



UNIVERSITI PUTRA MALAYSIA

***TRADE AGREEMENT, INNOVATION AND SURVIVAL OF PROCESSED
FOOD EXPORT IN MALAYSIA***

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FOOD EXPORT IN MALAYSIA**

By

AFIZA BINTI IDRIS

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirements for the Degree of Doctor of Philosophy**

July 2021

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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July 2021

Chairman : Professor Normaz Wana Ismail, PhD
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Over the past decade, processed food export of Malaysia has recorded buoyant growth. However, recent evidence showed that it was losing competitiveness. Excluding palm oil exports, Malaysia even lagged behind its peer countries in the ASEAN region. In order to gain greater market access, many countries including Malaysia, have increasingly used trade policy tools in the form of free trade agreements. In addition, enhancing innovation has been widely accepted as an important strategy to boost economic growth and increase exports. However, there are limited studies on the impact of trade agreements ratified by Malaysia and innovation activities on the performance of processed exports. To the best of our knowledge, there is hardly any study on the export survival of processed food products in Malaysia. Therefore, against this backdrop, the objectives of the study are to examine on the effect of trade agreements on the performance of processed food exports, investigate the impact of innovation on export margins, and identify the factors that influence its export survival.

The study examined exports of processed food for a period of 18 years from 2000 to 2017 and used panel data from 32 countries. The gravity model was used to investigate on the impact of trade agreements. The study found that trade agreements ratified by Malaysia at the regional level, namely the ASEAN bilateral FTAs with China, India, Japan, Korea, and Australia and New Zealand led to export creation and expansion for Malaysia's processed food. The study did not show any evidence of export diversion. The magnitude of impact varied according to product groups and each FTA.

In addition, gravity model was also used to examine the impact of innovation input and output on export margins. The study showed that Malaysia's export growth of processed food was mainly due to the intensive margin. In terms of innovation input, R&D intensity showed a positive impact on extensive and intensive margins up to a certain threshold before it declined. This was linked to the non-linear relationship between R&D intensity

and export margins. The impact of patents, which is a proxy for innovation output, was found to be insignificant, while trademarks showed a small positive impact.

The study also found that the processed food exports had a short survival time, in line with findings from previous studies on export duration. Using the Kaplan-Meier estimator, the median survival time for processed food export flow was only 2 years. The export survival rate and duration varied according to product type and market location. Export survival time was found to be longer and more persistent in the ASEAN and East Asia Pacific (EAP) regions. Furthermore, the larger the initial export value, the longer the survival time and rate. The Cox Proportional Hazard and the random effects logit model results showed that market size and free trade agreements were statistically significant in reducing the hazard of export failures, while vice-versa for distance and population of importing countries.

Overall, this study recommends ratification of trade agreements to stimulate exports of processed food and improve export survival. Closer integration among countries of the ASEAN region and its other key partners should be forged, particularly using RTA format that takes into consideration specific industry needs. In addition, the design of future RTAs and bilateral FTAs should cater for enhancing market access of new product varieties, which may require industry foresight studies. Meanwhile, R&D and targeted FDI should be enhanced in the food processing industry to stimulate product variety and export growth. Given the short export survival time, export promotion and assistance schemes will need to be customised according to different market needs and extended to exporters beyond the average survival time to ensure better export survival rate.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**PERJANJIAN PERDAGANGAN, INOVASI DAN KELANGSUNGAN
EKSPORT MAKANAN PROSES DI MALAYSIA**

Oleh

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Eksport makanan proses Malaysia telah mencatat pertumbuhan yang memberangsangkan sepanjang sedekad yang lalu. Namun, bukti terbaru menunjukkan bahawa ia kehilangan daya saing. Tidak termasuk eksport minyak sawit, Malaysia malah ketinggalan dari negara-negara sejawatnya di rantau ASEAN. Bagi mendapatkan akses pasaran yang lebih besar, banyak negara termasuk Malaysia semakin mengguna pakai instrumen dasar perdagangan dalam bentuk perjanjian perdagangan bebas. Di samping itu, peningkatan inovasi telah diterima secara meluas sebagai strategi penting untuk meningkatkan pertumbuhan ekonomi dan meningkatkan eksport. Bagaimanapun, kajian mengenai impak perjanjian perdagangan yang dimeterai oleh Malaysia dan aktiviti inovasi terhadap prestasi eksport produk makanan proses adalah terhad. Di samping itu, pada pengetahuan kami, hampir tiada kajian mengenai kelangsungan eksport produk makanan proses di Malaysia. Oleh itu, kajian ini pada umumnya bertujuan untuk mengkaji prestasi eksport makanan proses Malaysia dengan mengambil kira perubahan dasar perdagangan dan inovasi yang pesat. Secara khusus, objektif kajian adalah untuk mengkaji pengaruh perjanjian perdagangan terhadap prestasi eksport makanan proses, menyelidiki kesan inovasi terhadap margin eksport; dan faktor-faktor yang mempengaruhi kelangsungan (tempoh bertahan) eksportnya.

Kajian ini menggunakan data panel untuk tempoh 18 tahun iaitu daripada tahun 2000 sehingga 2017 dan melibatkan 32 negara. Model graviti digunakan untuk mengkaji kesan dasar perdagangan dan kesan inovasi terhadap margin eksport. Kajian ini mendapati bahawa perjanjian perdagangan serantau, iaitu FTA bilateral ASEAN dengan China, India, Jepun, Korea, dan Australia dan New Zealand menyebabkan penciptaan dan pengembangan eksport untuk makanan proses Malaysia. Kajian ini tidak menunjukkan bukti pengalihan eksport. Magnitud impak didapati berbeza mengikut kumpulan produk dan setiap FTA.

Selain itu, kajian ini juga menyelidik impak inovasi dari segi input dan output terhadap margin eksport. Kajian menunjukkan pertumbuhan eksport makanan proses Malaysia disumbangkan terutamanya oleh margin intensif. Dari segi input inovasi, intensiti penyelidikan dan pembangunan (R&D) menunjukkan kesan positif pada margin luas dan intensif hingga ke ambang tertentu sebelum ia menurun. Ini dikaitkan dengan hubungan tidak linear antara intensiti R&D dan margin eksport. Impak paten yang merupakan proksi bagi ukuran output inovasi didapati tidak signifikan sementara tanda dagangan memberi kesan positif yang kecil.

Kajian ini juga mendapati bahawa masa bertahan bagi eksport makanan proses agregat adalah pendek yang mengesahkan kajian sebelumnya mengenai tempoh bertahan eksport. Hasil anggaran Kaplan-Meier menunjukkan bahawa masa bertahan median untuk aliran eksport makanan proses adalah hanya 2 tahun. Masa bertahan eksport berbeza-beza mengikut jenis produk dan lokasi pasaran. Waktu bertahan eksport didapati lebih lama dan berterusan di rantau ASEAN dan Asia Timur Pasifik (EAP). Selain itu, semakin besar nilai eksport permulaan semakin tinggi masa dan kadar bertahan eksport. Keputusan analisis model *Cox Proportional Hazard* dan model logit kesan rawak menunjukkan bahawa pemboleh ubah saiz pasaran dan dasar perdagangan secara statistik adalah signifikan dalam mengurangkan risiko kegagalan eksport, sementara pemboleh ubah jarak geografi antara negara pengeksport dan pasaran, serta populasi negara pengimport meningkatkan risiko kegagalan bagi ekport makanan proses.

Secara keseluruhan, kajian ini mengesyorkan ratifikasi perdagangan bebas untuk merangsang eksport makanan proses dan meningkatkan kelangsungan eksport. Integrasi yang lebih erat antara negara di rantau ASEAN dan rakan dagang utamanya yang lain harus diperkukuh, terutama menggunakan format RTA yang mempertimbangkan keperluan industri tertentu. Di samping itu, reka bentuk RTA masa depan dan FTA dua hala harus mempertimbangkan untuk meningkatkan akses pasaran varieti produk baru yang memerlukan kajian pandangan industri. Sementara itu, R&D dan pelaburan langsung asing yang disasarkan harus ditingkatkan dalam industri pemprosesan makanan untuk merangsang variasi produk dan pertumbuhan eksport. Memandangkan masa bertahan eksport adalah pendek, promosi dan skim bantuan eksport perlu disesuaikan mengikut keperluan pasaran yang berlainan. Selain itu, tempoh skim tersebut hendaklah melebihi masa bertahan eksport secara purata, sehingga pengeksport memiliki peluang lebih baik untuk bertahan lebih lama.

