



UNIVERSITI PUTRA MALAYSIA

**SUCCESS FACTORS OF IMPORTED WOOD VENEER AS A MATERIAL
FOR VALUE-ADDED WOOD PRODUCTS MANUFACTURING IN
MALAYSIA**

CHIN KHOON ARK

FH 2019 13



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By

CHIN KHOON ARK

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

April 2019

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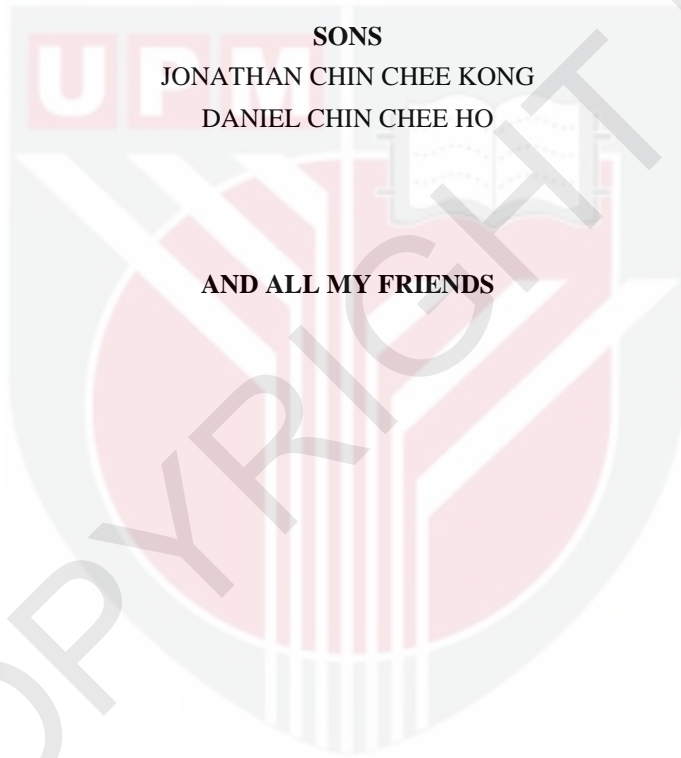
LYDIA CHOO LEE PENG

SONS

JONATHAN CHIN CHEE KONG

DANIEL CHIN CHEE HO

AND ALL MY FRIENDS



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

**SUCCESS FACTORS OF IMPORTED WOOD VENEER AS A MATERIAL
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CHIN KHOON ARK

April 2019

Chairman: Professor Jegatheswaran Ratnasingam, PhD

Faculty: Forestry

A study was carried out to evaluate the trends and attributes of wood veneer species used for door, flooring, and furniture manufacturing in Malaysia. A questionnaire was distributed to 30 value-added wood products manufacturers, in which there were 10 manufacturers in each category: door, engineered-flooring, and furniture. The study assessed the: (1) important wood veneer species used, both local and imported, (2) the reasons for using wood veneers in the manufacture of value-added wood products, and (3) attributes that determined the choice of wood veneer species used for specific wood products. The common local veneers include Rubberwood, Meranti, Nyatoh, Kembang Semangkok, and Bintangor, while the important imported veneers were White Oak, Red Oak, White Ash, Pine, Beech and Cherry. With increasing use of wood-based panels in the manufacture of these products, the use of wood veneers offers a good strategy to maintain aesthetic appeal, without sacrificing strength but at the same time reducing product cost. The factor analysis showed that aesthetic quality and market determinant factors were more important than the sustainability factor in the use of wood veneers in the manufacture of value-added wood products.

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

**FAKTOR KEJAYAAN VENIR KAYU DIIMPORT SEBAGAI BAHAN UNTUK
PENGELUAR BARANGAN KAYU YANG MEMPUYAI NILAI TAMBAH DI
MALAYSIA**

Oleh

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Satu kajian telah dijalankan untuk menilai trend dan ciri-ciri spesies venir kayu yang digunakan untuk pintu, lantai, dan pembuatan perabot di Malaysia. Borang soal selidik telah diedarkan kepada 30 pengilang barangan kayu yang mempunyai nilai tambah, di mana terdapat 10 pengeluar dalam setiap Kategori: pintu, lantai Kejuruteraan dan perabot. Kajian ini dinilai dalam: venir kayu (1) spesies venir kayu yang penting digunakan sumber tempatan dan diimport, (2) sebab-sebab menggunakan venir kayu dalam pembuatan barangan kayu yang mempunyai nilai tambah dan (3) ciri-ciri yang ditentukan pilihan spesies venir kayu yang digunakan terhadap produk kayu tertentu. Venir kayu tempatan yang biasa termasuk Kayu Getah, Meranti, Nyatoh, Kembang Semangkok dan Bintangor, manakala venir kayu diimport yang penting ialah White Oak, Red Oak, White Ash, Pine, Beech dan Cherry. Dengan meningkatkan penggunaan panel berasaskan kayu dalam pembuatan produk-produk ini, penggunaan venir kayu menawarkan strategi yang baik untuk mengekalkan rayuan estetik, tanpa mengorbankan kekuatan tetapi pada masa yang sama mengurangkan kos produk. Hasil analisis faktor menunjukkan bahawa kualiti estetik dan faktor-faktor penentu pasaran adalah lebih penting daripada faktor kelestarian dalam penggunaan venir kayu dalam pembuatan barangan kayu yang mempunyai nilai tambah.

