FIRM CHARACTERISTICS, CAPABILITIES AND PRODUCTIVITIES: A STUDY OF MALAYSIAN FOOD MANUFACTURING SECTOR

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FIRM CHARACTERISTICS, CAPABILITIES AND PRODUCTIVITIES: A STUDY OF MALAYSIAN FOOD MANUFACTURING SECTOR

ABSTRACT

This research establishes and examines a set of firm productivity measures for the Malaysian food manufacturing industry. The research further examines the differences in productivity based on the firm's characteristics and consequently examines the empirical relationship between firm capabilities namely marketing, ICT, R&D and human capital on labour productivity. The research uses cross sectional data comprising 1020 firms. Various methods were used in the research. Non-parametric analysis was undertaken to compare the productivity levels across firm characteristics while in examining the impact of capabilities on labour productivity the research uses quantile regression analysis. The finding shows that productivity differs based on firm legal status and size of enterprises only influence capital and labour productivities. Meanwhile, energy and material productivities differ mostly across industry types. Firm's ownership only influences labour productivity of food manufacturing. The results of the quantile regressions are as follows. The findings showed that size becomes less relevant at the higher tail of the quantile and as capabilities and human capital grows, productivity gains are much higher. The findings are robust to different measures of human capital and capabilities. Interestingly, among the capabilities, innovation matters the most in driving labour productivity. ICT capability, on the other hand, matters for firm in the lower quantile suggesting that investment in only several common technologies such as computers and information technology platforms will not be adequate once firms are in the higher quantile of the productivity. As for marketing capability, it shows that market creating capability of the firms enhances productivity. Nevertheless, the coefficient does not vary across the lower and upper productivity quantile. The study concludes with implications

for driving labour productivity across capabilities through policy recommendations to raise human capital and improve ICT infrastructure and working conditions.

Keywords: Food manufacturing, productivity, capabilities, Malaysia.

CIRI-CIRI, KEBOLEHAN DAN PRODUKTIVITI FIRMA: KAJIAN INDUSTRI PEMPROSESAN MAKANAN DI MALAYSIA

ABSTRAK

Satu set produktiviti pengilang makanan Malaysia telah berjaya dibangunkan dan diuji dalam kajian ini. Turut dikaji adalah perbezaan produktiviti bersandarkan ciri ciri pengilang dan hubungkait antara kemampuan pemasaran, *ICT, R&D* dan sumber manusia terhadap produktiviti buruh. Data keratan rentas yang mengandungi1020 firma telah digunakan.Secara khususnya pendekatan *Non Parametric* digunakan untuk membanding perbezaan produktiviti bersandarkan ciri-cirinya dan kaedah analisis Quantile Regresi pula digunakan untuk menguji kesan kebolehan firma keatas produktiviti buruh. Hasil kajian ini menunjukkan bahawa perundangan dan saiz firma mempengaruhi produktiviti modal dan buruh.Selain itu produktiviti tenaga dipengaruhi dengan perbezaan sifat pengilang manakala pemilikan hanya mempengaruhi produktivit buruh. Terdapat beberapa penemuan yang menarik hasil daripada penggunaan analisis Quantile Regresi. Penemuan kajian ini menunjukkan saiz firma menjadi tidak relevan apabila firma itu berada di Quantile yang tinggi. Menariknya, kajian ini mendapati kebolehan firma terutamanya sumber manusia telah menampakkan kesannya apabila bergerak ke Quantile yang lebih tinggi. Manakala ICT hanya memberi kesan kepada firma di quantile yang rendah sahaja, ini bermakna pelaburan dalam teknologi asas (komputer dan ICT) hanya memberi kesan apabila firma berada di quantile yang rendah. Innovasi (R&D) merupakan faktor yang paling penting untuk meningkatkan produktiviti buruh secara keseluruhan. Kemampuan pemasaran memberi kesan tetapi kadar koefisiennya tidak ketara untuk quantile tinggi dan rendah. Kajian ini turut memuatkan cadangan kepada pihak yang terlibat dalam industri pembuatan makanan.

Kata Kunci:Perkilangan Makanan, Produktiviti,Ciri, Kebolehan

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LIST OF SYMBOLS AND ABBREVIATIONS

ABS	:	Australian Bureau of Statistics
AIDA	:	Analisi Informatizzata Delle Aziende
ARD	:	Annual Respondents Database
BNM	:	Bank Negara Malaysia
BOS	:	Blue Ocean Strategies
CADS	:	Company Accounts Data Service
CAGR	:	Compound Annual Growth Rate
CEO	:	Chief Executive Officers
CES	:	Constant Elasticity of Substitution
CMIE	:	Center for Monitoring Indian Economy
CP	:	Capital Productivity
CPI	:	Capital Productivity Indices
CSP	:	Capital Services Productivity
ECHP	:	European Community Household Panel
ECM	:	Error Components Model
EP	:	Energy Productivity
EPI	:	Energy Productivity Indices
EU	:	European Union
FAMA	:	Federal Agricultural Marketing Authority
FLEED	:	Finnish Longitudinal Employer-Employee Data
GDP	:	Gross Domestic Product
HPWS	:	High Performance Work System
HRM	:	Human Resource Management
ICT	:	Information Communication Technology

IDA	:	Integrated Database for Labour Market Research
IJV	:	International Joint Venture Enterprise
IMP2	:	Second Industrial Master Plan
IMP3	:	Third Industrial Master Plan
ISTAT	:	Italian National Institute for Statistics
IPEADATA	:	Instituto de Pesquisa Econômica Aplicada
IMF	:	International Monetary Fund
LE	:	Large Enterprises
LP	:	Labour Productivity
LPG	:	liquefied petroleum gas
LPI	:	Labour Productivity Indices
MATRADE	:	Malaysian External Trade Development Corporation
ME	:	Medium Enterprises
MFP	:	Multi-Factor Productivity
MFPMM	:	Multifactor Productivity Measurement Model
MIDA	:	Malaysian Industrial Development Authority
MITI	:	Ministry of International Trade and Industry
MGCC	:	Malaysian-German Chamber of Commerce & Industry
MNC's	:	Multi-national Companies
MNE	:	Multinational Enterprise
MP	:	Material Productivity
MPI	:	Material Productivity Indices
NA	:	National Accounts
NBS	:	National Bureau of Statistics
n.e.c.	:	not else classification
OECD	:	Organisation for Economic Co-operation and Development

OLS	:	Ordinary Least Square
PICS	:	Productivity and Investment Climate Survey
R&D	:	Research and Development
RHO	:	Spearman Rank Order Correlation
RM	:	Ringgit Malaysia
SABI	:	Sistema de Análisis de Balances Ibéricos
SBA	:	The United States Small Business Administration
SE	:	Small Enterprises
SEDA	:	Sustainable Energy Development Authority
SEM	:	Structural Equations ModellSping
SIM	:	Survey on Investment in Manufacturing Firms
SME	:	Small and Medium Enterprise
SMEs	:	Small and Medium Enterprises
SME Corp.	:	SME Corporation Malaysia
SMIDEC	:	Small and Medium Industries Development Corporation
SPM	:	Sijil Pelajaran Malaysia
SPSS	:	Statistical Package for the Social Sciences
TFP	:	Total Factor Productivity
TFPI	:	Total Factor Productivity Indices
TNB	:	Tenaga Nasional Berhad
UK	:	United Kingdom
USA	:	United States of America

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Small and Medium Enterprises (SMEs) are among the most dynamic firms in the Malaysian economy. These firms have progressed to become significant suppliers and service providers to large corporations. Consequently, MITI (2005) noted the great efforts were undertaken by the Malaysian government to develop SMEs, especially in the early 1990s. The Malaysian government emphasized strongly on the SMEs' development in the Second Industrial Master Plan (IMP2) to ensure that they could play an important role in the economy. IMP2 ended in the year 2005 when the Malaysian government launched the Third Industrial Master Plan (IMP3, 2006-2010) to carry the Malaysian economy to a higher economic level.

The Department of Statistics Malaysia (2011) data showed that the 97.30% of total business establishments in the year 2010 were SMEs. The value added of SMEs grew at an annual average 6.30% between 2005 and 2011, which was higher than the average annual growth rate of the Malaysian Gross Domestic Product (GDP) at 4.50%. Hence, the contribution of SMEs to the GDP of Malaysia increased from 29.40% in the year 2005 to 32.50% in the year 2011.

Figure 1.1 shows real growth rates using 2005 prices of SMEs and GDP in Malaysia over the period 2006-2013. The lowest rate for SMEs growth was at 0.20%, while GDP recorded -1.50% contraction in 2009 due to the global economic crisis. In the year 2011, SMEs grew at 6.80% compared to 5.10% of Malaysia's GDP growth. Besides the higher growth rate of SMEs, the employment and productivity growth of SMEs were also higher compared to total employment and productivity growth in Malaysia. SME employment grew by 3.90% when total employment grew by 3.70%. In addition, SME

productivity rose by 2.80%, while productivity growth of the overall economy grew by 2.10%.

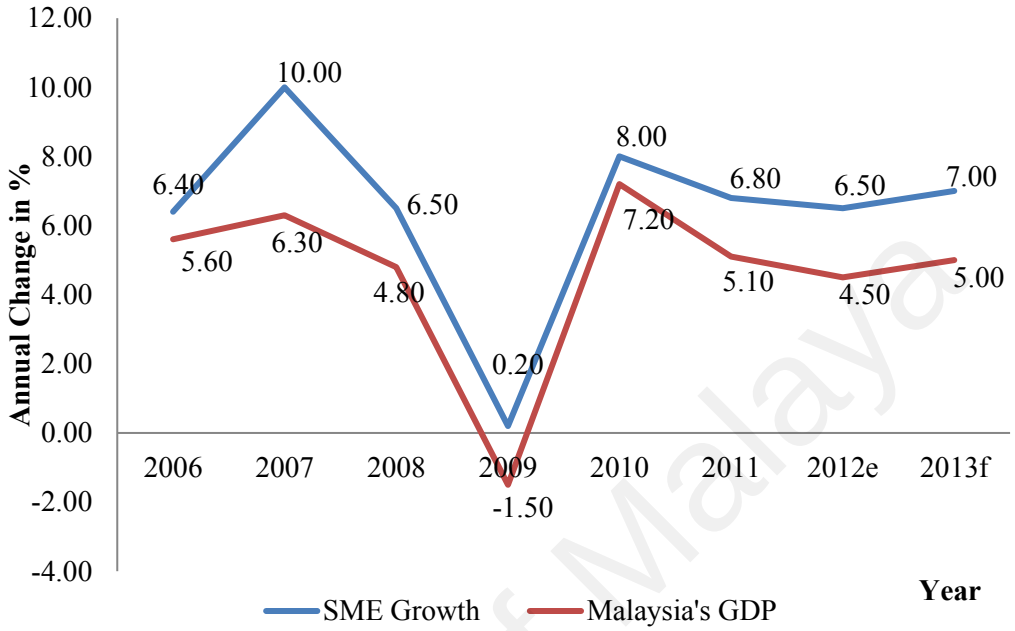

Figure 1.1: SMEs and Malaysia GDP growth (Constant 2005)
Source: Department of Statistics, Malaysia and SME Corporation Malaysia
Note: f = forecast

Table 1.1 : Comparison between SME and GDP Growth by Key Economic Activity, Malaysia, 2011

	Year 2011 (% Annual Change)	
	SME growth	**Malaysia's GDP growth**
Mining & Quarrying	3.40	-5.70
Construction	2.90	4.60
Agriculture	6.40	5.90
Manufacturing	7.60	4.70
Services	6.40	7.00
Total	**6.80**	**5.10**

Source: Department of Statistics, Malaysia
Note: Computed using 2005 prices

Table 1.1 shows SMEs' and Malaysia's GDP growth by Key Economic Activity in 2011 based on constant 2005 prices. According to the National SME Development Council (2012), SME growth in 2011 was spread across all sectors. The manufacturing sector, e.g. food, clothing and textiles, as well as construction-related products (e.g. non-

metallic minerals and fabricated metal products), played an important role in contributing towards SME manufacturing growth. Meanwhile, the growth of SMEs in the services sector was driven by wholesale, retail and trade activities, which included trading of motor vehicles. In addition, finance, insurance, real estate and business services, food and beverages services (restaurants), transport and storage and private services were also important contributors from the service sector in the year 2011. In the agricultural sector, livestock, fishery and plantation were the main contributors.

The manufacture of food products contributed the highest value by SMEs, *viz*., RM69.50 billion (35.90%) in output and RM8.30 billion (21.90%) in value added, which was followed by output value of rubber and plastic product industries of RM22 billion (11.30%), chemicals and chemical products of RM20.30 billion (10.50%), manufacture of fabricated metal products (excluding machinery and equipment) of RM11.80 billion (6%) and manufacture of basic metals of RM11.40 billion (5.90%). These five sub-sectors cumulatively accounted for more than two thirds of the output value (RM135 billion) and half of value-added (RM22 billion).

Nonetheless, SMIDEC (2002) reported that the number of registered companies in the manufacturing sector was 40 793, out of which, 39 376 were SMEs. The food and beverages sector was the second largest manufacturing sub-sector after textile. This industry made up the majority of SMEs with 5 925 business establishments from a total number of 6 069 companies. Saleh and Ndubisi (2006) stated that the majority of the manufacturing companies in Malaysia were located in the West Coast of Malaysia. Johor (17.50%) had the largest concentration of manufacturing companies, such as textiles and apparel and wood-based industries, followed by Selangor (16.70%), Perak (9.40%) and Penang (8.70%). They concluded that the 2000 Census showed SMEs in Selangor predominantly in the transport and equipment, and electrical and electronics sectors,

while Johor specialized in textiles and apparel and wood-based industries. The food and food-related manufacturing sectors were concentrated in the states of Perak and Johor.

According to the Economic Census of the profile of SMEs (2011), there were 39 669 establishments in the manufacturing sector in 2010 with SMEs accounting for 37 861 (95.40%) of them. SMEs generated RM194 billion (23.20%) of the total manufacturing output of RM836.50 billion in 2010. In addition, SMEs contributed RM38.10 billion (22.30%) of the RM170.70 billion manufacturing value added in 2010. SMEs also created 698 713 jobs (38.60%) of the 1 810 344 jobs created in the manufacturing sector in 2010. Despite being fewer in numbers, medium-sized firms contributed 58.80% of the total value-added generated by SMEs.

SMEs offer great job opportunities for Malaysian citizens as according to the National SME Development Council (2012), SMEs contributed 56.40% of total employment in Malaysia in 2003. Indeed, the Tenth Malaysia Plan (2010) reported that almost 99.20% of businesses, and 56.70% of total employment in Malaysia were contributed by SMEs (EPU, 2010).

The food and beverages sector (MGCC, 2010) employed 44 778 in 2007 compared to 45 418 in 2008, which accounted for about 10% of total Malaysian manufacturing output and 1.40% of new jobs created in 2010. Fish and fish products, livestock and livestock products, fruits and vegetables and cocoa-based products were the main industries in the food processing sector. The beverage segment covered the manufacture of soft drinks and mineral water.

Shah Alam (2009) reported that manufactured food from Malaysia is exported to more than 80 countries, with an annual export value of over RM6 billion or approximately USD1.70 billion. Importantly, 80% of establishments in this industry are SMEs. SMEs accounted for around two-thirds of Malaysian food exports in 2010. Hence, recognizing its importance, the Small and Medium Industries Development Corporation (SMIDEC),

Malaysian External Trade Development Corporation (MATRADE) and Malaysian Industrial Development Authority (MIDA) have jointly worked on strategies to assist SMEs to stimulate further exports.

According to SMIDEC (2002), SMEs in Malaysia faced challenges domestically and globally. The domestic challenges faced by the SMEs in Malaysia were, *viz*., limited capacity for technology management and knowledge acquisition, low productivity and quality output, a shortage of skilled workforce, limited access to the financial market, high cost of infrastructure and the lack of knowledge and information. Malaysian SMEs also faced global challenges, such as intensified global competition and limited capability to meet the challenges of market liberalization and globalization.

Consequently, the Malaysian government formulated the "SME Masterplan" to stimulate the activities of SMEs in the country. The government identified six focus areas to improve SME performance over the period 2011-2020. A total of 183 government-supported programmes were implemented in the year 2011 followed by another 144 government-supported programmes in 2012. (See National SME Development Council, 2012)

According to the National SME Development Council (2012), the Malaysian government spent RM4.70 billion in 183 government-supported programmes in 2011, which benefited 681 263 SMEs targeted at human capital development (33%), access to financing (25%), innovation and technology adoption (19%) and market access (17%). A total of RM4.30 billion was allocated by the government to 45 supported programmes for the purpose of access to financing that benefited 325 183 SMEs. In 2011, 61 government supported programmes (including in human capital development) amounting to RM162.80 million was spent, which benefited 127 594 SMEs. Furthermore, for market access and infrastructure, the government allocated RM36.60 million and RM110.80

million under 31 and 12 supported programmes respectively, which benefited 225 192 and 258 SMEs respectively.

In 2012, 144 government supported SME programmes were implemented with a financial commitment of RM 14.80 billion, which benefited 487 871 SMEs. About 32 government supported programmes (RM 236.40 million) were implemented under human capital development, which benefited 18 435 SMEs. A total of 42 government supported programmes were implemented with RM 11.90 billion to provide access to financing, which benefited 346 011 SMEs. Finally, RM121 317 million and RM108.10 million were spent under 31 and 11 government supported programmes to support market access and infrastructure development, which benefited 121 317 and 941 SMEs respectively.

It can be seen that the government has taken a serious interest in supporting SMEs in the country, which is not only because of their contribution to the national economy but also because of the potential entrepreneurial route these firms offer Malaysians in economic development. Important parastatals, such as SMIDEC, have played a major role to enhance the participation of SMEs in the national economy, including the food and beverage manufacturing sector.

1.2 Problem Statement

In Malaysia, SMEs face low productivity levels coupled with weak firm-level capabilities. Productivity, technology, marketing as well as human capital capabilities play important roles to ensure that the Food Manufacturing sector in Malaysia grows effectively as they become integrated in the global market. In addition, firm characteristics, such as size of enterprises, legal status, ownership and different types of industry are also important determinants especially in the enterprise management to ensure enterprise growth in the future. These factors influence firm-level capabilities.

Hence, it is important to analyse the relationship between firm characteristics and firm-level capabilities.

Albeit it is dated, the BNM (2007) reported that the labour productivity of SMEs was only RM14 740 in 2006**,** which was far below that of large enterprises at RM47 830 per worker. The size-based disparity in productivity between SMEs and large firms has become wider. According to SME Masterplan, productivity per worker for the Malaysian SMEs was RM44 000 in 2008. In 2010, the estimated productivity per worker for Malaysian SMEs was RM47 000, which was about one-third that of the large firms (RM148 000) (NSDC, 2012, p. 30). This situation due to technology advancement, human capability and R&D capabilities uses by large enterprises compared to SMEs in the same industries.

Malaysian SMEs have relatively less productivity compared to high income countries (NSDC, 2011). High technology human capital, Marketing and Innovation are the factors resulting high productivity of SME in high income countries when compared to developing countries such as Malaysia. Productivity of SMEs in Singapore was four times higher and seven times higher in the United States, compared to the productivity of Malaysian SMEs. Low productivity of SMEs attracted the attention of Malaysian policy makers and researchers. Therefore, it is important to examine the productivity for the Food Manufacturing Industry especially SMEs in Malaysia. Moreover, as argued below, it is imperative to examine how productivity differs based on firm characteristics and how capabilities influence productivity for more insights.

SMEs in general lack the marketing, technology and financial capabilities to compete with large firms. Marketing is one of the fields whereby Malaysian food manufacturing SMEs have faced enormous challenges. McCarthy (2003) classified marketing activities into four broad groups of 4 Ps, *viz*., Product, Price, Place and Promotion. Marketing management refers to the ability of organizations to manage the

product, price, place and promotion of particular goods and services. Ahmad (2013) further explained that the firm's financial success often depends on its marketing ability, especially advertising and promotional activities. Ruiz-Ortega and Garcia-Villaverde (2008) and Song et al. (2005) argued that marketing capability has a big influence on financial performance of firms. They further explained that firm performance is, inter alia, determined by investments on assets and innovation. As with most SMEs in the developing economies, Malaysian food manufacturing SMEs encountered serious capital shortage limitations. They also face difficulty in launching effective advertising and promotional programmes to increase sales performance.

Malaysian manufacturers also showed low access to cutting edge technologies, especially ICT usage (Economic Census-Manufacturing, 2011). Most food manufacturing SMEs use semi-automatic (89.10%) and manual (10.70%) machinery and equipment with only 0.20% deploying fully automatic technology in their daily operations (Economic Census-Manufacturing, 2011). Given that industrial development is a process of acquiring technological capabilities and transforming it into product and process innovations (Lall, 1990), such capabilities are critical for Malaysian SMEs to raise productivity to sustain their competitiveness. Following the launching of the Industry 4.0 Master Plan in 2018, Malaysian policymakers have directed their agencies to assist manufacturers to upgrade technological capability (Malaysia, 2018).

According to Franco and Haase (2010), finance is one of the challenges faced by SMEs either in developing or developed countries. Even in the most advanced economy of the United States, Small Business Administration (SBA) found that 24% of all new businesses in the United States failed within two years, and 63% failed within six years (Wheelen & Hunger, 1995). Unlike the United States where SMEs have strong access to finance through the provision of preferential interest rates, most SMEs in Malaysia lack that sort of funding. Circumstances are worst of among the Least Developed Countries,

such as Cambodia, Lao PDR and Myanmar where interest rates are generally higher (ERIA, 2015).

Acs and Audretsch (1990) provided evidence of small firms competing effectively with large firms in generating innovations. This is possible as Rasiah (2017) has shown that the evolution of networks of knowledge flows that connect small firms to critical research and incubation nodes have dispelled the Schumpeterian myth that only large firms could do frontier R&D. Schumpeter (1934) did not envisage the emergence of regional knowledge networks that integrate specialized knowledge generators with knowledge appropriators (see also Rasiah, 2017). Examples of such successful agglomerations of knowledge synergies include the Silicon Valley, Route 128, Hsinchu Science Park, and many metropolises in France.

Productivity, marketing and technological capabilities are often related to firms' characteristics, such as ownership. However, previous researches show that most productivity and firm capability comparisons have been based on developed countries rather than developing countries. Davies and Lyons (1991) found that foreign firms had higher productivity compared to the local firms in the United Kingdom (UK) manufacturing sectors for the years 1971 – 1981. They concluded that foreign firms were 48.60% more productive than domestic firms, of which, 23.50% was due to the ownership effect and 20.30% was due to the structural effect. Among the few studies done on the developing countries, Rasiah and Gachino (2004) and Rasiah and Tamale (2004) found foreign firms to be more productive than national firms in Kenya and Uganda respectively.

Luo (2002), Yan and Gray (1994) and Rasiah (2004) went further to explain that foreign-owned enterprises would transfer sophisticated technology and capabilities, such as manufacturing skills, and managerial expertise to their local partners. The argument on whether joint ventures would benefit local partners from foreign partners'

technological and firm capabilities transferring process is mixed (Rasiah, 2004). While the potential exists (Caves, 1974), it depends on the nature of agreement between the partners and the capacity of local partners to appropriate gains from the foreign partner. According to Economic Census-Manufacturing (2011, p. 97), the total manufacturing establishments in Malaysia was recorded at 39 669, which consisted of 38 276 (96.50%) domestic-owned enterprises; 1 348 (3.40%) foreign-owned enterprises; and only 45 (0.10%) joint-ventures. The small number of foreign-owned and joint-venture establishments indicate that less interaction between local and foreign-owned establishments in manufacturing sector. This situation resulted less firm capability transfer especially in food manufacturing.

Legal status plays a significant role to influence firm performance (Buranajarukorn, 2006; Cooper & Dunkleberg, 1986; Fay, 1998; Fernandez & Nieto, 2006; Thuvachote, 2006). According to Thuvachote (2006), the labour productivity per day for Canadian individual proprietorship and partnership were recorded at USD18.50 and USD36.20 respectively for the year 1998**.** In comparison, for USA firms, it was recorded at USD23.70 and USD31.50 respectively for the same period. In 2005, the Canadian individual enterprises increased to USD26.50 and USD47.90 respectively. Meanwhile, the USA individual proprietorship and partnership were recorded at USD31.50 and USD44.10 in the same year. Currently, there is a lack of studies regarding firms' legal status on performance especially in Malaysian Food Manufacturing. Therefore, this research plays a significant role in filling this gap in this field.

1.3 Research Questions

This study addresses three main research questions, *viz*.,

- What is the level of productivities of SMEs and large food manufacturing firms in Malaysia?

- Do firm characteristics influence firm productivities among the Malaysian Food Manufacturers?
- What are the effects of firm capabilities and characteristics on labour productivity among the Malaysian Food Manufacturers?

1.4 Objectives of Research

This research aims to examine the productivity level and the relationship between firm characteristics, capabilities and productivity of food manufacturers in Malaysia. Specifically, the objectives of this research are:

- To investigate the productivity levels of SMEs and large firms in the Malaysian Food Manufacturing industry
- To examine firm-size based productivity and firm characteristics in the Malaysian Food Manufacturers
- To investigate the effects of firm capabilities on the labour productivity of SMEs and large firms in the Malaysian Food Manufacturing sector

1.5 Methodological Considerations

In order to meet the abovementioned objectives, this quantitative research utilizes cross sectional data analysis. Generally, non-parametric and quantile regression analysis were used in examining the relationships between the variables of this study. The manner of applying these statistical techniques depended on the nature of the research question and the variables involved, which will be further discussed subsequently.

To answer the first research question, a set of productivity indicators were developed. While there are a number of productivities, firm characteristics and capabilities studies on Malaysia's manufacturing sector, there is a lacuna in the food manufacturing industry. Therefore, we seek to fill this significant research gap. Meanwhile, firm characteristics in this research refer to the firm's ownership, industry type within the industry, legal status, and size of enterprises, which were found to be

important an influencing firm-level productivity. Factors such as marketing, technology, and human resource capabilities are the important determinants of firm-level productivity. We have used advertising and promotion expenditure and incidence to refer to marketing capability refers to advertising. Since food manufacturing SMEs are largely incremental innovators, we have used only ICT capability to refer to technology. For human capital capabilities we have used training expenditure and the share of educated workforce in total workforce to estimate it.

The Multi-Factor Productivity (MFP) approach is applied to answer the first objective. In addition, we compounded total factor productivity using the four input factors of capital, labour, energy, and material. By compiling firm productivity, benchmarking for food manufacturers can easily be done. There is a lack of studies on food manufacturing among developing countries, including Malaysia.

Wazed and Ahmed (2008) and Sink (1985) concluded that MFP is the ratio of output to the sum of two or more inputs whereby Labour Productivity (LP), Capital Productivity (CP), Energy Productivity (EP), Material Productivity (MP) and Capital Services Productivity (CSP) can be analysed separately. Most of previous work on firm-level productivity firms have used only Total Factor Productivity (TFP) and Labour Productivity (LP) to estimate productivity. This approach is expected to offer new insights into the estimation of firm-level productivity.

On firms' legal status and type of industries that influence the firm's productivity, the analysis will focus on individual proprietorship, partnership, private limited company, and other types of legal status (public limited company and cooperative) on a firm's productivity. The results will help establish the impact of firms' legal status on productivity in the Malaysian Food Manufacturing industry.

The expenditures of Promotion and Advertising, Information Communication Technology (ICT), Training, and Research & Development (R&D) will be used tp

measure firms' capabilities. ICT and R&D expenditures are the two important components in technological capabilities. Increasing expenditure of ICT and R&D expenditures will increase a firm's productivity.

1.6 Scope of Research

This research primarily focuses on the SME's in the Food Manufacturing sector in Malaysia, which consisted of 69.10% (4 099) of the total number of establishments and 42.40% (83.20 million) of total number of people engaged in the industry for the year 2010 (Economic Census – Manufacturing, 2011). Food Manufacturing consists of 17 sub-industries, which serve as the final goods or intermediate goods for other industry, which demonstrates it strong backward linkage generation potential. The breakdown by sub-industry and firm-size of the Malaysian food manufacturing industry in 2010 is shown in Table 1.2. There were 2 517 micro firms, 1 403 small firms, 103 medium firms and 76 large firms in this industry in 2010. The industry comprised 61.40% of micro enterprises, 34.20% of small enterprises, 2.50% of medium enterprises and 1.80% of large enterprises. Among the sub-industries, manufacturing of bread, cakes & other bakery products recorded a higher number of establishments (1 620), while the manufacturing of sugar and sugar products only had 6 establishments in 2010. Eight sub-industries recorded the higher number of small, medium and large enterprises, compared to micro enterprises, *viz*., manufacturing of sugar; sugar products; cocoa products; chocolate and chocolate products; sugar confectionery; coffee; tea and egg products.

Except for sugar, sugar confectionary and coffee, micro enterprises dominated all the 17 food manufacturing sub-industries in Malaysia. Small enterprises dominated the sugar, sugar confectionary and coffee sub-industries in Malaysia. Medium enterprises were mainly found in the bread, cakes and other bakery products, coffee, meehoon, noodles and other related product, and sauces and condiments sub-industries. Meanwhile,

large enterprises were mainly found in bread, cakes and other bakery products, and biscuits and cookies sub-industries.

By state, Selangor had the highest number of establishments in Food Manufacturing Enterprises at 21.10% (863 enterprises), (See Table 1.2) followed by Johore at 13.80% (567 enterprises) and Perak at 11.70% (481 enterprises). Kedah and Kuala Lumpur had 8.60% (351 enterprises) and 7% (286 enterprises) respectively. The remaining 1 551 enterprises (37.84%) operated in the other states of Malaysia.

Table 1.2: The Number of Enterprises in Malaysia Food Manufacturing according to the Sector and Size of the Firms (2010)

Manufacturing Sector	Micro Enterprise	Small Enterprise	Medium Enterprise	Large Enterprise
Biscuits & cookies	176	102	8	10
Bread, cakes & other bakery products	1061	533	12	14
Snack products	211	73	9	6
Frozen bakery products	12	4	1	0
Sugar	0	0	2	4
Sugar products	5	1	0	0
Cocoa products	3	8	7	5
Chocolate & chocolate products	15	22	3	6
Sugar confectionery	10	16	6	2
Meehoon, noodles & other related product	178	154	10	5
Prepared meals & dishes	118	54	6	3
Coffee	75	91	13	4
Tea	2	8	1	2
Sauces & condiments	157	135	13	5
Spices & curry powder	85	59	3	3
Egg products	2	6	0	0
Food products n.e.c.	407	137	9	7

Source: Department of Statistic, Malaysia
Note: Calculated from Principal Statistics of Manufacturing Industries by Industry, 2010

1.7 Significance of the Study

Given the scope of this research as discussed in the previous section, the findings of this study add valuable contributions to the further theoretical and conceptual development of factors related to productivity. Since this research focuses on the food manufacturing sector of SMEs in Malaysia, the factors identified to contribute to the level of productivity in this industry could lead to better understanding of core theories on economics, productivity, and even human capital. As the legislative parameters govern the economic landscape of Malaysia, the environment in which the SMEs thrive in this setting can be deduced as unique in its own ways; thus, this could provide a different theoretical and conceptual perspective in comprehending factors related to firm capabilities and characteristics.

With respect to practical applications, the identification of the relevant aspects of firm capabilities leading to higher levels of productivity could serve as a starting point of introspection for managers in the food manufacturing sector. For instance, the current study has identified the significance of human capital in inducing a more productive environment; therefore, managers should thrive to find ways to highlight the importance of training and development for the continuous learning and growth of their employees.

With the significant number of food and manufacturing SMEs in Malaysia, government initiatives through timely and suitable programs and policies could help drive future growth in this industry. Since legislation sets Malaysian SMEs apart from others in the region, it should also be through proper legislation that the government could show its support on SMEs through budget appropriations to improve human capital, research and development, and the technological infrastructure. Henceforth, such socio-political initiatives could have positive repercussions in the achievement of key systemic economic vision and aspirations.

1.8 Limitations of the Study

The study only considers the food manufacturers and the time frame is limited in the sense that only cross-sectional data was used. Since panel data is not available, the study relies on cross sectional data. Manufacturing Survey 2010 provided by Department of Statistics Malaysia was used as the secondary data in this research. A total of 1 090 enterprises were considered in this survey. However, only 928 enterprises (85.14%) were chosen. Most of the unselected firms were from the micro enterprises. The rejection of certain firms from this data pool was largely due to the fact that they do not have enough data for this research to be conducted.

The Food Manufacturing (MSIC 10799) consists of 17 sub-industries. Nevertheless, the study broadly classified them into three main sub-industries. Indeed, the study did not specifically analyse these three sub-industries individually. The results presented might not illustrate the specific sub-sectors. Nevertheless, industry dummy captures some of the observations.

Only small, medium and large enterprises for the Food Manufacturing were considered in this study. The lack of documentation and age of micro firms caused micro firms to be avoided in this research. Besides that, the large firms are used as a comparison with the small and medium firms. Despite the proliferation of data from large firms, this vast quantity of data yields skewed comparison hindering the reliability of this study. Needless to say, the profitable and stable nature of larger enterprises renders limited opportunities for exploration in terms of productivity compared with developing and more volatile small and medium enterprises (Zariyawati, Hirnissa & Diana-Rose, 2017). Moreover, the saturation of studies on productivity in large enterprises moves the focus of current research in this area towards SMEs (Demena & van Bergeijk, 2017). Therefore, the large enterprises will not be analysed in detail as much as it is with both small and medium-sized enterprises.

Since this research utilized secondary data, limitations of data occurred in this research. Although the formation of Malaysia is multi-ethnic and comprised of different states, the data based on ethnicity and demographic was not available. Therefore, this situation did not allow for the multi-disciplinary study approach to be implemented.

1.9 Thesis Outline

This thesis consists of 7 chapters. Chapter 1 presented performance of SMEs, problem statement, objectives and research questions to guide the study. It finishes with the organization of chapters and limitations of the study. Chapter 2 discusses the literature review of the thesis, where existing gaps in the extant literature will be identified.

The third chapter establishes the research methodology and theoretical framework of the thesis. In this chapter we discuss the data sources, variable measurements, and the analytical model. Chapter 4 discusses the various level of productivity while Chapter 5 explains how it differs based of firm characteristics and Chapter 6 reports and discusses the results of impact of capabilities on labour productivity. Chapter 7 presents the synthesis of the study and draws implications for theory and policy. It is in this chapter that we present a profound assessment of the contributions of the thesis.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

As this study seeks to examine the relationship between firm characteristics, firm capabilities, and level of productivity in food and manufacturing SMEs in Malaysia, this chapter discusses the conceptual and contextual foundation of these variables. With the prevailing need to further identify contributors of productivity, the sections of this chapter refer to related literature to probe into the factors selected in this study, as well as the gaps in knowledge, practice, and methodology. Section 2.2 mainly focuses on the discussion of the definition of small medium enterprises used in Malaysian context. Meanwhile sections 2.3, 2.4 and 2.5 reviewed previous research related to this research. The main discussion for section 2.3 was the issue of firm's productivity. On the other hand, section 2.4 focused on reviewing previous findings related to firm's characteristic and firm's productivity. Section 2.5 concentrated on factors that influence firm's productivity. The factors were marketing, technology and human resources capability. Lastly, section 2.6 provided the chapter summary for this chapter.

2.2 Contextual Background: SMEs in Malaysia

Before the formation of the National SME Development Council (NSDC) in June 2004, no standard definition of SMEs was used. Different agencies defined SMEs according to their own personal criteria, generally benchmarking them against yearly sales turnover, number of full-time employees and shareholder funds. For instance, SMIDEC defined SMEs as enterprises with yearly sales of less than RM 25 million and with full-time employees of less than 150. Bank Negara Malaysia explained SMEs as enterprises with shareholder funds of less than RM 10 million.