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This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

ASEAN	Association of South East Asian Nations
AANZFTA	ASEAN Australia New Zealand FTA
ACFTA	ASEAN China Free Trade Area
AFTA	ASEAN Free Trade Area
AIFTA	ASEAN India Free Trade Area
AJCEP	ASEAN Japan Comprehensive Economic Partnership
AKFTA	ASEAN Korea Free Trade Area
ATIGA	ASEAN Trade in Goods Agreement
AITIGA	ASEAN India Trade in Goods Agreement
CEPII	Centre d'Études Prospectives et d'Informations Internationales
CES	Constant elasticity of substitution
COX PH	Cox Proportional Hazard
EU	European Union
FEM	Fixed Effects Model
FTA	Free Trade Agreement
GATT	General Agreement on Tariffs and Trade
GSTP	Global System of Trade Preferences
HACCP	Hazard Analysis Critical Control Point
MERCOSUR	Southern Common Market
MFN	Most Favoured Nations
NTM/NTMs	Non-tariff measures
NTT	New trade theory
NNTT	New-new trade theory

OECD	Organisation of Economic Cooperation
POLS	Pooled ordinary least squares
PPML	Poisson pseudo-maximum likelihood
REM	Random effects model
RTA	Regional Trade Agreement
SITC	Standard International Trade Classification
SME	Small medium enterprise
SPS	Sanitary and Phytosanitary
TBT	Technical barrier to trade
WTO	World Trade Organization

CHAPTER 1

INTRODUCTION

1.1 Background

The Malaysian food processing industry is important not only in meeting the demand for adequate nutrition and consistent food supply of the nation but also as a source of national income. In 2015, the industry was the third largest contributor to the manufacturing gross output amounting to RM213 billion. Its importance was emphasized in the Third Industrial Masterplan (IMP 3), which envisioned Malaysia to become a regional production and distribution hub with a focus on halal food in 2020. The emphasis on food industry was also in line with increased global food trade, which has led food to become more abundant, diverse and accessible today than in the past. In addition, processed food production is associated with positive spillover effects in developing countries in terms of employment, household income and knowledge generation particularly involving exporters (Jongwanich & Magtibay-Ramos, 2009).

This study will examine the export performance of Malaysia's processed food from the aspect of free trade agreements particularly the ASEAN bilateral agreements, innovation and export survival. The processed food products in this study consist of food and beverage material that have undergone food processing phase. The American Society for Nutrition specifies food processing as changing raw or inedible food material into palatable and better-preserved foods that are safe for human consumption (Weaver et al., 2014).

1.1.1 International Food Trade Patterns

International trade of agriculture products has experienced expansion and structural shift. The annual trade value of agriculture and food products has grown more than threefold or about 8% annually to reach USD2.6 trillion between 2000 and 2017. The structural change in agriculture and food trade since the last few decade is marked by the significant fall of the traditional agri-food commodities share in the world trade and replaced by the processed food products (Liapis, 2011; Jongwanich, 2009; Serrano & Pinilla, 2014; Regmi, Gehlhar, Wainio, Johnston & Kathuria, 2005). Between 1980 and 2006, the share of processed food exports in total world food exports and in total world agriculture exports rose from 44% to 63% and from 32% to 51%, respectively (Jongwanich, 2009).

The structural shift in agricultural trade has been linked to changes in global food consumption patterns (FAO, 2015). According to Regmi and Takeshima (2008), food purchasing patterns in middle income countries has converged with the high income countries as dietary patterns changed towards more meat based, dairy products, sugar

and caffeinated beverages. The change in consumption pattern was contributed largely by increased urbanization across the globe. Urban food consumption in Asia could reach as high as 60% to 70% of total food consumed and more than 50% in Africa (Reardon et al., 2014). Similarly, an earlier study by Ishida, Law and Aita (2003) showed that the food expenditure in Peninsula Malaysia has diversified to include more meat, dairy products, vegetables and fruits, and food away from home was expected to gain greater importance in future as Malaysia continues to develop further.

The increased in demand for processed food products was attributed to various factors such as changes in diet following rising incomes especially in developing countries, growth in intra-industrial trade and government intervention policies in developed countries that resulted in self-sufficiency in the production of food and raw materials (Serrano & Pinilla, 2014). The study also highlighted that product differentiation theory explains the growth of trade in high value and processed products while the relative factor abundance theory explains trade growth in agricultural commodities.

As pointed by Liapis (2011), trade of processed food products concentrated among high income countries, particularly among EU members whereby intra-EU trade accounted for about 41% share of total world trade. The majority of high-income countries have comparative advantage and higher average export productivity level in processed food products compared with other agricultural and non-agricultural products. In terms of growth, however, trade among emerging countries have increased two times faster. In another study by Baiardi, Bianchi and Lorenzini (2015), the export price elasticity of processed food and its average unit value, which is a proxy for product quality was found to be inversely related indicating that higher quality goods could allow exporting countries to gain market power and dictate price.

The study by Liapis (2011) also found that China have low export productivity level in agri-food. This is in line with an earlier study by Chen, Lian and Yufeng (2000), which showed that China's competitiveness in agri-food exports was on a downward trend over the period 1980–96 and export growth was due to general increase in world export growth of agri-food. Nevertheless, in a more recent study by Baiardi et al. (2015), China showed low elasticity in export prices for agri-food products which is similar to that of the advance countries. This signifies China's increasing significance in the international food market. Within Europe, the Central European and Balkan countries do not possess trade advantage for processed agri-food products in the EU market which explains the dominance of advanced European countries in processed food trade (Bojnec & Ferto, 2009).

The share of processed food (including beverages) in total world merchandise exports has stabilised at approximately 8%. Between 2000 and 2017, the processed food exports grew by 8% per annum and its share to the total food exports was 64% as shown in Table 1.1. The exports of processed food exports are mainly concentrated in consumer products instead of intermediate products.

Table 1.1 : World Exports of Processed Food 2000-2017

	2000	2017
Total Exports (USD million)	360,823	1,153,711
Share of Processed Food in Total Food Exports	63%	64%
Share of Processed Food exports for Industry use	24%	26%
Share of Processed Food exports for Household consumption	76%	74%

(Source: UNCOMTRADE)

The demand of urban consumers is met by global trade resulting in surges of food imports and changes in the composition of agriculture and food trade. The trade of processed food has been dominated by the high-income countries, especially the EU member countries albeit the upper-middle and middle income countries are also becoming important global players (Jongwanich, 2009 and Liapis, 2011). In 2016, the top five processed food exporters in the world were the United States of America (USA) with 10.6% market share, Germany 6.5%, United Kingdom (UK) 5.8%, France 4.8% and Netherlands 4.5%.

1.1.2 Performance of the Malaysian Food Processing Industry

In Malaysia, the agriculture and food policy has been steered towards enhancing domestic food production and ensuring stable food prices. Ismail and Radam (2004) noted the strategies of the first IMP (1986-1995) had focussed on further diversification and deepening of the manufacturing sector including food processing industry. The strategies continued in subsequent IMPs where food processing industry is recognised as one of Malaysia's promoted sector under the IMP3. In the 11th Malaysia Plan (2016-2020), the industry is promoted under the Halal development initiative and down streaming of agricultural crops.

Based on the Economic Census 2016, the number of companies in the food processing industry increased to about 8,500 companies (2010: 6,200 companies). More than 97.7% of these companies were small medium enterprises (SMEs). The industry accounted for 12.5% of the manufacturing value added in 2015 (2010: 12%). In terms of gross output, the industry was the third highest contributor for the manufacturing sector at RM213 billion. The largest contributor in food processing industry is the palm oil manufacturing which contributed 43.4% and 64.2% to the industry value added and gross output, respectively. Although SMEs are dominant in terms of establishment, the SMEs in the industry however only contributed 49% to the industry value added and 51% to gross output. More than 270 thousand workers were employed with RM7.3 billion in total salaries and wages.

In addition, the food processing industry is largely a domestic oriented industry as reflected by the lower export intensity at 35% compared to an average of 53% recorded by the manufacturing sector in 2015 as shown in Table 1.2. Despite its domestic orientation, the number of firms involved in exporting has increased almost three times from 475 firms in 2010 to 1,352 firms in 2015. Direct exports of processed foods firms have also increased significantly by 54% from RM46.8 billion in 2010 to RM72.1 billion in 2015 (DOSM,2017).

Table 1.2 : Export Performance of Malaysia’s Processed Food Industry

Indicators	2010	2015
Export intensity of manufacturing	47%	53%
Export intensity of food industry	31%	35%
No. of firms exporting	475	1352
Direct exports (RM billion)	46.8	72.1
Share in merchandise exports (%)	4.1%	9.1%
Export growth (per annum)		-2%
Import growth (per annum)		4%

(Source: DOSM (2017), UNCOMTRADE)

Overall, processed food product accounted for 9% of the total merchandise exports in 2017 compared with only 4.1% in 2000. Between 2000 and 2017, Malaysia’s trade of processed food grew by 9.8% per annum, which amounted to USD28.7 billion in 2017. Both exports and imports recorded annual growth at 9% and 10% respectively during the same period. In contrast to the world’s export of processed food which showed concentration in products for household consumption, Malaysia’s exports of processed food are concentrated in intermediate products which accounted for 75% vis-à-vis consumer products at 25%. The main exports in the processed food category are palm oil and related products, food preparations such as convenience foods, cocoa butter, coffee extracts and non-alcoholic beverages. Malaysia’s leading export destination for processed food in 2016 were Singapore, China, Thailand, Indonesia and Vietnam.

