UNIVERSITI PUTRA MALAYSIA

EXTENT AND DRIVING FACTORS OF INNOVATION IN PENINSULAR MALAYSIA FURNITURE INDUSTRY

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By

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EXTENT AND DRIVING FACTORS OF INNOVATION IN PENINSULAR MALAYSIA FURNITURE INDUSTRY

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Chair: Prof. Jegatheswaran Ratnasingam, PhD

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The furniture industry in Malaysia has shown tremendous growth rate due to the abundant forest resource, low-cost factor inputs and cheap workforce. However, the percentage share of gross domestic product (GDP) of manufacturing and agriculture sector has been narrowing in recent years. The Malaysian furniture industry's Value Addition Intensity (VAI) is declining, due to the industry's increased input costs. The ratio of innovation capacity analysis shows the negative trend which indicates the declining of successful innovation in the industry. Due to the current scarcity resources of the industry, innovation is very important to be taken into consideration in order to enhance the business growth and the economic performance in the nation.

In this study, the main objective is to investigate the extent and driving factors of innovation in Peninsular Malaysia furniture industry. To be more specific, the study also aims to investigate the determinants factors of innovation, to identify the ranking of innovations sources and main problems of innovation faced by the industry. In this study also identify the awareness of industry towards National Timber Industry Policy (NATIP) which contain a specific thrust regarding to the innovation development of the industry.

The result indicates the sample population of 98 surveyed companies by direct-interview agreed that the importance of innovation in the business,

but their participation in innovation activities is limited. The sample population is mostly involved in Original Equipment Manufacturing (OEM) which referred to the company that originally built a given product, which was then sold to other companies to rebrand and resell. This has shows the limitation of innovation activity. Based on the theoretical framework applied to this study, which has adapted the theory of perceived attributes and types of innovation by The Organization for Economic Co-operation and Development (OECD), the companies perceived that there are five main factors, which has been extracted by factor analysis. The five major main driving factors of innovation are product development, organization structure and management, process trend, market growth and institutional support and quality, which are significantly important. The first factor is product development, which has includes raw materials supply, product use or application, design or functionality, raw materials price, and appearance. Market growth is the second factor consists of industrial relation, promotion activities, supporting industries, market demand, and market information. The third factor is organization structure and management which comprises of work culture, availability of skilled workers, and capable top management. The fourth factor is process trend which consists of production technology and quality system. Finally, institutional support and quality is the last factor which includes financial incentives, and training as well as education.

The companies' awareness towards the seven thrusts stated in National Timber Industry Policy (NATIP) is also relatively low. Based on the binary logistic model used in this study, there are only two variables were positively significant affecting their awareness towards NATIP, which are Marketing and Promotion, and Bumiputera Participation. This indicates the companies have positive awareness of relationship towards National Timber Industry Policy (NATIP), which is related to the thrust of Marketing and Promotion, and Bumiputera Participation. Thus, National Timber Industry Policy (NATIP) has to put more efforts on the other thrusts to enhance the effective policy implications in order to develop the industry, as well as increase the awareness of the companies in the industry.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

TAHAP DAN FAKTOR MENDORONG INOVASI INDUSTRI PERABOT DI SEMENANJUNG MALAYSIA

Oleh

LIM TAU WAI

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Industri perabot di Malaysia telah menunjukkan kadar pertumbuhan yang positif disebabkan oleh kekayaan sumber hutan, faktor input yang berkos rendah, disertai tenaga kerja yang murah. Walau bagaimanapun, bahagian peratusan daripada keluaran dalam negara kasar (KDNK) bagi sektor pembuatan dan pertanian telah menurun sejak kebelakangan ini. Kecenderungan Nilai Penambahan (VAI) industry perabot semakin merosot, disebabkan peningkatan kos input. Nisbah analisis keupayaan inovasi menunjukkan tren negatif sehubungan menandakan penurunan inovasi yang berjaya dalam industri. Oleh itu, inovasi adalah sangat penting dalam usaha meningkatkan pertumbuhan perniagaan dan prestasi ekonomi industry perabot dalam negara.

Objektif utama dalam kajian ini adalah untuk menyiasat tahap dan pemandu faktor inovasi dalam industri perabot Semenanjung Malaysia. Objektif yang lebih spesifik dalam kajian ini juga bertujuan untuk melihat faktor-faktor penentu inovasi, mengenal pasti pemeringkatan sumber inovasi dan masalah utama inovasi yang dihadapi oleh industri. Sementara itu, kajian ini juga mengenal pasti kesedaran industri pada Dasar Perindustrian Kayu Negara (NATIP) yang mengandungi teras khusus berkaitan pembangunan inovasi industri.