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I certify that a Thesis Examination Committee has met on 16 April 2019 to conduct the final examination of Chin Khoon Ark on his thesis entitled "Success Factors of Imported Wood Veneer as a Material for Value-Added Wood Products Manufacturing in Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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LIST OF ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
BJC	Builders' Joinery and Carpentry
DOS	Department of Statistics
FAO	Food and Agriculture Organization of the United Nations
FDPM	Forestry Department Peninsular Malaysia
FDS	Forestry Department Sarawak
GDP	Gross Domestic Product
IMP	Industrial Master Plan
MDF	Medium Density Fiberboard
MPC	Malaysian Productivity Corporation
MPIC	Ministry of Plantation Industries and Commodities
MTC	Malaysian Timber Council
MTIB	Malaysian Timber Industry Board
NATIP	National Timber Industry Policy
NFP	National Forest Policy
FPDSB	Forest Plantation Development Sdn Bhd
SFD	Sabah Forestry Department
SFM	Sustainable Forest Management
SME	Small and Medium-Size Enterprises
STIDC	Sarawak Timber Industry Development Corporation

CHAPTER 1

INTRODUCTION

1.1 Background

The wood products industry in Malaysia has contributed significantly to the socio-economic development of the Malaysian economy. In 2017, wood products export contributed almost RM 23 billion in earnings and provide employment to nearly 182,000 workers (MTIB 2018). The wood products industry consistently contributed almost 4% to the Gross Domestic Product (GDP) since the 1980s (National Timber Policy 2009), but this figure has reduced to about 1.8% over the years due to slower growth of the wood industry compared to other manufacturing sector. The industry reflected progressive growth although faced with competition from low-cost producers such as China and Vietnam. Despite the growing pessimism that the wood products industry would decline due to losing competitiveness, it remained strong and has grown steadily, albeit at a slower rate (Ratnasingam, 2012). Although its contribution to the country's GDP is reduced, the wood industry remains important as an employment provider and the building of Small and Medium Enterprises (SME).

The wood-based industry in Malaysia began in the early 1900s, concentrated in the manufacturing of primary commodity products of saw logs and sawn timber. However, after independence, the wood-based industry has contributed consistently to the nation's foreign earning and provides employment to its citizens. In the mid-1980s, the government departed from the export of primary commodities into more value-addition processes and to keep up with global market dynamics (Lim et al. 2016).

Hence, the government launched the 1st Industrial Master Plan (IMP 1986-1995), which targeted the wood-based industry as a sector driven for more value-addition. Instead of exporting just primary saw logs and sawn timber, secondary manufacturing activities, particularly furniture, molding, builders' joinery and carpentry (BJC) and wood-based panel manufacturing were encouraged. The government hoped to strengthen the productivity growth through further value-addition activities, especially on furniture manufacturing and other value-added products when the 2nd Industrial Master Plan (1996-2005) was implemented. In view of the increasing regional competition, especially from low-cost producers such as China and Vietnam, the 3rd Industrial Master Plan (2006-2015) was implemented with the focus on producing high value-added products that is of original design that captures the high-price market segment. This was done through an emphasis on innovation as well as the adoption of high technology and quality human capital. Therefore, under the various Industrial Master Plans, the wood products industry in the country has been transformed from a cottage-based industry exporting

primary producers, to one that is driven by the export of secondary processed, high value-added products that generate a large foreign exchange earnings for the country (Ratnasingam *et al.* 2013).

Studies by Ratnasingam (2003) and Ratnasingam and Ioras (2003) have argued that the growth of the wood industry in the country has been driven primarily by incremental inputs, especially raw materials and labor, assisted by favorable government policies as stipulated in the IMPs.

1.2 Problem statement

Supply chain is a network between a company and its suppliers to produce and distribute a specific product to the customer (Anon, 2017). Supply chain plays an integral part in Malaysia's success as a major wood products exporter. One main contributing factor is the abundance of local timber resources. There are two components in the supply chain for wood products manufacturing, namely, the wood and non-wood materials. Both components are either supplied locally or imported. Wood products produced in the country make use of locally sourced Malaysian tropical sawn timber and plantation-grown timber especially rubberwood (*Hevea brasiliensis*) (Lim *et al.* 2016).