In 2005, NSDC introduced a new definition for SMEs in the manufacturing, manufacturing related services, primary agriculture and services sector (NSDC, 2005). The SMEs Masterplan 2012 has provided a general definition for SMEs. SMEs in the

manufacturing sectors was defined as enterprises with entrepreneurship annual sales turnover of not more than RM 25 million or full-time employees of not more than 150. In addition to this, SMEs in the service sectors and other sectors was defined as enterprises with company annual sales turnover of not more than RM 5 million or full-time employees of less than 50 (NSDC, 2012). The SME Annual Report 2011 defined knowledge-based SMEs including consultancy industries, where knowledge workers consisted of more than 20% of their staff and these staff must possess at least tertiary or professional education. Besides that, K-based SMEs must use ICT and technology to adopt innovation and R&D findings in their business processes in order to improve their products (NSDC, 2012). Table 2.1 shows a detailed definition of SMEs by category, namely micro, small and medium size of enterprises in Malaysia.

Table 2.1: Definitions of SMEs by Category: Micro, Small, and Medium according to Annual Sales Turnover and Number of Full-Time Employees

Annual Sales Turnover			
Size	**Manufacturing (including agro-based) & Manufacturing-related Services**	**Primary Agriculture**	**Services Sector (including ICT)**
Micro	Less than RM 250 000	Less than RM 200 000	Less than RM 200 000
Small	From RM 250 000 to less than RM 10 million	From RM 200 000 to less than RM 1 million	From RM 200 000 to less than RM 1 million
Medium	From RM 10 million to less than RM 25 million	From RM 1 million to less than RM 5 million	From RM 1 million to less than RM 5 million
Number of Full-Time Employees			
Size	**Manufacturing (Including Agro-Based) & Manufacturing-Related Services**	**Primary Agriculture**	**Services Sector (Including ICT)**
Micro	Less than 5 employees	Less than 5 employees	Less than 5 employees
Small	From 5 to less than 50 employees	From 5 to less than 20 employees	From 5 to less than 20 employees
Medium	From 50 to less than 150 employees	From 20 to less than 50 employees	From 20 to less than 50 employees

Source: SME Masterplan 2012

In this research, the definition of small size enterprises are manufacturers with an annual sales turnover from RM 250 000 to RM 10 million or full-time employees from 5

to 49 employees. Besides that, the medium size manufacturers are defined as enterprises with an annual sales turnover from RM 10 million to RM 25 million or full-time employee from 50 to 149 employees. Besides that, the SMEs must be registered under the Registration of Businesses (Act 197) or Companies Act 1965 (Act 125).

2.3 Gauging the Level of Productivity

According to Barnes (2011), productivity growth is the determinant of long-term economic and income growth. Productivity measures indicate the efficiency of an economic operation. Furthermore, the Commission of Productivity (2009) found that multifactor productivity (MFP) resulted in a measurement of the combined output of labour and capital units. Principally, MFP was used as an indicator of technological progress due to its ability to measure economic growth beyond that of working hours and capital. As a result, the Productivity Commission acknowledged the comprehensiveness of MFP growth in providing sharper insights into factors of economic growth that were relevant to economic policies and adopted them as the commission's primary measure.

According to Wazed and Ahmed (2008) and Sink (1985), the multifactor productivity measurement model (MFPMM) was developed by the American Productivity Centre in 1977 (nowadays known as the American Productivity and Quality Centre). In this model, MFP is the ratio of output to the sum of two or more input in the same breadth of time. Besides MFP, total factor productivity (TFP) was another approach widely used to research the efficiency of firms. Wazed and Ahmed (2008) and Slack (1999) found that TFP could be measured as the ratio of the total output to the total resource (input) which can be disaggregated separately into products and service productivity. As shown in Table 2.2, although similarly construed in terms of determining levels of productivity, minor details pertaining to MFP and TFP as key measures of productivity are contrasted and summarised. Craig and Harris (1973) further developed a TFP model at the firm level.

Table 2.2: A Comparison between MFP and TFP

Multifactor Productivity (MFP)	Total Factor Productivity (TFP)
the ratio of output to the sum of two or more input in the same breadth of time	the ratio of the total output to the total resource (input)
used as an indicator of technological progress	can be classified into products and service productivity
offers critical insights into factors of economic growth	a primary contributor to GDP growth

A Cobb-Douglas function was used by Rasche and Tatom (1981) for the analysis of the effects of higher energy prices on private business sector output in the US1949–1978, which included capital, labour hours, and the real price of energy. They concluded that there was a long-term productivity reduction of 7% in higher energy prices during the years 1973–1977. The finding of Rasche and Tatom (1981) was supported by Jorgenson's (1988) findings. In Jorgenson's (1988) examination of multifactor trans-log price functions in 35 broad sectors of the USA for the years 1958–1979, the relative input prices determined input substitution and the rate and bias of technical change. In the post-1973 productivity slowdown, he found that higher prices of electricity and non-electrical energy played significant roles in production.

By using the case study approach, Roberts (2006) analysed MFP of the Australian mining industry for the periods of 1984/1985 and 2004/2005. He found that the MFP for the Australian mining industry grew steadily until the year 2001. Thus, Roberts concluded that the Australian mining industry had no output growth since the year 2000. During that period, the input for the Australian mining industry was greater than the output. The component of MFP (capital services) was slowed down since the year 2000 due to a significant fall in investments in the year 1999/2000. However, it showed a growth trend in subsequent years due to the labour employment, and total hours worked had increased rapidly over the last few years at more than 30% since 2001/2002. Although Roberts' research covered a sufficient period, he did not consider the energy and materials used in

this industry. Energy and materials were important parts to the mining industry. If these two important components were taken into account, the results might be different.

The study of Banga and Goldar (2007) focused on contribution of services (input) to Indian manufacturing during pre- and post-reform periods. The growth rate was 7.21% and 8.12% for the years 1981-1990 and 1990-2000 respectively. For the same two periods, the manufacturing services grew to 0.42% and 15.78% respectively. Meanwhile, along the years 1981-2000, total output and manufacturing services grew at 7.63% and 7.52% respectively.

According to Banga and Goldar (2007), the TFP was increased to 0.59% in the years 1981-2000. It was recorded at 0.88% for the pre-reform period but decreased to 0.26% in the post-reform period. For the total input, 7.04% was achieved along the years 1981-2000. Meanwhile, the corresponding growth rate of pre- and post-reforms were 6.33% and 7.86% respectively. Within these 18 years, the total of manufacturing services contributed 13%. The contribution of services to output growth in years 1981-1990 recorded 0.80%, which increased to 25.50% in the years 1990-2000. Therefore, manufacturing services played an essential role to ensure India's manufacturing grew in 1981-2000. However, due to a variety of database sources applied in this research, it can be confusing. It is suggested that an enhanced consistency in database sources may increase the accuracy of the research findings.

The case study approach was used by Gupta and Dey (2010) for the research productivity of tea estate in Silchar, Assam, India between the years 2003 to 2007. This research utilized the productivity accounting model to develop a productivity measurement model for the tea industry in India. They concluded that the TFP for this enterprise recorded 1.30-1.66 while the Labour Productivity, Energy Productivity, Material Productivity, subsidized productivity, miscellaneous productivity and Capital Productivity recorded 3.04-3.84, 8.34-9.45, 3.20-9.21, 308.19-446.88, 12.87-23.82 and

181.15-665.60 respectively in the observation period. They found that the TFP for the estate showed the same level between 2003 and 2004 before declining to its near-original state in 2007.

Gupta and Dey (2010) further explained that labour, material and energy from 85% to 92% of the total input for the years studied had experienced a general deterioration in their productivity indices during the whole period. It was concluded that the breaking down of the old equipment was partially responsible for the falling trends of the TFP. They also concluded that there was poor resource utilization of the three major inputs, namely labour, material and energy. However, this research cannot represent the tea industry in India. This industry was not an industry of monopoly. It comprised of many enterprises within the industry itself. Therefore, one enterprise cannot be representative of the whole industry.

The study of Ray and Pal (2010) focused on India's iron and steel industry for the period of 1980 to 2004. They divided this study into two phases, known as pre-reform (1980-1992) and post-reform (1992-2004) periods. They found that the CP for this industry showed an annual growth rate of 0.80% while the MP was 1.83%. In addition, LP and value-added grew at 5.81% and 6.76% per annum respectively. However, the TFP experienced a slight decline of 0.10% annually along this period.

Besides this, Ray and Pal (2010) also concluded that for the pre-reform period of India's iron and steel industry, TFP, CP and MP grew at 0.57%, 0.26% and 1.39% respectively. Meanwhile the LP and value-added was recorded at 6.29% and 4.70% respectively. In comparison, for the post-reform period, the TFP, CP and MP were 0.48%, 1.33% and 1.76% respectively. For the LP and value-added, there was an increase of 7.06% and 6.90% in the post-reform period.

In this research, Ray and Pal (2010) considered the intermediate energy as material input. This was supported by Jorgenson's (1988) observation that the role of

intermediate inputs like material, and energy, were significant sources of output growth in a three inputs production framework. However, the differences of demography, industry and time would cause Jorgensen's finding to be irrelevant. Therefore, energy must be considered as one important input for this research. Through this, researchers can easily determine the contribution of energy and material productivity to the TFP.

Sahu and Narayanan (2011) used a two-stage regression deploying OLS to estimate the TFP for Indian manufacturing industries for the year 2008. There were 2 541 firms that were used as samples drawn from Indian manufacturing industries. Compounding of TFP was done with capital, labour, energy and material as the inputs. They concluded that labour and material inputs played a major role compared to the capital and energy input. When OLS test was applied as first stage regression, the results showed capital, labour, energy, and material recorded positive and statistically significance with total output. However, in this research, Sahu and Narayanan (2011) did not clearly state how the labour and material inputs played a major role in comparison to capital and energy input for Indian manufacturing industries.

After having gone through several previous studies, it was found that most of the researches in firm's productivity used productivity accounting model as their framework. These models were used to compare sectorial or industrial productivity. However, there was a lack of utilization of this method to calculate firm's productivity at the enterprise level. In the Pakistani setting taken from the World Bank data, Jamal (2018) suggested a model to measure and compare productivity using TFP in various manufacturing sectors through the following factors: ownership, ICT usage, education and skills development of workers, global partnership, and innovation processes. Although this helps establish the measurement of TFP, there is still a lack of research regarding firm level productivity. Besides that, most of the productivity research was done for other manufacturing but not for the food manufacturing sector. This was especially true in developing countries such

as Malaysia. Therefore, this research was conducted to fill in the gap in the lack of knowledge regarding firm level productivity approaches especially in firm manufacturing.

2.4 Firm's Characteristics and Firm Productivity

Empirical studies in the field of economics have identified certain firm characteristics that have significant effects on firm productivity. This section discusses the following characteristics: ownership, legal status, and size of enterprise. Table 2.3 presents an overview of published works on firm characteristics from Web of Science and Scopus. In presenting these figures, a thematic approach was used by referring to keywords in this study.

Table 2.3: Keyword Search Results on Firm Characteristics

Keywords	Year	Web of Science	Scopus
Ownership	2016-2020	4 003	6 687
Legal Status		32	135
Size of Enterprise		12	22

2.4.1 Ownership

Previous literature showed that ownership had a direct effect on firm productivity. According to Davies & Lyons (1991) foreign owned enterprises achieved higher labour productivity compared with locally owned establishments in the United Kingdom (UK) for the period of 1971 to 1981. They used two-tier decomposition method to find out the structural and ownership effects for their research. They concluded that foreign firms are 48.60% more productive than domestic firms, of which, 23.50% was due to the ownership effect and 20.30% was due to the structural effect. In this research, the author overlooked the differential contribution between skilled and unskilled labour in manufacturing for that period. If this important aspect had been considered, the findings would have been different. Similarly, foreign firms in Hungary were noted to be more effective in

shouldering low fixed costs of importation compared with their domestic counterpart, which positively affects their level of productivity (Halpern, Koren & Szeidl, 2015).

Oulton (1998) conducted a research in the UK manufacturing and services sector. He used Annual Respondents Database (ARD) data set for the manufacturing sector and One Source data set for the services sector. He concluded that foreign subsidiary enterprises have 38% higher labour productivity compared with domestic firms in manufacturing. On the other hand, a foreign firm has a one-third higher labour productivity compared with domestic firms in the services sector. These findings are due to the high physical and human capital-intensive factors used in foreign firms compared with domestic firms in UK manufacturing and services sector.

Temouri et al. (2008) used firm level data from Amadeus to study the relationship of Total Factor Productivity (TFP) with ownership and Germany's manufacturing and services sectors. They used semi-parametric approach proposed by Levinsohn and Petrin (2003) to estimate augmented production function in their research. They concluded that overall German Multinational Enterprises (MNEs) are more productive when compared to foreign firms in the manufacturing sector.

However, for the high-tech manufacturing sector, the foreign enterprises especially from the European Union (EU) and Organisation for Economic Co-operation and Development (OECD) were more productive than local MNEs. Foreign and local enterprises did not have a different level of productivity in the German high or low-tech enterprises in the services sector. These findings led to biased results due to the fact that they assumed the firms with missing data on the country of holding company and ultimate holding company to be German-owned firms. Jefferson et al. (2008) used firm-level data set collected by China's National Bureau of Statistics (NBS) to analyze the relationship between multifactor productivity (MFP) and enterprise legal status. This database covers all state-owned firms and non-state-owned firms with sales exceeding RMB 5 million

and consists of 250 000 'above-designated size' enterprises. They found that in the year 1998, private enterprises achieved 2.23; foreign enterprises 2.18; centre-owned enterprises 2.17; followed by others-owned enterprises 2.15 and state-owned enterprises 1.29 MFP. Meanwhile in the year 2005, the MFP achieved by others-owned enterprises was 2.72; centre-owned enterprises 2.69; private enterprises 2.66; followed by foreign enterprises 2.53 and lastly state-owned enterprises 2.38. Through compounded MFP, they concluded that state-owned enterprises achieved the highest MFP growth compared to other enterprises. However, in this research, the researchers never showed the detailed growth of capital and labour productivity among Chinese enterprises in the period 1998–2005.

Li et al. (2009) used about 5 000 International Joint-Ventures (IJVs) from the period 1999 to 2003 in China to investigate the relationship between ownership and labour productivity. They used Hausman-Taylor's method to establish the regression for their research. They concluded that on average, an IJV's productivity was about twice as high as the average productivity in the industry. They further explained that the engagement in joint ventures with foreign companies contributes to technology transfer, and this will increase firms' productivity.

Moreover, foreign direct investment could be seen as another factor contributing to increased levels of productivity. Xiao and Park (2018) analysed how spillovers from foreign direct investments affected the local business in China. Based on their comparative data analysis, they found out that FDI spillover increases productivity due to the fact that other internal and external factors are at play. These aspects include the legal contextual setting and the structure of the ownership, which are key institutional factors that establish the need to look into ownership as a vital contributor to productivity.

In the production of olive oil in the Mediterranean, Ozden and Dios-Palomares (2016) identified factors related to ownership that have a direct effect on the level of

productivity. Since the countries involved in this particular study were regarded as highly productive in terms of producing olive oil, the findings quantified this high level of productivity by looking into ownership structures. Thus, it was noted that private ownership yields a positive impact on productivity due to the autonomy of the company and the intense competition among olive oil producers.

Despite the proliferation of studies arguing that ownership only plays a very minimal role in increasing productivity, Joyez (2019) counterargued by noting that ownership factors enable control in a localized environment and partnership in a global scale. Given the right relationship between the firms and the government, shared ownership could yield a high level of productivity if there is a full integration with join ventures especially with foreign investors. Another criticism to ownership pertains to capital allocation, which is perceived to be misappropriated towards large businesses that are perceived to be profitable rather than SMEs in Spain, Italy, and Portugal; thus, this impeded productivity in these countries unlike other European countries like France and Germany (Gopinath, Kalemli-Özcan, Karabarbounis & Villegas-Sanchez, 2017).

Moreover, a study involving banking firms in India attributed growth and productivity by classifying state-owned banks and overseas-private banks. Gosh (2016) noted that state-owned banks tend to have a lower growth rate compared to privately owned banks. Hence, this suggests that the level of productivity could be determined by the type of business due to their distinct characteristics that could be postulated to affect growth factors.

2.4.2 Legal Status

In a study from twelve European countries, Bloom, Draca and Van Reenen (2016) assessed how the legal status of a company and technical factors are influenced by the rising imports from China. Since importation from China has been reported to have affected the productivity of European markets, it was then hypothesised how the firm's

legal status of proprietorship could have effects on the technological upgrade of the current infrastructure. Hence, the study attributed a 14% rise in the upgrading of technological systems in private limited companies in Europe to keep up with the influx of import from China.

The difference of LP between individual proprietorship and partnerships for Canada and USA was studied by Abor and Quartey (2010). In this study, they found that LP for individual proprietorship firms of Canada was recorded at USD 18.50 (1998) and USD 26.50 (2005). Meanwhile, the LP for individual proprietorship firms was recorded at USD 23.70 and USD 31.50 respectively for the year 1998 and 2005 for USA. Meanwhile, LP for the partnerships & corporations for Canada were recorded at USD 36.20 (1998) and USD 47.90 (2005) in this study. The LP for the same category for USA firms was recorded at USD 31.70 and USD 44.10 in the year 1998 and 2005 respectively. In this research, Abor and Quartey (2010) did not clearly discuss the factors that caused the differential between LP individual proprietorship and partnerships for both countries above. The various databases and definition for both countries contributed to the unclear information and findings in this study.

2.4.3 Size of Enterprise

Charoenrat and Harvie (2012) used stochastic frontier analysis and technical inefficiency effects model to analyse the legal status of a company with regards to the technical efficiency of manufacturing SMEs in the North-eastern region of Thailand in 2007. The locations of their study are Khon Kaen, Udon Thani and Nong Khai provinces. This research utilised the databases of industrial census 2007. They concluded that small enterprises are more technically efficient compared to medium sized enterprises especially in Udon Thani province. This finding was supported by Le (2010). They explained that small enterprises are more flexible, allowing them to quickly diversify. Thus, this makes them more efficient (Biggs, 2002; and Le, 2010).

A study by Imbriani et al. (2014) focused on the relationship between size of enterprise and ownership with TFP in Italian manufacturing for the period 2002 to 2007. In their study, they utilized the Analisi Informatizzata Delle Aziende (AIDA) database, which consisted of 563 000 enterprises. The semi-parametric approach suggested by Olley & Pakes (1995), and modified by Levinsohn & Petrin (2003) was applied. They concluded that foreign MNEs increased the TFP of the local SMEs. Foreign MNEs in upstream industries had provided inputs that were not available in the country and complementary services to small local enterprises as an effort to ensure them more advancement in technology.

For the medium enterprises in Italian manufacturing, the findings of Imbriani et al. (2014), in line with Schilirò (2011). They explained that these establishments employed a relatively high degree of flexibility in their business models, and this degree of flexibility paved the way for organised structure, being able to withstand global challenges and having similar characteristics and common strategies (Musca & Schilirò, 2012) with foreign MNEs compared to small and large enterprises. However, the findings of this study for the large enterprises showed a contrast with the findings of Zhang et al. (2010). According to Zhang et al. (2010), large enterprises had benefited from recognizing and practicing new technologies and management brought on by foreign MNEs. In general, these large establishments enjoyed economy of scale. Hence, they could spread out the R&D expenditure into mass production.

However, these situations did not occur in the studies conducted by Imbriani et al. (2014). The researchers did not concentrate their study in specific manufacturing for the Italian economy. Besides that, this study also did not shed light on material and energy expenditure in their research. By overlooking these important aspects, the results would be inviting arguments. As such, Harris and Moffat (2015) argued that in the British setting the capacity of larger local enterprises to produce large quantities and to build

worker capacity leads to a higher TFP due to their dependence on streamlined manufacturing procedures. In Germany, the quantity of output was measured to be correlated with the input from the size of the workforce and sourced materials; thus, the size of the enterprise was presented as a clear indicator of productivity (Tekleselassie, Berhe, Getahun, Abebe & Ageba, 2018).

Serrasqueiro and Nunes (2008) used database from the Exam Journal, provided by a Portuguese branch of Dun and Bradstreet Consultants to find out the relationship between performances (profitability) with size of business for the selected SMEs in Portugal in the years 1999 to 2003. They used dynamic estimator to conduct their research. Only 51 enterprises from Portugal were considered in their research. They concluded that there was a positive relationship for SMEs and performance among Portugal enterprises in their research period. This study was supported by Hart and Oulton (1996) and Geroski (2002). According to them, SMEs have higher growth rates than large enterprises. However, Becchetti and Trovato (2002) and Fagiolo and Luzzi (2006) found that SMEs faced difficulties to access external finance to finance good investment opportunities compared to large enterprises. This situation will reduce SMEs growth and performance in the future.

A widely quoted set of studies by Acs and Audretsch (1988, 1990) make the point that small firms can be equally or more innovative and productive than large firms. Using a large data set from the United States, Acs and Audretsch argue that small firms with access to the right resources have outperformed large firms in several industries. To this point one can draw on the findings of Rasiah (2019) who argues that small firms connected to knowledge networks, including knowledge nodes, (such as universities and public laboratories), appropriate synergies from incubators, funding and inventions to scale up prototypes, as well as improve their product range and sophistication.

Similarly, a study conducted by Piabuo, Baye & Tieguhong (2015) in Cameroon utilized data from the World Bank to shed light on the relationship between the size of the enterprises and credit constraints. From more than 360 firms across several towns in Cameroon, a rigorous cross-sectional data analysis rendered that small and medium enterprises are heavily affected by credit constraints due to the limited production that did not match the economic environment and legal environment of Cameroon. Hence, the paper proposed for creation of public banks and governmental agencies to support SMEs. In the Malaysian setting, government support in terms of financial and non-financial initiatives was reported to have been perceived positively to have a significant effect on the performance of SMEs (Shamsuddin, Sarkawi, Jaafar & Rahim, 2017).

Using Australian Bureau of Statistics (ABS) data base, Mahmood (2008) conducted a study on the relationship of labour productivity and employment for Australian SMEs Manufacturing between the period of 1994/1995 and 1999/2000. This study utilized Cobb-Douglas production function (Greenhalgh & Gregory, 1997) derived from neoclassical production function. It covered 9 manufacturers from Australian economy. He concluded that the SMEs labour productivity increased between 1994/1995 and 1999/2000 across all industries in their study. The equipment of capital and technology as well as management skills played a significant role in influencing labour productivity in their study. In this study, he used most of the data from sample surveys, thus subjected to both sampling and non-sampling errors. Besides that, there was unclear discussion on factors influencing labour productivity in his findings. Therefore, the findings of Mahmood (2008) are debatable.

Fazio and Piacentino (2010) studied the labour productivity of Italian SME's manufacturing using multilevel analysis approach. Bureau Van Dijk Database (AIDA, 2009), that consisted of 7 097 firms was used. They concluded that capital intensity was the main determinant contributing positively to productivity. A doubling of capital

intensity leads to a 5% increase for labour productivity of Italian SMEs. The study put more emphasis on demographic factors compared to size of enterprises. However, the researcher did not clearly discuss the size of enterprises that influenced firm productivity. On the other hand, this study did not focus on specific manufacturing in Italy. Different manufacturing requires different level of skilled workers in today's manufacturing scenario. Overlooking these important factors can raise questions on the validity of these findings.

Since different researchers yield different findings concerning size of enterprise, legal status and ownership with firm productivity, it is important to investigate this relationship in the Malaysian context, especially for food manufacturing. In addition, there was a lack of research related to the relationship between different types of industries on productivity, especially for developing countries. Therefore, this research plays an important role to fill the gap of knowledge in the Malaysian context. Through this, the effect of size of enterprise, legal status, and firm ownership towards Malaysia's capital, labour, energy and material productivity can be illustrated.

2.5 The Effects of Firm's Capabilities and Characteristics on Labour Productivity

Different scholars have different views on marketing, technological and human capital capabilities towards firm performance. This section elaborates on the different capabilities and characteristics of firms that could lead to labour capability. Table 2.4 illustrates an overview of published works on firm capabilities from Web of Science and Scopus. In presenting these figures, a thematic approach was used by referring to keywords in this study.

Table 2.4: Keyword Search Results on Firm Characteristics

Keywords	Web of Science	Scopus
Marketing Capability	106	212
ICT Capability	11	31
Human Capital	4 132	6 119
Innovation and R&D	2 571	9 919

2.5.1 Marketing Capability

Vorhies (1998) documented the role of marketing capability, which was to fulfil the market-related needs of the business by allowing firms to provide added value. This capability also aimed to adapt to the changing market conditions. Tsai and Shih (2004), Vorhies (1998), and Weerawardena (2003) concluded that marketing capability arose when individuals applied knowledge, market environment, experience, and company resources to resolve commercial problems in order to generate higher value for the organization and to be competitive in the market. Therefore, marketing capability referred to the combination of employees' knowledge, skills and resources to fulfil the market needs.

McCarthy (2003) defined marketing approach into four broad groups of 4 Ps, which are product, price, place and promotion. Marketing management referred to the ability of an organisation to manage the product, price, place and promotion of a particular product or service. Ahmad (2013) further explained that for Malaysian SMEs, marketing decision must be made by considering the marketing variables under each P. The financial success of a firm often depended on its marketing ability.

Ahmad (2013) conducted a research to find out the marketing practices among local SMEs on fresh agro-based products in the industry of aquaculture, livestock, fruits and vegetables, horticulture, palm oil and rubber. He distributed 300 sets of questionnaires but only 237 sets were usable in his research. The marketing capability was analysed based on their perceptions towards target market, product, price,

distribution and promotion. He concluded that only 20 companies were categorized as successful SMEs.

Most of the respondents produced the products based on the needs of their customers, and the price of the products was based on market rate after considering the price set by competitors, and cost of production. Most of the respondents in this research distributed the products through middlemen such as sundry shops and applied traditional ways of promotion such as distributing leaflets and placing banners. The financial constraints were the reason respondents were unable to distribute their products to the targeted market and launch modern promotional activities to increase sales. This situation dampened the growth of the establishments. In addition, the study of Ahmad (2013) did not provide enough information relating to modern packaging and advertising and promotional activities in these industries.

From a "budgetary" context perspective, the biggest part of marketing expenditure usually goes to advertising and promotional activities (Ambler, 2000). According to Sheth and Sisodia (1995), the marketing expenditure was relatively higher than management cost in manufacturing sector in the last few decades. Sales increased when the advertising and promotional activities were effective and this effect was sustained for a few years (Dekimpe & Hassens, 1995; Peles, 1971). Effective advertising generated widespread knowledge, and in the process, created brand acceptance that has a long-term effect on the company (Cobb-Walgren et al. 1995; Ehrenberg et al. 2002). This argument was supported by Haghirian and Inoue (2006). They concluded that the information from advertising programmes played a significant role in influencing Japanese consumers' attitude towards mobile devices.

The study of Pergelova et al. (2010) was related to the effects of advertising & promotional activities on eighteen car companies in Spain between the periods of 2001 to 2007. The advertising medium used were printing, broadcasting, internet and outdoor

in Spain. The two-stage approach that was applied were contemporaneous efficiency frontiers and truncated regression models. They concluded that online advertising seemed to be a promising way to increase overall advertising efficiency but mixed medium (online and broadcasting) was more efficient compared to online medium. This finding was in line with the finding of Tsao and Sibley (2004), Saeed et al. (2002), and Chang and Thorson (2004). In this study, the authors only concentrated on car industry (homogeneous product) with medium of advertising and promotions. If other industry was considered, the product became heterogeneous, and the findings could be different.

According to Tanakinjal et al. (2010), television was the traditional advertising and promotional medium that conveyed to consumers information by marketers. However, Li and Leckenby (2004) found that the internet replaced television to become the first screen in advertising and promotional programs due to its high efficiency (Briggs & Hollis, 1997) as compared to traditional media. In agreement, Kiang et al. (2000) further explained that, today, a lot of companies used the internet for advertising or corporate promotion activities. It makes online advertising and promotional activity more important as compared to the traditional print media. Online media provided a two-way communication, which was, identifying customers (Roberts & Ko, 2001) and reaction of customers (Pavlou & Stewart, 2000). In addition to the aforementioned media, retail labels and packaging contributes to adding value to the food product, which induces a demand in production (Klecka, 2017).

The expenditure of advertising and promotional programmes played a significant role especially in recession periods. However, until today, scholars have different views concerning the findings of this method. According to Kamber (2002), increase in the expenditure of advertising & promotion will increase firm profitability. On the other hand, Kijewski (1982), found that, there was no significant increase in profit when this expenditure was increased during a recession period. Srinivasan et al. (2011) found that

the manufacturing firms in the USA recorded satisfaction in advertising and promotion expenditure, especially during the recession periods. The findings of Srinivasan et al. (2011) were biased due to the failure to consider characteristics such as size and ownership of enterprises. In addition, this study did not take into account consumer benefits from advertising & promotional programmes.

Dave and Saffer (2012) used monthly time series databases from 1994 to 2005 to examine the forecast and non-forecast advertising activities for the price of pharmaceutical products in the USA. They concluded that the price was augmented due to advertising activities being implemented by producers. This finding reflected the studies of Gallagher et al. (2001), McCarthy (2003), Kanso and Nelson (2004), Li and Leckenby (2004), Parker and Plank (2000), and Balabanis and Reynolds (2001). According to them, mix medium advertising was more efficient compared to single medium advertising approach. The study of Dave and Saffer (2012) did not clearly discuss the process of transferring cost of advertising to consumers from the producer of the pharmaceutical industry in the USA. The variety of databases applied in their study caused biases in their findings. In addition, this research did not clearly state the reason(s) behind the increase in market price of pharmaceutical products: whether it was caused by quality or advertising costs.

2.5.2 ICT Capability

The success of broadcasting advertising and promotional activities depended highly on firm's ICT capability. However, until today, the debate on potential contribution of ICT capability to firm's performance is still going on. Hence, this attracted the attention of this researcher to conduct this current study to contribute further knowledge in this gap. According to Parsons et al. (1993) and Dos Santos et al. (1993), there was a negative relationship and non-significance relationship between IT investment with firm's TFP. However, a study by Jorgenson and Stiroh (1995) showed a positive and statistical

significance relationship between this investment and TFP. On the other hand, Hernando and Nuńez (2004) and Sánchez et al. (2006) found that IT investment played a significant role in influencing the LP of Spanish enterprises.

More studies have been conducted on the relationship between ICT capability and firm's performance in the past decade. Some studies showed positive relationship between ICT capability and firm performance while some showed contradictory findings. The effects of ICT in business performance were only significant in the long-term. Therefore, Patrakosol and Lee (2009) concluded that a lot of researchers overlooked the time period for ICT to take effect in business performance. Similarly, a review on the impact of ICT on productivity revealed the extent of its effects as manifested by the rise in the GDP (Tisdell, 2017). Needless to say, the growth in GDP trickles down to the micro businesses, and the utilization of technology in SMEs contributed to a more efficient system that leads to a high level of productivity.

According to Mohapatra and Singh (2012), ICT benefited businesses especially for the administrative functions in daily operations. The benefits of ICT were not only for large firms, but also for SMEs as well. In agreement, Lai et al. (2006) found that ICT can be a tool to obtain information on financial, products, costs, customers and competitors, therefore contributing to operating efficiency of the enterprises. However, Rath et al. (2012) found that SMEs lag behind large enterprises in terms of ICT usage in their operations especially in developing countries. These resources did not only enhance marketing activity for the sellers but also provided buyers with more options to source for products. Reducing cost of operations and rapid increase of sales would increase firm profitability.

Bharadwaj used Information Week 500 (IW500) and Standard and Poor's Compustat Databases for the year 1991 to 1994 to examine the IT leaders with superior IT capability associated with performance for IT industry. The resource-based view

theory and matched comparison method were applied. She concluded that there is a positive relationship between IT capabilities with firm profitability. Methodology issue arose in her study. The process of determinant of a control company from a potential set of firms that fit the selection criteria will influence overall findings of this study.

Pérez-López and Alegre (2012) used SABI database to study the relationship between IT and firm performance for 162 Spanish enterprises. The survey method and structural equation modelling were applied. 1 660 sets of questionnaires were distributed to the top management in 11 industries. However, only 162 (9.76%) samples were usable in this study.

Chae et al. (2014) used pair-wised comparison, regression analysis and industry benchmark tests, to analyse IT capability on firm's performance in the IT sector. They chose 561 firms from IW500 databases between 2001 and 2007, which consisted of 296 IT leaders and 265 firm controllers. Interestingly, this research showed contradicted findings with Bharadwaj (2000). All tests applied in Chae et al. (2014) showed that IT capability did not influence firm's profitability. This situation was due to the affordability of IT equipment and manpower. However, in their research, the authors did not analyse IT capability based on ownership. In general, foreign and joint venture had more IT capability and profitability in comparison to local enterprises. Overlooking this important aspect could cause biased findings.

Technological and marketing capabilities did not increase firm's productivity when human capital capability did not appear in a particular firm. These 3 capabilities have a close relationship with firm's performance. Abduli (2013) documented that highly qualified, motivated and happy staff contributed tremendously to the success of the enterprises. Excellent customer service provided by the employees will increase the firm's competitiveness. This in turn, increased the firm's performance. Agreeing with

this, Sims (2002) found that the success of the organisation today and tomorrow was being seen as more and more dependent on the effectiveness of human resource.

They concluded that there were positive and statistical significance between knowledge management and market performance as well as between market performance and financial performance. These findings validated the findings of Lin and Kuo (2007), Liu et al. (2004), Zack et al. (2009), and Lee and Choi (2003). According to them, the relation between knowledge management was indirect and via market performance. However, this study did not consider small Spanish enterprises. Moreover, varieties of industry were considered in this study. In general, small enterprises faced financial limitation; hence, limited IT was applied in their operations. Besides that, different industry had different needs for IT, failure to consider these two important aspects caused Pérez-López and Alegre (2012) findings to be skewed.

2.5.3 Human Capital: Educational Background and Skills Development

From the theory of human capital perspective, a highly educated workforce is more productive compared to a lowly educated one. However, the debate between human capital researchers is still going on until today. Gibbons et al. (2005) explained that the number of school years attended by the workforce showed a strong link to its efficiency. Higher education equipped the employees with the ability to use more advanced technology in the firm's production line. On the other hand, Yeaple (2017) attributed the development of human capital to the interplay between knowledge acquisition through relevant education and skills development through job or training opportunities from employers and the state.

Fleisher et al. (2011) argued that less educated workers had more job experience compared to higher educated employees in enterprises in China. They found that less educated workers recorded an average of 1.70 years more experience than higher educated workers. In addition, less educated employees recorded 2.78 years more

experience than higher educated employees in China state-own enterprises. The longer working experience and training enabled them to be more competitive and efficient compared to the higher educated workforce in the labour market.

The relationship of higher and lower education workforce with TFP was studied by Fleisher et al. (2011). The Productivity and Investment Climate Survey (PICS) year 1998-2000 databases that consist of 425 enterprises from 5 industries and production function estimation techniques (Pakes & Olley, 1995; Levinsohn & Petrin, 2003; Ackerberg et al., 2006) were applied. They concluded that the Chief Executive Officers (CEOs) of enterprises that received higher education showed positive and statistical significance with TFP, while the education level for the rest of the workforce did not influence TFP. However, in their study, the authors did not further emphasize the impact of the experience of the workforce on firm performance. For the capital intensive and high technology industries, skilled workers play a significant role in firm performance. The five selected industries in their study did not fall under these categories of industries. Therefore, the findings of their studies are questionable.

Human capital also plays a significant role to raise the productivity of SMEs. According to Nelson and Phelps (1966), in SMEs, highly skilled workforce was related to higher levels of productivity. This situation was due to the capability of skilled workers to utilize new technology. Hence, Griffith et al. (2004) concluded that a high skilled workforce was essential for enterprises, growth and development. This begs the question: Does this situation occur in the SME Malaysian Food Manufacturing? The answer is still unclear as there is no existing evidence to support this argument.