1.1.2.1 Challenges in Food Processing Industry

One of the main challenges of the industry is low productivity. The average value added per worker of the industry was RM121, 034 in 2015 (2010: RM99,771). The low productivity suggest that they are mostly involved in low value-added activities as highlighted in an earlier study by Mohamed Arshad, Kusairi and Saari (2013), which is particularly inherent for SMEs in Malaysia. Given that each sub-industry bears different characteristics, thus some sub-industries have higher productivity than manufacturing average as shown in Figure 1.1. The industries that showed higher value added per worker are oils and fats, dairy products, beverages and prepared animal feeds. These industries share a common characteristic of which they are export intensive compared to others.

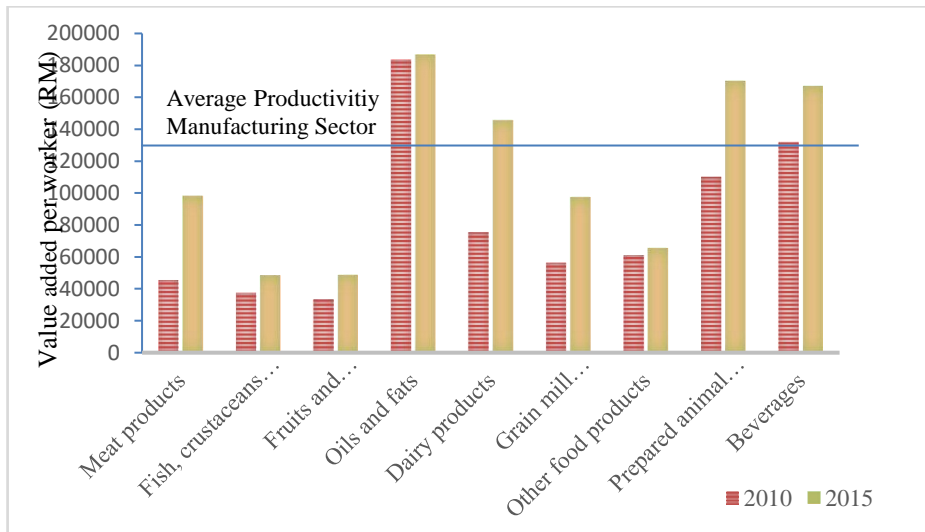


Figure 1.1 : Productivity of Processed Food Industry
(Source: DOSM, 2017)

From trade perspective, Malaysia's exports of processed food have been on a declining trend in recent years as shown in Figure 1.2. In addition, Malaysia's market share at selected export markets has shown a plateauing or declining trend as in Table 1.3. The reduction in market share is most pronounced in China and Middle East North Africa region. Given the dominance of palm oil in processed foods exports, the declining trend is largely attributed to the depressed price of palm oil which had reduced by 100% to RM1,900 as at end 2018 from a high of RM3,800 in early 2011. Furthermore, due to SMEs dominance in the food processing sector, the lack of compliance to international standards prevent local products to obtain trust in domestic and international market (Hasnan, Aziz, Zulkifli, & Taip, 2014).

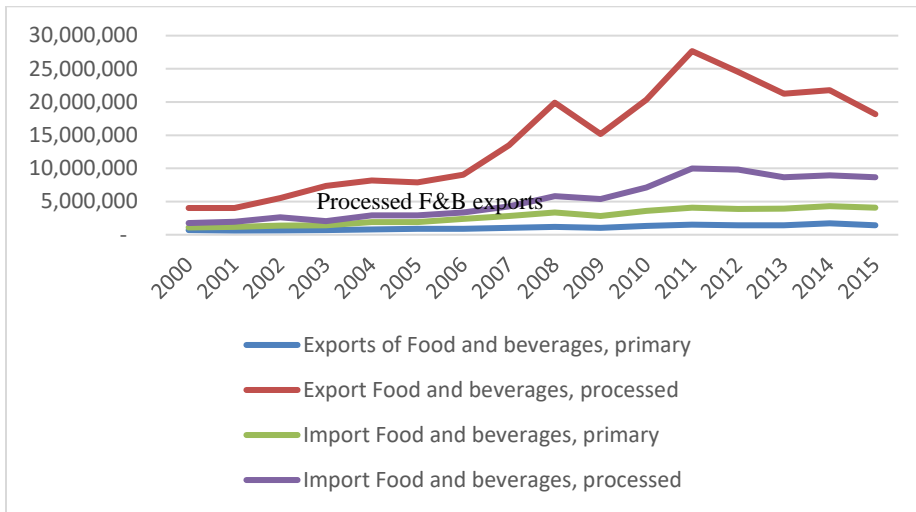


Figure 1.2 : Malaysia’s Trade of Food and Beverages (in USD), 2000-2015
 (Source: UNCOMTRADE)

Table 1.3 : Share of Processed Food Imports from Malaysia at Selected Markets

Region	Import (USD Million)			Market Share (%)		
	2000	2010	2017	2000	2010	2017
ASEAN						
Total	696.4	2677.4	3474.7	10.6%	11.5%	9.8%
For household	421.2	1491.0	2035.6	8.7%	8.9%	8.0%
For industry	275.2	1186.3	1427.6	15.9%	18.2%	15.2%
East Asia						
Total	769.1	4285.9	3185.4	2.0%	5.6%	2.5%
For household	201.8	375.2	807.0	0.6%	0.6%	0.8%
For industry	567.2	3910.7	2280.5	14.2%	24.1%	13.8%
Middle East North Africa						
Total	316.4	1987.5	1930.6	2.9%	4.2%	3.2%
For household	36.8	216.8	367.2	0.5%	0.6%	0.9%
For industry	279.7	1770.7	1562.6	9.6%	13.6%	9.3%
European Union						
Total	437.1	1745.5	1765.8	0.4%	0.7%	0.6%
For household	60.6	71.3	105.4	0.07%	0.03%	0.04%
For industry	376.5	1672.9	1650.5	2.6%	4.1%	3.6%
North America						
Total	215.8	1726.7	887.4	0.6%	2.0%	0.7%
For household	33.2	128.4	134.1	0.1%	0.2%	0.1%
For industry	182.6	1598.2	746.4	4.2%	12.8%	5.1%
China						
Total	405.8	3300.6	2134.8	12.8%	15.4%	4.5%
For household	84.4	122.9	432.1	3.8%	1.1%	1.3%
For industry	321.4	3177.7	1667.3	33.4%	31.5%	16.6%
India						
Total	519.3	792.1	1571.7	34.0%	9.8%	11.1%
For household	3.1	16.4	22.0	0.8%	2.1%	2.2%
For industry	516.3	775.7	1549.6	45.6%	10.6%	11.8%

(Source: Author's calculation, UNCOMTRADE)

The industry has continuously showed weak external competitiveness. Based on the 2016 Trade Performance Index (TPI)¹, Malaysia's processed food industry showed reduced market share in the world market at -5% in 2016 and decreased competitiveness effect with a score of -2.2% between 2012 and 2016, ranked at 122nd position out of 169 countries, as shown in Table 1.4. The competitiveness effect measures a 5-year percentage change in a country's share in destination import market relative to the initial share in the world market. These scores have worsened, in line with the decreasing trend of market share in several export destination. Malaysia performed poorly in terms of competitiveness effect score if compared with its main competitors such as Indonesia

¹ The International Trade Centre, a trade related technical assistance focal point in the United Nations system produced the annual Trade Performance Index (TPI) to assess and monitor export performance and competitiveness by sector and by country

which scored 1.99% and Vietnam 0.11%, while Thailand scored worst at -2.84%.

The negative score for initial product specialization at -3.5% point towards the lack of dynamism in Malaysia's exports in the world market. This reflected that Malaysia was exporting processed foods that has seen reduced world demand and these goods maybe over represented in Malaysia's export basket or the possibility of the demand for Malaysia's export has reduced despite growth in world demand for the particular categories of processed food. The TPI findings is in tandem with an earlier finding by Ismail and Radam (2004) which indicated that the Malaysian food processing industry competitiveness to be relatively weak.

