Final Report

A Cross-country Analysis of Entrepreneurship, Innovation and Technical Efficiency of Manufacturing SMEs in ASEAN Economies

By Assistant Professor Dr Teerawat Charoenrat

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A Cross-country Analysis of Entrepreneurship, Innovation and Technical Efficiency of Manufacturing SMEs in ASEAN Economies

Researcher	Institute
1. Assistant Professor Dr.Teerawat Charoenrat	Khon Kaen University
2. Associate Professor Dr.Charles Harvie	Wollongong University

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Abstract

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Investigator : Assistant Professor Dr Teerawat Charoenrat

E-mail Address : fanta7711@hotmail.com; tc888@uowmail.edu.au

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Abstract:

Closer economic integration in ASEAN and East Asia presents many export opportunities for firms in economies such as Thailand. At the same time, it also presents them with many challenges. Small and medium-sized enterprises (SMEs) dominate the business landscape in Thailand but — like the country — are caught in a sort of middle-income trap. They face intense competition from SMEs in low labour cost, low value-add production locations in the region (such as Cambodia, China and Vietnam), yet they also are unable to transition into innovation, intensive, higher value-adding activities (such as SMEs in Japan, Korea and Taiwan). Can Thai SMEs take advantage of the potential benefits arising from closer regional integration?

This paper: assesses the role, contribution and significance of manufacturing SMEs to the Thai economy; examines the major challenges that they face and likely factors affecting their export participation; and identifies the policy framework environment in which they operate. An empirical analysis is then conducted identifying critical factors associated with Thai manufacturing SME exports. This uses Probit and Logit models based on data compiled for the 2015 ERIA-ISEAS SME survey of Thailand. Key results obtained suggest that foreign ownership of local enterprises, membership of an FTA, awareness of ASEAN and the ASEAN Economic Community and appropriately targeted government business support policies can most effectively increase the export participation of Thai small manufacturing firms.

Keywords : Thailand, SMEs, Regional Economic Integration, ASEAN Economic Community

Final report content:

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This paper: assesses the role, contribution and significance of manufacturing SMEs to the Thai economy; examines the major challenges that they face and likely factors affecting their export participation; and identifies the policy framework environment in which they operate. An empirical analysis is then conducted identifying critical factors associated with Thai manufacturing SME exports. This uses Probit and Logit models based on data compiled for the 2015 ERIA-ISEAS SME survey of Thailand. Key results obtained suggest that foreign ownership of local enterprises, membership of an FTA, awareness of ASEAN and the ASEAN Economic Community and appropriately targeted government business support policies can most effectively increase the export participation of Thai small manufacturing firms.

2. Executive summary

2.1 Introduction to Research

Thailand's SMEs have played a pivotal role in the country's economic and social development (Office of Small and Medium Enterprises Promotion (OSMEP), 2014). They constituted 99 per cent of all enterprises in the country and contributed 73 per cent of total employment during the period 2007 to 2012. They contributed 33 per cent of total exports on average and approximately 38.8 per cent of total GDP at current prices on average over the period 2007 to 2012 (OSMEP, 2013). Of total SMEs almost one-third were in the manufacturing sector over the period 2007 to 2012. Manufacturing SMEs employed around 27.1 per cent of the private sector workforce on average over the period 2007 to 2012 and their contribution to total SME GDP was 28.7 per cent over the same period.

Hence, Thai SMEs in general have made, and continue to make, a significant contribution to the country's social and economic development (Regnier, 2000; Brimble et al., 2002; Mephokee, 2003; Pholphirul and Biatasevi, 2012). This contribution is multi-dimensional in nature: business numbers; employment, GDP and exports. This section conducts a brief overview of this contribution with a focus upon the period 2007 to 2012. The hiatus of manufacturing SMEs in particular occurred in 1997 before the full effects of the Asian Financial Crisis (AFC) began to have an impact. They have not regained such a level of importance, although they still remain important in terms of their contribution to the number of SME enterprises, employment, GDP and exports. They will remain important in the future but the extent of this will likely depend upon enhancing their competitiveness.

2.2 Literature review

This section provides a review of the literature in relation to the factors that can influence the export decisions of firms, such as firm age, firm size, foreign ownership, R&D, financial support, and government assistance.