Nevertheless, as alluded by Lim *et al.* (2016), the raw materials supply situation in the country has been on a steady decline, since the strict enforcement of Sustainable Forest Management (SFM) principles in managing the country's natural forests. Inevitably, from a peak natural forests log production of 18 million m³ per annum, the present volume of saw logs produced stands at approximately 14 million m³ per annum (Lim *et al.* 2016). Although this short-fall in saw log supply from the natural forest, was expected to be supplemented by the increasing supply of saw logs from the plantation forests established in the country, the overall supply of raw materials in the country remained low (NATIP, 2009). Consequently, a net short supply of almost 2.5 million m³ of raw materials had to be met through imports, in order to cater for the demands from the wood sector in the country.

Although, the Peninsular Malaysia had banned the exports of saw logs since 1978 and has imposed export quotas and export levies on sawn timber to minimize exportation of raw materials, while ensuring a consistent supply of raw material for the rapidly expanding value-added wood products industry (Ratnasingam *et al.* 2013), the demand for raw material from the booming value-added wood products sector outstripped the available supply. As a result, increasing volume of raw materials have been imported into the country since the late 2000s, in order to ensure that the demand for raw materials from the value-added wood products manufacturing sector was met (Ratnasingam and Lim 2015).

Against the reducing supply of raw materials, coupled with the higher cost of imported raw materials due to the fluctuating USD-RM exchange rate, the government was forced to revise the NATIP's target of wood products export downwards from the original RM 53 billion to RM 25 billion by the year 2020 (Ratnasingam *et al.* 2013). Further, the strategy to encourage greater use of wood-based panels, especially medium density fiberboard (MDF) and particleboard (PB) as raw materials for furniture, BJC and moldings was intensified, with the hope of reducing the demand for solid wood resources. Since, the perceived value and the willingness to pay for the value-added wood product is dependent on its appearance, as highlighted by the wood species used, the surfaces of wood-based panels will have to be over-laid with relevant wood veneer to ensure acceptable aesthetic value (Nicholls and Roos 2006). In this context, wood veneer attributes (which includes its appearance, color, grain direction, veneer matching and jointing, environment-friendliness, emission, cost, and availability) are the important determinants for its intended applications (Ratnasingam *et al.* 2007; Lim *et al.* 2016). The definition of attribute, as given by Brandt and Shook (2005), suggests that it is a feature of the veneer that differentiates it from other veneer in the same product category. It must be emphasized that the attributes and properties of wood veneers are important to value-added wood products, as it is strongly associated with the prevailing market opportunities and consumer acceptance.

Although several studies on the attributes of sawn timber that influence the selection of a particular sawn timber species for a specific product or application in the United States, European countries and Malaysia are available (Arowosoge and Tee 2010; Ratnasingam *et al.* 2016; Lim *et al.* 2016), studies on the trends in the use of wood veneers for value-added wood products in Malaysia is non-existent. Therefore, this study aims to evaluate the trends in the use of wood veneers in the value-added wood products manufacturing in Malaysia, with a focus of the common wood veneer species used, application technology employed, adhesive-type used, and evaluate the attributes that influence the choice of wood veneer for door, engineered-flooring, and furniture manufacturing.

Hence, the research questions of this study are:

1. What are the trends in the use of wood veneers in the manufacturing of value-added products of door, engineered-flooring and furniture in Malaysia?
2. What are the drivers and reasons for manufacturers in their preference to use the common wood veneers and source of origin of these wood veneers?
3. How do the attributes of wood veneers influence the selection of a particular type of value-added product application?

1.3 Objectives

The general objective of this study is therefore to determine the success factors of common wood veneers as a material for value-added wood products manufacturing in Malaysia.

While, the specific objectives of this study are:

- i. To evaluate the trends in the use of common wood veneers in the value-added wood product manufacturing of door, engineered flooring and furniture in Malaysia.
- ii. To identify the factors that influence the choice of wood veneers used and the attributes relevant to the selection of a particular product application.
- iii. To evaluate the application method commonly used for wood veneering and type of adhesive used.

1.4 Scope of Study

This study will be confined to common wood veneers only as its use has been steadily growing over the years in the value-added wood products manufacturing industries. Although, the number of mills using these wood veneers are small, the increasing volume used, clearly highlights the importance it plays in the value-added wood product manufacturing industry. However, to limit the scope of the study, 3 wood products manufacturers were selected namely door, engineered flooring and furniture. These 3 value-added manufacturers were selected because they together consume the most volume of wood veneers in Malaysia.

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Chin Khoon Ark was born in July 1959 in Butterworth, Penang, Malaysia. He completed primary and upper secondary in 1978 and furthered his study in Canada where he graduated with BSc in Forestry (Wood Science) degree from the University of Toronto in 1985. He was involved in the furniture and timber-related industry for the last 30 years. From 2002-2017, he ventured into business selling and marketing imported timber and veneer.

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