs are calculated and shown in Table 5.

Table 5: Summary statistics of variables used in the binary logit model

Variables	N	Mean	S.D.	Min	Max
NPD	165	-	-	0.00	1.00
AGE	165	46.13	9.40	22.00	69.00
EDU	165	10.27	4.12	0.00	18.00
EXP	165	11.92	5.80	3.00	25.00
CAP	165	2.09	1.21	1.00	7.00
RISK	165	3.11	0.92	1.78	5.00

Variables	N	Mean	S.D.	Min	Max
INNO	165	3.23	0.72	1.56	5.00
AUTO	165	3.22	0.87	2.00	5.00
PRO	165	3.30	0.70	1.84	5.00
COM	165	3.21	0.80	1.33	5.00

Source: Calculated.

For the correlation among the independent variables used in the binary logit model of the NPD decision by longan processing entrepreneurs (Table 6), the results show that the correlation values of all independent variables do not exceed 0.7 thus meaning that there is no multicollinearity in the model.

The results on the influences of entrepreneurial competencies on NPD decision from application of the binary logit model are reported in Table 7. The goodness of fit of the model with the McFadden's R-square of 0.4876 and 81.21 percent has the correct prediction.

Table 6: Correlation between the variables used in the binary logit model

Variables	AGE	EDU	EXP	CAP	RISK	INNO	AUTO	PRO	COM
AGE	1.00								
EDU	-0.23	1.00							
EXP	0.16	-0.19	1.00						
CAP	-0.02	0.13	0.03	1.00					
RISK	-0.30	-0.12	-0.08	0.17	1.00				
INNO	-0.25	-0.06	-0.06	0.23	0.54	1.00			
AUTO	-0.38	-0.06	-0.08	0.20	0.58	0.63	1.00		
PRO	-0.20	-0.14	-0.05	0.28	0.49	0.58	0.62	1.00	
COM	-0.24	-0.13	0.01	0.19	0.55	0.60	0.40	0.66	1.00

Source: Calculated.

Table 7: Binary logit model analysis of product development decision by longan processing entrepreneurs

Variable	Estimate		Marginal effect	
	Coefficient	t-value	Coefficient	t-value
Constant	-0.7111	-0.264	-0.1778	-0.264
AGE	-0.0936**	-2.857	-0.0234**	-2.856
EDU	-0.1065	-1.593	-0.0266	-1.592
EXP	0.0057	0.146	0.0014	0.146
CAP	0.1529	0.534	0.0382	0.534
RISK	1.9468**	2.887	0.4867**	2.892
INNO	2.8284**	3.701	0.7071**	3.703
AUTO	0.4107	0.734	0.1027	0.734
PRO	-5.4102**	-4.161	-1.3525**	-4.171
COM	2.1968*	2.421	0.5492*	2.421
Number of observations	165			

Variable	Estimate		Marginal effect	
	Coefficient	t-value	Coefficient	t-value
Restricted log likelihood	-114.0023			
McFadden's R-square	0.4876			
Percent correctly predicted	81.21			

*Note: *, ** denote .05 and .01 statistically significant levels, respectively.*

The estimations in Table 7 are interpreted by the significant variables as follows:

Age of entrepreneur (AGE): The age of an entrepreneur reflects his/her ability to learn and adopt new things. The result in Table 7 indicates that age of an entrepreneur has a strong negative relationship with the NPD decision at 99% confident level. The increase in the age of an entrepreneur results in the reduction of the decision making chance of the production development around 0.0234. Thus, the entrepreneurs who are the younger individuals are more likely to make a decision on a new product development.

Risk taking orientation (RISK): Risk taking in longan processing of entrepreneurs demonstrates the ability to tolerate ambiguity and uncertain situations and make sound decisions in this situation, work hard and change continuously in situations, adapt to different contexts, situations, people and media quickly and appropriately, assume boundary situations and overcome them, and handle contradictions (Robles & Rodríguez 2015). The estimation in Table 7 reveals that the increase in the risk taking of the entrepreneurs brings about an increase in the chance of decision making on NPD by 0.4867 at 99% confidence interval. This result shows the same direction with impact that is similar to the research conducted by Rauch et al. (2009), Freitas et al. (2012) and Carvalho & Rabechini (2015). In addition, the evidence of this situation is confirmed by the findings with respect to the recommendation for longan processing entrepreneurs about the enhancement of their competencies, especially in risk taking orientation, as mentioned in previous sections, as well.

Innovativeness orientation (INNO): Innovativeness concerns with ability to listen, ask questions, express ideas and concepts effectively, and ability to produce an original, unexpected and appropriate new work according to the needs of the context (Robles & Rodríguez 2015; Mthanti & Ojah 2017; Gursoy et al. 2017). The result shown in Table 7 indicates that the innovativeness has a positive influence on decision making of NPD by longan processing entrepreneurs at 0.01 statistically significant level, and with the marginal effect of 0.7071. This finding implies that the entrepreneurs who focus on the new things for improvement are likely to develop the new products.

Pro-activeness orientation (PRO): Pro-activeness implies taking initiative to anticipate and pursue new opportunities. The result shows that the pro-activeness of longan processing entrepreneurs has a negative effect on the decision making of NPD

approximately 1.3525 at 0.01 statistically significant level. This finding opposes the study of Mu & Di Benedetto (2011), Setiawan et al. (2015), Mu et al. (2017) and Martens et al. (2018) defining pro-activeness as seeking new opportunities related to the introduction of new products. One reason for this situation is that enterperneurs are inclined towards doubtfulness in the consumer acceptance of new products. Many longan processing entrepreneurs have faced the uncertainty of longan processing market. They rather improve their product quality than develop a new one.

Competitiveness orientation (COM): Competitiveness is also one of the two factors recommended for longan processing entrepreneurs to enhance their competencies in the previous section. The result mentioned in Table 7 reveals that the increase in entrepreneurial competitiveness contributes to the rise in the decision making probability of the NPD around 0.5492 at 95% confident interval.

4. Conclusion

This research aims to evaluate the entrepreneurial competencies (entrepreneurships) of longan processing entrepreneurs and analyze the impacts of entrepreneurial competencies on NPD decision.

The results of entrepreneurial competencies show that the longan processing entrepreneurs have capabilities of pro-activeness orientation in the highest level. On the contrary, the entrepreneurs should enhance their competencies especially in risk taking orientation and competitiveness orientation, which are the two lowest scores. In terms of the influences of entrepreneurial competencies on NPD decision, the results reveal that age of the entrepreneur and pro-activeness orientation of the entrepreneur have negative impacts on the decision making probability of the new product development. Whereas the entrepreneurial competencies on risk taking, innovativeness and competitiveness have some positive influences on NPD decision.

The findings lead to a question in discussion about whether the longan processing entrepreneurs are ready to develop the new product, or not. The contributions of this research confirm the readiness of longan processing entrepreneurs in Thailand in acceptance with innovation or NPD programs through the results of over 50% of the entrepreneurs having entrepreneurial competencies in the moderate level and 80% of entrepreneurial competency determinants have the statistically significant effects on NPD decision. Consequently, the longan processing entrepreneurs and the relevant agencies can be assured that the participations in entrepreneurial competency enhancement and NPD programs are useful in the long term.

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