A number of studies have investigated both linear and non-linear relationships between firm size and export performance (see Jongwanich and Kohpaiboon, 2008; Dueñas-Caparas, 2006; Althukorala et al., 1995). Jongwanich and Kohpaiboon (2008) utilized the 1997 Thai Industrial Census to examine the determinants of a firm's export decision in the Thai manufacturing sector. They found that firm size has a positive and significant impact upon a firm's export decision, indicating that there are typically significant sunk costs related to entering export markets, hence larger firms are more likely to obtain advantages than smaller firms. However, a non-linear relationship between firm size and its export decision, was not found in their study.

Dueñas-Caparas (2006) investigate the determinants of export performance in Philippine manufacturing firms. They found both positive linear and negative non-linear relationships between a firm's size and its export performance in the country's clothing sector, but insignificant results were found in the food processing and electronics sectors. Athukorala et al. (1995) studied the Sri Lankan Survey of Manufacturing in 1981 and found that firm size is significantly and positively correlated with the export decisions of 111 Sri Lankan manufacturing firms. They suggested that firm size can be an important factor of export participation where scale or size economies exist. Reaching an adequate size may be crucial for achieving success in export markets, since exporting is a costly and risky activity. Smaller firms, therefore, may be at a disadvantage in gathering market

information, introducing overseas sales-promotion campaigns, withstanding exchange rate and other risks, and adapting their products to foreign markets.

However, a number of empirical studies have presented that firm size can have a negative association with a firm's export decision (Biggs, 2002; Wiboonchutikula, 2002; Alvarez and Crespi, 2003; Yang and Chen, 2009; Le, 2010). The benefits of being a small firm are as follows: 1) they have the flexibility to adjust and diversify their activities in order to become more efficient; 2) small firms add dynamism to business activities which can improve economic performance; 3) small firms are likely to have a cost advantage relative to medium- and large-sized firms (Biggs, 2002; Biesebroeck, 2005; Yang and Chen, 2009; Le, 2010).

Firm age, indicating a learning-by-doing experience, can be one of the factors that significantly affect export decisions, since old firms can compete with foreign companies due to their cumulative experience, business networks and reputation. Aggrey et al. (2010), however, pointed out that young firms are more proactive, flexible and aggressive than old firms. As a result, they are willing to adopt modern technology, whereas old firms are stuck with outdated physical capital. Focusing on empirical studies, Jongwanich and Kohpaiboon (2008) found that firm age has a significant and positive linear effect on export decisions among Thai manufacturing enterprises, implying that older firms tend to have more operating experience and higher efficiency through their learning-by-doing process than younger firms. A negative and significant non-linear effect, however, was found among Thai manufacturing enterprises, indicating that after a certain threshold, a firm's experience does not exert a positive effect on its export performance. In other words, a negative relationship between a firm's age and its export activity may be observed, since firms firstly supply the local market, and diversification into exports does not occur until an expansion of their domestic markets has been exhausted (Jongwanich and Kohpaiboon, 2008).

However, Dueñas-Caparas (2006) found both positive linear and negative non-linear associations between a firm's age and its export performance in the Philippine clothing and electronics sectors, but an insignificant result was found in the food processing sector.

A number of empirical studies have found a significant and positive relationship between foreign ownership and firm export decisions (Greenaway et al., 2007; Jongwanich and Kohpaiboon, 2008; Aggrey et al., 2010). For example, Greenaway et al. (2007) found that foreign ownership had a significant and positive effect on firm export participation for 9,292 UK manufacturing enterprises between 1993 and 2003. For Thailand, Jongwanich

and Kohpaiboon (2008) used the 1997 Thai manufacturing census and found that foreign ownership has a significant and positive impact on firm export participation among Thai manufacturing enterprises. This positive result implies that an increase in foreign participation encourages firms to participate in export markets since foreign partners bring new foreign markets and distribution, new products, managerial know-how and advanced production technology (Jongwanich and Kohpaiboon, 2008). Jongwanich and Kohpaiboon (2008, p21) also pointed out that foreign-owned firms can cover sunk costs and enter foreign markets more easily than domestically owned firms.