Cravo et al. (2012) used Instituto de Pesquisa Econômica Aplicada (IPEADATA) Database from the year 1985 to 2004 to examine the contribution of human capital to SMEs' TFP in Brazilian Manufacturing, Commerce and Services sectors. The first-differenced GMM (Arellano & Bond, 1991) and the system GMM (Blundell & Bond,

1998) were applied. They concluded that a highly skilled workforce showed a positive contribution to firm productivity but was not significance to the Brazilian economy. This finding was supported by Van Stel et al. (2005). According to them, less human capital in certain establishments prevented them from contributing to the productivity growth. However, Cravo et al. (2012) study did not compare human capital with capital-intensive or labour-intensive industries of the Brazilian economy. Generally, human capital is an important determinant for the capital-intensive industries, especially for those large establishments that conduct R&D activities. Ignoring this important aspect will cause the results to be biased.

Using a structural estimation of the firms' production function (Ackerberg et al., 2006) approach, Hiller et al. (2010) examined the relationship between firm TFP and education level of the workforce for Denmark from 1995 to 2005. The databases such as Integrated Database for Labour Market Research (IDA) and Regnskab consisted of 24 000 enterprises that were compiled by the Department of Statistics of Denmark. They concluded that education level showed a positive relationship and statistical significance in influencing firm TFP especially for white-collared workers, compared to blue-collared workers in enterprises that conducted more R&D activities. These findings validated previous studies by Hong and Page (2001, 2004), Berliant and Fujita (2008), and Alesina and La Ferrara (2005). According to them, a highly educated workforce contributed to knowledge spill-over, creativity and problem-solving abilities in their daily operations. The data was compiled based on the size of enterprises by Hiller et al. (2010) study. However, the discussion and the findings of their studies were not based on the size of enterprises. In addition, the firm TFP in their study consisted of capital, labour and material expenditures. In this case, energy expenditure was not taken into account. This expenditure played a significant role especially for manufacturing, wholesale & retail

trade, transport as well as financial & business services industries. If this expenditure was considered, the findings of this research might be different.

Human capital not only plays a significant role at an enterprise level but also affects the regional and national economy. Production function and TFP growth models were applied by Fleisher et al. (2010) to study the contribution of human capital for China economy between 1985 and 2003. They concluded that there were three ways of contribution from a highly educated workforce to China's economy. They were production, TFP growth and technology spill over. This study was in line with the findings of Fleisher and Wang (2001, 2004). According to them, highly educated workers had a significantly higher marginal productivity, compared to low levels of schooling work force in China. Variant databases (approximately eight set of databases) for the firm level were applied in Fleisher et al. (2010) study. This resulted in biased findings.

Training plays an important role to speed up the knowledge and skills of the firms' workforce. Obisi (1996) and Steinmetz (1969) found that training referred to a systematic process by which company staff learned technical knowledge, skills and attitudes to become more effective. Since training plays a crucial role to ensure the success of an establishment, previous studies identified several factors that resulted in the failure of establishments to provide training for their workforce. According to Panagiotakopoulos (2011), financial limitation (Storey & Westhead, 1997), low-cost business strategies (Hendry et al., 1995) and lack of commitment from the owner as well as the employees were the main factors that hampered enterprises from providing training for their employees. In the agreement, Johnson (2002) concluded that the shortage of suitable external training programmes, poor quality of the external training vendors, the problematic need for the training programmes analysis in the firm as well as lack of awareness of the training opportunities were the problems encountered by enterprises in the effort to provide effective training programmes for their employees.

Bontis et al. (1999) defined human capital as representing the human factor in the organisation – the combined intelligence, skills and expertise that gives the organisation its distinctive character. The workers of the organisation are capable of learning, changing, innovating and providing the creative thrust which will ensure the long-term growth and success of the enterprise. Hence, human capital theory suggests that formal or informal education provides workers with useful skills and knowledge which raises their productivity and increases their future income (Becker, 1964). Clearly, formal education and training is essential to the population's growth in production capacity (Sakamoto & Powers, 1995) by investing in the innate cognitive abilities of human beings. Olaniyan and Okemakinde (2008) stated that such investments were worthwhile than that of physical capital.

Chidi and Shadare (2011) conducted their research to find out the relationship of Nigeria's SMEs with managing human capital development among enterprise owners. They mailed out 164 questionnaires and the response rate was 85% from the total questionnaires mailed out. They found that human resource development was one of the challenges for SMEs in Nigeria. They concluded that 52% of the respondents realized the importance of human capital development in their enterprises but did not further analyse the results of implemented human capital development programmes. Their findings showed that 73% of the respondents managed to retain their skilled labour while 76% of respondents did not allocate an adequate budget for human resource development. This finding was supported by Obokoh (2009). According to Obokoh (2009), the main problem of SMEs was the inability to employ a skilled labour force due to the small budgets of their firms.

Apart from that, 79% of the respondents agreed that the owners or managers displayed apathy or lack of interest in training their employees for fear of being poached by their competitors in Nigeria. This finding was supported by Storey (1994) which

described the situation of poaching of staff from small firms due to the low wages offered by small firms compared to larger firms. 79% of respondents agreed that many SMEs have a negative training philosophy and pay lip service to human resource development. This finding corroborates the views of Fajana (1995). In this study, Chidi & Shadare (2011) failed to analyse human capital development in detail by industry. Different industries have different needs for skilled workers; if the industries are analysed together, the results will be indistinguishable.

Osman (2011) conducted a research to understand the importance of Human Resource Departments in the Services sector of Malaysian SMEs. They mailed up to 200 sets of questionnaires to Human Resource Managers or top management of SMEs in retail and wholesale, information technology, consultancy, real estate, transport and communication, and healthcare industries. The response rate in this research was 21.50%. She concluded that most organisations adopt human resource practices but only 51.20% of the respondents in the study have a Human Resource Department. Of these, 48.80% of them are staffed by employees who had degrees and work experience of more than three years in human resource or a human resource related area. Besides that, she found that the respondents generally have neutral job satisfaction and gauged their own organisation's performance as comparable to the industry's average.

She found that there were significant differences in SMEs with a Human Resource Department and SMEs without Human Resource Departments, in terms of "training and development", "performance appraisal", "employee relations and communication" and "employees' job satisfaction".

However, this research has an unsatisfactory sample size. In general, the Services Sector in Malaysia is a dominant sector with the most number of SMEs, but only 43 SMEs responded to the questionnaire. Due to the small sample size, the result is not significant enough to fully represent the Services industry.

Previous studies showed training is essential to increase firm productivity and achieve their goals (Colombo & Stanca, 2014; Sepulveda, 2009 and Konings & Vanormelingen, 2015). Arthur (1994); Huselid (1995) and Ichniowski et al. (1997) argued that effective training programmes not only increased firms' productivity but also reduced workforce turnover rate. However, Singh and Mohanty's (2012) findings differed from previous studies. They found that training has a lesser effect on LP for certain industries; for example, the luxury industry (e.g. branded wall paint), risky industry (e.g. Credit banks), and service industry (e.g. insurance). They further explained that market forces and a high turnover rate caused limited training effects on these industries. However, the Singh and Mohanty (2012) study had methodology issues. They were unclear on the number of respondents, industries and demography in their study. Furthermore, the authors did not clearly emphasize the training effects on LP for the whole industry in their study. In addition, the authors only chose large enterprises but did not clearly state reasons why SMEs were not taken into account.

The study of De Grip and Sauermann (2012) showed a positive relationship and statistical significance between LP and training programmes for 179 customer service workers in a Netherlands multinational mobile network operator for the year 2008. Remarkably, the authors used few experiments and linear regression techniques in their study. They concluded that after their workforce received training, the company returns were increased by more than 37.70% compared to training expenses. In addition, the workforce that received training recorded 10% increase in their performance compared to before. However, the study of De Grip and Sauermann (2012) failed to analyze the motivation, emotions, and problem-solving skills before and after training for their workforce. These three elements played an important role in the training programmes especially for the call centre workforce. The failure to consider psychological elements

in the training programmes was the reason why the effects could not be translated into firms' performance.

The comparison of different types of training programmes that contributed to firms' performance was studied by Saks and Burke-Smalley (2014) for the manufacturing, services and government sectors in the Canadian economy. The training approach applied in their study was on-the-job, classroom, and computer-based training approaches. The respondents were training and development professionals who were members of a national training and development association in Canada. The survey method and multiple regression analysis approach were applied. Out of 1 300 sets of questionnaires, only 150 (11.54%) were useable samples.

Saks and Burke‐Smalley (2014) found that most of the organizations in Canada used on-the-job, classroom, and computer-based training but only on-the-job training recorded a positive relationship and statistical significance with transfer of training effects. Meanwhile, on-the-job training and computer-based training showed a positive relationship and statistical significance with organizational performance. Thus, the authors found all training programmes in their study showed positive relationships and statistical significance with organizational performance. Several methodology issues arose in Saks and Burke‐Smalley (2014) study. There was no specific industry and period mentioned in their study. Besides that, the respondents used in their study were mainly the professional trainers not the administrative and operating workforce of the organization. Overlooking these important factors caused the findings of this study to be questionable.

Training capability has a positive effect on firm performance and also on regional economy. Kim and Ployhart's (2014) study was related to firm profitability and LP with training and staffing effects for the South Korean economy during the pre and post-recession period. The pre-recession period refers to the years between 2004 and 2007 and

the post refers to 2008 to 2011. In the survey of Human Capital Corporate Panel (HCCP) databases, 359 enterprises from the manufacturing, financial and non-financial industries were involved. Human Capital Research (Crook et al., 2011; Ployhart & Moliterno, 2011) and Random Coefficient Growth Models (Bliese & Ployhart, 2002; Lang & Bliese, 2009) were applied.

Kim and Ployhart (2014) concluded that firm profitability and LP showed a positive relationship and statistical significance with training for the pre and post-recession periods. The authors further explained that those firms that recorded high training expenditure recovered faster than those that spent less. These findings were in line with the findings of Aguinis and Kraiger (2009); Arthur et al. (2003); Klein and Kozlowski (2000) and Tharenou et al. (2007). According to them, intensive training programmes provided employees with the knowledge of firms' operation, markets, customers, co-workers and products. It has led to increase employees' efficiency and performances. However, the authors failed to emphasize on the training effect that contributed to the performance of each industry. In addition, their research also did not analyze further the effect of human resource practices on the performance of the largest or smallest enterprises.

In a case study conducted in Malaysia, Jordaan (2018) emphasised the importance of both low-skilled and high-skilled foreign workers in the Malaysian economy. Significantly, this research highlighted that food manufacturing industry ranked high in employing low-skilled foreign workers, which suggested that this sector does not put emphasis on requiring high order skill sets from the workers. Likewise, the skills levels of the workers were not identified to be a significant aspect in inducing a high level of productivity; however, what was noted was the appropriateness or suitability of the skills for the required tasks.

Training is an important element in human resource management. Therefore, further analysis is needed to explore the relationship between training and firm productivity. Besides that, the literature review also shows they are still lacking in terms of marketing, human resource, innovation and ICT capabilities research on food manufacturing especially in developing countries. This leads to an urgent need for this study to fill this gap. Through this research, knowledge related to marketing activities, technology and human capital on firms' productivities in Malaysian food manufacturing can be demonstrated.

2.5.4 Innovation and Research & Development Capabilities

Besides human capital, innovation and R&D capabilities also contributed to firm productivity. According to Solow (1957), technological change through R&D activities is one of the key driving factors of productivity growth. In the agreement, Klette and Griliches (1996) extended the endogenous growth theory for R&D and productivity in firm level. They developed the quality ladder model in a partial equilibrium framework in their study. Through their study, they concluded that R&D investment and innovation activities are the engine of growth of firm productivity.

Vaona and Pianta (2008) used data from SIEPI-CIS 2 developed by University of Urbino to examine the firm size of eight European countries and the innovation activities (R&D) in 22 subsectors of manufacturing from 1994 to 1996. Ordinary Least Square (OLS) and Error Components Model (ECM) were applied. They found that the United Kingdom (UK), Norway and Italy had the highest expenditure for innovation-related new machinery per employee. SMEs had higher expenditure for new machinery compared to large enterprises. Food and Beverage manufacturing was a sub-industry that achieved high expenditure for innovation-related new machinery per employee in their study.

Interestingly, the findings of Vaona and Pianta (2008) showed contradiction with that of Cohen and Klepper (1996). According to Cohen and Klepper (1996), large

enterprises tend to have an advantage in process innovations because their innovation costs can be spread over larger volumes of output. Therefore, large firms will enjoy lower cost of output compared to SMEs.

Rothwell (1983) also agreed that firm innovation and performance was affected by firm size. Large enterprises tend to have more resources which enabled them to enhance their innovation capability and performance compared to smaller-sized enterprises. Large enterprises were more powerful compared to small enterprises and had an advantage in gaining the support of headquarters for their business operations and innovation activities. Caloghirou et al. (2004) had argued that the size of enterprises had no direct influence on technological innovation performance. Firm innovation activities were related to the competitiveness of the firm operation. To address this issue, Boor and Singhal (2018) determined that cluster method could increase the rate of production and event decrease the rate of rejection leading to an improved level of total productivity regardless of the business type and size.

Yam et al. (2011) conducted a research to find out the technology of innovation, innovation capability, and sales performance on Hong Kong manufacturing industries. They selected electronics, electric appliances, toys, machinery, and watch & clock industries in their research. 1 200 sets of questionnaires were mailed out to the respondents but only 200 were usable. The respondents of this research consist of the presidents, general managers, directors of engineering, R&D managers, and engineering managers.

Structural Equations Modelling (SEM) approach was applied to examine the capabilities in R&D, resource allocation, manufacturing, marketing, organisation, as well as strategic planning. They concluded that external information affected all innovation capabilities of the firm, while external expert organisations affected only the firm R&D and resource allocation capabilities. The usable questionnaire size for Yam et. al. (2011)

was relatively small. The smaller sample size could not accurately represent the real situation faced by the particular industries. In addition, firm ownership was also a main determinant for the firm acquired technologies. If these factors were not considered, the findings might not be accurate.

The relationship between firms TFP and R&D activities was studied by Sharma (2012) for the Indian pharmaceutical industry. The database from Center for Monitoring Indian Economy (CMIE) that consists of 89 enterprises was used and growth accounting framework (Atella & Quinteri, 2001; Coe & Helpman, 1995) was applied. The author concluded that R&D plays a significant role to increase firm TFP especially in foreign owned establishments in the Indian pharmaceutical industry. This finding is similar to prior findings by previous researchers. Labour and Material Productivities are crucial in the pharmaceutical industry, yet these were not discussed in Sharma's (2012) study. However, in order to bring about sustainable growth through innovation, SMEs are expected to also comply with adoption strategies by juggling incentives and distribution with internal processes as well as licensing from external developers (Benhabib, Perla & Tonetti, 2017).

The contribution of tangible and intangible assets for Italian manufacturing firms between 1982 and 1999 was studied by Bontempi and Mairesse (2015). Tangible assets refer to fixed assets and intangible assets consist of R&D, advertising, pattern and trademark expenses. Company Accounts Data Service (CADS), National Accounts data (NA) of the Italian National Institute for Statistics (ISTAT) and Survey on Investment in Manufacturing Firms (SIM) databases that consist of 14,254 of Italian Manufacturing Enterprises were chosen in their study. The framework of multiplicative, additive and constant elasticity of substitution (CES) derived from Cobb-Douglas function as well as alternative panel data estimation techniques were applied.

Bontempi and Mairesse (2015) concluded that the marginal productivity for intangible assets was four times larger than tangible assets in Italian manufacturing. In comparison, productivity of advertising was larger than R&D, trademarks and patterns. The authors' findings were supported by Telser (1961) and Hirschey (1982). According to them, the continuous advertising programmes will ensure consumer awareness of the innovations and new products developed by enterprises, thus enhancing the performance of the firms. However, Bontempi and Mairesse's (2015) study did not take into account the intermediate inputs such as material and energy, the essential components of input in manufacturing sector. The failure of analysing these important components in TFP resulted in uncertainties in their findings.

The demographics also have an impact on the R&D capability of the enterprises. Aiello et al. (2014) used the databases from UniCredit-Capitalia that consisted of 3 019 firms to analyse the relationship between TFP and internal and external factors for the years 2006-2008. The framework of Levinsohn and Petrin (2003) and multi-level approaches would apply. They concluded that enterprises investing more in R&D obtained higher TFP levels compared to the firms with low innovative activities. In addition, the enterprises that operate in high R&D-orientated region, with good infrastructure and efficient public services will achieve high TFP. Similarly, the R&D capabilities of public enterprises in the Netherlands were reported to have positive correlation with growth in TFP through technological and legislative initiatives from government and industry partnership (Soete, Verspagen & Ziesemer, 2020).

The findings of Aiello et al. (2014) was in line with the finding of Griliches (2000), Parisi et al. (2006), Camagni (1991), and Ciccone and Hall (1993). According to them, the enterprises located in a region with high innovation-creating potential made firms perform better. On the other hand, skilled workforce will ensure more innovation and fast adoption of technology, leading to firm's efficiency in performance. However,

the Aiello et al. (2014) study did not specifically examine the value-added to Italian manufacturing with internal and external factors in the firm level. Previous studies show that R&D has a significant influence on manufacturing value-added output. However, until today, there is no study on Malaysia food manufacturing. Therefore, this study attempts to fill in the gap.

2.6 Chapter Summary

This chapter discussed the contextual foundation of this study, which is anchored on the economic and legal environment of Malaysian food manufacturing SMEs. Guided by empirical studies, this current research identified essential firm characteristics and capabilities that could drive firm and labour productivity. After going through previous researches, some gaps were discovered. In previous researches, the existence of a set of productivity for the particular country and industries is not available. Most of the firms' productivity researches used a comparison approach. A set of productivity for that particular country, industry and firm plays an important role for the comparison. Different time period and demography will cause the findings of the research to be inaccurate. Therefore, it is important to establish a set of productivity for developing countries such as Malaysia.

Besides the gap mentioned above, there is a lack of reading materials and knowledge-related firm characteristics with productivity. Generally, large firms, public-listed firms and foreign-owned firms are more productive compared to small and medium firms and local-owned firms. However, there is no clear finding especially for the food manufacturing in Malaysia. When considering the firms' capabilities, the findings became interesting. Therefore, it is important to conduct a research to find out the influence of firm's characteristics and capabilities on productivity for this industry.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

After going through an extensive literature review, several gaps of research were discovered. Therefore, this research plays a significant role in filling the research gaps. In this chapter, the methodology used for this research will be discussed in detail. According to Creswell and Clark (2007) and Van Manen (1990), methodology refers to the philosophical framework and the fundamental assumptions of research. Thus, methodology acts as the framework that relates to the entire process of research.

Section 3.1 in this chapter discusses the introduction, while section 3.2 discusses framework and theory used for this research. The framework of this research provides a guideline for researchers to conduct their research. Meanwhile, section 3.3 will discuss the variable measurements used in this research. In this section, productivity, firm characteristics, and capabilities measurement will be discussed in detail. Apart from this, section 3.4 discusses the techniques of analysis applied in this research. Section 3.5 discusses in detail data source such as profiles of SMEs Food Manufacturing of Malaysia that are involved in this research, while section 3.6 provides the summary for this research.

3.2 Theoretical Framework of the Research

3.2.1 Framework of Research

In Malaysia, food manufacturing enterprises can be classified as micro, small, medium and large enterprises. These enterprises produce direct and indirect consumed food products and beverages as their main production. Besides that, these enterprises are owned by locals, foreign citizens as well as joint-ventures. The legal status of food manufacturing enterprises can be in the form of individual proprietorships, partnerships, private limited companies and others. Through previous research, these firm

characteristics showed great influence on firm productivity as mentioned in Chapter 2 of this research.

Amit and Schoemaker (1993) and Grant (2006) further explained that firms' resources had to be coordinated in order to achieve the goals of the enterprises. The skills of coordinating and making resources work together is human capital capability (labour), which consists of a complex set of abilities to perform efficiently and systematically the operations of a firm using a series of coordinated organizational resources. Human capital capability is among one of the most important organizational capabilities. Developing and sharing information amongst the staff to utilize firms' resources is the basis of human capital capabilities. Thus, capabilities are accumulated over time and deeply embedded in the organizational processes. In short, this capability relates to the knowledge, experience, and skills required to perform a task and the complex patterns of coordination and cooperation between individuals and resources (Grant, 2006; Schulze, 1994). The interaction between firm characteristics and capabilities with firm productivities will be further discussed in the section below.

Figure 3.1 shows the framework of the study. Despite the proliferation of various factors affecting productivity. it should be emphasized that the selection of variables in this study was based on the comprehensive review of literature in Chapter 2 and the economic environment of the Malaysian food manufacturing SMEs. As shown in Figure 3.1, the various measures of productivity are measured in this study: capital, labour, energy, material, and total factor. In addition, the firm characteristics were identified as follows: size, ownership, type of industry, and legal status. Lastly, firm capabilities were determined according to literature on productivity and firm management: research & development, human capital (educational background and skills), and marketing.

Moreover, the three variables are then compared across different characteristics of the firms to assess on how productivity differs based on characteristics. As shown in

Figure 3.1, the impact of firm characteristics and firm capabilities on productivity is determined by the factors outlined for each variable. In addition, this study also assesses the impact of capability on productivity specifically labour productivity. The succeeding subsections will further discuss the connections between these factors according to relevant studies on productivity, firms, and human capital.

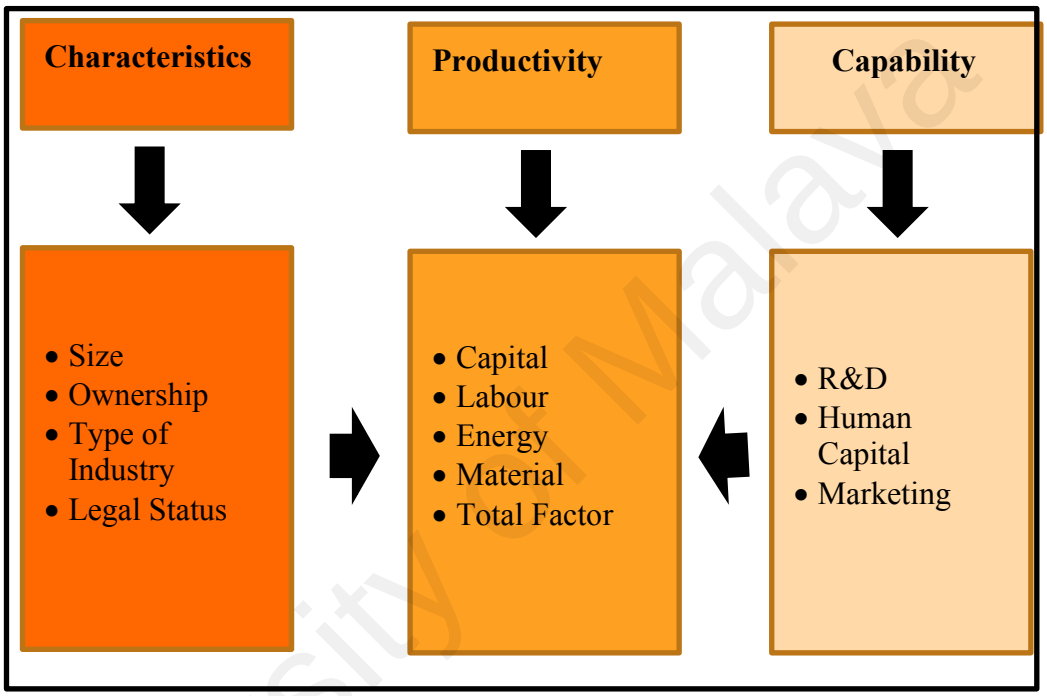

Figure 3.1: Theoretical framework: interactions between firm characteristics, firm capability, and productivity

Source: created by Author

3.2.2 Interaction between Firm Characteristics and Productivity

In this section, due emphasis will be given to a discussion on the firm characteristics that influence productivity. Previous research shows that ownership has an influence on firm productivity (Davies & Lyons, 1991). According to them, foreign firms operating in the United Kingdom have an aggregate productivity advantage over domestic firms in UK manufacturing over the period 1971–1987. This finding is similar to that of Oulton (1998a, 1998b), Griffith (1999), and Griffith and Simpson (2004). The same findings also applied to Germany's economy, and it was supported by Belmann and Jungnickel (2002) and Peri and Urban (2006).

According to Caves (1974), Chakraborty and Nunnenkamp (2008), Görg and Strobl (2005), Smarzynska Javorcik (2004), and Schiff and Wang (2008), foreign-owned enterprises had a positive effect of productivity spill-over in the domestic market. Caves (1971) further explained that multinational enterprises (MNEs) brought in superior knowledge through their subsidiaries. The superior knowledge can take the form of process and product, managerial and organizational skills, and scale efficiency for the firms (Kokko & Kravtsova, 2008). With this superior knowledge, foreign-owned enterprises became more efficient and productive compared to local-owned enterprises. Therefore, Luo (2002) and Yan and Gray (1994) further explained that foreign-owned enterprises transferred their sophisticated technology, manufacturing skills, and managerial expertise to their local partners.

Technological gap is one of the important factors hampering knowledge and technology spill-over between foreign and local enterprises in the manufacturing sector. The potential for positive spill-over was higher when there was a large technological gap between foreign and local enterprises (Findlay, 1978; Wang & Blomström, 1992; Blomström & Wolff, 1994; Jordaan, 2008). However, this argument was challenged by Imbriani et al. (2014), Kokko (1994), DIMELIS (2005), and Hamida and Gugler (2009). They concluded that, for a large technological gap, local enterprises had no internal knowledge and resources to enable them to recognize the value and content of a variety of knowledge elements, brought by foreign MNEs, thus making spill-over unlikely to occur.

According to Li et al. (2009) and Lane et al. (2001), in developing countries, MNEs were often interested in using International Joint Ventures (IJVs) to apply their knowledge in order to pursue local markets or become efficient export bases. The MNEs would then transfer their technology to local partner enterprises. Local partner enterprises need to integrate advanced technology and products of the foreign partners with local

knowledge and resources. The local partner enterprises would utilize the expertise to fulfil local consumer needs and government requirements, as well as connections with local suppliers in the effort to increase the firm's performance. Through this, the local firm productivity will increase.

Besides ownership, size of enterprises also influences firm productivity. Some authors, such as Arrow (1962), Cockburn et al. (2001), and Cohen and Klepper (1996) concluded that large firms had an advantage in terms of scale, access to financing and private appropriation of rents, among others, making them more efficient innovators. However, Koberg et al. (2003) and Qian & Li (2003) argued that small firms were better innovators due to their more flexible nature. With the lesser rigidity of their organisational structure, small enterprises could easily recognize growth opportunities and had a greater ability to adjust to innovation processes and establish networks with others. On the other hand, Pi and Timme (1993) and Goddard et al. (2005) found that diminished company productivity could be due to an increase in size. After all, greater size could imply a greater need for formality in the relationships among the various agents involved in the enterprise activity, which in turn, brought about the possibility of less owner control of management action. According to Yoon (2004), beyond the optimal level, an increase in company size could diminish productivity. Consequently, increased size did not necessarily equate to increased productivity (Rogers, 2004).

According to Resource-Based View, the sustainability of a firm strongly depended on its ability to obtain firm capabilities that could lead to competitive advantages (Barney, 1991). Previous literature has proven that innovative activities influenced firm survival positively (Audretsch, 1991, 1995; Audretsch & Mahmood, 1995). Moreover, technology-oriented firms had higher survival rates compared to firms in other sectors (Westhead & Cowling, 1995). A lack of innovative capacity due to liquidity constraints faced by SMEs affected their development (Franco & Haase, 2010).

To date, there is no common agreement among scholars regarding the relationship between size of enterprises and firm productivity. According to Fiegenbaum and Karnani (1991), large firms could have large strategic diversification, economies of scale and greater bargaining power with suppliers. Moreover, large firms could be more competitive and had a price advantage. This situation caused a positive relationship between large enterprises and productivity.

However, Pi and Timme (1993), Goddard et al. (2005), Yoon (2004), and Rogers (2004) showed contradictory findings for the relationship of size of enterprises with productivity. Pi and Timme (1993) and Goddard et al. (2005) found that the larger the firm size, the greater was the need for formal relationships among various agents participating in the enterprise activities. This meant that there would be less control from the owners to manage actions. Yoon (2004) further explained that smaller firms might find it easier to recognize growth opportunities resulting from their lesser rigidity organisational structure, unlike those of large firms. Moreover, Rogers (2004) found that smaller firms tended to have greater ability to adjust to innovation and establish networks with others. This result further emphasized that increased firm size did not necessarily mean increased firm productivity.

Russeeuw (1997) also found a positive relationship between small enterprises and performance for small Dutch companies in real estate. He concluded that the firms' profits increased but at a decreasing rate when the size of small firms increased. This result was also supported by Chow and Fung (1997) for small and medium-sized manufacturing firms in Shanghai. They further explained that the increased size of small firms would increase their technical efficiency, but this technical efficiency would start to diminish when the small firms evolved to medium firms. Therefore, an increase in size of enterprises did not exactly increase the technical efficiency of firms' daily operations.

Some previous researches had even shown a negative relationship between size of enterprise and performance. Goddard et al. (2005) concluded that increased size did not necessarily mean increased profitability for the Belgian, French, Italian, Spanish and UK enterprises. Pi and Timme (1993) further explained that increased size could reduce management efficiency as a result of lessening control of managers' actions by owners. Lesser control by owners led to a loss of motivation for management teams to ensure SMEs' further growth in the future. Thus, is this also true in the Malaysian Food Manufacturing context? Further discussion of the relationship between ownership, size of enterprises and firms' productivity is provided in Section 2.3 of this research.

Besides size of enterprises, a firm's legal status also plays a significant role in influencing its technical efficiency and productivity. This argument is supported by Charoenrat and Harvie (2012). According to them, individual proprietorship, partnership, private and public limited companies as well as cooperatives influenced Thailand's SMEs manufacturing efficiency. The findings of Buranajarukorn (2006), Cooper and Dunkleberg (1986), Ha (2006), Fay (1998), Fernandez and Nieto (2006), and Thuvachote (2006) showed the relationship between firm legal status and firm performance. According to Buranajarukorn (2006), Cooper & Dunkelberg (2006), and Ha (2002), individual proprietorship enjoyed the benefits of fast decision-making, minimal legal costs and less documentation in their operations. Meanwhile, partnerships had advantages such as sharing resources, responsibilities, and expertise of co-partners and jointly overcoming barriers in business (Fay, 1998; Cooper & Dunkelberg, 2006; Fernández & Nieto, 2006).

According to Cooper and Dunkelberg (2006), Fernández and Nieto (2006), and Ha (2002), the main difference between private and public limited companies with individual proprietorship and partnerships was the separation of company management from shareholders. Private and public limited companies continued despite the

resignation or bankruptcy of its members. New shareholders and investors could be easily incorporated, and employees could acquire shares in these enterprises. Active participation and control by shareholders were the two important factors that resulted in the high productivity of cooperatives (Cooper & Dunkelberg, 2006; Thuvachote, 2006). The factors above were certified through the findings of Charoenrat and Harvie (2012) on the technical efficiency and productivity of Thai SMEs manufacturing.

However, previous researches overlooked the importance of firm legal status in affecting productivity. Most of the research on firm legal status was related to agency problems, financial challenges and owner control. The importance of determinants such as liability and risk derived from firm legal status were less emphasized by researchers. According to Hansmann and Kraakman (2000), the scope of liability for individual proprietorship and partnership were wider than private and public limited companies where personal assets were fully protected. The personal assets of individual proprietorship and partnership were not excluded from liability, which meant that their personal assets were at risk in addition to their investments in the firm (Greenwood et al., 2007). The unlimited liability caused them to be more careful and responsible in their investments. Since, the owners in an individual proprietorship enjoy all the profit this makes them work harder in ensuring an increase in firm performance.

Among large enterprises in food manufacturing, private and public limited companies are the most common business entities. Both of these business entities have similar characteristics. Private limited companies refer to enterprises whose shares are not traded but held by owners and the business partners who are actively participating in the management of the firm, while public limited companies are business entities whose shares are widely held by external owners. The separation of ownership and control is applied in public limited companies. For private and public limited companies, the owners have limited liability. The financial and expertise limitation does not exist in these

firms. The management teams are motivated to improve their firms' growth, in order to advance their own career prospects. In contrast, the separation of control between the owner and the management teams for public limited companies may cause low productivity. This reflects the main motivation behind conducting this study, which was to investigate the relationship between firm legal status and productivity for Malaysian food manufacturing.

The types of industry that are involved in food manufacturing are direct and indirect-consumed food products and beverages. According to the current trends based on industry player accounts, the need to examine the type of industry plays a vital role in understanding productivity especially in the Malaysian setting. In studies conducted in Europe, it was found out how a particular type of business could serve as a determinant in quantifying and qualifying labour productivity (Ghosh, 2016; Harris & Moffat 2015; Soete et al., 2020). However, these industries require different technology, materials and labour skills. For instance, in the food and marketing industry, the type of machinery and technology required poses challenges and opportunities for improved production; hence, these factors have a direct influence on the productivity for this type of industry. The difficulty in classifying types of industry caused this characteristic to be constantly overlooked by researchers.

Moreover, the direct and indirect consumed food products and beverages also present different perspectives in terms of exploring purpose and effects on target consumers. As direct and indirectly consumed F&B products have different target consumers, this could have a potential opportunity for further examination as to how people's preferences could affect productivity. In the Malaysian SME setting, these points of examination render a very limited research base; therefore, this research will overcome the aforementioned research gap.

3.2.3 Interaction between Firm Capability and Productivity

In this research, ICT, R&D, human capital, and marketing capabilities were analysed to find out the relationship with firm productivity. Technological capability was strongly influenced by R&D and ICT capabilities. Loane, McNaughton and Bell (2004); Loane (2005); Mathews and Healy (2008); Mostafa, Wheeler and Jones (2006); and, Petersen, Welch and Leisch (2002) acknowledged that the Internet had been one of the most important tools for modern day business. Gabrielsson and Kirpalania (2004); Loane et al. (2004); Mathews and Healy (2008); and, Prasad, Ramamurthy and Naidu (2001) had further pointed out that the Internet had enabled improvement of transaction efficiency.

According to Boothby et al. (2010), ICT was an important factor for a firm's transformation of its business structures, adoption of modern business models, and participation in the global supply value chain. This argument was supported by Black and Lynch (2004), Clayton et al. (2005), and Hagen and Zeed (2005). Black and Lynch (2004) used firm level data to estimate the firm productivity after the adoption of new workplace practices and computer use. After its implementation, especially for computer usage, firm productivity increased significantly. In agreement, Mohapatra and Singh (2012), Lai et al. (2006), and Bharadwaj (2000), also found that ICT capabilities had a positive and statistically significant relationship with firm productivity. They further explained that ICT usage did not only benefit administrative work but also reduced operational cost. Therefore, ICT capabilities would increase firm efficiency in the long run.

According to Bowles and Gintis (2011), employees' contribution on the production floor can be a form of "labour power." "Labour power" referred to the contribution of the workforce through physical, mental capacities, skills and potential impact on the performance of each employee involved in production. In addition, Bowles and Gintis (2011) also agreed that schooling years (qualification) also played a significant role in human capital capabilities. This argument was supported by the findings of Nelson

and Phelps (1966), Hong and Page (2001, 2004), Alesina and La Ferrara (2005), Gibbons et al. (2005), Ackerberg et al. (2006), Hiller et al. (2010), and Cravo et al. (2012). Bowles and Gintis (2011) further explained that longer schooling years enhanced worker productivity and higher education produced better workers that were required by employers in all industries.

However, the current knowledge and skills obtained by the workforce during schooling is inadequate, especially for enterprises that use new technology in their production line. An efficient training programme is required to enhance the competency of the workforce. Enterprises that invest in new technology will only benefit when this technology is fully utilised. To achieve this, a new work culture including training was required (Parisi, Schiantarelli & Sembenelli, 2006; Bartel et al., 2007).