Table 1.4 : Trade Performance Index for Processed Food Sector – Selected Indicators (2012-2016)

Selected Indicators		Value	Rank (total 169 countries)
Position in 2016	Export growth in value p.a. (%)	-7%	144
	Share in world market (%)	2.6%	15
	Product diversification (N ^o of equivalent products)	7	95
	Market diversification (N ^o of equivalent markets)	23	3
Change 2012-2016	Relative change of world market share p.a. (%)	-5%	
	Competitiveness effect, p.a. (%)	-2.2%	122
	Initial product specialisation, p.a. (%)	-3.5%	143
	Adaptation effect, p.a. (%)	0.64%	83

(Source: International Trade Centre)

In summary, the industry face challenges in terms of low productivity level, reflecting that most establishments are involved in low value-added activities. From trade perspective, the industry has been experiencing weak external competitiveness and declining exports. Given the importance of the industry to Malaysia's manufacturing sector, the continuous weak external competitiveness of the industry has to be further examined. Constraints and contributors to trade competitiveness are multiple and intertwined. According to the Farole & Reis (2012), the factors affecting competitiveness are categorised into three main areas, namely:

- i) **Product or services market issues** – trade policy, competition policy, price distortions, subsidies, licensing, standards for products and services, customs, logistics, property rights, and the regulatory framework.
- ii) **Factor market issues** – wages, capital charges, utility market issues, labour market rigidities, land price and zoning.
- iii) **Market-related issues** – market diversification, research and development, product or service diversification and supplier linkages.

1.2 Trade Policy

Trade policy measures, which comes in the form of changes in tariffs or other duties, quantitative restrictions such as custom procedures, bans, taxes and other non-tariff measures can affect exports and imports of goods and services. The consequence of trade policy has long been debated as trade openness was viewed to generate losers and gainers among countries particularly in the aspect of terms of trade. This is currently evidenced in the persistently large global trade imbalances which has been perceived as unfair and has led to increasing support for protectionist policies in G20 countries, particularly in the USA. The scepticism of trade openness is exacerbated on the back of weaker merchandise trade growth post 2008-2009 crisis and slower pace of policy reform (OECD/FAO, 2017).

1.2.1 Proliferation of Free Trade Agreements

1.2.1.1 Regional Trade Agreements

Notwithstanding the current debate on trade openness, the number the regional trade agreements (RTAs) continue to rise as shown in Figure 1.2. The term RTAs is often used to classify any trade arrangement that allows preference beyond the WTO most favored nations (MFN) with the objective of fostering deeper trade and economic integration in a region. In 2018, there were 287 RTAs in force compared with only 25 in 1990 and 79 in 2000.

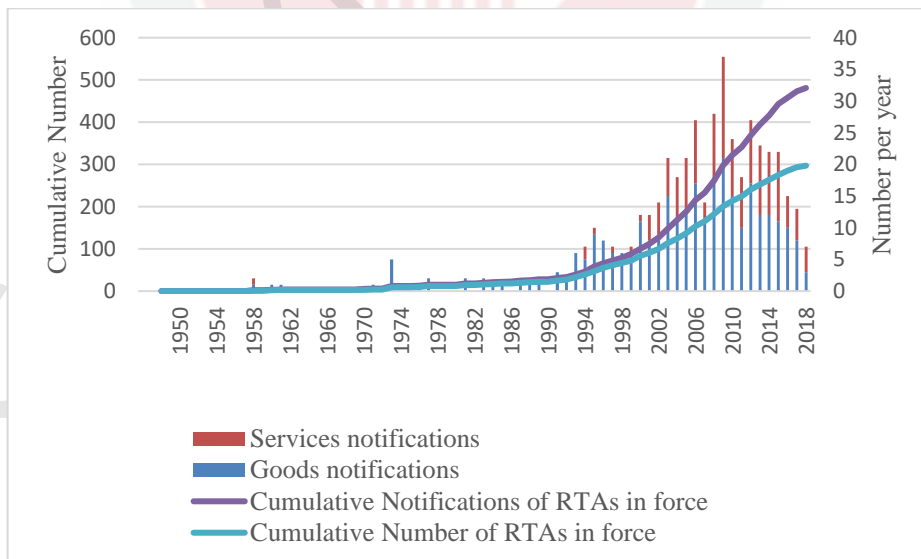


Figure 1.3 : Regional Trade Agreements in the World, 1948-2018
(Source: WTO)

The Asia Pacific region continued to be the driver of preferential trade deals globally with more than 60% of RTAs currently in force involved economies from this region (UN Escap, 2016). Regionalism is expected to continue in future with international trade being regulated through unilateral, bilateral and multilateral arrangements (Baldwin, 2006). This is despite the ‘spaghetti bowl’ or its Asian version of ‘noodle bowl’ phenomenon which could negate the benefits of RTAs. The effects arising from various RTAs are expected to pave the way towards greater multilateralism as firms lobbied governments to harmonize rules of origin following the phenomenon of ‘unbundling of manufacturing processes’ evidenced in the EU countries.

In Malaysia, based on the main roles and mandates of the Ministry of International Trade and Industries (MITI) in enhancing trade growth, the factors that drives Malaysia to sign an FTA include among others:

- (i) to seek better market access,
- (ii) to facilitate and promote trade, investment, and economic development,
- (iii) to enhance Malaysian exporters’ competitiveness, and
- (iv) to build capacity in selected areas through technical cooperation).

Thus far, Malaysia has signed 7 bilateral free trade agreements (FTAs) and 6 regional trade agreements (RTAs) reflecting the importance of trade policy in charting Malaysia’s future economic growth. Refer Table A.1 in the Appendix for information on the RTAs and bilateral FTAs that Malaysia has ratified thus far.

1.2.1.2 ASEAN Bilateral FTAs

In tandem with increased trend in regionalism particularly in North America and Europe, the Association of Southeast Asian Nations (ASEAN) proceeded in the same direction through internal liberalization efforts by establishing the ASEAN Free Trade Area (AFTA) in 1992. In the goods sector, AFTA aimed at eliminating tariffs on intra-ASEAN trade in goods through progressive tariff cuts via the Common Effective Preferential Tariff (CEPT) scheme which resulted in tariffs to be between 0% and 5% starting January 1993. Based on the ASEAN Trade in Goods Agreement (ATIGA) tariff schedule 2016, Malaysia has 73 tariff lines or less than 1 per cent (0.59 percent) that have import duties ranging from 5% to 20% covering tropical fruits, tobacco and highly sensitive products such as rice products. Meanwhile, alcoholic beverage is listed in the General Exclusion List, which is not subjected to reduction or elimination of duties. The ASEAN member countries further embarked in ASEAN Bilateral FTAs to strengthen economic linkage with its established dialogue partners in Asia namely China, Japan, South Korea and India as well as Australia and New Zealand. The salient features of these FTAs related to trade in goods are in the Appendix Table A.2.

Tariff reduction commitments made by the ASEAN partner countries ranges from most liberalised at 100% tariff lines eliminated by Australia and New Zealand, and the least by India at 79%. ASEAN India FTA has the lower average commitment for tariff line

elimination at 80%. India listed a significant number of food products lines in the exclusion list of ASEAN India FTA such as selected fish products, cereals and cereal products, coffee and related products, dairy, natural honey, oils and fats, and alcoholic beverages, which are capped at most favoured nation base (MFN) rate between 30% and 100%. As for China, its exclusion and sensitive list for ASEAN China FTA include fewer food products, such as coffee and related products which is capped at 5% and rice products at 50%.

1.2.1.3 Malaysia's Bilateral FTAs

The shift towards bilateral agreements in the ASEAN region was initiated by Singapore in the late 1990's. Due to fears of losing competitiveness in exports market and attracting FDI, other ASEAN members eventually ventured into bilateral FTAs. As at end 2017, Malaysia has signed 7 bilateral FTAs, namely the Malaysia-Japan Economic Partnership Agreement (MJEPA) in 2005, Malaysia-Pakistan Closer Economic Partnership Agreement (MPCEPA) in 2007, Malaysia-New Zealand Free Trade Agreement (MNZFTA) in 2010, Malaysia India Comprehensive Economic Cooperation Agreement (MICECA) in 2011, Malaysia Chile FTA (MCFTA) in 2012, Malaysia Australia FTA(MAFTA) in 2013, and Malaysia Turkey FTA (MTFTA) in 2015. All of the FTAs signed follow a progressive track for tariffs reduction and elimination.

Exported products from Malaysia are subjected to the agreed Rules of Origin (ROO) and the domestic regulations as well as standards which are stipulated under each agreement. For example, under the MICECA, the ROO criteria are: (i) product must be wholly obtained from country of origin; (ii) it has undergone substantial transformation in term of change of tariff classification in the subheading at the six-digit level of the HS (CTSH); and (iii) the Qualifying Value Content of not less than 35% of the FOB value.