With respect to research and development (R&D), Dueñas-Caparas (2006) found that R&D has a significant and positive effect on a firm's export decision in the Philippine electronics industry, but a significant and negative relationship was found in the country's clothing industry. Roper and Love (2002) also found small plants' export propensity was positively affected by informally and formally organised R&D activity, but only more formally organised R&D was useful for large plants.

Finally, government assistance can influence a firm's exporting decision. Such aid can be in the form of financial support (e.g., credit assistance, income tax exemption or reduction, and exemption from import duties on essential raw materials) and non-financial support (e.g., managerial and technical assistance, and training support). The coefficient estimates of the government support variable are positive. Wu and Cheng (1999) studied the determinants of export performance in China's township-village enterprises, and found that government financial support contributes positively toward the international competitiveness of TVE export performance.

2.3 Objectives

2.3.1 To identify the role, significance and contribution of Thai SMEs;

2.3.2 To examine the factors that can affect the export participation of Thai manufacturing SMEs;

2.3.3 To identify plans and policies to improve the performance of Thailand's manufacturing SMEs.

2.4 Research methodology

Data compiled for the 2015 ERIA-ISEAS SME survey of Thailand will be utilised for the empirical analysis conducted in this report. Focusing on the methodology, it presents empirical results identifying the most important variables impacting the export participation of our sample of firms. A binary variable for export participation is used as

the dependent variable. Therefore, the Limited Dependent Variable Models, such as 1) the probit model, and 2) the logit model, are utilised to conduct this study, which can be illustrated as follows (Wooldridge, 2006):

$G(z) = \phi(z) = \int_{-\infty}^{z} \emptyset(v)dv$ Probit Model

$G(z) = \frac{exp(z)}{1+\exp(z)} = \Lambda(z)$ Logit Model

Where:

$\phi\ (z)$ is the standard normal density as given by $(2\pi)^{-1/2}\exp\ (-z^2/2)$.

For probit and logit models the relationship between dependent and independent variables is assumed to be an increasing function. For the binary response model, Wooldridge (2006, p. 256, 582) also mentioned that the probit and logit models can overcome certain drawbacks of the linear probability model (LPM), since the LPM model violates the homoskedasticity assumption that is important for justifying the t and F statistics. The assumption of linear parameters between the dependent and independent variables is also generally required for the LPM model under the ordinary least squares (OLS) estimation. The probit model is also more popularly compared with the logit model, as economists are likely to favour the probit model's normality assumption (Wooldridge, 2006, p385). In addition, the probit model's method of maximum likelihood estimation automatically accounts for the heteroskedasticity problem. However, these two estimation models are utilized to check the sensitivity of this study's results (Jongwanich and Kohpaiboon, 2008). Applying the limited dependent variable models the equation for the export decisions of all firms are identified as follows:

Equation 1:

$$Z_{ij} = \beta_0 + \beta_1 FIRM\_AGE_{ij} + \beta_2 FIRM\_SIZE_{ij} + \beta_3 FOREIGN\_OWNERSHIP_{ij} + \beta_4 FAMILY\_BUSINESS_{ij} + \beta_5 IN-HOUSE\_R\&D_{ij} + \beta_6 OUTSOURCE\_R\&D_{ij} + \beta_7 FINANCIAL\_SUPPORT_{ij} + \beta_8 FTA_{ij} + \beta_9 ASSIST\_EXPANSION_{ij} + \beta_{10} AWARE\_AEC_{ij} + \beta_{11} AWARE\_ASEAN_{ij} + \beta_{12} BUSINESS\_ASSOCIATIONS_{ij} + u_{ij}$$

Where

Z_{ij} = Dummy for export participation:

Z_{ij} = 1 if firm *i* in industry *j* exports to foreign markets

= 0, otherwise;

$FIRM\ AGE_{ij}$ = Age of firm *i* at time *t,* represented by the number of operating years.

$FIRM\ SIZE_{ij}$ = Size of firm *i* in industry *j*, represented by the number of workers.

$FOREIGN\ OWNERSHIP_{ij}$ = Dummy for foreign ownership;

$FOREIGN\ OWNERSHIP_{ij}$ = 1 if firm *i* in industry *j* has foreign ownership;

= 0, if firm *i* in industry *j* does not have foreign ownership.