The study of Parisi, Schiantarelli and Sembenelli (2006) and Bartel et al. (2007) concluded that the adoption of new manufacturing technology must be followed by substantial skill requirements and changes in the human resource practices in the enterprise. On the adoption and integration of new technology by organisations, firms should embrace it by obtaining new skills and upgrading the existing skill level of the workforce. This situation could bring about a significant difference due to the integration of new technology. According to Becker (1964); Sakamoto and Powers (1995); and, Psacharopoulos and Woodhall (1987), a positive and statistically significant relationship found between effective training programmes and firm productivity. It would ensure knowledge accumulation through hands-on learning, resulting in enhancement of firm productivity.

Furthermore, Konings and Vanormelingen (2015), concluded that training also had a significant and economic effect on firm productivity. Almeida and Carneiro (2006) conducted a research on 1 500 Portuguese manufacturing firms to find out the relationship between training and firm productivity in the years 1995 to 1999. They concluded that an

increase of 10 hours on workers' training resulted in an increase of 0.60% to the firm productivity. This finding was in line with Bartel (1994), Black and Lynch (2001 & 2004), and Barrett and O'Connell (2001). In addition, Colombo & Stanca (2014) reported in their findings that an increase of 1% of training intensity increased firm productivity by 0.07%. This finding was similar to Zwick (2005, 2006). Human capital capability becomes a critical issue especially for SMEs in developing countries. Effective human development strategies are not only to identify the training need for workers but also play an important role to retain and attract new skilled workers to join in SMEs.

R&D activities played a significant role in raising firm productivity (Sharma, 2012; Aiello et al., 2014; Griliches, 2000; Parisi et al., 2006; Camagni, 1991; Ciccone & Hall, 1993). According to Solow (1957), technological change through R&D activities was one of the key driving factors of productivity growth. Klette and Griliches (1996) concluded that R&D investment and innovation activities were the engine of growth for firm productivity. However, the R&D effects were more evident in large enterprises compared to SMEs (Cohen & Klepper, 1996; Rothwell, 1983).

Innovation played an important role in firm technological capability. The survival, growth and progress of enterprises were highly dependent on innovation (Acs & Audretsch, 1990). Process innovation was defined as "the adoption of technologically new or significantly improved production methods" (Mortensen & Bloch, 2005, p. 32). R&D capability was the determinant of innovation that had received the greatest attention from researchers (Becheikh et al., 2006) and mainly in the context of SMEs (De Jong & Vermeulen, 2006). R&D had become one of the important determinants for the strategic development of achieving "world-class" status, and specifically for manufacturing SMEs (Hendry, 1998). As established in the literature, due to the effect of R&D investments on the subsequent progress of the firm (Co & Chew, 1997), some studies detected SMEs' capacity or propensity to innovate due to these R&D investments (Qian & Li, 2003; Wolff

& Pett, 2006). Therefore, R&D capability in enterprises was also one of the determinants that influenced firm productivity in this research.

The output generated by R&D activities can be commercialized through advertising and promotional programmes. Through this, firm productivity (sales) will increase tremendously. Low R&D will reduce firm competitiveness especially in the global market. The experience and knowledge from advertising and promotions will ensure that firms are financially sound to maintain their daily operations.

Marketing capability becomes one of the important firms' capabilities in today's competitive business world. According to Kotler (2002), marketing capabilities were defined as enterprises' ability to set its products and services apart from their competitors, as well as creating and maintaining a strong profitable brand. There were 8 processes for describing marketing capabilities (Weerawardena, 2003), which were customer service system, promotional activities for higher market share, sales force quality, superiority in distribution and sales networks, allocation of required resources to advertisements, marketing research, ability in product differentiation, and rapid introduction of new products. Therefore, the advertising and promotional capability is chosen in this study to analyse its effects on firm productivity.

3.3 Variable Measurements

A critical analysis of the aforementioned factors necessitates a comprehensive examination through a quantitative research design. Given the large quantity of data to be analysed to give a clear picture of a phenomenon, a quantitative design using a positivist-objectivist approach utilises appropriate statistical procedures in order to provide a realistic representation (Cohen, Manion & Morrison, 2011). This approach is deemed necessary in social science research to objectively identify current conditions or relationships existing in its natural state. Furthermore, as a cross-sectional study, this research looks into data on food manufacturing SMEs in Malaysia, which were gathered

from different points of time in order to examine the trends in this research setting (Cohen et al., 2011).

3.3.1 Productivity Measurements

The concept of productivity has been widely used in economic debates; hence, these variables were selected for this study due to the following general conditions: the empirical studies discussed in Chapter 2 and the Malaysian perspective through a socio-economic, legal lens. Over two centuries ago, the term productivity was used in the Journal de l'Agriculture (Wazed & Ahmed, 2008; Tangen, 2005). According to Schroeder (1985) and Slack et al. (2010), productivity is the ratio of what is produced by an operation of processes to what is required to produce it. To put it simply, it is the ratio of actual output to input over a period of time. Input might include transforming and transformed resources, such as materials, equipment, customers and staff. Meanwhile, output is the goods and services produced. Besides that, this definition was also supported by Tangen (2005), who defined productivity as the ratio of what is produced to what is required to produce it. Thus, productivity is the comparison of the physical input of a factory with the physical output from the factory.

According to Slack (1999), Total Factor Productivity (TFP) is the ratio of the total output of all products and services to the total input.

$$Total\ Factor\ Productivity = \frac{Total\ Output}{Total\ Input} \quad (1)$$

where

Output = Sales, Inventory, Change, etc. in money unit

Input = Labour + Material + Capital + Energy + Other Expenses

According to Kendrick and Creamer's (1965) "Measuring company productivity", there is an introduction to two basic productivity indices at the company level, namely, total productivity and partial productivity.

$$TFP\ Index\ for\ given\ period = \frac{Measured\ period\ output\ in\ base\ period\ price}{Measured\ period\ input\ in\ base\ period\ price} \quad (2)$$

Partial productivity such as labour, capital or material productivity index can be calculated as:

$$Partial\ productivity = \frac{Output\ in\ base\ period\ price}{Any\ input\ in\ base\ period\ price} \quad (3)$$

Even then, the concept of productivity may be developed further to overcome certain limitations (Andersson, 1996; Fitzsimmons & Fitzsimmons, 1994; Witt & Witt, 1989). Firstly, the output is usually expressed in different forms to the input. Output is often measured in physical terms such as units. However, the input is usually physically different and includes measures of people (numbers, skills, hours worked or costs) or materials (tons and costs). Besides that, the ratio by itself tells us little about performance. For example, the ratio of 0.75 is of little value unless it is compared with previous time periods, as a benchmark, or the potential productivity of the operation. Meanwhile, the concept of productivity can also be measured in the form of many ratios such as financial and non-financial.

In the effort to overcome the limitations voiced out by Andersson (1996), Fitzsimmons and Fitzsimmons (1994), and Witt & Witt (1989), one set of benchmark productivity for food manufacturing will develop in this research (Chapter 4). All the measurements of the variables in this research are in currency units. In other words, this research modifies the productivity accounting model introduced by Davis (1955). Besides that, the total output will be changed to the total value-added (Y) of the firm. This is important to ensure data for the real performance for these firms is captured.

Most of the food manufacturing SMEs in Malaysia sells their output directly to their customers. Through this, they can limit the operational costs such as logistics and storage costs. This situation is due to the lack of financial capability among the business

owners. In addition, most of the food manufacturing SMEs in Malaysia are still labour-intensive. Therefore, it is difficult to estimate the actual output. The short expiry date of the food products produced by this industry is another reason to replace total output with total value-added. Stated below is the firm production function as according to Celikkol (2003):

$$Q_{it} = F_i(X_{ij}, \dots, X_{in}, t) \quad (4)$$

where

F_i is the fraction of plant *i*

t is the time of period

Q_{it} is the output of plant *i* in period of *t*

X_{ij} is the input, *j* of plant *i* where *j*=1,…,*n*

The single year cross section firm level data will be used in this research. Therefore, time variable (*t*) in equation (4) can be eliminated (*t* = 0). Now firm production function becomes:

$$Q_i = F_i(X_{ij}, \dots, X_{in}) \quad (5)$$

where

Q_i is the output of plant *i*

X_{ij} is the input, *j* of plant *i* where *j*=1,…,*n*

Rewrite the total factor productivity for the firm as below:

$$Y_i = F_i(K_i, L_i, E_i, M_i) \quad (6)$$

$$Total\ Productivity\ in\ a\ firm\ i \quad (7)$$

$$= \frac{Total\ Output\ of\ the\ firm\ i}{Total\ Input\ of\ the\ firm\ i}$$

$$= \frac{Y_i}{(K_i + L_i + E_i + M_i)}$$

where

Y_i is total value added (Sales – Cost of raw materials) for the firm *i* in currency unit

K_i is firm *i* fixed capital and asset in currency unit

L_i is total wages of the firm *i* in currency unit

E_i is total energy used for the firm i in currency unit

M_i is total material used for the firm i in currency unit

The partial factor productivity approach, Long (2012) concluded that productivity can be calculated as the ratio of an output to a specific factor or to all relevant factors of production. The definition of capital productivity used in this research is defined by Guellec et al. (2001, p. 17) as shown in equation (8) below. However, in equation (8), the annual investment in the firms' fixed assets and the maintenance will be considered as well. The cost of maintenance is an important component to increase firms' fixed asset productivity. Therefore, this is an important component to consider in fixed asset productivity.

$$\frac{Value\ added}{Capital\ input} = \frac{Y_i}{K_i} \tag{8}$$

where

Y_i is value added for firm i

K_i is the fixed asset + maintenance expenditure for firm i. Fixed assets are computers, buildings and other construction, transport equipment, machinery and equipment or furniture and fittings.

The definition of labour productivity refers to the value-added for the firm contributed by the firm's effective workers. This definition was used by Guellec et al. (2001, p. 15) and supported by Bracalenta et al. (2008). Thus, in this research, part-time workers are considered as part of the firm's production line. The full-time and part-time workers have a significant contribution towards the firm's performance. Part-time workers become important when the firms face a shortage of full-time workers. Labour productivity is defined as:

$$\frac{Value\ added}{Labour\ input} = \frac{Y_i}{L_i} \tag{9}$$

where

Y_i is value added for firm i

L_i is labour expenditure for firm i

Labour = Full time labour + Part time labour

The intermediate productivity refers to material and energy productivity. According to Denis et al. (2015), energy productivity is defined as amount of productive output or value derived from each unit of energy consumed. The energy productivity is defined as:

$$\frac{Value\ added}{Energy\ input} = \frac{Y_i}{E_i} \tag{10}$$

where

Y_i is value added for firm i

E_i is energy input for firm i.

The total expenditure of energy included electricity and non-electricity expenses. The non-electricity expenditure refers to diesel, oil, petrol, furnace oil, fuel oil, liquefied petroleum gas, natural gas or other fuels. Raw materials are key input in food manufacturing. However, some of the raw materials may be damaged during the production processes. Therefore, replacement of raw materials is required to sustain the quality and quantity of products. In this research, the replacement of raw material will also be considered as raw material usage for the enterprises. The material productivity in this research is defined as:

$$\frac{Value\ added}{Materials\ input} = \frac{Y_i}{M_i} \tag{11}$$

where

Y_i is value added for firm i

M_i is materials expenditure for firm i

3.3.2 Characteristics Measurements

The following characteristics measurements were adopted for this study: type of ownership, legal status, and size of enterprise. The selection of these factors involved a comprehensive process of reviewing related literature on productivity factors, as well as expert recommendations from key industry players in the Malaysian food manufacturing sector. As such, the justification for these measurements will be discussed in the succeeding parts of this subsection.

The ownership used in this research consists of local, foreign and joint-venture. Meanwhile, firm legal status refers to entity of business such as individual proprietorship, partnership, private limited company, and others (i.e. private limited company and cooperative). The definition of ownership and firm legal status applied in this research were in line with the standard used by the Department of Statistics Malaysia and Companies Commission of Malaysia respectively. On the other hand, the size of enterprises can be classified as small, medium and large enterprises. The definition of size of enterprises was provided by the Secretariat to National SME Development Council in the year 2012.

Based on Economic Census: Manufacturing (2011, p. 45), the ownership of an establishment is classified according to the residential status of the owner(s) of the majority paid-up capital (more than 50%). Joint venture is defined as an establishment in which the paid-up capital is equally held by both Malaysian and non-Malaysian residents. Malaysian residents include any individual, or enterprise that is residing in Malaysia for more than a year. Malaysian registered branches or subsidiaries of foreign companies are also categorized as Malaysian residents. Meanwhile, any individuals, or enterprises that reside outside Malaysia are categorized as Non-Malaysian residents. Foreign registered branches or subsidiaries of Malaysian companies are also classified as Non-Malaysian residents. Thus, an establishment can be classified as Malaysian-owned if more than 50%

of its paid-up capital is held by Malaysian residents or vice versa. Small enterprise refers to enterprises with a size of 5-49 employees. For medium enterprises, the size of the company lies between 50-149 employees. Organisations with employees above 150 are referred to as large enterprises. All the enterprises are lawful entities. The enterprises must be registered under the Registration of Businesses Act 1956 (Act 197) or Companies Act 1965 (Act 125).

Individual proprietorship refers to business, owned and operated by one person for his own profit. In this establishment, the owner has full control of the business decision-making. Meanwhile, partnership refers to a business formed by a group of individuals who agree to contract and to carry out a business with the objective of making a profit. All shareholders or appointed persons among the shareholders can manage the business for all parties. A partnership must consist of between two to twenty members.

A private limited company refers to a private corporation established to undertake a business with the objective of making profit. The shares are closely held by the shareholders of the corporation who have control over its operation. It is registered with limited liability. This establishment limits their members to between two to fifty members. A public limited company has similar characteristics with a private limited company. However, the shares in a public limited company are openly held, and in the case of a company listed on the stock exchange, the shares are freely transferable. A co-operative refers to a voluntary association with an unrestricted number of members and is registered under the Co-operative Act 1993 (Department of Statistics Malaysia, 2011, p. 96).

Products of food manufacturing also can be classified into three main categories, which are direct, indirect-consumed food products, and beverages. The manufacture of coffee and tea are considered as beverage manufacturing. Meanwhile, the manufacture of biscuit & cookies; bread, cakes & other bakery products; snack products; chocolate &

chocolate products are classified as direct-consumed food products. Indirect-consumed food products include manufacturing of frozen bakery products; sugar, sugar product, sugar confectionery; cocoa products; meehoon, noodles & other related products; prepared meals & dishes; sauces & condiments; spices & curry powder; egg products; and other food products n.e.c. We believe that different categories of food manufacturing products can influence a firm's productivity. Therefore, the variable types of industries will be analysed in detail for the purpose of finding out the influence on firm's productivity.

3.3.3 Capability Measurements

The following capability measurements were adopted for this study: innovation, marketing, and ICT capabilities. The aforementioned capability measurement indicators were based on earlier studies on productivity evaluation (Barnes, 2011; Sink, 1985) and as suggested by the food manufacturing industry players in Malaysia.

Capabilities (CAP) are measured in terms of Innovation (spending in research and development), marketing (spending in advertisements) and ICT capabilities (spending in information and communication technologies (ICT)). We measure capabilities in two ways. First, we measured as a bundle of capabilities (CAP) by combining the investment per worker in R&D, Marketing and ICT. It indicates the total spending ratio per worker for capability building in *i*th firm. Second, to estimate the effect of each individual capability, the three capabilities Innovation (INNO), Marketing (MAK) and ICT were measured separately as dummy variables. The value takes 1, if a firm invested in any of the above capability building or else 0. We estimated both the bundled capabilities and individual capabilities separately. The human capital (HC) is measured using two variables, that is, the ratio of skilled labour (measure by qualification, ratio of workers with diploma and above in total employment) and training spending. It measures the quality of human capital. Each of the human capital measures is then been normalized

using a simple normalization formula[1]. The normalized score is then averaged (divided by two) to obtain the average scores for each of the firms. Alternatively, we also moved away from just using qualification as a proxy and measured the actual number managers, technicians and professionals employed as a ratio of total employment in a firm.

3.4 Technique of Analysis

3.4.1 Data Preparation

Firstly, a Normality Test was conducted to determine whether the productivities discussed in Section 4.2 were normal or non-normal distribution. This is an important prerequisite for choosing the right statistical approach for the research analysis. Appendix 1 is the output that shows the detailed Normality Test using SPSS Version 22. The descriptive statistics show that the means of capital, labour, energy, material and total factor productivities were recorded at 4.75, 3.65, 46.02, 1.45 and 0.53 respectively. The standard error of means for the productivities mentioned above is 0.29, 0.15, 4.50, 0.06 and 0.01 respectively. The medians of the productivities were recorded at 2.00, 2.76, 19.55, 1.07 and 0.48 respectively. The variance of the productivities was recorded at 75.40, 21.45, 18 787.43, 3.57 and 0.10 respectively.

Table 3.1: Normality Test Results of the Productivity Indices

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	**DF**	**Significance**	**Statistic**	**DF**	**Significance**
Total factor productivity	0.09	928	0.00*	0.83	928	0.00*
Capital productivity	0.29	928	0.00*	0.49	928	0.00*
Labour productivity	0.28	928	0.00*	0.31	928	0.00*
Energy productivity	0.37	928	0.00*	0.23	928	0.00*
Material productivity	0.25	928	0.00*	0.45	928	0.00*

Source: compiled by Author

Table 3.1 shows the summary result for the Normality Test. Ho: firms productivities show normal distribution; Ha: firms productivities show non-normal

[1] Normalization take the form of $HC_i = \frac{(Actual\ Score\ of\ ith\ firm - Minimum\ score\ of\ the\ sample)}{(Maximum\ score\ of\ the\ sample - Minimum\ score\ of\ the\ sample)}$

distribution. The α was fixed at 0.05. Ho was successfully rejected. Therefore, all the productivities were of non-normal distribution.

The skewness of capital, labour, energy, material and total factor productivity were recorded at 4.87, 16.20, 12.31, 6.97 and 2.80 respectively. The Kurtosis of the productivities was recorded at 32.82, 367.17, 190.93, 70.05 and 18.24 respectively. Both skewness and kurtosis of the productivities show values larger than ± 2. These values show that all the data are of non-normal distribution. Therefore, a non-parametric approach was chosen to analyse the data in this research.

Besides, non-parametric techniques can be suitably applied when data is collected in nominal (categorical) and ordinal (ranked) scales (Pallant, 2013, p. 213). Although non-parametric techniques have less stringent assumptions, there are a few general assumptions that must be fulfilled before these techniques can be applied. Two general assumptions for these techniques are random samples and independent observations. All the data applied in this research were fulfilled either via parametric or non-parametric general assumptions. However, the productivities showed non-normal distributions.

3.4.2 Analysis Technique of the Relationship between Firms' Productivity and Its Characteristics

In order to analyse the relationship between the productivities, the Spearman Rank Order Correlation (RHO) was chosen to analyse the relationship between productivities' indexes that were studied in this research. According to Pallant (2013, p. 128) the main purpose for applying the correlation analysis is to describe the strength and direction of the linear relationship between two variables. Correlation describes the relationship between two continuous variables, in terms of both the strength of the relationship and the direction. Therefore, Spearman (RHO) was designed for use with ordinal level or ranked data and particularly useful when the data does not meet the criteria for Pearson correlation.

Figure 3.2 shows the analysis procedure for the differences of firm characteristic on productivities. The Kruskal-Wallis Test was conducted. This statistical approach has been chosen to analyse the differences for the firms' characteristics against firms' productivities. When the results show significant differences in the Kruskal-Wallis Test, the multiple comparison tests need to be conducted. The Mann-Whitney U Test was chosen as the tool for further analysis and $\alpha=0.05$ ($p \leqslant 0.05$). In an effort to avoid Type 1 Error, Holm's Sequential Bonfferoni Method will be applied in this section.

The Kruskal-Wallis Test is the alternative technique to a one-way between-groups analysis of variance for parametric technique. This is a 'between groups' analysis, so different people must be in each of the different groups. According to Pallant (2013, p. 232), Kruskal-Wallis Test allows researchers to compare the scores on continuous variables for three or more groups. Scores are converted to ranks and the mean rank for each group is compared.

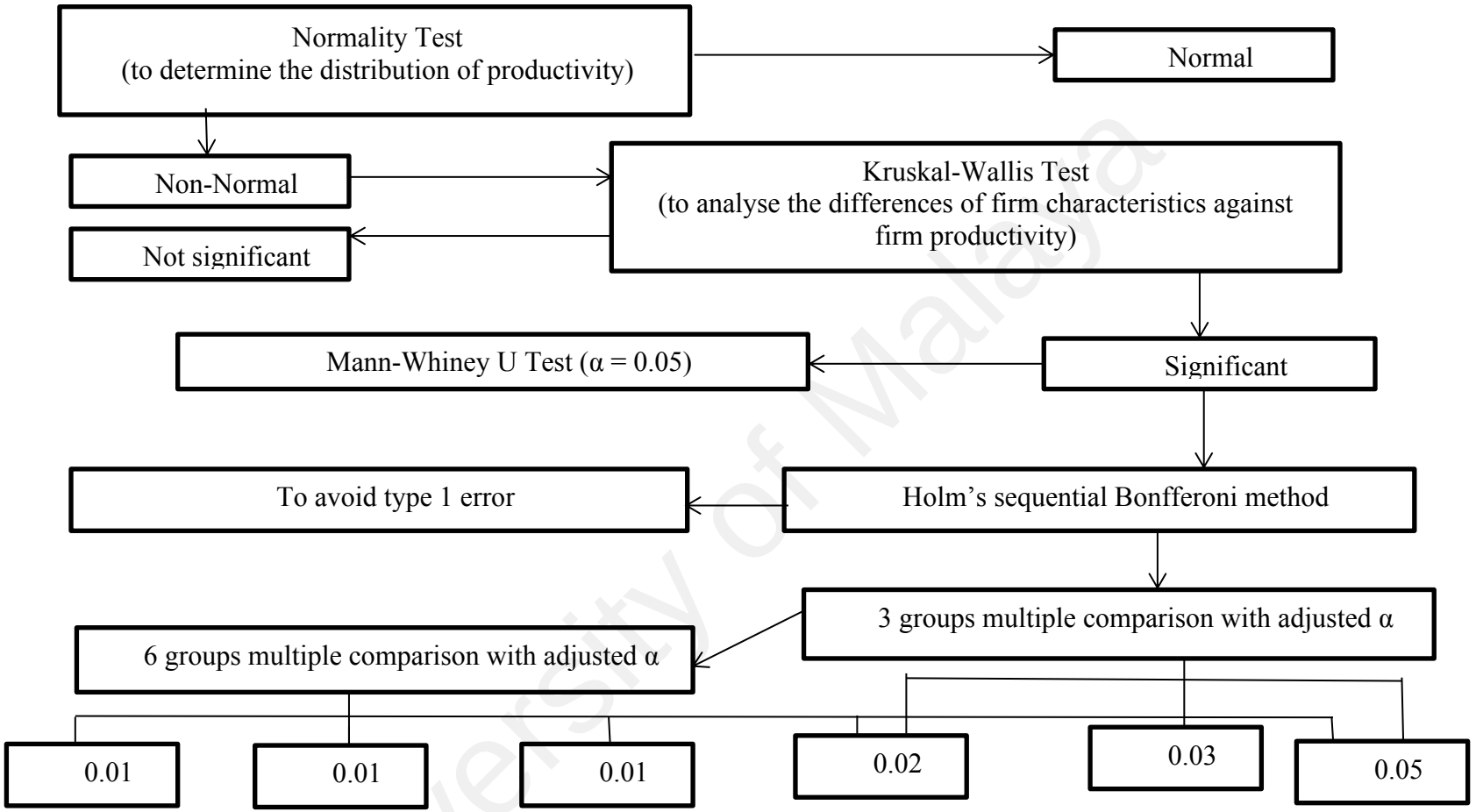

Figure 3.2: Procedure of analysing the difference of firm characteristics on productivity

When the results of Kruskal-Wallis Test show statistical significance, Mann-Whitney U tests must be carried out. This is to determine which group in Kruskal-Wallis Test causes overall results significance.

According to Grimm (1993, p. 470), "The Mann-Whitney U test is the nonparametric alternative to the independent groups t-test". The differences between two independent groups on a continuous measure can be tested using it. Pallant (2013, p. 227) further explained that the Mann-Whitney U Test compares medians and it is different from t-test. Also, the test converts the scores on the continuous variable to rank across the two groups to evaluate whether the ranks of those groups differ significantly.

In the Mann-Whitney U Test, when a true null hypothesis is rejected, this results in Type 1 error (Pallant, 2013, p. 207). Holm's Sequential Bonfferoni Method was applied to avoid this. The significant value from different Mann-Whitney U Test results is arranged in increasing order. After that, the significant values from different groups of Mann-Whitney U Test results with the adjusted alpha are compared. The adjusted alpha for the three groups multiple comparison tests are fixed at 0.017 (rounded up from 0.017), 0.03 and 0.05 respectively. The adjusted alpha for the six groups multiple comparisons were fixed at 0.01, 0.01, 0.01 (rounded up from 0.013), 0.017 (rounded up from 0.017), 0.03 and 0.05 respectively. If the significant values from the particular multiple comparison tests are lower than the adjusted alpha that means they are statistically significant.

3.4.3 Analysis Technique of the Relationship between Firms' Labour Productivity, Characteristics and its Capabilities

As discussed in section 3.4.1, the productivity skewness and kurtosis recorded at larger than ± 2. According to Dimelis and Louri (2002, p. 450), the use of least squares approach to estimate firms' labour productivity would yield coefficient estimates not representing the entire firm distribution when formal testing leads to a rejection of the usual assumption of normality test. Therefore, quantile regression technique is employed as more appropriate. The quantile analysis was considered robust lead to the inefficient estimates by standard least squares. According to Huang et. al (2017), quantile regression analysis has received increasing attention for the wide area of study. Currently, this approach was applied in the area of investment, finance, economics, medicine and engineering studies. Therefore, Davino, Furno and Vistocco (2013), concluded that quantile regression is a statistical analysis that is relatively powerful comparison to traditional approach.

According to Rodriguez and Yonggang (2017), the quantile regression was introduced by Koenker and Bassett (1978). This approach does not assume a particular parametric distribution for the response. In agreement, Le Cook and Manning (2013) further explained that this approach provides an alternative to ordinal least squares (OLS) regression and related methods in today's research world. The quantile regression analysis allows the researcher to understand relationships between variables of mean of the data. Compared with conventional regression, this approach can characterize the entire conditional distribution of the outcome variable and provides more comprehensive statistical modelling than traditional mean regression. The model specification and the detail techniques of the analysis is further elaborated in Chapter 5.

3.5 Data Source

This research utilised secondary data that was obtained from the Department of Statistics Malaysia i.e. the database of manufacturing survey 2010, focusing on the food manufacturing sector. This database consists of 1 090 enterprises involved in food manufacturing. The three-digit MSIC 2008 V1.0 code is 107. In this category of food manufacturing, there are 17 sub-industries. Due to a shortage of firms in the sub-industries of sugar, sugar products & sugar confectionery, these three sub-industries are combined into one sub-industry.

Among the 1 090 firms in the survey data, only 928 firms were considered in this research. The remaining 162 firms were not considered as they were micro enterprises. Of the 928 firms, 688 were small enterprises, 161 were medium enterprises and 79 were large. Although the National SME Development Council used turnover and number of employees to determine the size of the enterprises, this research used only the number of employees.

Table 3.2 shows detailed food manufacturing by firm size used in this research. In general, small enterprises dominated all sub-industries except for sugar, sugar products & sugar confectionery; cocoa products; and chocolate & chocolate products. There were 8 medium enterprises in the manufacturing of sugar, sugar products & sugar confectionery and 4 in cocoa products as compared to only 3 small enterprises and 2 small enterprises in those sub-industries respectively. In the manufacturing of chocolate & chocolate products, large enterprises recorded 6 establishments compared to 5 in the small enterprises category. Interestingly, there were only small enterprises in the egg products manufacturing while only medium and small enterprises were involved in the manufacturing of frozen bakery products and tea.

Table 3.2: Food Manufacturing Firms by Size, Malaysia, 2010

Manufacturing Sector	Small Enterprise (n)	Medium Enterprise (n)	Large Enterprise (n)
Biscuits & cookies	35	15	15
Bread, cakes & other bakery products	260	42	19
Snack products	37	9	9
Frozen bakery products	1	1	-
Cocoa products	2	4	1
Chocolate & chocolate products	5	3	6
Meehoon, noodles & other related products	76	17	8
Prepared meals & dishes	36	13	2
Coffee	39	10	5
Tea	3	1	-
Sauces & condiments	72	18	3
Spices & curry powder	37	3	2
Egg products	3	-	-
Other food products n.e.c.	79	17	5
Sugar, sugar products & sugar confectionery	3	8	4
Total	**688**	**161**	**79**

Source: compiled by Author

As shown in Table 3.3, 899 establishments (96.88%) were owned by Malaysian residents, and 29 establishments (3.13%) by Non-Malaysian residents (including 2 establishments in joint ventures form). Small enterprises were mainly owned by Malaysian residents, accounting for 678 establishments (98.55%), while only 10 establishments (1.45%) were owned by Non-Malaysian residents. Whereas for medium enterprises, 154 establishments (95.65%) were owned by Malaysian residents and 7 establishments (4.35%) by Non-Malaysian residents (including 1 establishment, 0.62% a joint venture). Among the large enterprises, 67 establishments (84.81%) were owned by

Malaysian residents and 12 establishments (15.19%) owned by Non-Malaysian residents (including 1 establishment, 1.266% a joint venture).

Table 3.3: Firms by Ownership, Legal Status, Direct & Indirect Consumed Products, 2010

Firm Characteristics	Small Enterprise (n)	Medium Enterprise (n)	Large Enterprise (n)	Total
Ownership				
Malaysian owned	678	154	67	899
Non-Malaysian owned	10	7	12	29
Legal Status				
Individual	101	2	0	103
Partnership	68	2	0	70
Private Limited	518	156	75	749
Public Limited & Cooperative	1	1	4	6
Type of Industry				
Direct consumed	337	69	49	455
Indirect consumed	309	81	25	415
Beverages	42	11	5	58

From the legal status perspective, 103 establishments (11.10%) were individual proprietorships; 70 establishments (7.54%) were partnerships; and 749 establishments (80.71%) were private limited company. Meanwhile, there were 5 public limited companies and 1 cooperative, and both of these are categorized as "Other Type of Legal Status". Among the small enterprises, 101 establishments (14.68%) were individual proprietorships; 68 establishments (9.88%) were partnerships; 518 establishments (75.29%) were private limited company, while only 1 establishment (0.15%) was a co-operative which was categorized under "Other Type of Legal Status". For medium enterprises, there were 2 (1.24%) establishments in each category of individual proprietorship and partnership. Meanwhile, private limited companies amounted to 156 establishments (96.90%); and only 1 establishment (0.62%) was others (public limited

company). Meanwhile, in large enterprises, there were 75 private limited establishments (94.94%); and only 4 establishments (5.06%) were others (public limited company).

The total number of establishments involved in direct-consumed food products, indirect-consumed food products and beverages were 455 (49.03%), 415 (44.72%) and 58 (6.25%) respectively. Looking at it via the small enterprise category, 337 establishments (48.98%) were involved in the manufacturing of direct-consumed food products; 309 establishments (44.91%) in indirect-consumed food products; and 42 establishments (6.10%) were involved in the manufacturing of beverages. Meanwhile for medium enterprises, 69 establishments (42.86%) were involved in the manufacturing of direct-consumed food products; 81 establishments (50.31%) manufactured indirect-consumed food products; and 11 establishments (6.83%) were involved in the manufacturing of beverages. Lastly, there were 49 establishments (62.03%) involved in direct-consumed food products among the large enterprises; 25 establishments (31.65%) in indirect-consumed food products; and 5 establishments (6.33%) in beverages.

3.6 Chapter Summary

This chapter discussed the research design and statistical methods used to identify the relationship between firm characteristics, capabilities, and productivity. After developing the multifactor productivity model for Malaysian Food Manufacturing, the results will be discussed in Chapter 4 together with the overall TFP, CP, LP, EP as well as MP. Besides that, the comparison between the productivity among small, medium and large industries will be further discussed in the next chapter. Comparison of contributions between the variety of fixed assets, and the percentage of electricity and non-electricity to variance productivity for these industries will be analysed in detail in the next chapter while the contribution of management and support, operation and part-time workers as well as material will be analysed in the following chapter.

CHAPTER 4: PRODUCTIVITIES OF MALAYSIAN FOOD MANUFACTURING SMES

4.1 Introduction

Based on the results of the cross-sectional data analysis, this chapter discusses the level of productivities of SMEs and large food manufacturing firms in Malaysia. Hence, in section 4.2 of this chapter, the multifactor productivity of SMEs' food manufacturing will be analysed in detail. In addition, the comparison between small, medium and large enterprises is presented through firm productivity indices in section 4.3.

4.2 Food Manufacturing SMEs in Malaysia

Food manufacturing plays an important role in serving the basic daily needs of Malaysian citizens. In general, this industry can be categorized into cocoa & cocoa preparations; prepared cereals & flour preparations; processed seafood; dairy products; prepared & preserved vegetables & fruits; processed meat; sugar & sugar confectionery; coffee; tea; spices; and edible products & preparations. Besides that, it also plays an important role in contributing to the Malaysian economy. During the Second Industrial Master Plan (IMP2) 1996-2005, the contribution of the industry, including beverages and tobacco, to the total manufacturing output increased from 6.10% in 1996 to 9.90% in 2005. The total output of food processing industry grew by 8.90% and 7.80% for the years 1996-2000 and 2001-2005 respectively. Meanwhile, the total employment for this industry totalled 196 700 people in 1996 and further increased to 298 000 people in 2005.

Based on the findings of the Annual Survey of Manufacturing Industries 2003, there were more than 2000 establishments involved in food manufacturing. SMEs comprised more than 80.00% of the total number of establishments (Department of Statistics Malaysia,2003).

The largest segment was the cereal and flour-based sector which produced grain mill products; bakery products; noodles and similar products. According to Economic

Census Manufacturing (2011), the total number of establishments increased to 4 099 in Malaysian Food Manufacturing. The majority of these establishments were micro enterprises. Small enterprises only comprised of 34.22%, medium enterprises 2.51% and large enterprises 1.85% of the entire industry. This situation shows that SMEs play a significant role in the manufacturing of food in Malaysia.

Table 4.1: Labour Productivity of SMEs vs Large Enterprises

Labour Productivity (RM'000)	SMEs	Large Enterprises
Census of Establishments and Enterprises	50	125
Economic Census	58	150

Source: Census of Establishments and Enterprises 2005 and Economic Census 2011, Department of Statistics, Malaysia

Table 4.1 shows Malaysia's labour productivity for SMEs and large enterprises in two different periods. Basically, LP of large enterprises grew by 20.00% compared to 16.00% for SMEs. However, LP of large enterprises is relatively higher compared to SMEs. Since SMEs are the "main players" in Malaysian Food Manufacturing, changes in the productivity of SMEs have a direct impact on production

SMEs need to improve their organisational capabilities by formalizing their structures and systems, which generally focus on innovation, a necessity for process improvements of greater efficiency, which in turn enhance cost-cutting which, in general, has been a successful strategy for large manufacturers (Bessant & Tidd, 2007; Prakash & Gupta, 2008; Wheelen & Hunger, 1995). However, this view met opposition from supporters of informality, who argued that SMEs with only a limited range of products that they developed for niche markets, would lose their competitive advantage over large firms by formalizing of their structures and systems (Fiengenbaum & Karnani, 1991; Appiah-Adu and Singh, 1998; Qian and Li, 2003). Indeed, Qian and Li (2003) found that formalization and centralization stifled innovation. The elements of informality that were important for manufacturing SMEs were flexible structures and systems that enabled

them to respond quickly to market uncertainties (Appiah-Adu and Singh, 1998 and Damanpour, 1991).