Berdasarkan hasil kajian, 98 syarikat terpilih sebagai populasi sampel melalui wawancara bersetuju bahawa kepentingan inovasi dalam perniagaan, tetapi penglibatan mereka dalam aktiviti inovasi adalah terhad. Kebanyakan syarikat terlibat dalam strategik 'Original Equipment Manufacturing' (OEM) yang merujuk kepada syarikat yang asalnya membina produk yang diberikan, kemudian menjual kepada syarikat lain

untuk menjenamakan semula dan menjual semula. Keadaan ini menunjukkan pembatasan aktiviti inovasi. Berdasarkan rangka teori yang digunakan dalam kajian ini, dengan saduram antara teori sifat persepsi dan jenis inovasi yang ditetapkan oleh The Organization for Economic Co-operation and Development (OECD), persepsi syarikat dalam kajian ini untuk faktor yang mendorong inovasi dalam industri perabot termasuk pembangunan produk, pertumbuhan pasaran, struktur organisasi dan pengurusan, arah gejala proses, dengan sokongan institusi dan kualiti, yang diekstrak oleh analisis faktor. Lima faktor penggerak utama inovasi yang ketara penting adalah pembangunan produk, struktur organisasi dan pengurusan, aliran proses, pertumbuhan pasaran, sokongan institusi dan berkualiti. Faktor pertama ialah pembangunan produk, termasuk yang mempunyai bekalan bahan mentah, penggunaan produk atau aplikasi, reka bentuk atau fungsi, harga bahan-bahan mentah, dan penampilan. Pertumbuhan pasaran adalah faktor kedua yang terdiri daripada hubungan industri, aktiviti promosi, sokongan industri, permintaan pasaran, dan maklumat pasaran. Faktor ketiga ialah struktur organisasi dan pengurusan yang terdiri daripada budaya kerja, pekerja mahir, dan pengurusan tertinggi yang berkaliber. Faktor keempat ialah trend proses yang terdiri daripada teknologi pengeluaran dan sistem kualiti. Akhir sekali, sokongan institusi dan kualiti adalah faktor terakhir yang termasuk insentif kewangan, dan latihan serta pendidikan.

Kesedaran syarikat-syarikat terhadap tujuh teras yang dinyatakan dalam Dasar Perindustrian Kayu Negara (NATIP) juga agak rendah. Berdasarkan model logistik perduaan yang digunakan dalam kajian ini, hanya mempunyai dua pembolehubah adalah berpositif sebagai kepentingan yang mempengaruhi kesedaran mereka terhadap NATIP. Dua pemboleh ubah yang positif tersebut adalah Pemasaran dan Promosi, dan Penyertaan Bumiputera. Hal ini menunjukkan syarikat-syarikat mempunyai kesedaran positif terhadap NATIP melalui teras Pemasaran dan Promosi, berserta Penyertaan Bumiputera. Oleh itu, NATIP perlu lebih memberi perhatian dan usaha bagi lima teras yang kurang memberangsangkan supaya meningkatkan implikasi dasar yang berkesan dalam usaha pembangunan industri ini, juga meningkatkan kesedaran dalam kalangan syarikat dalam industry ini.

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

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LIST OF ABBREVIATIONS

B2B	Business to Business
BJC	Builders' Joineries and Carpentries
CAD	Computer Aided Design
CoC	Chain of Custody
DOSM	Department of Statistics Malaysia
EFA	Explanatory Factor Analysis
FELDA	The Federal Land Development Authority
GDP	Gross Domestic Product
ICT	Information and Communications Technology
KMO	Kaiser-Meyer-Olkin Measure of Sampling Adequacy
MATRADE	Malaysian External Trade Development Corporation
MDF	Medium Density Fiberboard
MFPC	Malaysian Industrial Promotion Council
MIDA	Malaysian Industrial Development Authority
MITI	Ministry of Trade and Industry
MOHA	Ministry of Home Affairs
MOHR	Ministry of Human Resources
MPIC	Ministry of Plantation Industries and Commodities
MPOB	Malaysian Palm Oil Board
MRB	Malaysian Rubber Board
MTC	Malaysian Timber Council
MTCC	Malaysian Timber Certification Council
MTCS	Malaysian Timber Certification Scheme
MTIB	Malaysian Timber Industry Board
NATIP	National Timber Industry Policy
NDP	New Product Development
OBM	Original Brand Manufacturing
ODM	Original Design Manufacturing
OECD	The Organization for Economic Co-operation and Development
OEM	Original Equipment Manufacturing
R&D	Research and Development
SME Corp. Malaysia	Small and Medium Enterprise Corporation Malaysia
SMEs	Small and Medium Enterprises
SPSS	Statistical Package for the Social Sciences
UPM	University Putra Malaysia
USD	United States Dollar
VAI	Value Addition Trend
VIF	Variance Inflation Factor
WPC	Wood Plastic Composite