$FAMILY\ BUSINESS_{ij}$ = Dummy for a family business;

$FAMILY\ BUSINESS_{ij}$ = 1 if firm *i* in industry *j* is a family business;

= 0, if firm *i* in industry *j* is not a family business.

$IN-HOUSE\ R\&D_{ij}$ = Dummy for in-house R&D activities;

$IN-HOUSE\ R\&D_{ij}$ = 1 if firm *i* in industry *j* has expenditure on in-house R&D activities.

= 0, if firm *i* in industry *j* does not have expenditure on in-house R&D activities.

$OUTSOURCE\ R\&D_{ij}$ = Dummy for outsourcing R&D;

$OUTSOURCE\_R\&D_{ij}$ = 1 if firm *i* in industry *j* has expenditure on outsourced R&D activities.

= 0, if firm *i* in industry *j* does not have expenditure on outsourced R&D activities.

$FINANCIAL\ SUPPORT_{ij}$ = Dummy for financial support;

$FINANCIAL\ SUPPORT_{ij}$ = 1 if firm i in industry j obtains financial support;

= 0, if firm i in industry j does not obtain financial support.

FTA_{ij} = Dummy for FTA:

FTA_{ij} = 1 if firm *i* in industry *j* is involved[1] with an FTA.

= 0, if firm *i* in industry *j* is not involved with an FTA.

$ASSIST\ EXPANSION_{ij}$ = Dummy for assist expansion;

$ASSIST\ EXPANSION_{ij}$ = 1 if firm i in industry j obtains assistance in business expansion from abroad;

= 0, if firm i in industry j does not obtain assistance in business expansion from abroad.

$AWARE\_AEC_{ij}$ = Dummy for aware of the ASEAN Economic Community (AEC);

$AWARE\_AEC_{ij}$ = 1 if firm i in industry j is aware of the AEC;

= 0, if firm i in industry j is not aware of the AEC;

$AWARE\_ASEAN_{ij}$ = Dummy for aware of ASEAN Policy Blueprint/Strategic Action Plan;

$AWARE\_ASEAN_{ij}$ = 1 if firm i in industry j is aware of the ASEAN Policy Blueprint;

[1] Defined to mean firm usage of any FTA in the conduct of their business

= 0, if firm i in industry j is not aware of the ASEAN Policy Blueprint;

$BUSINESS\ ASSOCIATIONS_{ij}$ = Dummy for business associations;

$BUSINESS\ ASSOCIATIONS_{ij}$ = 1 if firm *i* in industry *j* belongs to a business association;

= 0, if firm *i* in industry *j* does not belong to a business association.

3. Result

The results of maximum likelihood estimates (MLE) of probit and logit models for aggregate manufacturing based on our sample of 301 firms in 2015, as specified by equation 1, where export participation is the dependent variable. The results from probit and logit models show that only four specific factors were found to be statistically significantly associated with the export participation by Thai manufacturing firms in aggregate, these being in-house R&D, FTA, awareness of AEC, and business association membership, respectively.

For in-house R&D the coefficient estimates indicate a positive and significant association with a firm's export participation for both the probit and logit models in aggregate in 2015, indicating that R&D can help improve the quality of a firm's products to compete in international markets. With R&D, firms can produce goods to export-quality standards, such as ISO, making it easier for them to participate in the supply chains of multinational companies and international markets more generally.

With regard to FTAs, as measured by the use of any forms of FTA, the estimated coefficients indicate a positive and significant association with export participation for both the probit and logit models in aggregate. This result may imply that Thai manufacturing firms can benefit from any form of FTAs, such as Form A (GSP), Form B (MFN) and Form D (ATIGA). For awareness of the AEC, it is found to be positively and significantly associated with a firm's export participation for both the probit and logit models in aggregate, indicating that Thai firms may obtain benefits from Thailand being a member of the AEC. Finally, the business association membership coefficient estimates are found to have a negative and significant effect on export decisions for both the probit and logit models in aggregate. This is an unexpected negative sign for Thai firms.