Under the MJEPA, food products exported from Malaysia to Japan enjoy zero import duties starting from the 16th year of the FTA implementation or from year 2020. Meanwhile, under MICECA, both Malaysia and India have progressively reduced or eliminated tariffs on the industrial and agricultural products. From 2019 onwards, most food products are given duty free access except for a few products, namely pepper products at 50% import tariff, refined palm oil at 45% and three other palm oil related products, i.e., palm kernel oil (PKO), margarine and processed PKO are capped at 45% tariff (these three products have been excluded under ASEAN India Trade in Goods (AITIG)). Based on MNZFTA, all food products that are exported from Malaysia to New Zealand have duty free access from year 2016 onwards. Similarly, Malaysia accords zero import duties for products from New Zealand except those in the exclusion list such as alcoholic beverages and tobacco. The exclusion list for the bilateral FTAs for Malaysia is similar to that in the RTAs signed by Malaysia at the regional level.

1.2.2 Increasing Prevalence of Non-Tariff Measures

The adoption of non-tariff measures (NTMs) by countries has shown an increasing trend. The NTMs are broadly defined as measures other than customs tariffs that could potentially affect international trade in terms of changing prices or quantities traded or both (UNCTAD, 2013). According to Hoekman & Nicita (2018), governments use NTMs to achieve two main objectives, namely (i) to align trade policy with economic policies, which favour domestic industries over foreign competition, and (ii) to protect public safety and security by imposing standards and regulations for products and services.

The number of NTMs in 2015 increased to 2,236 from 1,200 notified to WTO in 2002, with two thirds of the NTMs originated from Asia Pacific countries (UN Escap, 2016). In ASEAN, the popularity of NTMs has increased significantly from 1,634 measures in 2000 to 5,975 measures in 2015 (Ing, Cordoba, & Cadot, 2016). This trend coincided with the decreasing trend of tariff rates where the average tariff rates decreased from 8.9 percent to 4.5 percent during the same period. Of the total NTMs, 33.2 percent were in the form of Sanitary and Phytosanitary (SPS) measures, 43.1 percent were technical barrier to trade (TBT), 12.8 percent were export measures, and 10.9 percent were in the form of various other measures. In 2015, Thailand had the greatest number of NTMs followed by Philippines and Malaysia as shown in Table A.3 in the appendices.

Among the various types of NTMs, the technical barrier to trade (TBT) are the most pervasive with more than 30% of product lines and almost 70% of world trade are affected by it, as shown in Figure 1.3. Quantity and price control measures affected about 15% of world trade whereas SPS measures affected about 10 percent. In terms of economic sector, the agriculture sector is mostly affected by SPS and TBT measures, as shown in Figure 1.4.

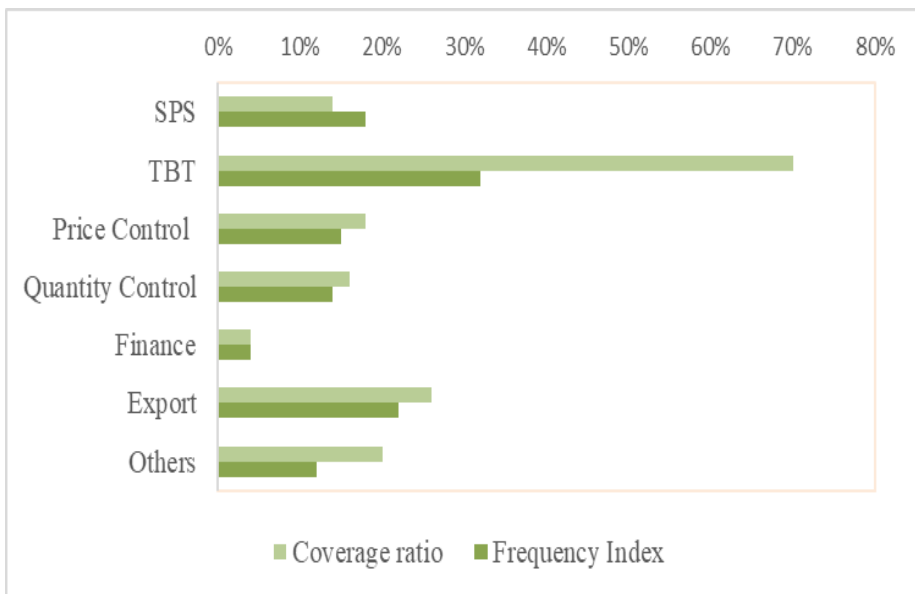


Figure 1.4 : NTMs in World Trade (2015)

(Source: UNCTAD, 2018)

Note: Frequency index is the percentage of tariff lines affected by a measure or set of measures; Coverage ratio is the percentage of trade affected by a measure or set of measures.

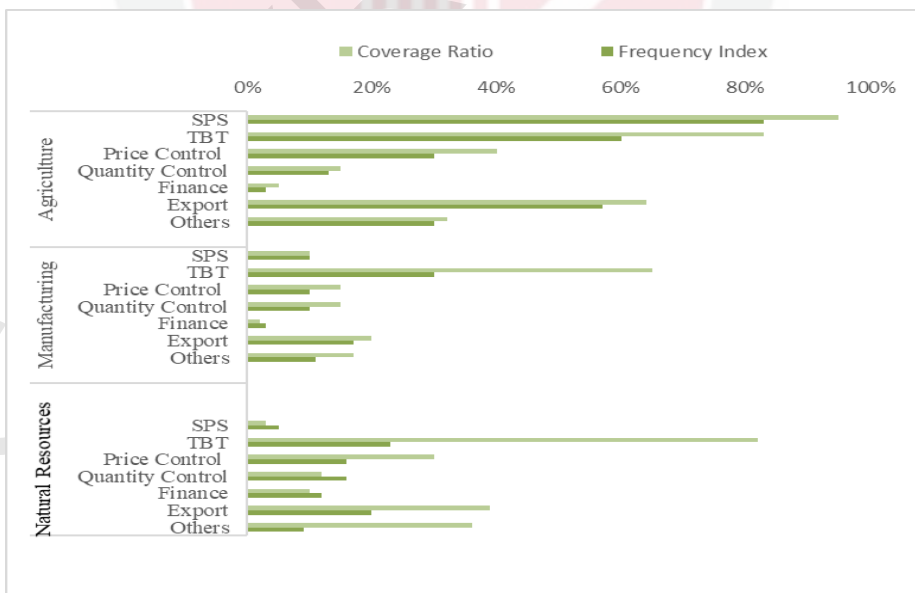


Figure 1.5 : NTMs in World Trade (2015), by Sector

(Source: UNCTAD, 2018)

Processed food products which have multiple and varied quality attributes necessitates the use of food safety standards and regulations (Jongwanich & Magtibay-Ramos, 2009). In order to facilitate food trade, the Codex Alimentarius Commission was created to develop and harmonize food standards that would protect public health and ensure fair practices in food trade. Currently, it is the single most important international reference point for food standards. Under the WTO arrangement, food safety standards and regulations are included in the definition of non-tariff measures. The WTO's Agreement on the Application of Sanitary and Phytosanitary (SPS) Measures and WTO's Agreement on Technical Barriers to Trade (TBT) rely on Codex standards by setting these out as the benchmark for harmonization. Refer to Table A.4 in the appendices for description of SPS and TBT agreements.

Given the increasing food trade, adoption of international food safety standards and regulation has been pervasive as government response to public demand for traceability, consumer safety and environmental concerns. Consumers are increasingly vocal about food-related risks, including health hazards due to micro-organisms, pesticide residues, other contaminants and unsafe food additives. Food safety crisis such as the melamine contamination of milk products in China in 2008 which caused deaths and severe illness among infants necessitates for stringent food safety standards.

As such, the prevalence of NTMs in food trade is expected to increase. From 1999 to 2010, more than 60% of food related products were found to be affected by at least one SPS measure (UNCTAD, 2013). In the ASEAN region, NTMs in the food sector affect more than 90% of product items and they are found to be import restrictive (Devadason, Chandran, & Kalirajan, 2017). In addition, the preferential trade agreements are being used to harmonise standards and bind countries to adopt specific NTMs for market access. More than half of the RTAs contained deeper commitments on sanitary and phytosanitary (SPS) measures compared with the commitments under the WTO agreement (FAO, 2015).

A closer look at the NTMs imposed by Malaysia's FTA partners as well as top 30 destinations for exports processed food showed that there are 8 countries with high NTM for SPS and 9 high NTM countries for TBT. Refer Table A.5 in the appendices for details. showed that although the high NTM countries are not necessarily richer countries compared to Malaysia, but all developed countries in the list are found to be high NTMs countries in both categories. In terms of dispute notification to WTO pertaining to SPS and TBT related NTMs, Malaysia did not put forward any dispute notification during the study period.