CHAPTER 1

INTRODUCTION

1.1 Background

As a developing country, Malaysia's transformation from an agricultural-based economy to a manufacturing based economy over half a century has been astounding. In fact, the percentage share of the manufacturing sector and agriculture sector towards the country's gross domestic product (GDP) has steadily increased over the years (Figure 1.1) (Ministry of Finance Malaysia, 2014).

In this context, it is no surprise that the furniture industry in the country has also shown tremendous growth rate, both in terms of export earnings and employment provision (Ratnasingam, 2012). Blessed with a rich forest resource and an ample supply of workforce, the industry has been growing rapidly with an annual growth rate of 10.00 % since the 1980s. However, in recent years, the wood products sector has come under increasing pressure to move up the value-chain and manufacture innovative products to starve off the increasing competition from other regional low-cost producers, especially China and Vietnam (Ratnasingam, 2012). As a result, the percentage share of the manufacturing sector to the gross domestic product (GDP) has been narrowing in recent years as shown in Figure 1.2 (Ministry of Finance, 2014).

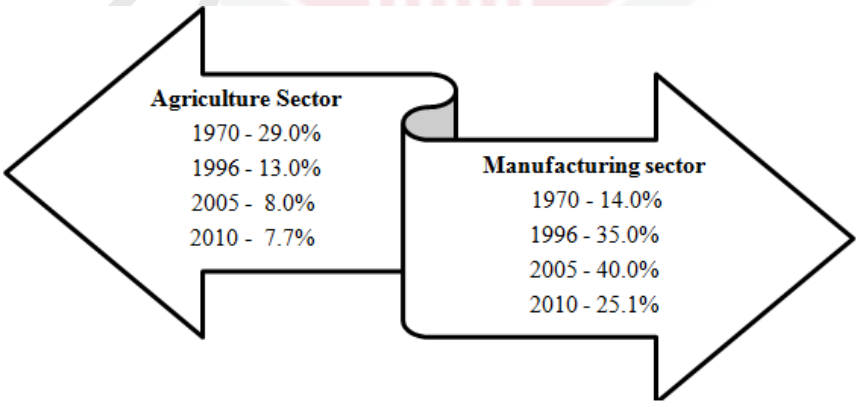
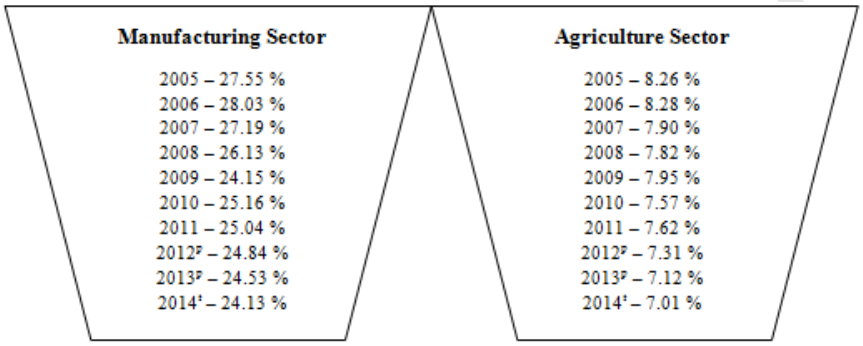


Figure 1.1: Historical Percentage of Share of Gross Domestic Product (GDP) Contributions to the Agricultural and Manufacturing Sectors in Malaysia (Source: Ministry of Finance Malaysia, 2014)

Due to the reducing contribution of the manufacturing sector to the country's economy, it is important to ensure that greater value-added and innovative products are produced to minimize the impact of the reduced manufacturing sector output.

Although the strategies for innovation activities in the manufacturing sector was implemented since the mid-1990s through the 2nd Industrial Master Plan (1996-2005), the extent of innovation within the wood-based industry has been reported to be limited (Ng and Thiruchelvam, 2012).