The results of maximum likelihood estimates of the parameters of the probit and logit models for large manufacturing firms. The results from the probit and logit models show that there is only one specific factor, FTA, that was found to be statistically significantly associated with a large firm's export decision among small manufacturing firms. The

estimated coefficients for forms of FTAs have a positive and significant effect on export decisions for both probit and logit models in aggregate, indicating that Thai manufacturing firms may benefit from any form of FTA, such as Form A (GSP), Form B (MFN) and Form D (ATIGA).

The results of maximum likelihood estimates of the parameters from the probit and logit models for small manufacturing firms. For foreign ownership the estimated coefficients have a positive and significant effect on export participation for only the probit model for small firms, whereas the result for the logit model is not statistically significant. This positive result implies that a rise in foreign ownership participation encourages firms to participate in export markets, since foreign partners bring new foreign markets and distribution, new products, managerial know-how and advanced production technology (Jongwanich and Kohpaiboon, 2008).This result is also consistent with other empirical studies (Greenaway et al., 2007; Jongwanich and Kohpaiboon, 2008; Aggrey et al., 2010).

With respect to FTA, coefficient estimates have a positive and significant effect on export participation for both the probit and logit models for small firms, indicating that small manufacturing firms may benefit from country membership of FTAs. For assistance expansion, as measured by government assistance in the form of non-financial assistance, the estimated coefficients have a positive and significant effect on a firm export participation for both the probit and logit models.

For awareness of AEC, coefficient estimates are found to be positively and significantly associated with export participation for both the probit and logit models for small firms, implying that small firms may benefits from the AEC. However, the estimated coefficients for awareness of ASEAN are found to have a negative and significant effect on export participation for both the probit and logit models for small firms. This is an unexpected negative sign for Thai firms.

4. Conclusion and Discussion

This research project has presented a plethora of potential factors impacting the competitiveness and export participation of Thai SMEs. There are common threads in the evidence presented. Foreign ownership and investment in local enterprises is a potent force to rapidly upgrade firm competitiveness, technology and engagement in exporting. The capital stock and technology of domestic Thai SMEs needs to be improved. There is considerable regional inequality in the performance (technical efficiency) and export participation of Thai SMEs. This gap needs to be closed otherwise certain regions in

Thailand will not benefit from the effects of free trade agreements and regional economic integration in general, and inclusive growth and development, a key objective of the AEC, will not be achievable.

There are market opportunities arising from ASEAN integration and for SMEs, in particular, from the AEC with its aim of encouraging cross border production and regional production networks. It is clear from this study that Thai small businesses are aware of these developments, and by implication the opportunities arising, and the challenge they face is to ensure that they are in a good position to take advantage of these. This can occur from appropriate business support measures including that of access to finance, technology, skilled labour, market information and networking.

5. Appendix

8. Output (Acknowledge the Thailand Research Fund)

8.1 International Journal Publication (ISI) : Teerawat Charoenrat and Charles Harvie (2017), 'Thailand's SME Participation in ASEAN and East Asian Regional Economic Integration', Journal of Southeast Asian Economies, Vol. 34, No. 1, pp. 148–74.

8.2 Application

8.2.1 The findings from this research project provide useful guidelines for SME policy makers in Thailand to enable their small businesses to take advantage of closer regional integration through membership of ASEAN and the ASEAN Economic Community.

8.2.2 Measures to attract increased foreign ownership to locally based small businesses carries with it numerous advantages: technology transfer, managerial practices, attainment of product international standards, access to international markets and increased likelihood of participation in regional production networks, access to finance from both domestic and foreign sources and spillover benefits to local firms.

8.2.3 In this context the provision of requisite skilled workers, good infrastructure, suppliers, a conducive and stable business and political environment would all be high priority policy dimensions.

8.2.4 This is also linked to economic openness to domestic and international markets through participation in regional free trade agreements such as the ASEAN Free Trade Agreement as well as in higher forms of economic integration such as that of the ASEAN Economic Community and adoption of ASEAN Policy Blueprint/Strategic Action Plan.

8.2.5 Suitable assistance policies in this framework, tailored to meet the needs of exporting SMEs would further facilitate such firms taking advantage of export market opportunities.