1.2.3 Declining Tariffs

Over the last decade, international trade has enjoyed a declining trend of average tariff rates due to liberalisation process, albeit some regions especially South Asia and Sub-Saharan Africa still impose high degree of import restrictiveness in 2016, as shown in Figure 3. The tariff trade restrictiveness index (TTRI) in Figure 1.5 measures the average

level of tariffs imposed on imports. In 2016, the TTRI was substantially higher in developing countries compared with the developed countries.

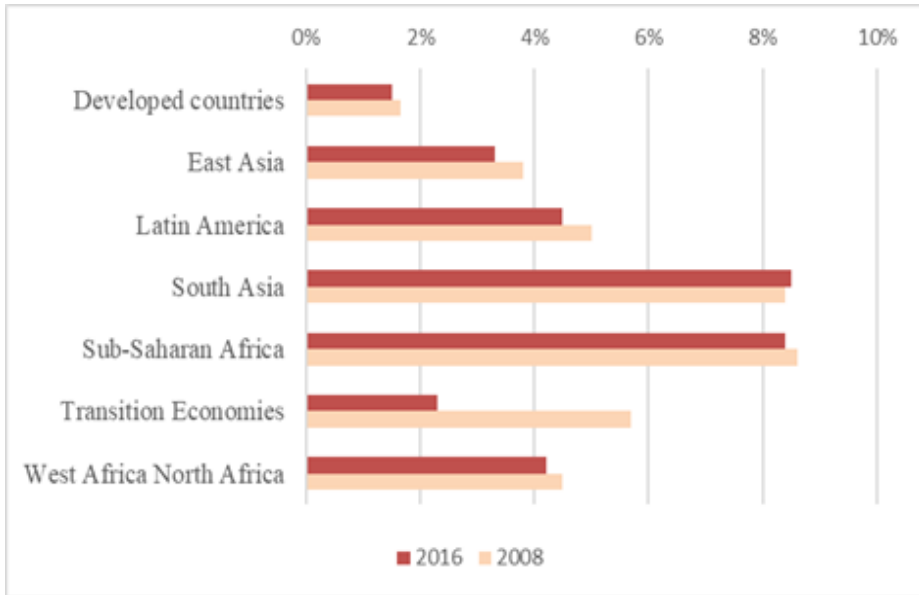


Figure 1.6 : Import Restrictiveness (TTRI) Across Regions
(Source: UNCTAD (2017))

In terms of export restrictiveness, exports from East and South Asia faced a higher degree of restrictiveness with a market access tariff trade restrictiveness index (MA-TTRI) of 3.5% in 2016, as shown in Figure 1.6. In contrast, exports from the Sub-Saharan and Transition economies faced lower restrictiveness with MA-TTRI at 1.5% as they mainly export natural resources which typically has low tariffs.

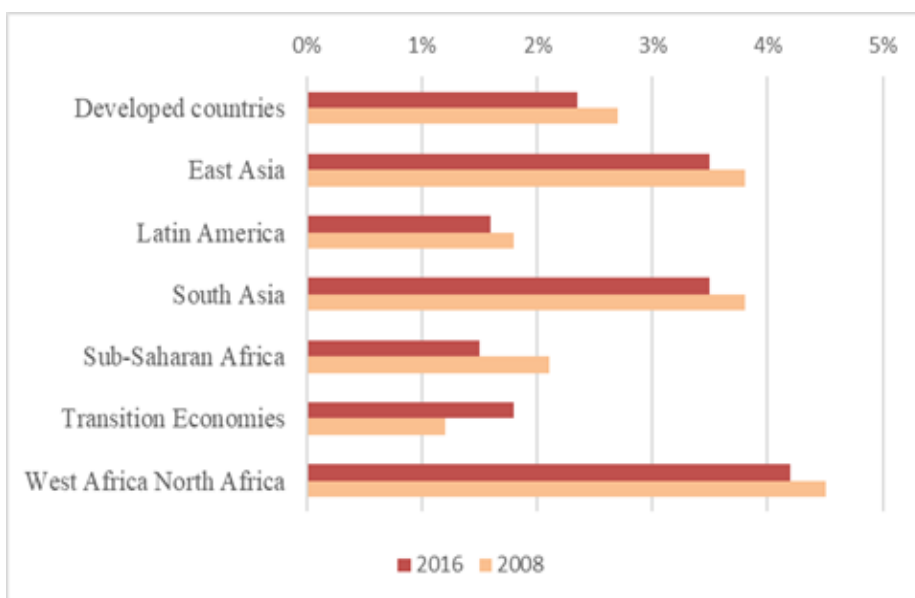


Figure 1.7 : Export Restrictiveness (MA-TTRI) Across Regions
(Source: UNCTAD (2018))

Although the average tariff is low, there is significant difference in the level of tariffs across economic and product sectors. In general, tariff for agriculture is much higher at an average of almost 20% compared to manufacturing and natural resources. Across product sectors, average tariffs vary from 8% for vegetable products to almost 0% for fuels, ores and office machineries. Despite the declining trend in tariffs, there has been some escalation for certain products such as the rise in tariffs for vegetable oils in South Asia. In addition, there is also a number of product sectors that are imposed high tariff rates of more than 15% generally referred to as tariff peaks, even after considering preferential arrangements. Tariff peaks tend to concentrate in products of interest in low-income countries, particularly agriculture sector as well as apparels, textiles and tanning. About 25% of food products have tariffs higher than 15%, constituting 10% of international trade of food (UNCTAD, 2018).

1.3 Innovation and Trade Margin

Innovation plays an important role in ensuring that countries are able to sustain export growth of their products in the international market. This is because innovation activities may result in product differentiation that will create and enhance demand, lower the cost of production and reduce the transaction cost along the supply chain, which will make the product more competitive (Ghazalian & Furtan, 2007).

1.3.1 Innovation and related measurements

Porter (1990) claimed that “a nation’s competitiveness depends on the capacity of its industry to innovate and upgrade”. In this regard, innovation plays a crucial role in enhancing a nation’s ability to compete in the international market. According to Schumpeter (1934), there are five types of innovation, namely:

- i) Introduction of a new product or improvement in product quality
- ii) Introduction of a new process in an industry;
- iii) Opening new markets;
- iv) Development of new sources of supply for raw materials or other input; and
- v) New forms of industrial organisation.

Given the broad definition of innovation, finding the most accurate and direct measurement of innovation has been challenging. The Oslo Manual 2018, which provided guidance for innovation surveys and research, focusses on two aspects of Schumpeter’s definition, i.e., product and process innovation (OECD/Eurostat, 2018). In order to assess innovation, the measurement can be undertaken from two different perspectives, namely the inputs to innovative activity and the outputs of innovative activity. The Oslo Manual highlighted that by convention all R&D is considered as innovation, hence R&D expenditure is generally accepted as a proxy for input to innovative activities.

Trade and innovation have a two-way link. In addition, innovation activities are parts of the global value chain as they involve disperse suppliers and production activities in various countries. Innovation drives trade as it is the source of comparative advantage by enabling countries to add variety to its export’s basket and destination. Hence, innovative nations export, invest abroad or licensed their technologies to benefit from their innovations. In contrast, trade affects innovation through technology transfer, knowledge spill-overs and scale economy. This underpins the importance of foreign direct investment in driving innovation in a country. This makes FDI as an accepted proxy for input to innovative activities.

Most firms that have invested in innovative activities would usually want to protect their intellectual property (IP) rights. IP protection comes in the form of patent, design, trademark and other IP application rights. The Oslo Manual recognised IP protection statistics including number of patents and trademarks applied or granted as the measurements for the output of innovative activities.

Similar to other industries, innovation in food processing industry is categorised into four types, namely the product innovation that increases demand, process innovation that enhances productivity, market innovation which involves improvement in distribution channel and new market coverages as well as the organizational innovation that takes place following changes in industrial structure and business culture. In the food processing industry, the examples of innovation activities include lengthening shelf life

of products, enhancing usage of healthier ingredients, improving packaging and labelling, boosting customer experience through changes in business model (servitisation), creative marketing and mass customization of products.

1.3.2 Innovation in Processed Food Industry

In Malaysia, the ratio of gross research and development expenditure to the GDP or known as R&D intensity, which recorded an upward trend between 2008 and 2016 showed a reversal in trend as it decreased from a high of 1.44% in 2016 to 1.04% in 2018 (MASTIC, 2020). The reduction was among the biggest compared to other countries in the region. The downward trend is translated in lower innovation activities. High innovation cost and knowledge are among the factors that hamper innovation activities in the country.

Despite the importance of innovation, certain industries in the manufacturing sector continue to record a low level of R&D i.e., a proxy for innovation input. Based on the Economic Census 2015, the R&D expenditure of food processing industry amounted to RM1.1 billion or about 14% of total R&D expenditure spent by the manufacturing sector in 2015. More than 70% of the R&D expenditure spent by companies in the food processing industry was contributed by companies in the palm oil industry. Apart from palm oil industry, the level of technology in food manufacturing in Malaysia lagged behind other ASEAN countries, particularly Thailand, as there is lack of impetus for companies to innovate (Mohamed Arshad et al., 2013). Between 2000 and 2017, the average patent and trademark registered per year were 17 and 340, respectively.