Note: p-Preliminary; f-Forecast; Percentage by Calculations of Author according to annual GDP
Source: GDP by kind of Economic Activity at Constant 2005 Price, Ministry of Finance, Malaysia

Figure 1.2: Contributions of the Agricultural and Manufacturing Sectors to the Percentage Share of Gross Domestic Product (GDP) of Malaysia from year 2005-2014

1.2 The Malaysian Wood-Based Industry

The wood-based industry in Malaysia has consistently contributed to the nation's economic growth, as well as its foreign exchange earnings. To date, there are almost 3900 for wood-based manufacturing enterprises in the country, providing employment to almost 380,000 people (DOSM, 2012). The forestry and wood-based sector contributed 7.8 % to the country's GDP and 3.1 % percent of the country's total merchandise export in 2011 (MITI, 2014).

The rise of the wood-based industry in Malaysia which began in early 1900s focused mainly on primary processing of saw-logs and sawn timber. The government restructured the industry in the mid-1980s to ensure greater value-addition activities and also to keep pace with the dynamics of the global market. The transformation of the industry, from primary processing to an industry driven by value-addition was brought about

through the implementation of a series of Industrial Master Plans which spurred productivity growth within the industry (Ratnasingam, 2002a; Asid, 2010).

Although, the first Industrial Master Plan (IMP-1) (1986-1995) did not realize its intended goals completely, the government modified the second Industrial Master Plan (IMP-2) (1996-2005) to strengthen the productivity growth in the manufacturing sector (Mahadevan, 2001; Lee, 2011). In this context, the policy of restructuring the wood-based industry was regarded successful as the proportion of exports of value-added products (which includes furniture, moulding, builders carpentry and joinery, wood-based panels) increased significantly compared to the exports of commodity-type low-value products such as logs, sawn-timber and plywood (Table 1.1).

In realizing the increasing regional competition, especially from low-cost producers such as China and Vietnam, the third Industrial Master Plan (IMP-3) (2006-2015) was implemented to further value-add within the industry, through innovation as well as through the adoption of high technology and quality human capital (NATIP, 2009).

This on-going industrial efforts have had mixed results due to the challenges that appear to stifle innovation within the industry.

Table 1.1: Constituents of Wood-based Products Export

Year	Primary Wood Product (%)	Secondary Wood Product (%)
1990	68	32
1995	59	41
2000	50	50
2005	49	51
2010	48	52

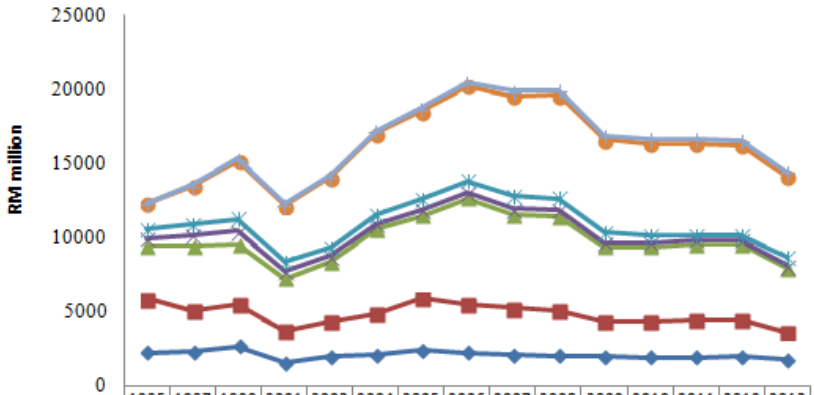
Source: Ratnasingam, 2012

Figure 1.3 reveals that the sub-sectors within the wood-based industry have had inconsistent growth performances, although the furniture and plywood sectors appear to be on a more positive trend. This was most likely due to the relatively greater level of innovation within these sub-sectors (Ratnasingam, 2012).

In this context, the wooden furniture industry has emerged as the largest sub-sector accounting for almost a third of the total export income from the forest products sector of the country. The industry was earmarked as a target industry under the Industrial Master Plans, and was accorded special incentives to boost export growth. Inevitably, it is no surprise that

the export/production ratio of the industry is in the range of 80 % (Ratnasingam and Ioras, 2003).

Despite the positive sentiments reported through export statistics, it is most revealing that the net profit margin for almost all wood products exported from Malaysia has been on the decline since the mid-1990s. This has been reported due to the stagnating productivity growth and limited value-addition within the industry (Ratnasingam and Ioras, 2005). Figure 1.3 shows the export of timber and timer products for the years. The figure shows that the export trend is increasing by years but slightly decrease for recent years. It is indicating the growth of the industry has been slightly dilatory.