Currently, there is no national level benchmark on the productivity of the SMEs' food manufacturing in Malaysia. In this research, firm level data will be used. The purpose of section 4.2 is to develop a benchmark for the PFP, CP, LP, EP as well as MP for the national level food manufacturing in Malaysia. The comparison between SMEs in the same industry and demography can avoid disturbances. In today's modern world, there is a difficulty in finding similar demography, social economy as well as policy related to the development of SMEs. Therefore, one standard benchmark for productivity is required for the comparison. Thus, this research hopes to fulfil this research gap.

4.3 Firm Productivity Indices

Looking at the total sales and value-added for small enterprises, they contributed RM1 647.55 million (12.77%) and RM751.60 million (13.96%) respectively in Malaysian Food Manufacturing. Meanwhile, medium enterprises contributed RM2 687.4 million (20.82%) of total sales and RM1 200.86 million (22.30%) of the total value added. Large enterprises played a significant role in food manufacturing in Malaysia. They contributed RM8 570.54 million (66.41%) of total sales and RM3 431.69 million (63.74%) of total value-added in this industry. Therefore, SMEs are still lagging behind the performance of the large enterprise.

The analysis further discusses inputs used by small, medium and large enterprises in this industry. The total expenditure on capital, labour, energy and material by small enterprises was recorded at RM584.95 million (33.50%), RM215.09 million (12.32%), RM42.64 million (2.44%) and RM903.27 million (51.74%) respectively.

Meanwhile, the total expenditure of these inputs for medium enterprises were recorded at RM970.65 million (34.62%), RM263.54 million (9.40%), RM72.78 million (2.60%) and RM1 496.98 million (53.39%) respectively. In comparison, the expenditure

of large enterprises amounted to RM2 961.28 million (33.10%) on capital; RM565.28 million (6.32%) on labour; RM221.39 million (2.48%) on energy and RM5 197.84 million (58.10%) on materials which were their operational inputs. Capital and material are the 2 most important inputs for this industry followed by labour and energy.

Figure 4.1 shows the comparison of inputs for SMEs and large enterprises in food manufacturing Malaysia. Total input expenditure for large enterprises in this industry was recorded at 66.286% (RM8 945.80 million) in the year 2010. In comparison, SMEs spent 12.94% (RM1 745.93 million) and 20.78% (RM2 803.95 million) respectively in this research period. Minimising the cost of inputs is the main way to improve firm efficiency. Of the total expenditure in food manufacturing, 51.74 - 58.10% was spent on materials and 33.10-34.62% was invested in fixed assets. The remaining 6.32 - 12.32% went to labour wages and only 2.44 - 2.60% was spent on energy consumption for this industry in 2010. This expenditure breakdown shows that fixed assets and materials were the main requirements for food manufacturing in Malaysia. However, the prices of these two items were not within the entrepreneurs' control as they were supplied by third parties.

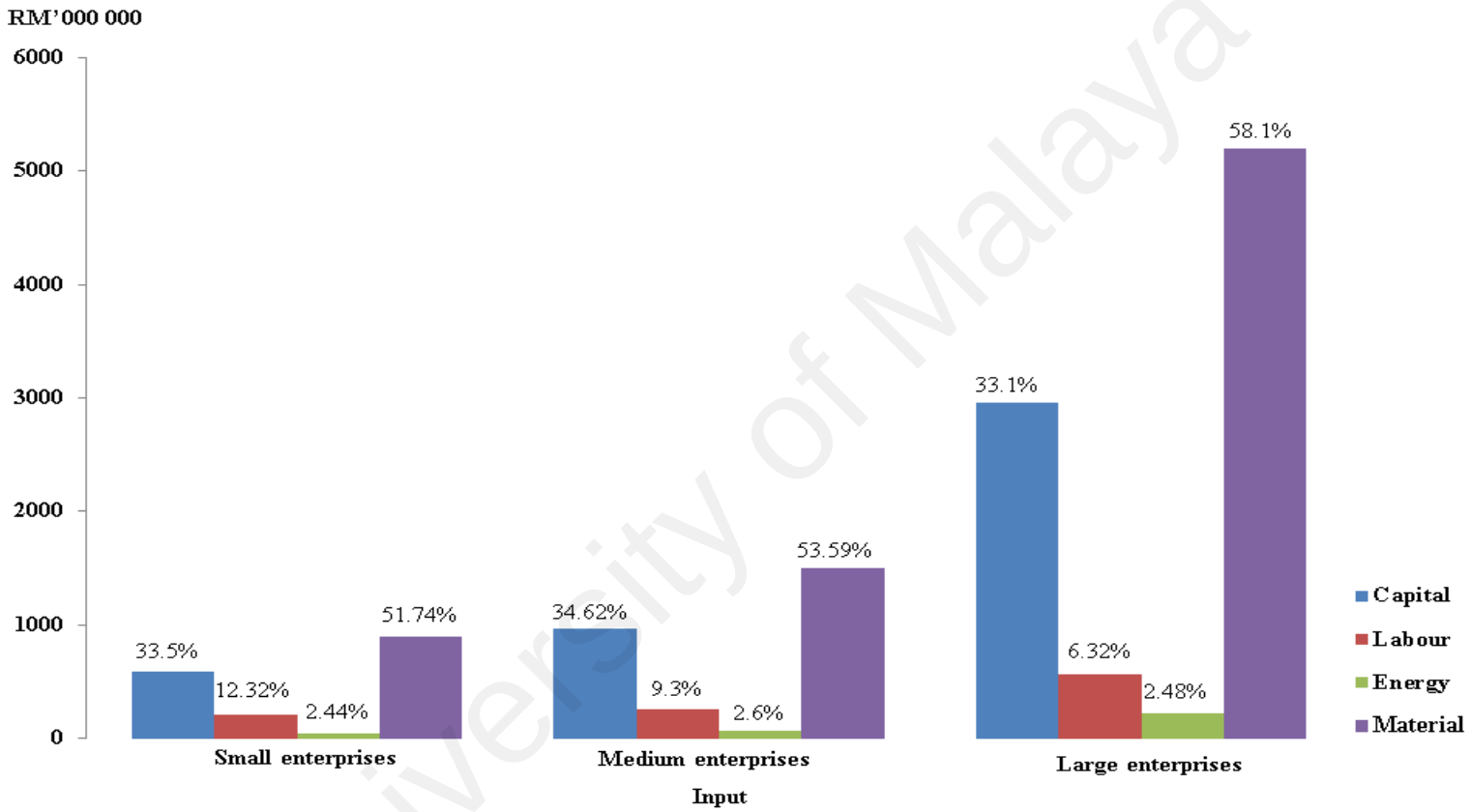

Figure 4.1: Cost of inputs for Malaysian food manufacturing, Year 2010

Source: Manufacturing Survey, Department of Statistics, Malaysia

Notes: Created by Author

In addition, Malaysia imported a substantial amount of agro products from countries such as Thailand, Vietnam, and China etc. As such, the raw materials for food manufacturing were also subjected to currency fluctuation.

For fixed assets investment, the majority of entrepreneurs in this industry tend to invest in Buildings & Constructions rather than Machinery and Computers. This situation occurs especially in SMEs compared to large enterprises in Food Manufacturing in Malaysia. From the entrepreneurs' point of view, fixed assets such as Buildings & Constructions and Transportations are important fixed assets to ensure the company's development in future. Therefore, SMEs tend to invest higher in these two fixed assets rather than large enterprises.

From the labour perspective, most SMEs were more labour intensive compared to large enterprises. This research therefore has similar findings with Liedholm and Mead (1987), Schmitz (1995), and Abor and Quartey (2010). In this industry, small enterprises spent 12.32 % and medium enterprises spent 9.40 % as their operational cost. Meanwhile, large enterprises only spent 6.32 % as wages from the total operational cost. From this simple comparison, we can conclude that large enterprises are more capital-intensive compared to SMEs. In general, capital-intensive enterprises are more productive compared to labour-intensive enterprises.

Maximizing value-added products play a significant role in increasing firm TFP. Entrepreneurs must produce high value-added products as the effort to increase their firm performance.

Table 4.2: National Benchmark for Productivity Indices of Food Manufacturing Sectors in Malaysia in 2010

	TFP			CP			LP			EP			MP		
Manufacturer Of	SE	ME	LE	SE	ME	LE	SE	ME	LE	SE	ME	LE	SE	ME	LE
Sugar, Sugar Products & Sugar Confectionery	0.48	0.45	0.15	1.97	1.27	0.90	2.76	3.40	6.53	8.19	14.75	5.62	0.92	0.94	0.20
Biscuits & Cookies	0.38	0.62	0.60	1.04	1.44	1.39	2.84	3.85	5.58	14.88	14.02	19.53	0.78	1.71	1.41
Bread, Cakes & Other Bakery Products	0.46	0.42	0.47	1.26	1.08	0.92	3.59	3.51	5.40	21.04	16.58	17.41	0.94	0.88	1.22
Snack Products	0.41	0.44	0.75	1.26	1.11	2.05	3.74	4.16	7.06	9.30	14.65	34.93	0.80	0.92	1.48
Frozen Bakery Products	0.76	0.42	-	2.70	0.99	-	8.19	20.98	-	30.67	18.05	-	1.27	0.80	-
Cocoa Products	1.94	0.21	0.22	2.48	1.27	2.38	18.24	9.02	16.22	130.33	12.72	26.53	20.12	0.26	0.25
Chocolate & Chocolate Products	0.34	0.35	0.37	0.70	0.84	1.16	3.10	4.96	4.88	14.44	26.88	13.79	0.91	0.72	0.64
Meehoon, Noodles & Other Related Products	0.41	0.45	0.31	1.42	1.46	0.66	3.33	4.12	3.36	9.37	14.64	8.23	0.75	0.81	0.81

Table 4.2: Continuation

Manufacturer Of	TFP			CP			LP			EP			MP		
	SE	ME	LE	SE	ME	LE	SE	ME	LE	SE	ME	LE	SE	ME	LE
Prepared Meals & Dishes	0.49	0.43	0.27	1.67	1.15	0.63	3.79	5.17	7.69	25.54	8.99	8.55	0.88	0.89	0.55
Coffee	0.43	0.53	0.48	1.53	1.69	0.94	3.56	9.22	5.65	23.38	34.54	33.51	0.73	0.85	1.23
Tea	0.21	0.12	-	0.28	0.38	-	2.61	1.05	-	10.54	36.41	-	1.44	0.20	-
Sauces & Condiments	0.45	0.48	0.84	1.24	1.10	3.06	3.55	3.94	4.76	24.28	30.00	31.74	0.89	1.11	1.60
Spices & Curry Powder	0.28	0.25	0.68	0.90	0.73	2.61	2.82	3.65	5.45	20.06	9.91	25.52	0.49	0.46	1.17
Egg Products	0.27	-	-	1.71	-	-	4.41	-	-	8.59	-	-	0.35	-	-
Other Food Products n. e. c.	0.41	0.48	0.37	1.51	1.70	0.96	3.02	3.05	7.24	19.71	16.10	15.11	0.71	0.90	0.67
Overall	0.43	0.43	0.38	1.29	1.24	1.16	3.49	4.56	6.07	17.63	16.50	15.50	0.83	0.80	0.66

Note: TFP: Total Factor Productivity; CP: Capital Productivity; LP: Labour Productivity; EP: Energy Productivity; MP: Material Productivity

Source: Computed by Author

Frequently, launching new products would increase firm's profit and the percentage of market share. High nutrition, variety of tastes and healthier new products will increase the demand of consumer and will benefit firm's profitability.

Table 4.2 shows the benchmark for productivity indices for food manufacturing by enterprise size in 2010. TFP is an important indicator to measure firm efficiency. In food manufacturing, TFP is not influenced by the size of enterprises when analysed by sub-industries. Small enterprises in the six sub-industries achieved relatively high TFP compared to medium and large enterprises. Meanwhile, the medium enterprises in the four sub-industries recorded the highest TFP compared to small and large size enterprises. Only those large enterprises in the five sub-industries achieved high TFP compared with SMEs.

The TFP for Malaysian Food Manufacturing showed similar findings to Mazumdar and Page (1987). According to Mazumdar and Page (1987), most studies in developing countries indicate that the smallest firms are less efficient compared to the largest firms. They further explained that in certain cases small and large firms are relatively inefficient compared to medium-scale enterprises. The findings of this research are slightly different than the findings of Mazumdar and Page (1987) regarding small enterprises. The small enterprises in six sub-industries are more efficient compared to medium and large enterprises in the same sub-industries in Malaysian Food Manufacturing.

The benchmark of TFP for large enterprises was relatively lower than those of the SMEs. This situation is due to the low performance of the manufacturing of Sugar, Sugar Products & Sugar Confectionary and Cocoa Products in 2010. Those large enterprises involved in both these sub-industries only recorded TFP at 0.15 and 0.22 respectively. The main cause of low TFP for large enterprises is government intervention through quota and permit requirements for the import of raw materials. Raw materials become further

scarce when low yields of plantation and local climate change occur in Malaysia. Therefore, Malaysia had to import 22 200 tons of cocoa beans in 1996 and this increased to 335 100 tons of cocoa beans in 2005 (IMP3, 2006) to fulfil the need in the manufacturing of cocoa. If the TFP for large enterprises did not take into account these two sub-industries, the benchmark for the TFP of large enterprises would have been 0.49 in 2010.

This research shows Fiegenbaum and Karnani (1991), Winter (1994), Serrasqueiro and Nunes (2008), and Hardwick (1997) only applies in certain large enterprises in food manufacturing in Malaysia. According to Fiegenbaum and Karnani (1991), large firms are more competitive and have a greater price advantage compared to SMEs. In addition, large firms have more strategic diversification and bargaining power when negotiating price of inputs with suppliers. Besides that, these establishments are able to reallocate resources more efficiently to achieve economies of scale. Therefore, large enterprises are more efficient compared to SMEs. However, the finding of Fiegenbaum and Karnani (1991) can be challenged when large enterprises operate in protected industries.

The low TFP for medium enterprises was recorded in the sub-industries of Tea and Cocoa Products. Meanwhile, small enterprises recorded low TFP for the sub-industries of Tea and Egg Products. If SMEs did not take into account these two sub-industries, the benchmark of TFP for both enterprises would have been 0.435 and 0.456 respectively. This shows that SMEs failed to exploit their size advantage as pointed out by Koberg et al. (2003) and Qian and Li (2003). According to Koberg et al. (2003) and Qian and Li (2003) SMEs are more innovative due to their more flexible nature and less rigid structure. Therefore, small enterprises easily recognize growth opportunities and have a greater ability to adjust to innovation processes and establish networks with others.

When analysed, more than half of the enterprises recorded higher TFP when compared to the national TFP. In the food manufacturing sector, 58.29% (401 establishments) of small enterprises achieved TFP higher than the benchmark TFP for small enterprises; whereas the balance of 41.72% (287 establishments) had TFP lower than the benchmark. For medium enterprises, 58.39% (94 establishments) achieved high TFP in comparison to the benchmark TFP. Out of 79 large enterprises, 68.35% (54 establishments) achieved high TFP while the remaining 31.65% (25 establishments) were below the TFP benchmark. Based on the percentage, most of the large enterprises achieved high TFP followed by medium and small enterprises in Food Manufacturing Malaysia. A high TFP for an establishment means that the establishments performed well in Malaysia Food Manufacturing.

Table 4.3 showed the results of Spearman RHO-1-tailed summary. This test was conducted to investigate the relationship between Total Factor Productivity Indices (TFPI), Capital Productivity Indices (CPI), Labour Productivity Indices (LPI), Energy Productivity Indices (EPI) and Material Productivity Indices (MPI). Small, medium and large enterprises recorded a high significance and strong correlation between TFPI-CPI and TFPI-MPI. The strong correlation for CPI of small, medium and large enterprises was recorded at 0.66, 0.67 and 0.74 respectively. Meanwhile, correlation for MPI of small, medium and large enterprises was recorded at 0.77, 0.79, and 0.71 respectively.

The correlation of determination for small, medium and large enterprises' CPI was recorded at 44.09%, 44.89% and 54.76% respectively. On the other hand, the correlation of determination for MPI of these establishments was recorded at 59.75%, 61.94% and 50.27%. These statistical results showed CPI and MPI have strong correlation and influence on TFPI for Food Manufacturing Malaysia.

Table 4.3: Summary of Spearman Rho Results of the Productivity Indicators and the Size of Firms

			TFP	CP	LP	EP	MP
Correlation Coefficient	TFP	SE		0.66 *	0.20 *	0.26 *	0.78 *
		ME		0.67*	0.22*	0.28*	0.79*
		LE		0.74*	0.09	0.36*	0.71*
	CP	SE	0.66*		-0.05***	0.14*	0.19*
		ME	0.67*		-0.08	0.29*	0.21*
		LE	0.74*		-0.07	0.34*	0.23**
	LP	SE	0.20*	-0.05***		-0.01	0.10*
		ME	0.22*	-0.08		-0.07	0.16**
		LE	0.09	-0.07		-0.03	0.01
	EP	SE	0.26*	0.14*	-0.01		0.20*
		ME	0.28*	0.29*	-0.07		0.17**
		LE	0.36*	0.34*	-0.03		0.22**
	MP	SE	0.78*	0.19*	0.10*	0.20*	
		ME	0.79*	0.21*	0.16**	0.17**	
		LE	0.71*	0.23**	0.01	0.22**	

Source: Compiled by Author
Note: TFP: Total Factor Productivity; CP: Capital Productivity; LP: Labour Productivity; EP: Energy Productivity; MP: Material Productivity; SE: Small Enterprises; ME: Medium Enterprises; LE: Large Enterprises

N SE = 688; N ME = 161 and N LE = 79

Therefore, CPI and MPI are the two important components that influence TFPI for Malaysia Food Manufacturing.

Since the results of the Spearman RHO showed strong positive correlation between TFPI and CPI, the discussion will be focusing on CP. High CP indicates a high return rate of fixed-asset investments while low CP indicates that the establishment uses capital-intensive practices and has good business prospects in the future. Based on the findings of Table 4.2, large enterprises in the food manufacturing sector are more capital-intensive rather than SMEs in this industry. However, SMEs showed better fixed-asset management compared to large enterprises in this industry. Now, the argument is whether capital-intensive practice or fixed-asset investment return rate is more important in food manufacturing.

There were 68.75% (473 establishments) of small enterprises that achieved high CP compared to the national CP for Malaysian small enterprises food manufacturing in 2010. For medium enterprises, 63.35% (102 establishments) achieved high CP whereas 36.65% (59 establishments) of the medium enterprises recorded an unexpected low performance of CP. There were 62.03% (49 establishments) of large enterprises that performed well in food manufacturing in Malaysia. Small enterprises recorded high CP in the 6 sub-industries when compared to medium and large enterprises in this research period. Meanwhile, medium enterprises recorded high CP in 5 sub-industries. However, large enterprises only recorded high CP in 4 sub-industries when compared to SMEs.

In this research, we can conclude that the financial strength arising from the size of enterprises is the main determinant for the enterprises' decision to invest in fixed assets. The data showed that more than half of the establishments in this industry recorded high CP. One of the reasons for this is bad financial position that hindered them from long term fixed-asset investment. Limited access to financial resources available to SMEs compared to large enterprises still exists in Malaysian SMEs Food Manufacturing.

Therefore, access to capital (Lader, 1996) is one of the challenges for SMEs Food Manufacturing Malaysia.

For those establishments that practice capital-intensive in their daily operation, machinery investment is an important component in their total asset investment. In general, these establishments enjoyed high profits (value-added) compared to those establishments that practised high fixed-asset return rate in this industry. Small enterprises with low CP accounted for 64.34% (RM483.6 million) from the total value-added for small enterprises. Meanwhile, medium enterprises that recorded low CP contributed 51.99% (RM624.28 million) from the total value-added from this category of enterprises. The value-added amounted to RM1 758.2 million (51.23%) was contributed by large enterprises that recorded low CP in the same category of enterprises.

The summary result shown in Table 4.3, with an exception on MPI for large enterprises ($p < 0.05$), CPI for small, medium, and large enterprises recorded positive and statistical significance ($p < 0.01$) for EPI and MPI. The small correlation EPI for SMEs was recorded at 0.14 and 0.29 respectively. Meanwhile, the medium correlation was recorded at 0.34 for large enterprises' EPI. The correlation determinant for EPI of small, medium and large enterprises recorded 1.82%, 8.30% and 11.36% respectively. These results showed SMEs invested relatively less in fixed assets such as machinery equipment that require high energy consumption compared to large enterprises.

On the other hand, small, medium and large enterprises recorded low correlation between CPI and MPI. The correlation of MPI for small, medium and large enterprises recorded 0.19, 0.21 and 0.23 respectively. For the correlation determinant of MPI, it was recorded at 3.61%, 4.37% and 5.11% for the establishments in this industry. In other words, increasing expenditure for fixed assets will directly increase MPI. Fixed assets such as machinery and computer will directly increase firm production. Therefore,

material demand will increase due to increase in production efficiency in these establishments.

The Spearman RHO-1-tailed test showed negative correlation between CPI and LPI. This means that high CPI will result in low LPI. This correlation for small enterprises was recorded at 10% statistical significance ($p < 0.1$). In general, high investment in fixed assets especially machinery (capital-intensive operation) will increase LP. In other words, low CPI will result in high LPI. This means that capital-intensive operations are more productive compared to labour-intensive operations. In order to increase the competitiveness, small enterprises in food manufacturing must increase their machinery expenditure after having owned their factories.

Of the total fixed assets invested by small enterprises, the division of the pie chart consists of 54.36% (RM313.06 million) for buildings & construction; 28.67% (RM165.10 million) for machinery; and 8.66% (RM49.87 million) for transportation. Another investment of 2.45% (RM14.08 million) was spent on other assets; and 1.17% (RM6.76 million) on computers; with a balance of 4.69% (RM27.01 million) of it on fixed assets maintenance. In terms of the composition of fixed assets for medium enterprises, 52.85% (RM512.98 million) was spent on building & construction; 31.95% (RM310.13 million) on machinery; and 5.09% (RM49.43 million) on fixed-asset maintenance. Moreover, these establishments also spent 4.720% (RM45.83 million) on transportation; 4.37% (RM42.39 million) on other assets; and 1.02% (RM9.89 million) on computers from their total fixed- asset expenditure. On the other hand, the composition of the fixed-asset investment of large enterprises, 48.21% (RM1 427.76 million) was on machinery; 37.60% (RM1 113.49 million) on building & construction; and 4.98% (RM147.60 million) on other assets. Besides that, there was an establishment expenditure of 3.80% (RM112.44 million) on maintenance of fixed assets, 2.84% (RM84.15 million) on transportation; and 2.56% (RM75.84 million) on computers. Through the simple

comparison above, the fixed assets for large enterprises concentrated more on machinery than building & construction. This is the key factor for the success of large enterprise compared to SMEs in this industry.

Fixed-asset investment is also influenced by stages of enterprise development. For new start-ups and small enterprises, they tend to priorities investing in building & construction rather than machinery. Several reasons influence the decisions of these entrepreneurs. One of them is that factory (building) is a requirement for any manufacturing operation. In order to reduce operational interruptions, it is best to have one's own factory and this includes building & construction. The entrepreneurs, who own their own factories, can set up infrastructure such as temperature-controlling systems, as well as storage and logistic systems without concern of having to relocate from that factory in the future. In the long run, operations are less likely to be disrupted, hence, reducing operational costs and avoiding unanticipated costs.

A possible scenario of not owning one's factory is frequent relocation. Whenever relocation happens, the cost of fixing the machines as well as renovation would increase overhead costs. Besides that, in the process of relocation, interruptions to the operations will occur. Trained staff might leave after the relocation if the new site is too far for production workers to travel to, in order to get to the workplace. As a result, there would be inevitably high turnover rates, which would lead to the need for recruitment and the training of new workers when the skilled workers had to quit due to inconvenience of workplace distance and so forth.

For the medium enterprises, the decision to invest in fixed assets differs from that of small enterprises. The investment in building & construction will ensure that the factory can accommodate growth and secure future needs. For medium enterprises that have their own factories, the focus then shifts to investments in machinery to increase

productivity. Therefore, the LP of medium enterprises is relatively higher than small enterprises.

For large enterprises, the fixed-asset investment is in machinery rather than building & construction, as machinery investment will increase production capacity and reduce the need for labour. With more machines in use, labour cost is reduced but maintenance costs will increase. LP will increase when the establishments operate on technology-intensive mode. Therefore, the profit margin of large enterprises is relatively higher in comparison to SMEs.

Transportation also plays an important role in the investment portfolio for SMEs. SMEs spent respectively about 8.66% and 4.72% of their fixed-asset investments in transportation. These investments benefitted SMEs when commercial vehicles were used to transfer raw materials and final products to the end-users. Fixed assets such as building & construction, machinery, and transportation can be used as collaterals when seeking financing from financial institutions.

The results of Spearman RHO in Table 4.3 showed that LPI has a negative relation with EPI for small, medium and large enterprises in Malaysian Food Manufacturing. However, this correlation is small and the effects are not significant on LPI. The EPI correlation for small, medium and large enterprises recorded at -0.01, -0.07, and -0.03 respectively. The correlation determinants for EPI of these establishments were recorded at 0.02%, 0.55%, and 0.12% respectively. Since the percentage that influenced LPI was relatively small, it can be ignored.

There is a positive correlation between LPI and MPI in SMEs for Malaysian Food Manufacturing. Those SMEs recorded statistical significance ($p < 0.050$) for LPI - MPI in the Spearman RHO test. The correlation between small, medium and large enterprises for MPI was recorded at 0.10, 0.16, and 0.01 respectively. The correlation determinant for these establishments was recorded at 1.02%, 2.50%, and 0.08% respectively. This

means that LPI for SMEs is influenced by MPI but not for large enterprises. The active involvement of entrepreneurs of SMEs on the production floor is the main reason that causes positive and statistical significance for the Spearman RHO test.

In reference to Table 4.2, small enterprises in the 3 sub-industries recorded high LP compared to medium and large enterprises. Meanwhile, medium enterprises in the 4 sub-industries recorded high LP as opposed to small and large enterprises in this research period. Large enterprises achieved the highest LP in this research. These establishments recorded high LP in 8 sub-industries compared to SMEs in food manufacturing in Malaysia.

More than half of the establishments in this industry show irregular low performance of LP. 74.13% (510 establishments) of small enterprises recorded low LP in comparison to the benchmark LP of small enterprises. Out of 161 medium enterprises, 28.57% achieved high LP. However, 115 performed below the national LP of medium enterprises. Out of 79 establishments, only 26 large enterprises (32.91%) showed good performance in LP of this industry. These findings show the same findings with Liedholm and Mead (1987), and Schmitz (1995), SMEs are more labour-intensive compared to large enterprises. This research also shows similar findings with BNM (2007) and SME Masterplan (NSDC, 2012).

For small enterprises, various types of workers were employed in their workforce. Out of the total number of employees in this industry, 29.61% was in management & support (3 869 employees), 67.16% in production & operation (8 777 employees) and only 3.23% part-timers (422 employees) were employed by small enterprises. The highest number of employees hired was 7 106 employees from the category of plant, machine operators & assemblers (56.19%); 1 573 employees from the category of manager, professionals & executives (12.44%) and 1 201 employees from clerical & related occupation workers (9.50%). Besides that, 8.66% of elementary occupation workers (1

095 employees); 7.31% of plant, machine operators & assemblers (924 employees) were employed through labour contractors and only 5.91% of technicians & associate professionals (747 employees) were directly employed by the establishments.

For the category of employees, medium enterprises employed 3 342 persons in management & support (23.27%), 10 890 persons in production labour (75.83%) and only 130 persons as part-timers (0.91%). The labour composition for medium enterprises was 981 persons in the managers, professionals & executives' category (6.83%), 1 297 persons for clerical & related occupations (9.03%), and 1 064 persons for elementary occupations (7.41%). Furthermore, medium enterprises also employed 1 014 persons as technicians & associate professionals (7.06%), 8 313 persons as directly employed plant & machine operators & assemblers (57.88%), 1 563 persons for plant & machine operators & assemblers employed through labour contractors (10.88%) and 130 part-timers (0.91%).

In this industry, large enterprises hired more employees compared to SMEs. For the labour composition, large enterprises employed 61.97% plant, machine operators & assemblers through labour contractors; 61.25% technicians & professional associates and 54.08% plant & machine operators & assemblers as their permanent workforce. Besides that, they also employed 51.66% as managers, professionals & executives; 50.720% in clerical & related occupations and 46.34% as part timers from the job market. For large enterprises labour composition, 0.65% (RM2.22 million) were employed as plant & machine operators & assemblers; 40.68% (RM139.87 million) as managers, professionals & executives and 22.28% (RM76.60 million) as technicians & associate professionals in 2010. In addition, they also spent RM50.38 million (14.65%) on plant & machine operators & assemblers employed through labour contractors; RM48.87 million (14.21%) on clerical & related occupations; RM23.71 million (6.90%) on elementary occupations and RM2.22 million (0.65%) on part timers as their employee expenditure.

Based on the comparison above, the various types of workers employed have been discovered. For large enterprises, most of the plant & machine operators were employed either directly or through labour contracts; followed by technicians & associate professionals and managers, professionals & executives. Other than that, they also hired clerical & related occupations, elementary occupations and part timers. If this is true, SMEs hired relatively less technicians & associate professionals. The lack of technicians & associate professional workers in the small enterprises resulted in slow technology development in this industry.

Lack of technical staff will indirectly increase the cost of fixed-asset maintenance which is done by a third party. This situation will directly increase over-head cost of small enterprises. Compared to small enterprises, medium enterprises employed relatively more technicians & associate professionals in their daily operations. This situation was due to high machinery usage and maintenance in the medium enterprises. In this situation, the possibility of medium enterprises increasing their technological capabilities would be higher than that of small enterprises.

Small enterprises hired relatively fewer managers, professionals & executives as compared to large enterprises. Most owners of small enterprises will manage their own companies. By controlling and supervising the production line and enterprise administration through their establishments, the owners will reduce operational costs. Besides that, the fast decision-making by the owners can ensure their establishments' stability and competitiveness in domestic and global markets. This situation was also highlighted by Fischer & Reuber (2000). However, the owners may sometimes overlook some administrative or operational problems. Mismanagement by owners will cause inefficiency in small enterprises.

In general, most of the establishments in this industry were still labour-intensive. The labour composition consists of 67% - 79% of production and operational workers.

Therefore, training plays an important role to enhance a firm's productivity. If enterprise owners implement an efficient training programme to train plant & machine operators & assemblers, the performances of these firms will be greatly enhanced. The increased investment on machinery will directly expand firm productivity when skilled workers fully utilised the machinery. Through this, LP will experience a further increase in growth.

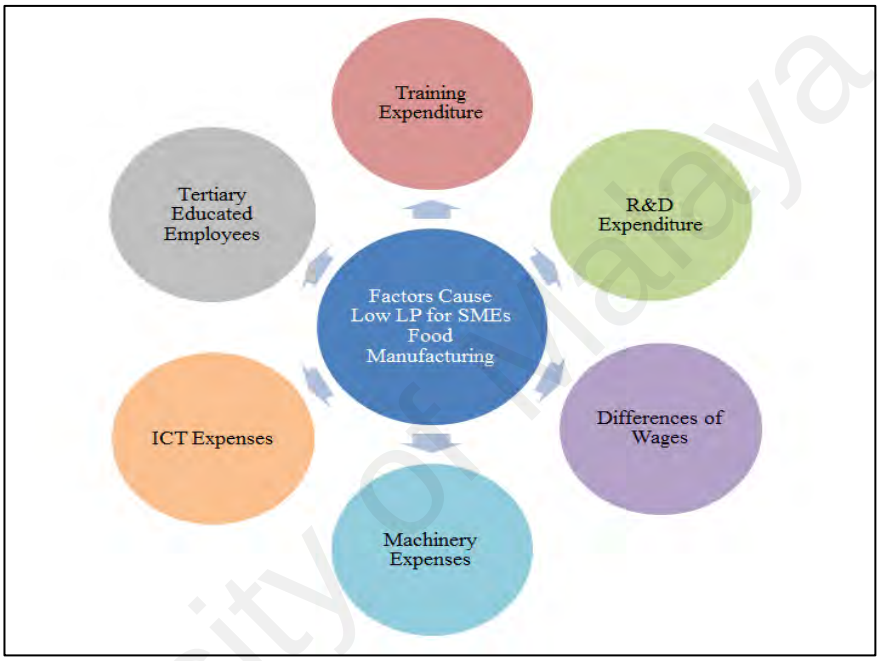

Figure 4.2: Factors causing low labour productivity in Malaysian food manufacturing

Note: Tertiary Educated Employees = Degree holder + Diploma

Manufacturing in 2010. Previous research such as Konings and Vanormelingen (2015) and Dearden et al. (2006) pointed out the importance of training expenditure to firm performance. According to Dearden et al. (2006), a 1% increase in training expenditure per worker will result in an increase of 0.60% value-added per worker. Therefore, it will translate to an increase in wages of 0.30% per worker. However, small, medium and large enterprises only spent RM47.62, RM93.00 and RM227.85 respectively to train their employee. Low training expenditure causes low labour performance in this industry. Entrepreneurs must increase training expenditure to increase productivity and wages in order to maintain skilled workers in this industry.

Realizing the importance of human resources development, the Malaysian Government allocated RM 162.8 million for 61 programmes in 2011 to further develop human resources of SMEs (NSDC, 2012). Will it benefit the workforce in food manufacturing? The formal training programmes organised by the Ministry of Human Resources and government agencies such as seminars and workshops may not be suitable for the less qualification work force. The specific functional training such as on the job training that is based on the suitable technology for the particular industry will attract employers to send their workers to participate in training programmes. Besides that, the methods used in the training programmes must be easy and interesting. This ensures the operational workers would absorb and apply the methods in their daily tasks. Through this, the operational workers' productivity will be increased.

The human capital of the workforce is the main challenge for enterprises implementing training programmes. Majority of the workforce in Malaysian Food Manufacturing only possess SPM qualification or equivalent. In this research, the employees of small enterprises consist of 4.01% (533) of degree holders; 10.80% (1 437) of diploma holders; and 85.20% (11 340) of SPM leavers or equivalent. Meanwhile, the employee qualifications of medium enterprises consist of 4.84% (695) of degree holders; 10.72% (1 540) of diploma holders; and 84.45% (12 134) of SPM leavers or equivalent. In comparison, large enterprises employed 5.17% (1 424) degree holders; 10.72% (2 950) diploma holders; and 84.11% (23 150) SPM leavers or equivalent in their workforce. For the workers that received basic education, informal trainings such as on the job training from their seniors who are more experienced and team building sessions are more suitable for them. Therefore, the ability of supervisors is an important factor to ensure this target group performed well in their tasks.

The average expenditure on machinery per person for small, medium and large enterprises was recorded at RM 13 055.64, RM 21 791.08 and RM 52 437.24 respectively

(refer to appendix 2 for details). Meanwhile, the average expenditure on ICT per person by small, medium and large enterprises was recorded at RM 486.07, RM 296.85 and RM 618.42 respectively in 2010. In this industry, 26.16% (180 establishments) and 28.05% (193 establishments) of the small enterprises achieved higher ICT and machinery expenditure respectively. Meanwhile, for the medium enterprises, 29.81% (48 establishments) and 24.22% (39 establishments) respectively achieved high ICT and machinery usage.

In this industry, large enterprises recorded high ICT and machinery per employee compared to SMEs. Low ICT usage is a factor in the inefficiency in business administration while low machinery usage could cause low productivity for SMEs compared to large enterprises. Lehr and Lichtenberg (1999) found that ICT usage had a positive correlation with LP, it means the skilled worker can highly benefit from ICT usage to improve firm performance. If SMEs in this industry increase their machinery and ICT expenditures, LP will increase accordingly.