Malaysia has attracted many multinational corporations (MNCs) in the food processing industry to establish their production in the country. Among them include Nestle, Fraser & Neave, Ajinomoto, Gardenia and other companies. From 2010 to 2018, the FDI in the manufacturing sector grew 7.5% annually. Meanwhile, the FDI in food processing industry increased from RM30.6 billion in 2010 to RM64.9 billion in 2018, which was 24.8% of the total FDI in manufacturing sector.

1.3.3 Intensive and Extensive Margins of Processed Food Export of Malaysia

Trade growth can come from two sources of margins namely, the intensive and extensive margins. At the intensive margin, trade increases through specialization by exporting more existing products in existing markets. Whereas at the extensive margin, trade growth occurs through diversification of products and/or markets. In other words, growth at extensive margin requires for an increase in product varieties sold to existing market or selling existing product to new markets or both. Intuitively, growth at extensive margin is more sustainable and much preferred by policy makers due to dispersal of risk. In addition, terms of trade is more likely to be positive when growth occurs at extensive product margin (Hummels & Klenow, 2005). Despite the preference

towards extensive margin, the world's export growth is largely explained by the intensive margin (Amurgo-Pacheco & Pierola, 2008).

Using the simple count method to determine product variety based on SITC Revision 3 at level 5, Malaysia was found to have increased product variety in export of processed food. It exported 178 product variety (lines) to the world in 2000 and increased to 184 in 2017. However, the median product lines of processed food products exported to top 30 export destinations and FTA partners was 46 product lines in 2000 and 67 in year 2017. This suggest that export variety of processed food products is limited to a few export destinations. The simple count analysis indicated that Malaysia's export growth was predominantly sourced through the intensive margin. This means that Malaysia's export growth was due to higher exports of existing products to existing market destinations.

Table 1.5 showed the results of the simple count analysis, whereby the extensive margins is the simple count of the number of SITC-3 level 5 products, while the intensive margin is based on the value per product. Through this method, the export of processed food is found to have grown largely due to intensive margin given the bigger percentage change in the average value of exports per product. This indicates that most bilateral partner countries have imported more of the same product variety from Malaysia. The intensive margin is largely contributed by exports to the Southeast Asia and East Asia Pacific regions. The largest growth in intensive margin is contributed by exports to Chile, Mexico and Philippines. In terms of value per product, the highest is recorded by exports to Turkey at USD22.4 million per product code. These countries recorded high growth in intensive margin due to surge in demand for palm oil products.

In terms of extensive margin, Malaysia have successfully exported more product varieties to almost all countries in the sample except Germany. From year 2000 to 2017, the average number of product variety increased from 54 to 75 types of products. In addition, the threshold for 25th, 50th and 75th percentiles increased to 36, 67 and 90 respectively. The number of export destinations that have recorded product varieties in exports, which exceeded 100 types of products expanded from 5 countries to 8 countries. The additional 3 countries are China, Australia and Vietnam. Malaysia has also succeeded in enhancing export variety at its non-traditional export destinations such as Iran, Papua New Guinea, Pakistan, Bangladesh, Vietnam, Cambodia and Myanmar. In addition, Malaysia exports more product varieties to its neighboring countries, particularly those that share a common border. Despite the overall increase in extensive margin, all sample countries representing Europe and most countries in America and Middle East and African regions continue to record extensive margin below the 25th percentile threshold. Meanwhile, the extensive margin from exports to Japan and USA fell below the 75th percentile threshold reflecting reduced importance in introducing new products in the two markets. The simple count method uncovers that Malaysia has high potential to export more product varieties to countries such as Cambodia, Myanmar and countries in the Indian sub-continent as well as Middle East and Africa region.

Table 1.5 : Trade Margins of Malaysia's Processed Food Exports using Simple Count Methodology

	Extensive Margin			Intensive Margin		
	Product variety		%	Average value of exports per product (US\$ Mil)		%
	2000	2017	Change	2000	2017	Change
Southeast Asia						
Singapore	155	167	7.7%	2.68	7.03	162.4%
Indonesia	115	142	23.5%	0.80	2.98	271.6%
Thailand	105	125	19.0%	0.68	3.84	465.3%
Philippines	89	94	5.6%	0.63	8.65	1266.5%
Brunei	115	136	18.3%	0.32	1.06	227.2%
Cambodia	25	57	128.0%	0.68	0.81	19.4%
Myanmar	30	68	126.7%	1.49	2.58	73.6%
Vietnam	54	112	107.4%	0.88	6.67	661.2%
East Asia Pacific						
China	59	106	79.7%	5.43	16.67	206.5%
Hong Kong, SAR	109	119	9.2%	1.38	1.71	23.9%
Japan	75	78	4.0%	2.25	8.23	265.8%
Korea	48	59	22.9%	1.58	5.95	276.4%
Australia	80	105	31.3%	1.08	3.70	242.8%
New Zealand	46	77	67.4%	0.34	0.97	174.7%
Papua New Guinea	27	67	148.1%	0.11	1.11	885.2%
Indian Sub-continent						
India	52	67	28.8%	11.48	21.05	83.4%
Pakistan	34	62	82.4%	8.85	10.12	14.3%
Bangladesh	34	71	108.8%	0.91	3.16	247.1%
America						
USA	78	82	5.1%	2.01	8.73	333.7%
Canada	39	49	25.6%	0.23	1.18	413.5%
Mexico	10	17	70.0%	0.20	2.81	1299.7%
Chile	14	15	7.1%	0.09	1.51	1595.4%
Europe						
Germany	37	33	-10.8%	0.75	1.47	94.8%
Russian Federation	16	25	56.3%	1.80	4.48	149.6%
United Kingdom	58	60	3.4%	0.45	1.06	134.6%
Middle East and Africa						
Saudi Arabia	39	57	46.2%	1.82	7.22	296.7%
UAE	60	86	43.3%	1.24	2.73	121.2%
Iran	13	34	161.5%	1.70	13.26	680.9%
Turkey	14	29	107.1%	4.00	22.39	459.3%
South Africa	32	37	15.6%	1.87	5.01	168.7%
Nigeria	18	20	11.1%	1.48	9.54	545.2%
Mean	54	75	50.3%	1.91	6.05	382.6%
25th Percentile	27	36	10.6%	0.59	1.51	131.3%
50th Percentile	46	67	28.8%	1.24	3.84	247.1%
75th Percentile	68	90	94.8%	1.85	8.69	505.3%

(Source: Author's calculation)

Many nations have benefitted from the trade-linked innovation effects such as China and South Korea. Clearly innovation supports trade diversification strategy that is commonly adopted by countries around the world. Various measures of trade diversification exist in literature ranging from the macro level indices expressed by Herfindahl, Gini or Theil to the more micro level perspective involving extensive and intensive margins of trade.

In relation to trade margins, innovation induces a positive and significant effect on both the extensive and intensive margins though the effects were mainly focused in intensive margin (Chen, 2013). The effect of innovation on exports was found to be stronger for low-income countries than for high-income countries. In addition, innovation increases export quality as reflected by the greater volume exported and higher prices charged by more innovative countries. Although, there is an increasing literature on extensive margin, studies on this subject matter in the agri-food sector is limited. One such study is by Liapis (2011), which found that developing countries export agriculture processed products at intensive margin with a price discount unlike the high-income countries. At the country level, a study on China also recorded expansion of its agri-food exports along the intensive margins (Tian, Hu, Wang, & Huang, 2016).

1.4 Export Survival

Export survival, which measures the ability of countries to sustain export relationship over time is an aspect of trade competitiveness that has garnered much interest among researchers. Not only firms from developing countries face great challenges in penetrating new markets or introducing new products in existing market, they also face higher chance of failure in sustaining newly built trade relationship compared to firms from developed countries. Although, new trade relationships are found to be short-lived averaging about 2 years, the more advanced countries have higher chance for longer survival rates (Reis & Farole, 2012; Besedeš & Prusa, 2006). Findings on export survival indicate the need to overcome constraints in sustaining export flows as a mean to ensure long term growth. Besedeš & Prusa (2011) showed that whether a country does better than others in long-run export growth depends more on its export survival rather than propensity to start new relationship.

There are various factors that can affect export survival. The export survival rate for agriculture and food products are found to be better with market integration (Bojnec & Ferto, 2012). In addition, export survival for agri-food trade is associated with the importing country's development status, region it belongs to, product processing degree, export experience and geographical space between trading partner (Tian, Li, Yao, & Huang, 2014). Overall, export survival and deepening have to be improved for developing countries to enhance its export growth in the long run (Besedeš & Prusa, 2011).