	1995	1997	1999	2001	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
particleboard	31	61	169	134	102	196	233	267	365	391	250	278	338	332	282
wooden furniture	1674	2531	3900	3778	4721	5438	5895	6409	6664	6921	6248	6230	6201	6105	5440
moulding	618	783	825	641	594	647	698	796	915	744	686	462	276	293	569
veneer	575	724	895	482	358	370	421	387	389	435	307	315	322	320	206
plywood	3521	4330	4051	3517	4064	5645	5575	7101	6274	6329	4987	5011	5103	5028	4265
sawn timber	3626	2744	2819	2172	2321	2843	3447	3278	3160	3077	2345	2403	2482	2490	1892
logs	2273	2359	2682	1547	2001	2070	2465	2261	2111	2057	2021	1946	1953	1998	1750

Figure 1.3: The Export of Timber and Timber Products, 1995-2013, (RM million)

1.3 Problem Statement

Malaysia's wood-based industry is a mature industry since it has shown favorable development despite the issues and challenges confronted by the industry, but its operational strategies are still in their infancy (Ng and Thiruchelvam, 2012). The point that needs to be addressed at this juncture is related to the innovation status of the Malaysian wood-based industry. One study used the framework developed by Balassa (1965) to

examine the comparative advantage of the Malaysian timber products in the European market and the results implied that Malaysian wood-based products have a noticeable advantage in the European market in comparison to other global producers. In fact, Malaysia is the largest exporter of sawn timber and the second largest supplier of plywood, as well as 10th largest exporter of furniture in the world in the year 2010 (MITI, 2014). However, this confirms the notion that the Malaysian wood-based product is dependent on the comparative advantage from the abundant wood resource, rather than the innovative capability.

This argument is strengthened by the fact that the industrial growth rate is consistent and more stable, but the value addition trend somewhat declined. It is apparent that the weak annual Value Addition Trend (VAI) trend, which shows that the brought-in price of raw material, is becoming higher, while value addition did not take place in a significant way to offset the increased input costs (Table 1.2). Therefore the nature of comparative advantage based on abundant resources is apparent, which did not rely heavily on innovation. (Ratnasingam, 2002). Without an increase in innovation, the Malaysian wood-based products sector will experience stagnating growth.

Currently, the development road map for Malaysia's wood-based industry is outlined in the NATIP. The NATIP envisions a vibrant wood-based industry that can continue to contribute to national development. NATIP embodies an aspiration for the industry to produce 60 % high-value downstream products and 40 % commodity-based products, such as sawn timber.

Table 1.2: Value Addition Trend of Malaysian Furniture Industry

Year	Value Added (RM million)	Value Added Growth (%)	Value Added Intensity (VAI)
1988	206	48.2	56.1
1993	596	41.2	34.9
1999	1,582	23.1	34.4
2003	2,223	1.0	30.0
2008	2,833	7.2	23.3

Source: Ratnasingam et al., 2013

In this regard, the wooden furniture industry, which is the main segment in the downstream manufacturing activities in the wood-based industry value chain, is expected to the main anchor of this forecasted growth. However, the vision set by the NATIP may be impossible to be realized without an in-depth study of the innovation patterns of the wood-based industry especially the furniture manufacturing activities. In fact questions that remain to be answered include: What is the current extent of innovation of Malaysian wood-based industry, especially furniture industry? Is the

current innovation structure in the Malaysian wood-based industry capable of increasing the value added in the industry? What are the challenges faced by the wood-based industry in innovation, besides the driving factors to encourage innovation activities within the industry?

1.4 Justification

Innovation is important to enhance value addition and productivity growth in the industry (Ratnasingam, 2012). Innovation is able to enhance the value addition which will offset the increasing costs. Innovation is crucial to ensure competitiveness of the Malaysian wood-based industry in the global. Hence, it is important to determine the sectoral innovation patterns of Malaysia's furniture industry in order to ensure the industry remains competitive.

1.5 Objective of the Study

The general objective of this study was to investigate the extent and driving factors of innovation in the Peninsular Malaysian furniture industry.

The specific objectives are:

(i) To establish the status and types of innovation in the current Peninsular Malaysia furniture industry

(ii) To identify the main challenges of innovation and sources of innovation in Peninsular Malaysia furniture industry

(iii) To determine the driven factors of innovation in the Peninsular Malaysian furniture industry

(iv) To determine the awareness towards the perception of the National Timber Industry Policy (NATIP) in development of Peninsular Malaysia furniture industry

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