The turnover rate for employees of SMEs was also one of the reasons that resulted in low productivity for these establishments. There were different rates of wages for all categories of workers in small, medium and large enterprises. Employees that worked in the management & support for small, medium and large enterprises received annual salaries of RM26 765, RM30 892 and RM39 190 respectively. The annual wages of employees for SMEs in this category were 46.423% and 26.861% respectively lower than the wages received by employees of large enterprises. Meanwhile, the category of operation & production workers in the SMEs received RM12 522 and RM14 634 respectively as compared to that received by those in the large enterprises at RM16 078 in the research period. This showed that the operational & production workers for SMEs received 28.40% and 9.87% less than those received for the large enterprises. The differences of wages will cause efficient and skilled workers to shift from SMEs to large

enterprises. This situation will increase the gap of LP between small, medium and large enterprises in food manufacturing industry.

In order to increase production operation labour wages, entrepreneurs of small enterprises need to increase their training expenditure for their workers. By enhancing the skills of workers, firm productivity will further increase, which will in turn, bring about an increase in overall productivity. Increased opportunity for training and higher wages will directly motivate the workers to work harder and increase the loyalty of workers. Through this, the problem of worker turnover and low productivity among SMEs will be overcome.

Most of the large enterprises in food manufacturing practised specialization of tasks. Therefore, large enterprises enjoyed economies of scale due to their high labour performances. High supervision, discipline and specializing of job tasks were the main determinant factors for large enterprises to manage their employees. Besides that, the expenditure of R&D for large enterprises (RM12.39 million) relatively higher than SMEs, which are RM1.6 million and RM1.48 million respectively. The R&D expenses for SMEs recorded 674.375% and 737.162% lower than large enterprises. These factors will result in higher LP for the large enterprises compared to SMEs in food manufacturing.

The result of Spearman Rho test showed EPI had positive and statistical significance ($p < 0.010$) with TFPI. This showed that intermediate inputs especially energy played a significant role in the production line. The small correlation between EPI-TFPI was recorded for SMEs while medium correlation was recorded for large enterprises. The correlation of EPI-TFPI for small, medium and large enterprises was recorded at 0.255, 0.283 and 0.360 respectively. Meanwhile, the correlation determinant for these establishments recorded 6.50%, 8.01% and 12.96% respectively.

Besides that, EPI also had positive and statistical significance ($p < 0.050$) with MPI. In addition, the result showed EPI had small correlation with MPI. Small, medium

and large enterprises recorded 0.20, 0.17 and 0.22 respectively for correlation EPI-MPI. The correlation determinants for MPI were recorded at 3.96%, 2.82% and 4.80% respectively for the establishments in this industry. This means, high electricity demand will increase material usage. This situation happened due to high machinery usage in operation line.

Looking at Table 4.2, the EP of small enterprises was slightly higher than medium and large enterprises. The small enterprises in six sub-industries recorded higher EP compared to medium and large enterprises in the same industry. Meanwhile, medium enterprises recorded high EP in five sub-industries of Food Manufacturing Malaysia. Large enterprises only recorded high EP in four sub-industries when compared to SMEs in this industry. The EP showed a positive relationship with CP. High machinery and transport usage are the two important factors that influence EP for this industry.

Based on these indices, 376 establishments (54.65%) of small enterprises achieved high EP compared to the national benchmark. For medium enterprises, 89 establishments (55.28%) achieved a higher EP, whereas 72 medium enterprises fell below it. Out of 79 large enterprises, 46 establishments exceeded the EP benchmark for that year. In food manufacturing, a high percentage of large enterprises achieved national benchmark of EP compared to SMEs in the same sub-industries. High EP shows that the particular establishment is energy- efficient in their daily operations.

There are three categories of energy consumptions by food manufacturing enterprises. Electricity is the main energy followed by diesel oil/petrol/furnace oil/fuel oil and liquefied petroleum gas (LPG)/natural gas and other fuels consumed by this industry. Normally, commercial vehicle use diesel oil/petrol/furnace oil/fuel oil as their main energy consumption while electricity was used by modern machinery as their energy consumption. Meanwhile, conventional machinery in food manufacturing used liquefied

petroleum gas (LPG)/natural gas and other fuels as energy consumption in daily operation.

Small, medium and large enterprises spent RM22.21 million (13.01%); RM40.33 million (23.62%) and RM108.22 million (63.38%) respectively for electricity expenditure. For the diesel oil/petrol/furnace oil/fuel oil, these establishments spent RM16.36 million (18.12%); RM25.56 million (28.31%) and RM48.36 million (53.57%) respectively in this research period. Meanwhile small, medium and large enterprises spent RM10.68 million (12.96%); RM6.89 million (8.36%) and RM64.82 million (78.68%) on liquefied petroleum gas (LPG)/natural gas/other fuels in Malaysian Food Manufacturing. Hence, large enterprises are the main energy consumer in Food Manufacturing Malaysia.

Food manufacturing is one of the unique industries in the manufacturing sector. The establishments in this industry not only used electricity as main energy consumption but they also used non-electricity such as liquefied petroleum gas and other fuels in their daily operation. However, natural gas and other fuels are less efficient compared to electricity when used in production line. Through this research, we found that the percentage of expenditure for liquefied petroleum gas (LPG) /natural gas/ other fuels was still high (about 9.47% – 29.28%). If all establishments increase their expenditure on high technology machinery that requires electricity as energy, productivity in this industry will increase further.

The higher machinery expenditure will cause higher maintenance expenditure. High machinery investment resulted in high energy demand for large enterprises compared to medium enterprises. Besides that, high machinery usage also caused large enterprises to employ more technicians & associate professional as their employees compared to medium enterprises. In addition, the cost of maintenance payment for third party on large enterprises' fixed assets was also relatively higher compared to medium enterprises. Hence, large enterprises employed 2 285 people as technicians & associate

professionals compared to medium enterprises which hired 1 014 technicians & associate professionals in their operation. Meanwhile, the cost of maintenance for large enterprises' fixed assets recorded 127.47% higher than medium enterprises for this industry in 2010.

In these industries, about 21.84% - 38.38% energy cost was spent on diesel oil, petrol, furnace oil, and fuel oil. These energy resources are the main energy sources for commercial vehicles. The number of establishments for small and medium establishments was relatively higher than large enterprises hence the number of commercial vehicles owned by SMEs was higher than large enterprises. Besides the higher number of commercial vehicles owned by SMEs, the higher transaction in trade is also one of the important factors that influence the usage of commercial vehicles. This situation caused small enterprises and medium enterprises to spend 33.22% and 35.12% from their total energy expenditure in 2010. In comparison, large enterprises only spent 21.84% from their total energy expenditure in this research period. There is unnecessary consumption in the logistics department due to the high frequency of stock delivery in vehicles of smaller capacity and the maintenance of the many such vehicles for both SMEs.

Since electricity is the main energy consumption for food manufacturing in Malaysia, electricity price is the main factor that influences firm production cost. The machinery with energy saving and fuel-efficient commercial vehicles are highly recommended fixed assets for this industry. In the long run establishments will enjoy production cost deduction when they use less electricity and fuel oil. Besides that, they can also avoid the negative effects of a price hike for this energy in the future.

According to Drescher et al. (1997), the food industry represents about 6% of total energy inputs in the manufacturing sector. However, Malaysian Food Manufacturing only used 2.44% - 2.60% energy as the total inputs. Low cost of energy and less value-added food products are the two main reasons that caused low energy input for this industry. In the effort to increase EP, subsidy of fuels including electricity for commercial use must

be removed. According to Miketa and Mulder (2005), energy prices have a positive correlation with EP. Entrepreneur will invest on new machinery to increase energy efficiency. Hence, higher energy prices provide an incentive to improve energy efficiency.

The result of Spearman RHO-1-Tailed test showed that, except for TFPI, MPI has a small correlation with CPI, LPI and EPI. The correlation between MPI-CPI of small, medium and large enterprises recorded positive and statistical significance ($p < 0.05$). The correlation was recorded at 0.19, 0.21 and 0.23 respectively for these establishments in Malaysian Food Manufacturing. The correlation determinant was recorded at 3.61%, 4.37% and 5.11% respectively for those enterprises in this industry. In food manufacturing, fixed assets, especially machineries and ICT play an important role to ensure that all the raw materials are processed into final products and hence, fulfil customer satisfaction.

MPI also recorded statistical significance ($p < 0.05$) and small correlation with LPI of SMEs in this industry. For SMEs, the correlation was recorded at 0.10 and 0.16 respectively. The correlation determinant for these establishments was recorded at 1.02% and 2.50% respectively. The active participation of owners in business management and production floor was the two important factors that caused this situation to occur. However, this situation does not occur for large enterprises due to the lack of attention from the enterprise owners.

MPI also has positive correlation and statistical significance ($p < 0.050$) with EPI. There was a record of small correlation MPI-EPI for small, medium and large enterprises at 0.20, 0.17 and 0.22 respectively. The correlation determinant for these establishments was recorded at 3.96%, 2.82% and 4.80% respectively. The MPI will increase when EPI increases. This situation occurs due to machinery and value-added effects.

Referring back to Table 4.2, the benchmark of MP for small enterprises is slightly higher than medium and large enterprises in this research period. The high MP indicates that particular enterprise fully utilized raw materials to produce high value-added final goods to fulfil their customer needs. Small, medium and large enterprises recorded high MP in five sub-industries with each sub-industry being different from other. The low MP for large enterprises was caused by a low performance from those large enterprises in the manufacturing of sugar, sugar products & sugar confectionery (0.20); and cocoa products (0.26). Meanwhile, medium enterprises recorded low MP for the manufacturing of tea (0.20); and cocoa products (0.26) in food manufacturing.

Out of 688 establishments, 62.79% (432 establishments) of the small enterprises achieved high MP whereas 37.21% (256 establishments) of the small enterprises under performed in comparison to the small enterprises benchmark of MP in 2010. Looking at the national benchmark for medium enterprises, 66.46% (107 establishments) of medium enterprises in food manufacturing achieved high MP. Out of the 161 medium enterprises, 54 of them (33.54%) recorded low MP performance. There were 64 (81.01%) of large enterprises in food manufacturing that achieved high MP when compared to the benchmark of MP of large enterprises. In this industry, large enterprises achieved high percentage for MP when compared to SMEs.

Overall, small enterprises spent relatively fewer material expenses compared to medium and large enterprises in this industry. Raw material usage by small enterprises totalled 11.89% (RM 903.27 million) of the entire amount of raw materials used in the food manufacturing in 2010. Of this amount of 11.89% of raw materials, small enterprises used 99.19% of it to manufacture final products, which mean that the wastage (replacement for damage raw material) was only 0.81%. This minimal wastage is due to the more hands-on and proactive supervising by the owners of small enterprises who tend to spend more time caring about the production floor.

The total material usage for medium enterprises in food manufacturing Malaysia was recorded at RM1 496.98 million (19.76%) from the whole industry material expenditure. Out of 19.76%, RM 1 486.55 million (99.30%) was used as raw materials to manufacture final goods. Meanwhile, RM10.44 million (0.70%) was wastage of raw material for this establishment. Although medium enterprises were only 17.35% (161 establishments) of the sample for this research, 65.73% more on total materials was spent as compared to small enterprises. Active participation of the enterprise owners on the production floor plays an important role to ensure the optimum usage of raw material in this establishment. Besides that, the higher number of staff management & support compared to small enterprises is also one of the important factors that ensure the optimum usage of raw material.

Large enterprises consumed 68.41% (RM5 197.84 million) from the total material for the Malaysian Food Manufacturing 2010. These establishments consumed RM5 138.85 million (98.87%) on raw materials and RM58.99 million (1.14%) on wastage of raw materials. In comparison, large enterprises consumed relatively more materials compared to SMEs in this industry. Large enterprises spent 247.22% material more than medium enterprises.

The material used for the SMEs is influenced by the sales performance for that particular year. This situation is due to the financial limitation for these establishments. Shortage of finance hindered SMEs from practicing good inventory system and purchasing large quantities of raw material. Normally, these establishments will purchase materials 1 or 2 months earlier or for a shorter period before their actual usage. SMEs only contributed 12.77% and 20.82% respectively from the total sales of this industry.

Subsequently, the large enterprises, with stronger finance and sales performance, can practice better inventory system and purchase large quantities of raw materials. These establishments purchased raw materials 3 to 4 months in advance by using forward

contract. Therefore, the establishments can benefit from the discounted prices when purchasing raw materials in bulk. In such an establishment, material expenditure was not greatly influenced by the current sales performance. In Food Manufacturing in Malaysia, the total expenditure of raw materials for large enterprises was relatively higher than SMEs.

In general, all establishments in food manufacturing have achieved optimum material usage. However, the control of enterprise owners is a main factor to determine wastage of raw material. Normally, SMEs owners pay attention in supervision of the production floor. In contrast, most of the large enterprises will hire supervisors to manage their production floor. The differences of proactivity and time spent between the enterprise owners and hired supervisors influenced the production workers' working behaviour towards material usage, hence resulting in a more careful and responsible handling of materials.

In addition, there was also unwarranted higher wastage of raw materials for large enterprises due to the higher machine usage for this industry. The large-scale production would require higher machine usage rate. When production line faces a technical error such as the malfunctioning of machines, a lot of raw materials could be damaged before realisations could come to light. This is a likely situation that would cause large enterprises to face up to a high wastage of raw material compared to a scenario from that of SMEs.

In Malaysian Food Manufacturing, large enterprises spent 59.53% (RM112.44 million) from the total fixed-asset maintenance from this industry to ensure their machinery remains in good condition. This situation is due to the old machinery and technology used by large enterprises in their operation line. Old machinery and technology caused a high wastage rate for these establishments. In the effort to overcome high wastage of raw materials, these establishments invested RM1 427.76 million

(75.03% from the total machinery investment for this industry) to upgrade their machinery and technology. In the future, the wastage rate for large enterprises will be reduced due to advanced machinery and technology in their operation line.

4.4 Chapter Summary

This chapter assesses the productivity levels of the SMEs and large food manufacturing firms in Malaysia. Overall, the findings indicate that the TFP indices of SMEs are 50% lower than of the large enterprises. In addition, the results showed that SMEs are more labour intensive than large firms, that large food manufacturers are more capital intensive than SMEs, and that SMEs spent less on materials than large firms.

CHAPTER 5: FIRM CHARACTERISTICS AND THEIR INFLUENCE ON PRODUCTIVITY

5.1 Introduction

Based on the results of the cross-sectional data analysis, this chapter responds to the second research question of this thesis as the succeeding section discussing firm characteristics and their influence on the productivity of SMEs and large food manufacturing firms in Malaysia. This chapter analyses the relationship between firm characteristics and firm productivity using appropriate statistical techniques.

5.2 The Relationship of Firm Productivity and its Characteristics

In this research, four types of firm characteristics were analysed together with firm productivities. The firm characteristics are firm size, legal status, ownership and type of industry. On the other hand, firm productivity is capital, labour, energy, materials and total factor productivities. Since firm productivity indices showed non-normal distribution, therefore the Kruskal-Wallis Test and the Mann-Whitney U Test were chosen for this research.

The detailed summary result of Kruskal-Wallis Test for firm productivities and characteristics for Malaysian Food Manufacturing was printed at Appendix 3 at the end of this research. For the first Kruskal-Wallis Test, H_0: Size of enterprise did not influence firm productivity; H_A: Size of enterprise did influence firm productivity. α was fixed at 0.05.

Figure 5.1 showed the summary of results of Kruskal-Wallis Test and Mann-Whitney U Test for size of enterprises and firm's productivities. The results showed that there are significant differences between CP across the sizes of enterprises, ($p < 0.05$). The Chi-Square results were recorded at 19.78 (DF = 2; n = 928). Therefore, the Mann-Whitney U Test needed to be initialized for determining the groups that caused a difference in the overall Kruskal-Wallis Test (refer to Appendix 4 for details). The Mann-

Whitney U Test for those small & medium enterprises with CP showed statistical significance. The U-value was recorded at 46 640 ($p < 0.03$; $n = 849$). The mean ranks for these enterprises were recorded at 437.71 and 370.69 respectively. Through this comparison, small enterprises have more influence on CP compared to medium enterprises.

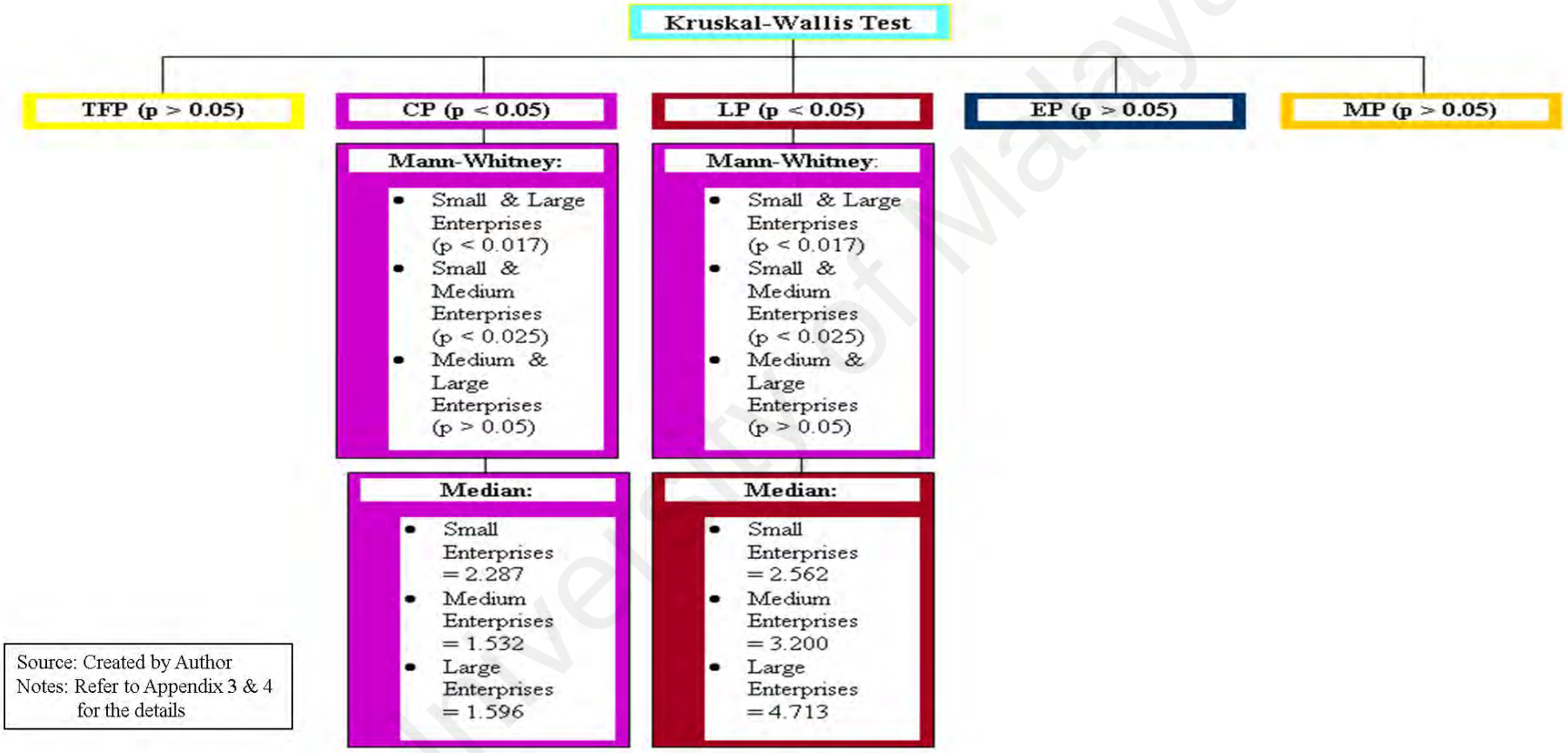

Figure 5.1: Summary results Kruskal-Wallis and Mann-Whitney U Test for size of enterprises and firms' productivity

When small & large enterprises were paired against CP for the Mann-Whitney U Test, the result showed statistical significance. The U-value was recorded at 20 488, ($p < 0.02$; $n = 767$). The mean ranks for these enterprises are 393.72 and 299.34 respectively. Based on this test, it can be concluded that small enterprises have more influence on CP when compared to large enterprises.

For the next Mann-Whitney U Test, medium & large enterprises against CP, the results are not statistically significant ($p > 0.05$). Subsequently, small-medium enterprises and small-large enterprises were the two main groups that contributed to the differences of CP in this research. The median for small, medium and large enterprises were recorded at 2.29, 1.53 and 1.60 respectively. Through the comparison of the medians between these enterprises, the small and large enterprises played an important role in influencing the overall Kruskal-Wallis test result.

Small enterprises faced more financial constraints in comparison to large enterprises. The findings of Storey (1994); Becchetti & Trovato (2002); and Fagiolo & Luzzi (2006) corroborate with this current research. The lack of financial ability caused many prospective investment opportunities for small enterprises to not be initialized. In addition, formal financial institutions (Cressy & Olofsson, 1997) were less interested to provide financial assistance to them compared to large enterprises. This situation hindered the growth of small enterprises in Malaysian Food Manufacturing.

The preferred asset investment for small enterprises is building & construction, while large enterprises prefer to invest in machinery. In terms of building & construction, factories are the main fixed assets in manufacturing, especially for small enterprises. In 2010, small enterprises invested 19.55% (RM322.12 million) for building & construction from their total sale. In comparison, large enterprises only invested 12.99% (RM1 113.49 million) for building & construction. In this research, small enterprises only invested 10.02% (RM165.1 million) for machinery from their total income. Meanwhile, large

enterprises spent 16.66% (RM1 427.76 million) on machinery from their annual sales. This situation will increase the capital-intensive gap between small and large enterprises in this industry.

An external factor such as financial ability is the main factor that ensures SMEs growth and success in the future. This statement was strongly agreed by Franco & Haase (2010), Cook (2001), and Ou & Haynes (2006). SMEs that achieved financial capabilities have high opportunity to obtain financial assistance from a formal financial institution to purchase fixed assets. The fixed assets such as factory and machinery are important to ensure high performance of enterprises.

The summary of Kruskal-Wallis Test in Figure 5.1 showed statistical significance $X^2 = 65.78$ (DF = 2; n = 928; $p < 0.05$) was recorded for LP against size of enterprises. For the first Mann-Whitney U Test, small & medium enterprises against LP, the result recorded statistical significance. The U-value was recorded at 42 973, ($p < 0.02$; n = 849). The mean ranks for these enterprises in the test were recorded at 406.96 and 502.09 respectively. This showed that medium enterprises played a more important role as compared to small enterprises.

The next test focused on small & large enterprises against LP. The results showed the U-value of 13 567, n = 767 and high statistical significance ($p < 0.03$). The mean ranks for small and large enterprises were recorded 364.22 and 556.27 respectively. This proved that large enterprises have more influence on LP.

For the third Mann-Whitney U Test, the analysis focused on medium & large enterprises against LP. The results showed statistical significance ($p < 0.05$; n = 240) and the U-value was recorded at 4 419. Meanwhile, the mean ranks for medium and large enterprises were found to be at 108.45 and 145.06 respectively. Therefore, large enterprises have more positive influence in this test. The medians for small, medium and large enterprises were recorded at 2.56, 3.20 and 4.71 respectively. This suggests that

large enterprises play an important role in influencing the overall result in the Kruskal-Wallis Test compared to SMEs.

This research finding is in line with previous research findings. The LP for large enterprises is relatively higher than the LP of SMEs. According to Fiegenbaum & Karnani (1991), Winter (1994) and Hardwick (1997), the bigger the size of the enterprises, the greater the enjoyment of the economy of scale and the efficiency in the use of human resources. Besides that, large enterprises also have high firm capability compared to SMEs.

The production ability of large enterprises that practice high specialisation of tasks and heavy machinery usage in their production line is relatively higher than those SMEs. In this research, average expenditure of machinery per operational worker for large enterprises was relatively higher than SMEs. This finding was discussed in detail in the previous chapter. Besides that, large scale production requires large quantities of raw material. Therefore, large enterprises have a relatively higher bargaining power compared to SMEs. Low material costs and high production capacity ensured that large enterprises enjoyed high profit margins compared to SMEs.

Figure 5.2 shows the summary results for Kruskal-Wallis and Mann-Whitney U Test for ownership and firms' productivity in Malaysian Food Manufacturing year 2010. For the second Kruskal-Wallis Test, H_0: Ownership did not influence firm productivity; H_A: Ownership did influence firms' productivity. α was fixed at 0.05. Among firm characteristics, ownership has a minor effect on the productivity of firm. The Kruskal-Wallis Test showed that only LP caused a significant difference with ownership. The X^2 value was recorded at 19.27, ($p < 0.05$; DF = 2; n = 928).

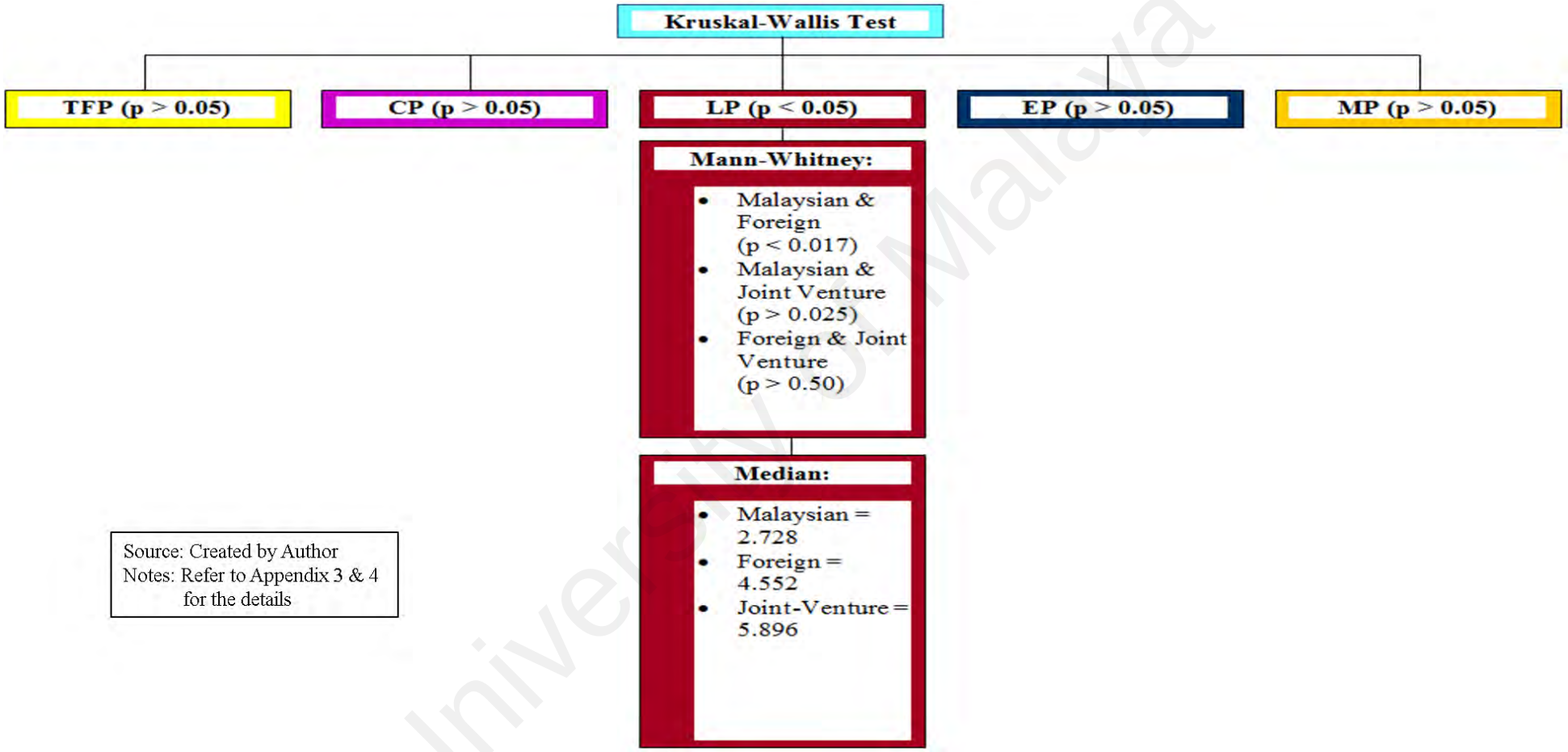

Figure 5.2: Summary results Kruskal-Wallis and Mann-Whitney U Test for ownership and firm's productivity

The first Mann-Whitney U Test was tasked to find out the differences in Malaysian & foreign-owned firms that influenced LP in food manufacturing. It showed a significant result for this test, the U-value was recorded at 6 595 ($p < 0.02$; $n = 926$). The mean range for Malaysian and foreign-owned firms were recorded at 457.34 and 668.74 respectively. This test showed that foreign ownership had more effect on Mann-Whitney U Test results.

The results of Malaysian-owned & joint venture against LP and Foreign-owned & joint venture against LP for the Mann-Whitney U Test did not show any statistical significance. The median of Malaysian-owned enterprises was recorded at 2.73 while foreign-owned and joint-venture enterprises were recorded at 4.55 and 5.90 respectively. Foreign ownership has more positive effects on LP in the results of the Kruskal-Wallis Test. The findings of this research showed similar results with Jordaan (2005 & 2008); Griffith & Simpson (2004); Doms & Jensen (1998); and Globerman et al (1994).

The size of enterprise was the main factor for LP variances between Malaysian and foreign-owned enterprises. In this research, local-owned enterprises consisted 678 establishments (75.42 %), 154 establishments (17.13 %) and 67 establishments (7.45 %) for small, medium and large enterprises respectively. In comparison, foreign-owned enterprises consisted 10 establishments (37.04 %), 6 establishments (22.22 %) and 11 establishments (40.74 %) for small, medium and large enterprises respectively. Large enterprises were more efficient due to the specializing in tasks, better resources allocation and economy of skill compared to SMEs.

This research consisted of 899 local-owned enterprises and 27 enterprises owned by foreigners. Low expenditure of R&D is one of the important factors that caused low LP for Malaysian-owned establishments in this industry. The importance of R&D expenditure was highlighted by Papadogonas and Voulgaris (2005) in the Greek manufacturing. Activities of R&D will generate new knowledge, sophisticated

technology and machinery. An increase in technology and machinery usage directly increases LP. However, Malaysian-owned enterprises only spent RM209.70 per employee (RM9.92 million) in 2010 for R&D activities. In comparison, foreign-owned enterprises spent RM380.26 per employee (RM2.36 million) in 2010.

Besides low R&D expenditure, Malaysian-owned enterprises have a relatively low human capital capability as compared to foreign-owned establishments in Malaysian Food Manufacturing. Although Welch, (1970) pointed out the importance of human capital in manufacturing sector several years ago, Malaysian establishments do not invest much in human capital development. This enterprises' workforce comprised of 4.07 % (1 971) degree holders; 10.53 % (5 096) diploma and 85.397 % (41 327) of SPM or equivalent. In comparison, foreign-owned enterprises employed 10.52 % (654) of degree holders; 12.26 % (762) of diploma and 77.22 % (4 801) of SPM or equivalent.

According to Corvers (1997), intermediate and highly skilled labour had a positive effect on LP. A workforce that has higher education is assumed to be more efficient. Therefore, education increases effective labour output from the hours worked. In order to compete with foreign-owned establishments, Malaysian-owned enterprises must increase the proportion of intermediate and high-skilled workers employed.

Previous literature has shown that training has a positive effect on LP for manufacturing, either in developed or developing countries (Black & Lynch, 1996; Turcotte & Rennison, 2004; Almeida & Carneiro, 2009; Aggrey et al., 2010). However, Malaysian-owned establishments in food manufacturing appeared not to be concerned with human capital development, especially in training their workers, compared to foreign-owned establishments. In 2010, Malaysian-owned establishments in this industry only invested RM140.43 per worker for training. In comparison, foreign-owned enterprises invested RM218.38 to train each worker.

However, this research shows that Malaysian-owned enterprises invest slightly higher in machinery and ICT compared to foreign-owned enterprises. The machinery investment was recorded at 15.21% per annual sales (RM1 593.53 million) by local-owned enterprises. In comparison, foreign-owned enterprises only invested 13.121% per annual sales (RM279.77 million) for machinery expenditure. Meanwhile, Malaysian-owned establishments also invested 0.24% per annual sales (RM25.3 million) in ICT whilst foreign-owned establishments only invested 0.15% per annual sales (RM3.19 million).

Although high investment in machinery and ICT does not appear to correlate with LP in the short term, machinery investment will increase firm production efficiency in the long run. Papadogonas and Voulgaris (2005); Lichtenberg (1993); and, Brynjolfsson and Hitt (2003) showed the importance of ICT on LP for the manufacturing establishments. ICT is a useful tool to facilitate expansion of business processes and information transactions between managers and employees. The lack of training caused the employees to be unable to fully utilise the new machinery and ICT in their firms, especially in Malaysian-owned establishments. Therefore, these establishments' LP is relatively low compared to the LP of foreign-owned establishments.

The difference in LP between Malaysian and foreign-owned establishments was also caused by differences of wages among the Malaysian Food Manufacturing workforce. The average annual salary of Management & Support staff at Malaysian-owned establishments is only RM30 634.29 whilst the Production & Operation labour only recorded RM14 232.07 in 2010. In comparison, the wages of Management & Support staff for foreign-owned establishments is RM53 098.45 which is 42.31% higher than their Malaysian counterparts. Besides that, the annual salary for Production & Operation staff for foreign establishments recorded RM19 357.86 which is 26.48% higher than the workers in the same category in Malaysian-owned establishments. Low wages

cause high turnover rate among skilled workers in Malaysian-owned establishments. Low wages also discouraged the workforce from working harder to transform the establishment to a higher stage. In order to compete with foreign-owned establishments, Malaysian-owned establishments must increase labour wages to increase LP in their daily operations.

Figure 5.3 shows the summary result of Kruskal-Wallis and Mann-Whitney U Test for different types of industry and firms' productivity in the Malaysian Food Manufacturing year 2010. For the third Kruskal-Wallis Test, H_0: The different types of industries did not influence firms' productivity; H_A: The different types of industries did influence firms' productivity. α was fixed at 0.50 in this test. The results showed only the differences across different types of industries with regards to Energy and Material Productivity. For EP, Chi-square was recorded at 17.62 ($p < 0.50$; DF = 2 and n = 928).

For the first Mann-Whitney U Test, analysis was focused on direct & indirect-consumed food products against EP. The U-value was recorded at 81 914; this result showed significance for the test ($p < 0.02$ and n = 870). The mean ranks for direct and indirect-consumed food products were recorded at 408.03 and 465.620 respectively. Therefore, indirect-consumed food products played an important role in influencing these test results.

For the second Mann-Whitney U Test, the focus was on direct-consumed food products & beverages against EP. The results showed statistical significance ($p < 0.03$). The U-value was recorded at 9 773 and n = 513. The mean rank for direct-consumed food products was recorded at 249.48 while for beverages, it was recorded at 316. Therefore, beverages have more influence on EP as compared to the direct-consumed food products in this test.

Next, the Mann-Whitney U Test was conducted on indirect-consumed food products & beverages against EP. However, the results showed statistical insignificance

($p > 0.05$). Therefore, the first group direct & indirect-consumed food products against EP and the second group direct-consumed food products & beverages against EP played an important role to influence the overall Kruskal-Wallis Test. The medians of direct and indirect-consumed food products were recorded at 16.80 and 21.67 respectively while the median for beverages was recorded at 27.01. These showed that beverages and indirect-consumed food products are the two types of industries that influenced Kruskal-Wallis Test results the most followed by direct-consumed food products.