In Malaysia's processed food industry, the large presence of SMEs leads to a more domestic oriented industry. As discussed earlier, the export intensity for processed food companies is lower than the average export intensity of other industries in manufacturing

sector. In order to be successful in the international market, exporters will require knowledge of the markets that they intend to penetrate and the risk involve in exporting. This is highlighted in a study by Arteaga-Ortiz and Fernández-Ortiz, (2010), which has identified knowledge barriers as one of the four main challenges in exporting among SMEs.

1.5 Problem Statement

Ratification of trade agreements between countries as well as implementation of tariffs and non-tariffs measures (NTMs), can affect exports and imports of goods and services. According to Viner's theory, preferential trade agreements may lead to trade creation and diversion. As at end 2017, Malaysia has signed 7 RTAs consisting of the AFTA and the ASEAN bilateral FTAs as well as 7 other bilateral FTAs. These trade agreements are expected to enhance market access for its goods and services. However, Malaysia's processed food exports have continuously experienced weak export competitiveness in the past several years. Therefore, what is the impact of the ratified RTAs on Malaysia's export of processed food?

The government of Malaysia has continuously pursued broad based economic growth anchored with productivity and innovation, as stipulated in its policy documents such as the 10th and 11th Malaysia Plans as well as various industrial masterplans. Despite the push towards greater innovation, the share of R&D expenditure to the GDP reduced to 1.04% in 2018 from 1.07% in 2010. On a related note, innovation is an important driver of export diversification as it enables introduction of new product variety and penetration into new markets. A country with diverse exports would be better able to take advantage of export opportunities in global markets. However, notable success of innovation initiatives in food industry is limited as demonstrated by the low level of R&D expenditure in the industry. From trade perspective, the extensive margin, which is a source of trade growth arising from introduction of something new whether its products or destination in exports fits well with the description of export diversification. A brief analysis on the extensive and intensive margins of processed food exports using simple count method indicates that Malaysia's export growth is mainly due to intensive margin. Therefore, how does innovation impact the intensive and extensive margins of the processed food products export?

Long term trade growth hinges upon the sustainability of trade flow or the ability of the extensive margin to convert into intensive margin (Besedeš & Prusa, 2011). As such an important measure of export competitiveness is from the aspect of exports survival. Exploring the reasons as to why some countries succeeded in sustaining trade flows while others failed will help explain the varying export performance across countries. In Malaysia, the export intensity of processed food industry is much lower than the manufacturing average indicating that most industry players prefer to market their products domestically. This is despite increasing global demand for processed food, which signals higher growth potential compared with the limited of size of local market. Policy intervention to address this issue requires knowledge, among others in terms of the survival rate of exports to enable specific risk assessment based on different

products/industries and market destinations. However, to date, the survival rate and the factors that affect the exports survival rate of processed food sector has yet to be determined. Therefore, what is the export survival rate of processed food and what factors determine the export survival rate?

1.6 Research Objectives

The general research objectives for this study are to examine the export performance of Malaysia's processed food industry in light of trade policy changes and rapid innovation. The specific objectives of the study are as follows:

1. To examine the effect of trade agreements on the performance of export in processed food industry;
2. To investigate the impact of innovation on trade margins of processed food exports; and
3. To identify the factors that influence the export survival of processed food.

1.7 Significance of the Study

Studies on export performance of processed food products or industry in Malaysia are limited. To the best of our knowledge, studies on Malaysia's processed food exports performance are focused on single products such as palm oil and cocoa products. The closest comparison that involves the food processing industry as a whole can be drawn from two earlier studies, which were on the competitiveness of the Malaysian food processing industry undertaken by Ismail and Radam (2010) as well as by Ismail and Yusop (2014). The first study investigated 20 different food processing industries for the period 2000-2005 using Domestic Resources Costs (DRC) and Social Cost-Benefit (SCB) indicators, whereas the second study investigated 16 industries for the period 2000-2008 using net social profits (NSP), which can be derived from the DRC and SCB indicators. Since the studies, there has been many changes in the international trade landscape such as greater trade openness, increased bilateral and regional FTAs, prevalence of NTMs as well as technological advancement and innovation in food processing industry. In addition, recent studies have addressed the issue of zero trade values in gravity model estimation, which will provide a more accurate and less biased findings in trade analysis. Hence, this study presents four main significances that are beneficial for policy makers, industry players and researchers.

(i) FTA Impact Evaluation

This study provides an up-to-date analysis of Malaysia's trade agreements' impact on the export performance of its processed food. The findings will be able to assist in future trade policy formulation. This is important as Malaysia continues to engage in multilateral and bilateral trade agreements negotiation. Previous studies related to impact of FTAs on exports have focused on manufacturing sector as the macro level as well as on other specific industries such electronic and electric industry. This study provides

detailed analysis on processed food products according to the SITC at level-5. Additionally, this study looks at the impact of FTAs especially ASEAN bilateral FTAs on exports of processed food from the aspect of trade creation and diversion. It will also provide evidence on which ASEAN FTA is most beneficial for processed food exports according to the categories of food products.

(ii) Innovation and trade margins

Export growth can be sourced from the extensive and intensive margins. While extensive margin can be a yardstick to assess the export diversification strategy thus far, intensive margin on the other hand would provide important assessment on growth sustainability. This study presents the impact of innovation on both intensive and extensive margins of processed food export. To the best of our knowledge, past studies on impact of innovation on Malaysia's trade have mainly concentrated on the relationship direction between the two variables. Moreover, in Malaysia, there is limited study that examines trade margins and factors that affect it. This study will identify whether export growth of processed food is mainly sourced from extensive (due to trade of new products) or intensive (trade of existing products) margins. This study will also provide evidence on the impact of innovation on export margins, which will enable better policy formulation on the innovation aspect of processed food industry in future.

(iii) Export survival outcome

Central to export competitiveness is the ability to sustain export flow over time or also known as export survival. Literature has shown that export survival for developing countries are much shorter compared with developed countries (Besedeš & Prusa, 2006b). Prior research on Malaysia's trade dynamic has not given much emphasis on export survival outcome. This study will determine the survival rate of processed food exports and provide insights on factors that influence the rate of export survival. This study will be among the pioneering study on export survival and its determinants of processed food export in Malaysia. The findings will be able to guide policy makers in designing future export assistance programmes and provide the knowledge on the chances of export failure according to types of products, geographical location and initial value of exports.

In conclusion, there is limited research done to examine the performance Malaysia's processed food exports particularly from the aspect of FTAs and RTAs, innovation and export survival. Given that the food processing industry in Malaysia is dominated by the SMEs, hence the evidence from this study could also be used to assist SMEs in exportation of products. This study could not have been timelier given the expansionary trend in global processed food demand in which Malaysian exporters could benefit from, while at the same time facing headwinds due to challenges arising from trade policy and regulatory changes, rapid innovation and increased regional competition.

1.8 Organisation of the Study

Chapter 1 of the study presents the background of the international food trade patterns and the performance of processed food industry in Malaysia. It also discusses on the current state of trade policy changes, innovation and export survival, which could affect the competitiveness of processed food export of Malaysia. Chapter 2 presents the theoretical and empirical literature review of the study. The chapter begins with discussion on relevant theories related to the study and subsequently, followed by the review on empirical literatures related to trade policy impact, trade margins, innovation and export survival.

Chapter 3 discusses on the theoretical model employed in the study, which covers the gravity model, extensive and intensive margins of trade, export survival, empirical specifications and estimation procedures. Meanwhile, chapter 4 provides empirical findings and analysis of the study. Chapter 5 presents the summary of findings, policy implications and conclusion of the study.

1.9 Scope of Study

Trade agreements can affect exports and imports of goods and services by instituting changes in tariffs or other duties, custom procedures and other non-tariff measures. For this study, the focus is to examine the impact of Malaysia's trade agreements, innovation and export survival on the performance of its processed food exports. The period under study is for 18 years, starting from 2000 to 2017. A total of 128 processed food products disaggregated according to Standard International Trade Classification (Rev. 3) at level 5 is used in this study.

Malaysia's export destination in the study are ASEAN countries (except Laos), its FTA partners (bilateral and regional) which are Australia, China, Japan, India, Pakistan, Turkey, Chile, Korea and New Zealand as well as other top destinations for processed food exports namely Canada, USA, Mexico, Germany, Russia, UAE, Saudi Arabia, Republic of Iran, UK, Nigeria, South Africa, Hong Kong, Papua New Guinea and Bangladesh.

The study uses the gravity model to investigate the impact of trade agreements on the performance of processed food exports and innovation on the extensive and intensive margins. In order to identify the export survival rate, the study uses the Kaplan-Meier estimator. In addition, the study uses Cox-Proportional Hazard model and logit with random effects model to determine the factors affecting export survival.

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