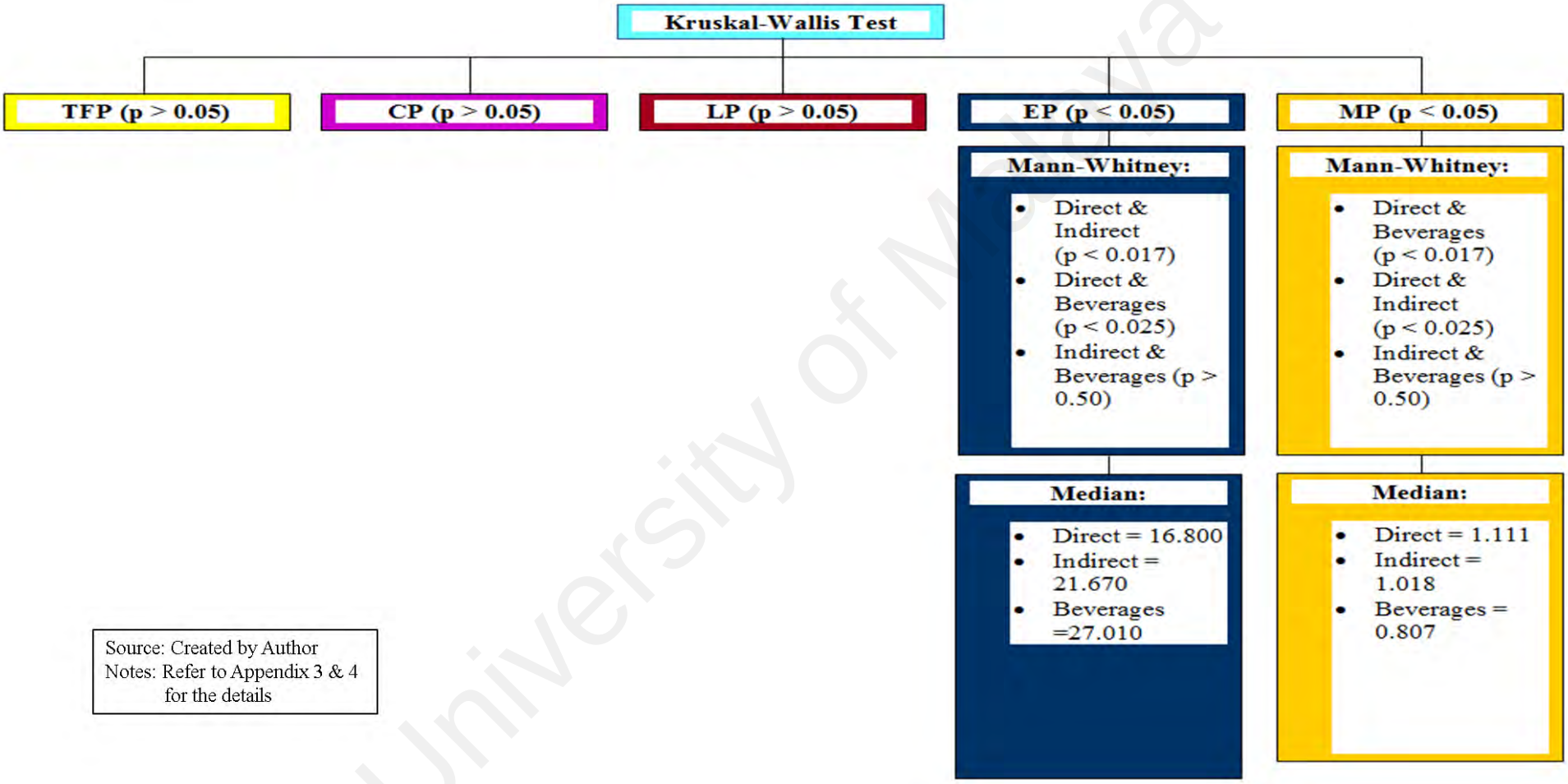

Figure 5.3: Summary results Kruskal-Wallis and Mann-Whitney U Test for different types of industry and firm's productivity

The process of preparing indirect-consumed food products used more energy compared to beverages. Indirect-consumed food products such as frozen bakery products and prepared meals and dishes products need special storage for stock preservation purposes. The higher value-added for indirect-consumed food products compared to beverages resulted in greater energy consumption. Besides that, indirect-consumed food products such as meehoon, noodles and other related products and spices and curry powder products need further processing before they can be consumed. Therefore, indirect-consumed food products consumed more energy as compared to the beverages such as tea and coffee.

A total of 47.16 % (RM80.485 million) was spent by indirect-consumed food Products Manufacturers from the total electricity consumption in this industry. In comparison, Beverages Manufacturers only spent 4.91 % (RM8.391 million) on electricity consumption in the year 2010. High electricity demand showed indirect-consumed food products manufacturers invested relatively higher on machinery compared to Beverage manufacturers in food manufacturing. This situation was due to the complex process for this industry.

In this research, indirect-consumed food products manufacturers contributed RM720.06 million (37.84 %) from total machinery investment in Malaysian Food Manufacturing. In comparison, Beverage manufacturers only spent RM84.58 million (4.45 %) for the total machinery investment in this research period. From the value-added, the Beverage manufacturers only contributed RM429.08 million (8.00 %) from the total value-added in this industry. Meanwhile, indirect-consumed food products manufacturers contributed RM2 167.60 million (40.26 %) from the total value-added in the year 2010.

The Kruskal-Wallis Test of MP against types of industry also recorded statistical significance. The Chi-square was recorded at 12.84, ($p < 0.05$; DF = 2; n = 928). The Mann-Whitney U Test focused on direct & indirect-consumed food products against MP. The result showed statistical significance ($p < 0.03$). The U-value was recorded at 83 988.50 and n = 870. The mean ranks of direct and indirect-consumed food products were recorded at 458.41 and 410.38 respectively. Therefore, direct-consumed food products have a greater influence on the result of Mann-Whitney U Test as compared to indirect-consumed food products.

When the Mann-Whitney U Test for direct-consumed & beverages against MP was conducted, the result showed statistical significance ($p < 0.02$). The U-value was recorded at 10 095, while n = 513. The mean ranks of direct-consumed food products and beverages were recorded at 263.81 and 203.55 respectively. This illustrates that direct-consumed food products affect the result of this test more than Beverages.

When focused on indirect-consumed food products & beverages, the Mann-Whitney U Test results showed statistical insignificance. Therefore, the direct & indirect-consumed food products against MP and the direct-consumed food products & beverages against MP are the two groups that influence the differences in MP in this research. The analysis of Mann-Whitney U Test above was supported by the medians for beverages, direct and indirect-consumed food products. The medians for these industries were recorded at 0.87, 1.11 and 1.02 respectively.

The materials used for these industries were different from one another. The frequency in the transaction of raw materials and complicated preparations are the two main reasons for wastage of direct and indirect-consumed food products. The wastage per annual sale for direct and indirect-consumed food products was recorded at 0.57% (RM29.59 million) and 0.65% (RM44.2 million) respectively. High wastage of raw

materials indirectly will increase over-head costs hence reducing competitiveness for the enterprise.

Figure 5.4 show the result of Kruskal-Wallis and Mann-Whitney U Test for Firms' Legal Status and Productivity in Malaysian Food Manufacturing. For the fourth Kruskal-Wallis Test, the H_0: Firm legal status did not influence productivity; H_A: Firm legal status did influence productivity. In this test, α was fixed at 0.05. Among the firm characteristics, legal status recorded the greatest influence in making a difference in firm productivity when compared to the size of the enterprise, ownership and different type of industry. When Kruskal-Wallis Test was conducted, only material productivity recorded statistical insignificance. For the firm legal status against TFP, the Chi-Square value was recorded at 11.97 ($p < 0.05$; DF = 3; n = 928). Further multiple comparisons were needed to find out which group played a major role in the overall significance for the Kruskal-Wallis Test.

When Mann-Whitney U Test was focused on those establishments registered on Individual Proprietorship & Partnership against TFP, the result showed statistical insignificance ($p > 0.01$). However, there was statistical significance recorded for those establishments registered on individual proprietorship & private limited company against TFP for the Mann-Whitney U Test. In this test, the U-value was recorded at 30 481 while n = 852 ($p < 0.01$). The mean ranks for individual proprietorship and private limited were recorded at 505.07 and 415.70 respectively. Individual proprietorship played an important role in contributing to the differences among TFP when compared to private limited company.

The Mann-Whitney U Test result for those establishments registered on individual proprietorship & other types of legal status against TFP showed statistical insignificance ($p > 0.01$). Similar result was also recorded for the Mann-Whitney U Test of those establishments registered on Partnership & Private Limited Company against TFP ($p >$

0.02); Partnership & Other Types of Legal Status against TFP ($p > 0.03$) and Private Limited Company & Other Types of Legal Status against TFP ($p > 0.05$). This implies that individual proprietorship played an important role in influencing differences in TFP as shown in Kruskal-Wallis Test. The medians for individual proprietorship, partnership, private limited company and other types of legal status were recorded at 0.56, 0.48, 0.47 and 0.51 respectively in the Kruskal-Wallis Test.

A part of Johnson and Perry (2001) findings of the characteristic of individual proprietorship could be used to explain the findings of this research. The individual proprietorship was the simplest form of legal organisation. According to Charoenrat and Harvie (2012) and Buranajarukorn (2006) the owners of individual proprietorship have complete control over decision making processes in their enterprises. The owner of individual proprietorship tended to be more responsible and work harder to ensure the success of their businesses as any profit or debt has to be borne by the owners themselves. Quick decision making, flexibility, innovated products and fulfilling customer satisfaction played the important role to ensure this organisation achieved success in their operation.

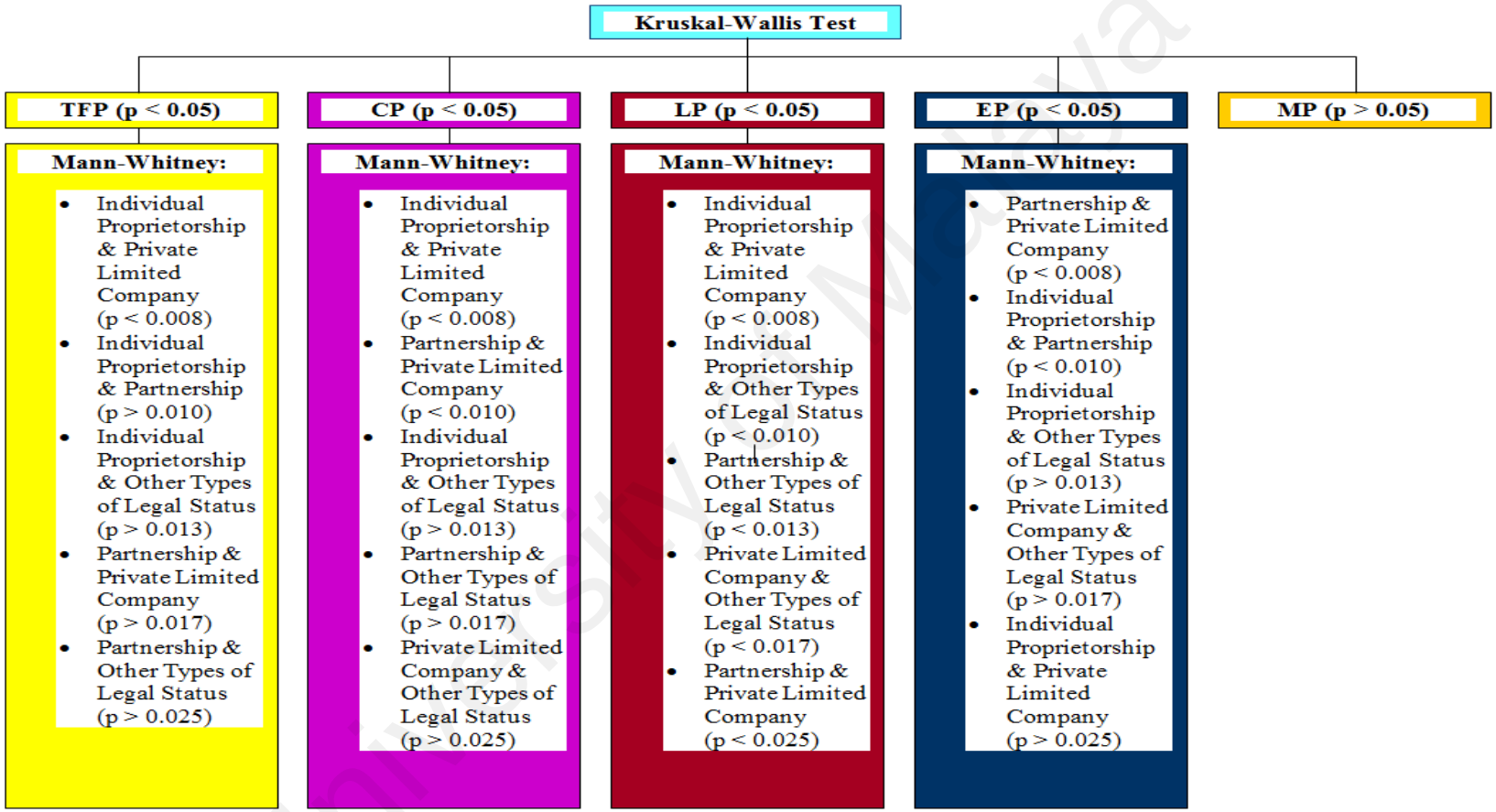

Figure 5.4: Summary results Kruskal-Wallis and Mann-Whitney U Test for firms' legal status and productivity

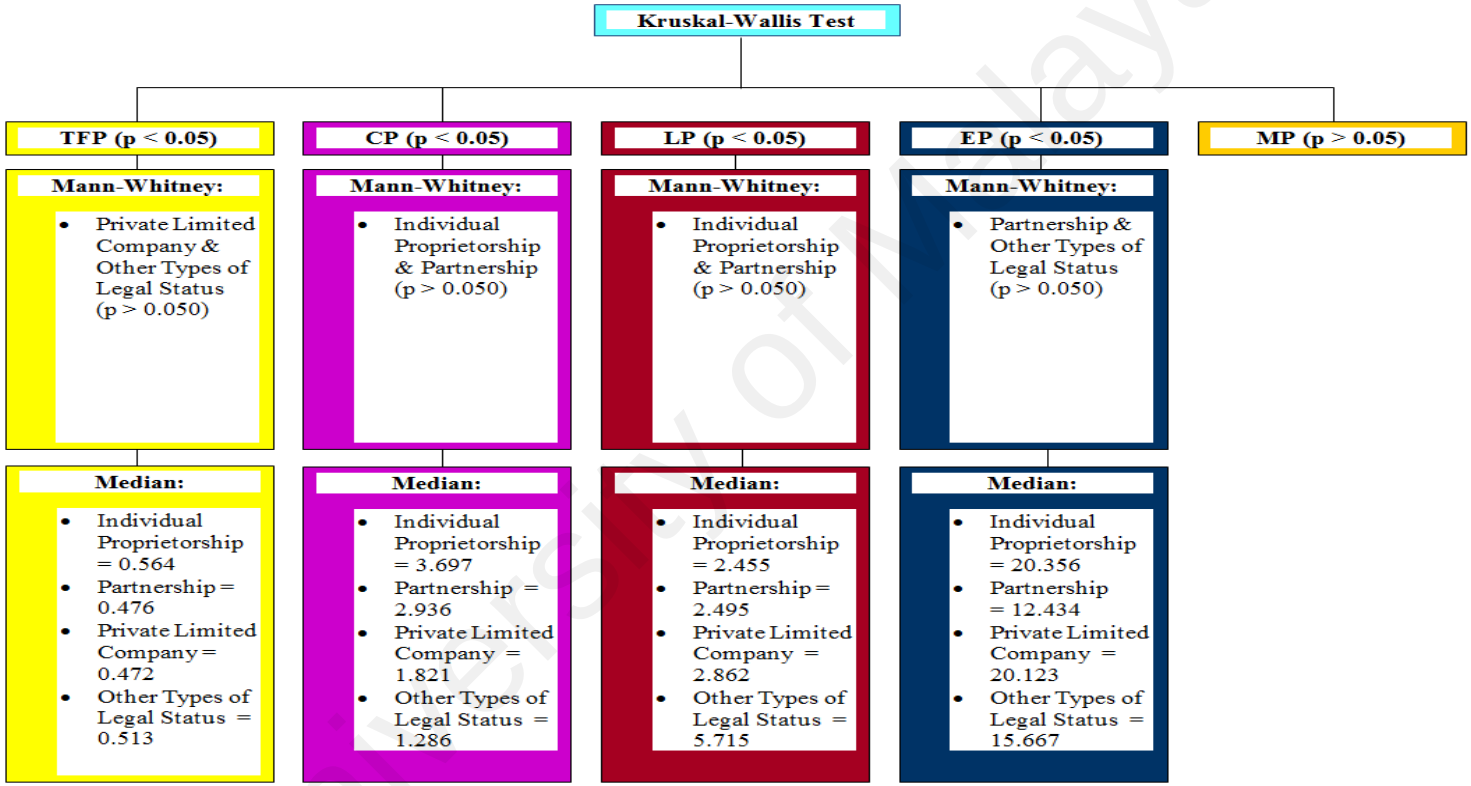

Figure 5.4, Continued

Source: Created by Author
Notes: Refer to Appendix 3 & 4 for the details

In comparison, private limited company was an entity with legal existence which separates management from shareholders (Cooper & Dunkelberg, 1986; Ha, 2006; Charoenrat & Harvie, 2012). Besides that, the shareholders of private limited company enjoyed limited liability for debts and actions of the business. However, formal structure management caused rigidity and long decision-making period especially medium and large enterprises in Malaysian Food Manufacturing. Out of 749 establishment of private limited company, they consisted of 518 (69.16%) of small enterprises, 156 (20.83%) of medium enterprises and 75 (10.01%) of large enterprises in this industry. Slow decision making, asymmetry problem and rigidity of procedures resulted in the inefficiency of private limited company when compared with individual proprietorship in this industry.

For the Kruskal-Wallis Test, CP against firm legal status also recorded statistical significance. The Chi-Square value was recorded at 37.20 ($DF = 3$; $n = 928$) and $p < 0.05$. The first test was focused on individual proprietorship & partnership against CP and $p > 0.05$. For the third Mann-Whitney U Test, the test focused on individual proprietorship & other types of legal status against CP, the result showed $p > 0.01$. Therefore, both of the Mann-Whitney U Tests showed statistical insignificance.

The Mann-Whitney U Test for individual proprietorship & private limited Company against CP, $p < 0.01$ and $n = 852$. The U-value was recorded at 26 655 for this test. The mean ranks for individual proprietorship and private limited company were recorded at 542.21 and 410.59 respectively. The result of this test shows statistical significance. This leads to individual proprietorship having more influence on this test when compared to a private limited company.

For the test of Partnership & Private Limited Company against CP, the U-value was recorded at 19 203 ($p < 0.01$ and $n = 819$). The mean ranks of partnership and private limited company were recorded at 510.17 and 400.64 respectively. Therefore, partnership has more influence on the results of this test compared to private limited company.

The Mann-Whitney U Test result for Partnership & Other Types of Legal Status against CP and Private Limited Company & Other Types of Legal Status against CP, the result shows statistical insignificance. For the Partnership & Other Types of Legal Status against CP, $p > 0.017$ while, Private Limited Company & Other Types of Legal Status against CP, $p > 0.025$. The medians of individual proprietorship, partnership, private limited company and other types of legal status were recorded at 3.70, 2.94, 1.82 and 1.29 respectively. This means individual proprietorship and partnership were the two types of legal status that influence the overall Kruskal-Wallis Test result.

The lack of financial assistance from external financial institutions was still a challenge for individual proprietorship compared to private limited company in Food Manufacturing Malaysia. These challenges, highlighted by Hutchinson (1999); Cassar (2004); and Storey (1994), still exist in individual proprietorship establishment until today. According to Hutchinson (1999), SMEs that were managed by owner leads to the information asymmetry problem, therefore higher collateral were required to obtain the external financial sources. Hutchinson (1999); and Cassar (2004) found that incorporated firms are in a better position to receive external funding compared to unincorporated firms. From the financial institution perspective, incorporate firms were more formal and credible in terms of legal form when they were compared to unincorporated firms. Therefore, Storey (1994) concluded that limited private companies were more likely to rely on bank financing as compared to individual proprietorship enterprises. Government interventions are needed to overcome this obstacle in order to ensure sustainable growth for individual proprietorship in food manufacturing.

Individual proprietorship and partnership receive relatively low paid-up capital when compared with private limited company and other types of company. Due to the weak financial capabilities of individual proprietorship and partnership companies, especially for SMEs, the fixed assets investment differs for private limited company and

other types of legal status companies. In this research, they consist of 11.10% (103 enterprises) of individual proprietorship and 7.54% (70 enterprises) of partnership from the total sample size. For the individual proprietorship, they invested 9.63% (RM9.76 million) and 6.38% (RM6.47 million) respectively from their annual sales to buildings & constructions and machinery. Meanwhile, the annual sales in similar fixed asset investment of partnership enterprises, invested approximately 9.00% (RM8.19 million) and 7.65% (RM6.96 million) respectively. In comparison, private limited companies invested 16.85% (RM1 848.75 million) and 14.28% (RM1 566.84 million) respectively from their annual sales to buildings & constructions and machinery. Lacking in fixed assets investments especially machinery hinders individual proprietorship and partnership enterprises to transform from labour-intensive practices to capital-intensive practices in their daily operations. This resulted in low LP for these establishments.

Referring to Figure 5.4, the results showed that there is statistical significance for firm legal status on the differences of LP. The Chi-Square value was recorded at 28.49 while $p < 0.05$ (DF = 3; n = 928). The Mann-Whitney U Test showed that individual proprietorship & partnership against LP recorded statistical insignificance ($p > 0.05$). The other Mann-Whitney U Tests for individual Proprietorship & Private Limited Company against LP showed statistical significance.

The result of Mann-Whitney U Test for individual Proprietorship & Private Limited Company against LP, the U-value was recorded at 29 979 while $p < 0.01$ (n = 852). The mean ranks for individual proprietorship and private limited company recorded at 343.06 and 437.97 respectively. This resulted in private limited company having a strong influence on Mann-Whitney U Test result. Meanwhile, the U-value was recorded at 35 in individual proprietorship & other types of legal status against LP and $p < 0.01$ (n = 109). The mean ranks for the individual proprietorship and other types of firm legal

status were recorded at 52.34 and 100.67 respectively. Thus, other types of firm legal status have more influence on Mann-Whitney U test.

In the next test, Partnership & Private Limited Company against LP, the U-value recorded at 21 542 ($p < 0.03$ and $n = 819$). The mean ranks of partnership and private limited company were recorded at 343.24 and 416.24 respectively. Therefore, we can conclude that private limited company has a strong influence on this test compared to partnership. For Partnership & Other Types of Firm Legal Status against LP, the U-value was recorded at 16 ($p < 0.01$; $n = 76$). The mean ranks for partnership and other types of firm legal status were recorded at 35.73 and 70.83 respectively. These results show that other types of firm legal status play an important role in this test result compared to partnership.

In the subsequent Mann-Whitney U Test, Private Limited Company & Other Types of Firm Legal Status against LP, the U-value was recorded at 587 ($p < 0.02$; $n = 755$). The mean ranks of private limited company and other types of firm legal status were recorded at 375.78 and 654.67 respectively. This implies that other types of firm legal status still hold the dominant effect on this test compared to private limited company. The medians for individual proprietorship, partnership, private limited company and other types of firm legal status were recorded at 2.46, 2.50, 2.86 and 5.72 accordingly. Therefore, other types of legal status, private limited company and partnership are the main legal status that influence LP compared to individual proprietorship.

This research shows the other types legal status enterprises consist of public limited companies and co-operatives achieve high LP compared to private limited companies, partnership as well as individual proprietorship enterprises in Malaysian Food Manufacturing. High paid-up capital for public limited companies and co-operatives enable them to carry out mass production in their daily operation. Therefore, these establishments enjoy economy of scale due to specialising in their task. Besides that,

public limited companies and co-operatives relatively practice high capital-intensive in their production line compared to private limited companies and unincorporated enterprises.

The findings of Welch (1970) regarding the importance of human capital in manufacturing sector can be used to explain high LP for the establishment those registered under public limited companies and co-operatives. The workforce of this establishments consists of 15.77% (246 persons) received tertiary education. The percentage of workforce received tertiary education for private limited companies slightly lower than public limited companies and co-operatives. They were 15.65% (7 957 persons) of workers in private limited companies with tertiary education.

According to Corvers (1996), the intermediate and high-skill workers have positive effects on LP. The effective training programme provided by establishment will further add-value to the intermediate and high-skill worker in their output per hour work. This statement was supported by Black and Lynch (1996), Turcotte and Rennison (2004), Almeida and Carneiro (2009), and Aggrey et al. (2010) findings. The private limited companies and co-operatives show serious concern on worker training compared to private limited companies in the food manufacturing industry in 2010.

An amount of RM 998.94 per worker was spent on labour training for public limited companies and co-operatives workforce. However, private limited companies only spent RM152.99 per worker, which is 552.95% lower than public limited companies and co-operatives in year 2010 to train their workers. Besides training expenditure, high investment on fixed assets such as machinery also play important role to ensure the high LP for public limited companies and co-operatives. In 2010, this establishment spent 18.52% (RM 322.73 million) per annual sale to invest on machinery. In comparison, private limited company only spent 14.28% (RM 1 566.84 million) per annual sales for machinery investment. High investment on machinery coupled with high training

expenditure; ensured that workers were fully benefited to increase LP in this establishment.

High wages is one of the human resource strategies for public limited companies and co-operatives to ensure the skilled workers keep contributing towards higher performance of these establishments. High wages resulting in low turnover rate for well-trained skilled worker. Average wages for management & support in public limited companies and co-operatives was recorded at RM52 933.35 while only RM33 459.63 was recorded for the same category of workforce in private limited companies for Malaysian Food Manufacturing 2010. As the efforts to increase LP, private limited companies must increase intermediate and high skilled workforce endowment. High wages will increase workforce motivation, performance and productivity in their daily task. In addition, they must increase training expenditure and investment of machinery. Through this, the LP will increase tremendously when well-trained worker fully benefited from the equipment.

In the Kruskal-Wallis Test for firm legal status against EP, the result illustrates $p < 0.05$ (DF = 3; n = 928) and the Chi-Square 14.781. For individual proprietorship & private limited company against EP, the U-value was recorded at 38 346 ($p > 0.03$). For individual proprietorship & other types of legal status against EP, the U-value was recorded at 260 ($p > 0.01$). Meanwhile, for Partnership & Other Types of Firm Legal Status against EP, the U-value was recorded at 205 ($p > 0.05$). Besides that, the Mann-Whitney U Test for Private Limited Company & Other Types of Firm Legal Status against EP, the U-value was recorded at 1 913 ($p > 0.02$). All the results for Mann-Whitney U Test mentioned above recorded statistical insignificance.

For the Individual Proprietorship & Partnership against EP, the U-value was recorded at 2 578 ($p < 0.01$; n = 173). This result showed statistical significance for the Mann-Whitney U Test. The mean ranks of the individual proprietorship and partnership

were recorded at 96.97 and 72.33 respectively. In this test, individual proprietorship has more influence on the Mann-Whitney U Test result as compared to the partnership.

For Partnership & Private Limited Company against EP, the U-value was recorded at 19 085 ($p < 0.01$; $n = 819$). The mean ranks of partnership and private limited company were recorded at 308.14 and 419.52 respectively. Therefore, private limited company has more influence on the Mann-Whitney U Test compared to partnership. The medians for individual proprietorship, partnership, private limited company and other types of legal status were recorded at 20.36, 12.43, 20.12 and 15.67 respectively. Consequently, individual proprietorship and private limited company are the two types of legal status that influenced EP. Private limited company and individual proprietorship are the two important firm legal statuses in Food Manufacturing Malaysia. Therefore, both individual proprietorship and private limited companies play important roles to influence overall Kruskal-Wallis Test result.

Low capital paid-up resulted in financial limitation for individual proprietorship enterprises in this industry. Due to limited financial ability, these types of enterprises normally use less machinery in their production lines. For the annual sale, individual proprietorship only spent 6.39% (RM6.47 million) on machinery investment. Low machinery investment showed that this establishment practised labour-intensive more than capital-intensive in their operation.

The electricity expenditure per annual sale for individual proprietorship enterprises only recorded at 1.43% (RM1.45 million) in 2010. The non-electricity expenditure was recorded 1.58% (RM1.6 million) for this establishment. When the non-electricity expenditure is relatively higher than the electricity expenditure, this showed that high traditional processing existed in production floor of this establishment. Lacking in machinery investment resulted in low LP for this establishment as compared to private limited company in Malaysian Food Manufacturing.

In general, the capital paid-up for private limited company is relatively higher than individual proprietorship enterprises. High capital paid-up showed private limited company possessed relatively higher financial ability as compared to individual proprietorship. The private limited companies invested 14.28% (RM1 566.84 million) from their total sale in 2010 to machinery investment. Private limited company showed more capital-intensive practices as compared to individual proprietorship.

High machinery usages caused high demand of electricity for private limited companies. This establishment electricity expenditure was recorded at 1.43% per annual sale (RM157.13 million) in this research period. This establishment only spent 1.16% per annual sale (RM126.86 million) for non-electricity expenditure in 2010. Therefore, private limited companies practised capital-intensive approaches more than individual proprietorship enterprises in this industry. High electricity usage influenced overall result of Kruskal-Wallis Test in this research.

5.3 Chapter Summary

Through the successful development and analyses of the benchmarks for TFP, CP, LP, EP and MP, this research has found that the partial productivity approaches played an important role for analysing the details of productivity for food manufacturing in Malaysia. In addition, differences in firm productivity by firm characteristics was observed. For instance, this research proved that the LP differs by firm legal status, size of enterprises and ownership especially for Malaysian Food Manufacturing in the year 2010. Meanwhile, EP differs by firm legal status and different types of industry in this research period. The size of enterprises and firm legal status played a significant role to influence enterprises' CP. The MP of establishments was only influenced by different types of industry. Finally, firm legal status contributed to TFP for the establishments.

CHAPTER 6: EFFECTS OF FIRM CHARACTERISTICS & CAPABILITIES ON LABOUR PRODUCTIVITY

6.1 Introduction

From the data gathered and the results of the cross-sectional data analysis, this chapter presents the findings in response to the third research question of this study in order to critically examine the effects of firm characteristics and capabilities on labour productivity among Malaysian food manufacturers. As such, Section 6.2 presents a contextual overview of labour productivity of food manufacturing firms in Malaysia in relation to the findings presented in the previous chapter and in related literature. The model specified to illustrate the relationship between firm characteristics, capabilities, and labour productivity is presented and elaborated in Section 6.3; whereas, the discussion of the results based on this model will be thoroughly explain in Section 6.4.

6.2 Labour Productivity and Capabilities of Food Manufacturing Firms in Malaysia

Being competitive in the manufacturing sector requires firms to be productive. Productive gains also ensure efficient use of resources. Indeed, Malaysia's declining manufacturing sector's contribution may indicate that the sector is losing its competitiveness (Chandran & Devadason, 2017; Rasiah, 2011). Rasiah (2011) further argued that Malaysia's manufacturing sector is facing premature deindustrialization as it recorded slowdown in value added, trade and productivity performance. Productivity gains have been an important issue debated by policy makers especially in Small and Medium enterprises and more so in developing countries like Malaysia. In the case of Malaysia, it shows that labour productivity is persistently lower in SMEs compared to large firms by about one-third (SME Masterplan, 2012). In addition, comparing country-wise among SMEs, labour productivity in Malaysia is relatively low (NSDC, 2012). However, these observations are deemed to be too macro in the sense that comparing just

SMEs and large enterprises would suggest that only scale matters for productivity. While scale can be an important driver, literature shows that to sustain performance, firms should learn how to combine and allocate its resources effectively.

A strand of literatures has focused on what drives performance. Within the neo-classical literature (Solow, 1956, 1957), the major conclusive evidence suggest that an economy can grow continuously if technological progress exists. Nevertheless, the so-called technological progress remains a black box and provides very little insights into how firms allocate resources. The pioneering work of Coase (1937), Penrose (1959) and Schumpeter (1934) have given a new impulse on understanding not only why firm exist but also how they sustain and potentially grow. Questing for more understanding, research in these areas has then proliferated to study how firms combine and allocate their resources. The emergence of resource-based view (Barney, 1991; Teece, 1982) and capability theory (Teece, Pisano & Shuen, 1990) within strategic and business literature has provided new knowledge. Following this, large bodies of research have investigated how capability helps to explain performance.

Although this area of research has been much widely investigated especially on how technological capabilities and innovation matters for performance, several gaps still exist in the following areas. First, past research focuses more on a few single measures of capability without considering them in a more holistic way. In other words, firms in developing countries most often do not operate on the technological frontier and they concentrate on developing other capabilities, e.g. marketing and information technology, to improve performance. These could be their immediate concerns as to maintain their performance. This may lead us to ask whether if firms operating at lower capability can still improve their performance. In other words, can the other types of capabilities (marketing and ICT) matter to drive performance? It is becoming more widely accepted that ICT-related productivity gains are accelerating from the use of ICT (Jorgenson, 2001;

Jorgenson, Ho & Stiroh, 2005; Inklaar, O'Mahony & Timmer, 2005; Correa, 2006; Cardona, Kretschmer & Strobel, 2013). Additionally, with the price of ICT falling, even small firms are able to drive productivity gains. Nevertheless, search of literature suggests that these two capabilities are less studied. Second, another important theoretical question that remained open for debate is why small firms could still drive performance despite their disadvantage of not attaining scale especially in the manufacturing sector. In answering these questions, it is necessary to examine what sets of capabilities could drive performance. Equally important is to investigate whether the effect of firm size declines as firms are becoming more productive with better capabilities.

This led us to understand if productive firms can be justified by the predominance of one of the capabilities. We build the argument on the drivers of productivity at the micro level and showed that the major way to develop productivity in developing country is to formulate policies in building capabilities and human capital. We find that within SMEs, those with higher productivity are those with better capability and human capital stocks. Another neglected area is the treatment of firms as homogenous agents and failing to account for the heterogeneity[2]. Teece (2019) argued that how capability is developed varies based on the strategy that the top management takes, and many studies have neglected the origin of firm heterogeneity. By employing quantile regression, this thesis tries to observe how capability matters along the productivity distribution. Principally, the paper does not treat the firm's productivity as the same that allows the estimation to capture some useful information for policy insights.

[2] There are various sources of heterogeneity and this thesis tries to avoid possible bias due to the fact that productivity are not normally distributed across firms.

6.3 Model Specification

The starting point of the model specification is the Cobb Douglas production function in an intensive form after taking logarithms as in Eq. 1 that relates labour productivity $\left(\frac{Y_i}{L_i}\right)$ to the capital intensity $\left(\frac{K_i}{L_i}\right)$ of the *i*th firm. The use of a ratio instead of level variables reduces the problem of heterogeneity which is a common issue for cross-sectional data. It also allows one to avoid the endogeneity issues between the two inputs, capital and labour. ε_i is the random disturbance term accounting for stochastic variation in labour productivity that measures errors and missing variables.

$$Ln\left(\frac{Y_i}{L_i}\right) = \alpha_0 + \alpha_1 Ln\left(\frac{K_i}{L_i}\right) + \varepsilon_i \qquad \text{(Eq.1)}$$

Eq. 2 shows the final augmented form of the production function to include the firm specific characteristics, capability and human capital variables. Introducing ownership, firm size and types of industry further mitigates the heterogeneity problems as past studies shows that productivity differs based on ownership structure, firm size and types of industry. In most cases, foreign-owned and large firms seem to be more productive. The industry type characterizes the product market characteristics in which the firm operates. A group of X_{ij} variables represent the variable of interest, capabilities and human capital. Parameters in Eq. 2 are estimated at various quantiles where they provide specific predictions at quantile q of the conditional distribution of the labour productivity for the known vectors of regressors, X_{ij}.

$$Ln\left(\frac{Y_i}{L_i}\right) = \beta_0 + \beta_1 Ln\left(\frac{K_i}{L_i}\right) + \sum \beta_{2j} X_{ij} + \beta_3 Size_i + \beta_4 Ownership_i + \beta_5 Industry_i + \varepsilon_i \qquad \text{(Eq.2)}$$

Variable measurements are as follows. The labour productivity is measured by dividing value added output by number of workers. Similarly, capital per worker is measured by dividing the total assets by number of workers. Ownership takes the form of

a dummy variable with 1 representing foreign ownership (more than 50%) and 0 representing local firms. We considered two industrial categories and introduced two dummy variables, one which involves the manufacturing of bakery products and the other one involves in the production of cocoa, chocolates, coffee and tea. Total employment measures firm size. The variable of interest, X_{ij} , measures capabilities and human capital respectively. Capabilities (CAP) are measured in terms of Innovation (spending in research and development), marketing (spending in advertisements) and ICT capabilities (spending in information and communication technologies (ICT)). We measure capabilities in two ways. First, we measured as a bundle of capabilities (CAP) by combining the investment per worker in R&D, Marketing and ICT. It indicates the total spending ratio per worker for capability building in *i*th firm. Second, to estimate the effect of each individual capability, the three capabilities Innovation (INNO), Marketing (MAK) and ICT were measured separately as dummy variables. The value takes 1, if a firm invested in any of the above capability building or else 0. We estimated both the bundled capabilities and individual capabilities separately. The human capital (HC) is measured using two variables, that is, the ratio of skilled labour (measured by qualification, ratio of workers with diploma and above in total employment) and training spending. It measures the quality of human capital. Each of the human capital measures is normalized using a simple normalization formula[3]. The normalized score is then averaged (divided by two) to obtain the average scores for each of the firms. Alternatively, we also moved away from just using qualification as a proxy and measured the actual number managers, technicians and professionals employed as a ratio of total employment in a firm.

[3] Normalization take the form of $HC_i = \frac{(Actual\ Score\ of\ ith\ firm - Minimum\ score\ of\ the\ sample)}{(Maximum\ score\ of\ the\ sample - Minimum\ score\ of\ the\ sample)}$

6.4 Results and Discussion

Figure 6.1 clearly shows that log value of the labour productivity appears reasonably symmetric indicating labour productivity is not normally distributed across firms. In this case, the standard linear regression may not be adequate to describe the relationship at different points in the conditional distribution of labour productivity. The ordinary least square (OLS) only summarizes the average relationship. We next discuss the outcome of both the OLS and quantile regression analysis.

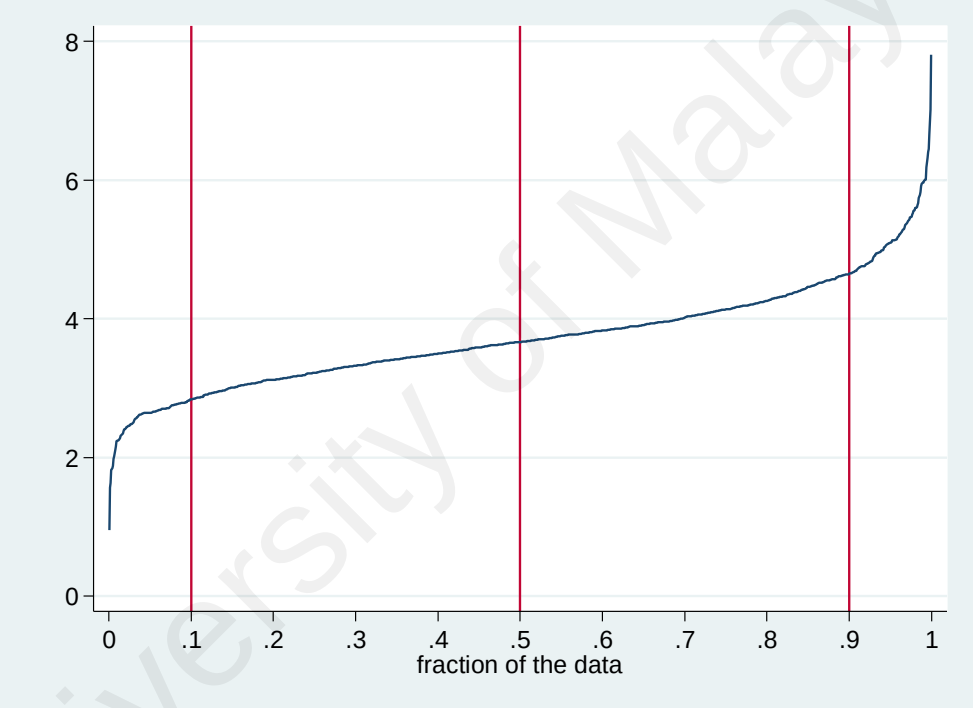

Figure 6.1: Plot of labour productivity
Source: Created by Author

Table 6.1 shows the effect of capabilities, human capital and firm characteristics on labour productivity. The coefficients of both capabilities and human capital is statistically significant and leads us to conclude that both are significantly important in increasing labour productivity in the food manufacturing sectors. In addition, firm size has a positive effect on productivity indicating that larger firms are more productive. Similarly, foreign owned firms exhibit higher productivity than local owned firms. As for

industry types, the results indicate that on average cocoa, chocolates, coffee and tea manufacturing firms tend to be more productive than others in the sample. Nevertheless, in our case, OLS may not give reliable estimates due to the non-normal distribution of the labour productivity. The quantile regression estimates show the coefficient for the five different quantiles of labour productivity. Mostly, capabilities, human capital, firm size and ownership are significant in driving labour productivity. Interestingly, it also shows that the most productive firms are less sensitive to size but more sensitive to capabilities and human capital. In other words, it suggests that even small firms could substantially drive labour productivity if they properly invest in building capabilities and human capital. We also checked the robustness of the human capital effect using a different proxy. We used the ratio of managers, technicians and professional workers as a share of total employment. The estimation suggests that at every quantile, human capital has a significant effect on the labour productivity[4]. The evidence is conclusive and robust in that capabilities and human capital matters for productivity growth and that firms can still drive productivity growth even if they are small.

Figure 6.2 shows a visual illustration of the coefficient estimates for various quantiles. It is clear that the estimated coefficients of the variables of interest (capabilities and human capital) vary over the conditional labour productivity distribution. As for capabilities, it indicates that when quantile regression is evaluated at the median form (example at 50% quantile and above), the capabilities appears to have a greater influence on labour productivity. In contrast, for human capital, the estimated coefficient rises sharply as one moves from firms in the lower to upper quantiles[5]. As for size, the

[4] The estimated coefficient are; OLS: 1.49(7.68); q.10: 1.07(2.97); q.25: 1.47(6.76); q.50: 1.34(6.04); q.75:1.44(4.81) and q.90: 1.65(4.93). The figures in parenthesis are the *t*-statistics.

[5] We also tested the equality of the estimated coefficient (specifically for capabilities and human capital) in each quantile and found the *F*-value is significant at 1% in all cases for human capital and significant for

estimated coefficient becomes smaller as firms move towards the upper quantile. Ownership, in contrast, remains to have mostly the same influence on labour productivity except for the end of lower (below 0.2) and upper (above 0.9) quantiles.

the lower quantile (.10) compared to upper quantile (0.75) for capabilities clearly rejecting the equality of the estimated coefficients for those cases.

Table 6.1: Effect of Capabilities, Human Capital and Firm Characteristics on Labour Productivity

Variables	OLS	Q(0.10)	Q(0.25)	Q(0.50)	Q(0.75)	Q(0.90)
Constant	2.69***	2.16***	2.41***	2.80***	3.12***	3.28***
	-41.23	-15.75	-24.46	-30.85	-43.63	-44.92
In K/L	0.19***	0.14***	0.16***	0.18***	0.20***	0.22***
	-11.48	-5.12	-7.57	-11.83	-9.97	-14.05
Capabilities (CAP)	0.01**	0.01	0.01	0.04*	0.04***	0.04***
	-3.12	-1.53	-0.81	-2.16	-4.01	-4.75
Human Capital (HC)	0.01***	0	0.00*	0.01***	0.01***	0.01***
	-5.55	-0.53	-2.48	-4.04	-5.87	-7.96
Size	0.14***	0.16***	0.14***	0.12***	0.09***	0.09***
	-7.64	-6.42	-5.77	-4.54	-3.55	-4.05
Ownership (Foreign)	0.35**	0.13	0.54	0.43***	0.52***	0.35***
	-2.72	-0.3	-1.9	-3.41	-4.46	-4.26
Industry (bakery products)	-0.11	-0.15	-0.1	-0.16	-0.08	-0.07
	(-2.91)	(-2.08)	(-2.03)	(-3.44)	(-1.87)	(-1.05)
Industry (cocoa/chocolate	0.05	-0.14	-0.06	-0.05	0.11	0.16
/coffee/tea)	-0.65	(-0.80)	(-0.77)	(-0.63)	-1.39	-0.63
R^2	0.36	-	-	-	-	-
Pseudo R^2	-	0.12	0.15	0.2	0.27	0.32
F	60.38	-	-	-	-	-
N	1063	1063	1063	1063	1063	1063

Source: created by author

Notes:

1. t statistics in parentheses
2. * p < 0.05, ** p < 0.01, *** p < 0.001
3. t-value for OLS is computed from white heteroscedasticity-consistent standard errors.
4. t-value for Quantile regression is computed from bootstrap standard errors to correct for heteroscedasticity.

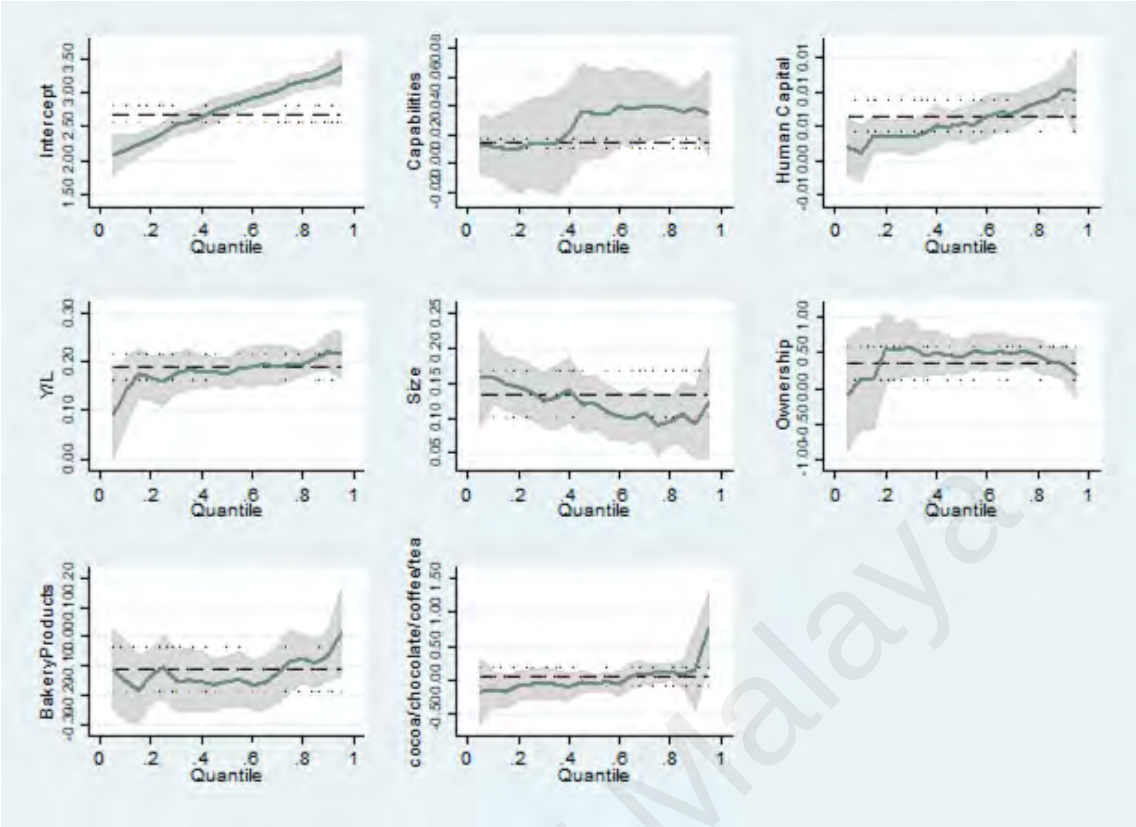

Figure 6.2: Coefficient estimates for various quantile, capabilities and human capital

Source: created by author

Note:

1. Horizontal lines represent OLS estimates with 95% confidence intervals
2. Variation in the coefficient of variable of interest, X_{ij} and other firm specific characteristics (i.e. $\beta_2, \beta_3 \beta_4 \beta_5$ in Equation (2))

Table 6.2 shows separately the effect of each of the capabilities, innovation, ICT and marketing capability (measured by dummy variables) on productivity. Innovation has been the most important variable in influencing labour productivity whereas the influence of ICT and marketing capabilities appears to be mixed in the quantile regression outcome. While we find that marketing investment is relatively higher than innovation, the significance of marketing in driving productivity remains less for more productive firms. The least significant capability is ICT. This indicates that firms' investment in ICT is not a consequential driver of productivity gains. Based on the results of higher quantile, even among those who have attained higher productivity, investment in ICT is still not significant. Figure 6.3 clearly shows that the coefficient of innovation increases as firms are more productive. In contrast, the impact of marketing remains the same along the

quantile and on the opposite. The ICT coefficient shows a declining trend confirming that ICT investment may not be sufficient enough to drive productivity after certain threshold. With the recent progress due to the information technology revolution, it is likely that much of the productivity gains can be achieved by offsetting the slower growth in other forms of capital with the use of ICT capital. But in the case of Malaysia, food manufactures seem to benefit less from ICT investments. In other words, the ICT coefficient shows a declining trend (see Figure 6.3) confirming that ICT investment may not be sufficient enough to drive productivity after certain threshold. It is also obvious that other types of capital (measured as Y/L) is significantly driving productivity even for the upper quantile. Likewise, it may also suggest that ICT investment matters more when the firms are at a lower quantile of productivity and there is a limit of how much ICT investment can drive productivity thereby requiring firms to continue relying on typical capital. Since our measure of ICT is confined to investment in computers and other information communications technology, an investment at the lower level of common technologies, it may also mean that other broader measure of ICT capital deepening is needed to examine the true effect of ICT. But at least, this study shows that investment in ICT in the commonly available technologies (computers and information technology platform) have its limits in driving productivity. Firms may have to invest in a more advanced ICT technologies to drive productivity.

Table 6.2: Effect of Innovation, ICT and Marketing Capabilities

Variables	OLS	Q(0.10)	Q(0.25)	Q(0.50)	Q(0.75)	Q(0.90)
Constant	2.70***	2.17***	2.35***	2.71***	3.06***	3.54***
	(37.06)	(14.23)	(23.69)	(21.32)	(25.04)	(24.31)
Innovation Capability (R&D)	0.35***	0.17*	0.18*	0.38***	0.33***	0.46**
	(4.87)	(2.43)	(2.27)	(4.17)	(3.79)	(3.13)
ICT Capability	0.25***	0.20	0.39***	0.35***	0.21	0.048
	(3.77)	(1.50)	(7.79)	(4.62)	(1.77)	(0.30)
Marketing Capability (MAK)	0.21***	0.22	0.22***	0.21***	0.20***	0.17
	(4.92)	(1.88)	(4.32)	(3.96)	(3.54)	(1.91)
In K/L	0.19***	0.14***	0.17***	0.16***	0.20***	0.22***
	(11.08)	(3.58)	(9.14)	(8.06)	(10.88)	(12.48)
Size	0.06**	0.07	0.04*	0.05	0.06*	0.034
	(2.72)	(1.38)	(2.43)	(1.34)	(2.09)	(1.02)
Ownership (Foreign)	0.39**	0.08	0.53***	0.42**	0.47	0.48*
	(3.00)	(0.25)	(4.21)	(2.60)	(1.95)	(2.33)
Industry (bakery products)	-0.13***	-0.16**	-0.13**	-0.13**	-0.17**	-0.13**
	(-3.37)	(-2.63)	(-3.10)	(-2.86)	(-2.82)	(-2.84)
Industry (cocoa/chocolate/coffee/tea)	0.03	-0.26*	-0.15	-0.02	0.08	0.51**
	(0.29)	(-2.43)	(-1.55)	(-0.16)	(0.67)	(2.78)

Table 6.2, continued

Variables	OLS	Q(0.10)	Q(0.25)	Q(0.50)	Q(0.75)	Q(0.90)
R^2	0.35	-	-	-	-	-
Pseudo R^2	-	0.13	0.18	0.20	0.24	0.27
F	61.46	-	-	-	-	-
N	1063	1063	1063	1063	1063	1063

Source: created by author

Notes:

1. t statistics in parentheses
2. $p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$
3. t-value for OLS is computed from white heteroscedasticity-consistent standard errors.
4. t-value for Quantile regression is computed from bootstrap standard errors to correct for heteroscedasticity.

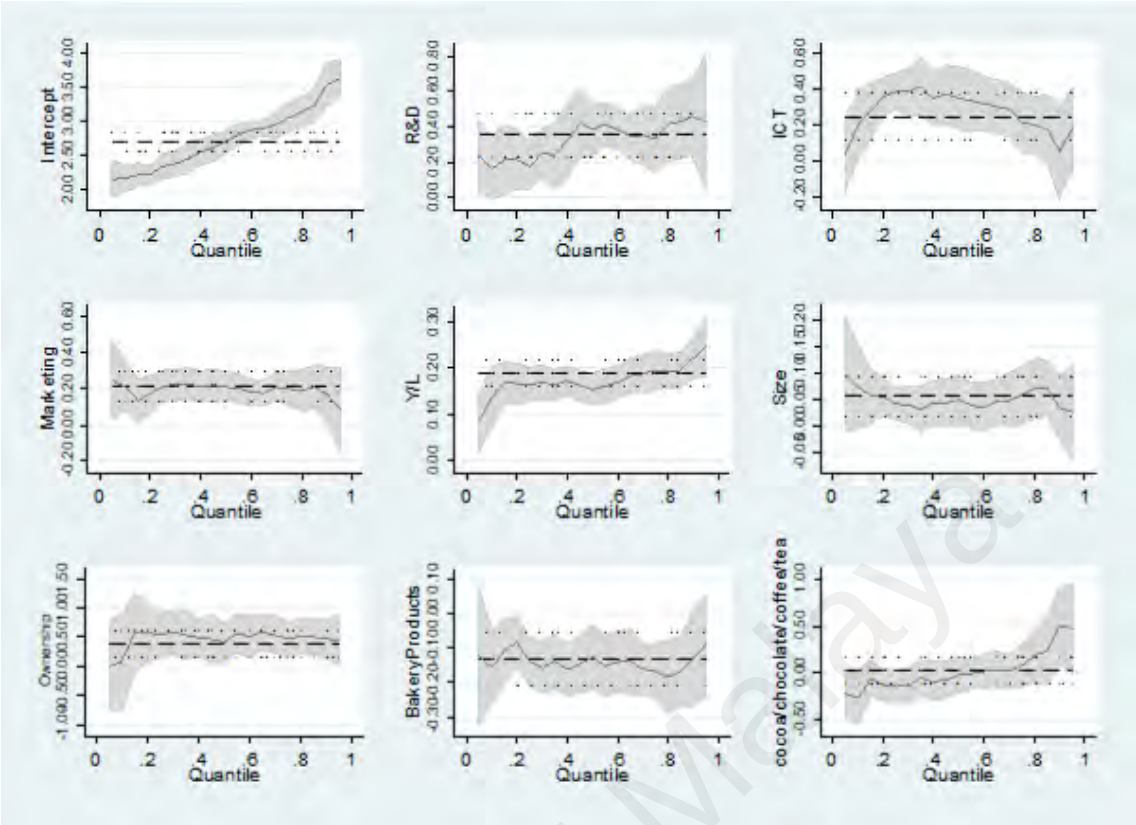

Figure 6.3: Coefficient estimates for various quantile, innovation, ICT and marketing

Source: created by author

6.5 Chapter Summary

This chapter presented the relationship between productivity, human capital and firms' capabilities using quantile regression analysis. Based on the specified model using Cobb Douglas production function, human capital and capabilities have a significant effect on labour productivity. Indeed, the importance of these factors varied according to the levels of productivity measured by its distribution. More importantly, size becomes less important when firms move to a higher productivity quantile. Among the firm capabilities, innovation has the most significant effect on labour productivity; whereas, ICT has the least significant effect. With these findings, further introspection and policy implications would be able to provide some direction for development policy aimed at the current efforts of the Malaysian government in driving manufacturing sectors productivity. These implications will be discussed accordingly in the next chapter.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This chapter provides the conclusion and recommendations. First, the chapter synthesis the main findings of the study giving more summary of the main findings related to the research questions. It further discusses the theoretical implications and the policy implications. Recommendations are put forward for policy makers.

7.2 Synthesis of Study

As outlined in the first chapter of this thesis, this quantitative study sought to respond to the following research questions:

1. What is the level of productivities of SMEs and large food manufacturing firms in Malaysia?
2. Do firm characteristics influence firm productivities among the Malaysian Food Manufacturers?
3. What are the effects of firm capabilities and characteristics on labour productivity among the Malaysian Food Manufacturers?

Hence, the following subsections systematically present the conclusive findings pertaining to each research question listed above.

7.2.1 The Level of Productivities of SMEs and Large Food Manufacturing Firms in Malaysia

As a result of cross-sectional data analysis, this study established the significance of SMEs in the Malaysian food manufacturing sector. Despite their relatively smaller size in comparison with large enterprises, the accumulated output and the total productivity from SMEs can be regarded as competitive as large enterprises. Other than the Malaysian setting, this remarkable performance of SMEs in the food manufacturing sector has also been observed in other industrial sectors where government initiatives and policies are in

place to support the productivity of SMEs (Demena & van Bergeijk, 2017; Zariyawati et al., 2017). The combined output of all SMEs may not supersede or even be as huge as large enterprises, but the positive performance of these SMEs are optimistic indicators of economic growth and stability.

In addition to gauging the status of SMEs and large food manufacturing firms in Malaysia, the levels of productivities were also identified based on relevant literature and the recommendations of industry players. As such, this study identified the following indicators of productivity: total factor productivity (TFP), capital productivity (CP), labour productivity (LP), energy productivity (EP), and material productivity (MP). The cross-sectional data analysis showed that SMEs are still lagging behind large firms in terms of these productivity indices especially in terms of cost of input and labour productivity as SMEs are more labour intensive than large enterprises. In a study in olive oil production in the Mediterranean region, Ozden and Dios-Palomares (2016) attributed the labour intensity of SMEs due to lack of machinery to facilitate efficient and less-labour intense production. In the Malaysian setting, it is not the question of lack of machinery but the necessity for SMEs to invest more in machinery and in skilled labourers and professionals to maximise the capacity of the workforce with the least amount of strains.

Furthermore, what this study was able to establish in the Malaysian context was that the productivity indicators can be correlated with the size of the firm. Similar correlational studies in various parts of the world have established the relationship between firm size and productivity (Demena & van Bergeijk, 2017; Gopinath et al., 2017; Soete et al., 2020). Given this correlation, this research confirmed that TFP of SMEs are lower in comparison with large enterprises, that large firms are more capital intensive than SMES, and that the MP of SMEs are significantly lower than large food manufacturers in Malaysia. These indicators may seem like a logical comparison in

relation to the size of the firm, but beyond these generalizations, this study has been able to provide national level benchmarks in the study of Malaysian food manufacturing industries for future research.

7.2.2 The Influence of Firm Characteristics on Firm Productivities among the Malaysian Food Manufacturers

The firm characteristics of Malaysian food manufacturers were correlated with firm productivity indices earlier identified in this study using cross-sectional data analysis. Based on related literature, the firm characteristics identified in this study are the following: firm size, legal status, ownership, and type of industry. Several studies in Europe and the United States identified these firm characteristics to have direct and significant positive effect of the levels of productivity in the food manufacturing industry (Benhabib et al., 2017; Ghosh, 2016; Harris & Moffat, 2015). Based on the findings of this current study, it was noted that firm size has a direct effect on capital productivity in such a way that large firms have higher capital productivity and SMEs have lower capital productivity. Also, large and medium enterprises have a positive influence on labour productivity.

In terms of ownership, foreign ownership and joint venture have no significant relationship with labour productivity; whereas, locally owned firms have low labour productivity due to financial constraints and low expenditure in hiring more skills workers and utilizing new technology. On the contrary, a study conducted by Ghosh (2016) in India noted that foreign ownership of firms has a positive impact on the productivity due to a higher level of capital investments and fixed assets that these companies used to invest on employee development and workforce capacity.

With regard to type of industry, the findings of this study revealed that indirect consumed food products consume more energy than direct consumed food products and

beverages. The level of energy productivity is highly dependent on the manufacturing demands and processes of the type of product manufactured (Jamal, 2018). Moreover, energy productivity in individually owned food manufacturing firms in Malaysia are lower compared with private limited companies given the technical capacity of larger, private companies to invest in sustainable technology to maximise their energy consumption and minimise their energy expenditures. In relation to that, partnership and private limited companies have higher capital productivity than individual proprietorship due to their larger financial capabilities, which then leads to higher labour productivity, material productivity, and energy productivity. Similar trends were observed in manufacturing sectors in developing countries as financial flow are vastly funnelled into larger corporations through investments, which are then used to improve business efficiency and labour productivity (Gopinath et al., 2017; Jamal, 2018; Tekleselassie et al., 2018).

7.2.3 The Effects of Firm Capabilities and Characteristics on Labour Productivity among the Malaysian Food Manufacturers

In response to the third research question of this thesis, model specification using Cobb Douglass production function was used to assess the relationship among firm capabilities, firm characteristics, and labour productivity in the food manufacturing industry in Malaysia. First, the issue on labour productivity in SMEs in Malaysia was identified as the focal, contextual point in this analysis. Then, by using ordinary least squares and quantile regression analysis, the relationships among the variables in this study were examined.

Thus, this study led to the conclusion that in the context of Malaysia's food manufacturing industry, the capability of the firm to innovate has the greatest impact on labour productivity while its capability to invest in and utilise ICT has the least impact. In the food manufacturing industry in Europe, innovation through research and

development and the application of the outcomes of innovation were reported to contribute to the growth of SMEs and even large manufacturers (Harris & Moffat, 2015; Soete et al., 2020). Although marketing investment is higher than innovation investment in this industry, the significance of marketing in driving productivity is lower for the more productive firms. It indicates that firm's investment in ICT does not do much to drive productivity gains. Given the financial capabilities of SMEs in Malaysia to invest in innovation through sustainable research and development, opportunities for growth and efficiency could be seized and emulated in other developing economies.

In terms of firm characteristics, firm size has significant effects on labour productivity. In this industry, the majority of entrepreneurs tend to invest in buildings & constructions rather than machinery (Boora & Singhal, 2018; Piabuo et al., 2015). This is especially so in SMEs compared to large enterprises. For those establishments that practice capital-intensive in their daily operation, machinery investment is an important component of their total asset investment. The financial strength arising from the size of enterprises is the main determinant of the enterprises' decision to invest in fixed assets, especially machinery.

Among firm characteristics, firms' legal status shows great influence on productivity study in this research. This finding ratifies the finding of Charoenrat and Harvie (2012) and Buranajarukorn (2006) in Thai economy. Control of decision making, being responsible and having unlimited liability ensures the efficiency of individual proprietorships since any profit or debt has to be borne by the owner. These are the factors resulting in the efficiency of establishments in Malaysian Food Manufacturing.

Legal status, size of enterprises and ownership affect capital and labour productivities for this industry. Individual proprietorships and partnerships receive relatively low paid-up capital when compared to others. Due to the weak financial capabilities of these enterprises, especially smaller ones, their investment in fixed assets

differs to private limited companies and others. Weak financial ability has adverse effects on the transformation from labour intensive practices to capital intensive practices on the production floor. It will lead to low competitiveness for these establishments.

This research's findings are similar to the findings of Hardwick (1997) and Jordaan (2005, 2008). Multinational companies with strong financial capabilities practice high capital intensive, R&D and human capital in their daily task. These are the main factors resulting in high LP for these establishments compared to local-owned establishments. Their innovative products achieved higher demands than low value-added products in food manufacturing. Therefore, foreign-owned enterprises are more profitable than locally owned enterprises in the food manufacturing industry of Malaysia.

Management culture and the product market characteristics are the two factors caused differences of energy and material productivities. Public limited companies with strong financial capabilities apply high capital-intensive practices in their daily tasks. Modern technology enables efficient usage of energy, hence reducing overall production costs. On the other hand, shelf life (eg. bread, bakery and related products) and storage preservation cause wastage of food manufacturing products. This situation leads to high overall production cost. High costs of products result in low demand of food manufacturing products especially among low income consumers.

This study illustrates the effects of firms' capabilities and characteristics on labour productivity of Malaysia Food Manufacturing. From firms' characteristics, size has a positive effect on productivity indicating that larger firms are more productive. Similarly, foreign-owned firms exhibit higher productivity than locally owned firms. As for industry types, the results indicate that on average cocoa, chocolates, coffee and tea manufacturing firms tend to be more productive than others in the sample. However, the effects of firm size and ownership show a larger effect than industry types on labour productivity of this industry. Meanwhile, human capital capability seems to influence labour productivity

more compared to other capabilities that are studied in this research. This research also found that the most productive firms are less sensitive to size but more sensitive to capabilities and human capital. In other words, it suggests that even small firms could substantially drive labour productivity if the firms properly invest in building capabilities and human capital.

7.3 Theoretical Implications

As elaborated in Chapter 2, this thesis is grounded on theories related to productivity, firms, and growth; thus, this study sought to contribute to the expansion of earlier theoretical assumptions and models on productivity in the food manufacturing industry. Whereas Sink (1985) conceptualised a model on measuring productivity using multiple factors, this study has extended this conceptualization by specifying the measurement according to how firm characteristics and firm capabilities could be examined alongside levels of productivity. Likewise, the theoretical model of assessing productivity levels according to Slack (1999) only provided general factors related to products and services productivity, which this current study has expanded to cover specific factors of productivity based on recent literature and recommendation from industry players. As Barnes (2011) noted the need to further extend the knowledge in productivity growth measurement in different contexts (i.e. geographical, chronological, industry-based, etc.), this study has identified national level benchmarks in the assessment of productivity in the food manufacturing industry, which extends the notion that productivity measurement is not only multidimensional but also contextual in nature.

To be more precise, the empirical findings of this study has several implications on theoretical development. First, the study confirms that productivity is not normally distributed. As such, it should utilise analysis using a more appropriate technique. Past research that has analysed determinants of productivity would have mis-specified and may have only taken a mean effect into account. Nevertheless, in this research, it shows

that effect of capabilities differs based on the level of productivity that a firm has achieved. Second, innovation capability seems to have a greater effect than other types of capability. In other words, capability itself would have different effects on productivity and should not be treated as similar among them. The effect also varies according to the level of productivity. Thus, these findings could provide guidance in further scrutiny of theoretical factors contributing to productivity.

The findings also show that productivity of food producing SMEs can be raised to match that of the large firms if technologies related to their scale is utilized, the right incentives are offered and if they can access Malaysia's knowledge networks, including science parks, which is consistent with the prescriptions of Acs and Audretsch (1988) and Rasiah (2019). In fact, as Rasiah (2018) has shown, the food industry has faced chronic trade deficit since 1989. Consequently, it is pertinent that the Malaysian government takes this seriously to reinvigorate the industry.

7.4 Managerial Implications

Human capital alone cannot ensure the success of the enterprises if the firms' capabilities such as technology and marketing capabilities do not exist. Technology capabilities such as ICT and R&D will increase the productivity. Managers and entrepreneurs must change their attitude towards R&D expenditure; they must get rid of the notion or excuse that increased R&D expenditure is a burden to the enterprises. At the beginning stage, entrepreneurs can put aside earnings made from sales for R&D funding. Over time this fund will grow and can be used for R&D activities. Through this transaction, entrepreneurs will not only benefit from improving productivity but could also benefits in terms of new products development.

ICT expenditure should not be considered a burden by small enterprises. The availability of commercial ICT equipment ensures this equipment is affordable for small enterprises. Therefore, SMEs must use ICT in their daily tasks. Management and

operational employees must attend training to ensure these workforces maximize ICT usage in their workstations. An increase of ICT expenditure will act as the first step to transform the establishment into a high technology enterprise. Efficiency will increase when small enterprises fully utilize ICT in their operation hence minimizing operational costs without compromising the firm's efficiency.

In the Malaysian food manufacturing industry, materials and capital expenditure play important roles to influence competitiveness locally and globally. Firm owners and managers especially in SMES should minimize the cost of these inputs is the main way to improve firm efficiency. Fixed assets and materials were the main requirements for food manufacturing in Malaysia. However, the prices of these two items were not within the entrepreneurs' control as they were supplied by third parties.

Besides that, stage of business development is the other important factor for entrepreneur fixed investment consideration. New start-ups and small enterprises tend to prioritize investing in building & construction rather than machinery. Factories are a requirement for any manufacturing operation. In order to reduce operational interruptions, it is best to have their own factory and for managers to maintain these factors regularly to avoid incurring losses due to mechanical failure. In the long run, operations are less likely to be disrupted, hence reducing operational costs and avoiding unanticipated costs. High investment for building and construction resulted in low investment in machinery for food manufacturing in Malaysia. This will lead to low capital-intensive among SMEs compared to large enterprises. Hence, this reduces the competitiveness of SMEs.

Malaysia is highly dependent on imported raw materials to fulfil food manufacturing needs. Almost half of the input cost was spent on raw materials. As such, the raw materials for food manufacturing were also subjected to currency fluctuation. In order to avoid price fluctuation for raw materials, food manufacturers must invest in the

production of sufficient raw materials for food manufacturing. Stimulation of the agricultural sector is a prerequisite to enhancing the development of the food manufacturing industry. Job opportunities will increase while the value import expenditure will reduce. Hence, the TFP of food manufacturing industry will increase.

More than half of the establishments in this food manufacturing industry show irregular low performance of LP. SMEs demonstrate relatively low labour productivity compared to large establishments, and this leads to low capital-intensive and human capital for SMEs. Low human capital hinders SMEs, especially local-owned, from competing with large enterprises locally and globally. Thus, managers and firm owners should be able to invest more in developing their workers through regular training.

Entrepreneurs must transform from the conventional production line to modern production line. Productivity will increase when machinery is fully utilized by a skilled workforce. Using machinery in their production line will ensure the quality and efficiency of the production floor. Increased production with a reduced workforce will increase firm profit in the long run. Through this, competitiveness of the enterprises will increase tremendously.

In general, all establishments in food manufacturing have achieved optimum material usage to fulfil their customer needs. However, the control of enterprise owners is the main factor to determine wastage of raw material. Most SME owners personally supervise the production floor. In comparison, most large enterprises hire supervisors to manage their production floor. The differences of proactivity and time spent between the enterprise owners and hired supervisors influenced the production workers' behaviour towards material usage, hence resulting in more careful and responsible handling of materials. Less material wastage reduces overhead cost and leads to an increase in competitiveness in this industry.

7.5 Policy Implications

This research aimed to study the link between productivity, human capital and firm capabilities using quantile regression analysis, which has implications on policymaking related to food manufacturing. Consensus emerged in that human capital and capabilities matter for productivity. Indeed, the importance of these factors varied according to the levels of productivity measured by its distribution. More importantly, size becomes less important when firms move to the higher productivity quantile.

Significant policy implications emerge from this study and the insights of this study may provide some direction for development policy aimed at the current efforts of the Malaysian government in improving the productivity of manufacturing sectors. First, since consensus emerged in that role of institutions are important in developing countries as SMEs neither have the resources nor the means to improve productivity, intervention policy can be made more targeted on developing human capital and capabilities as it shows a greater impact on productivity. Particularly, improving the innovation capability can be good candidate to consider for targeted support for SMEs.

For instance, the government of Malaysia must formulate efficient agriculture policy to ensure that the agriculture sector supplies enough raw materials to fulfil food manufacturing needs. The agricultural research institute must conduct R&D to develop new crops to improve the production of raw materials for food manufacturing use. Increasing the local production directly will reduce the import burden of agro products. In addition, encouragement and recognition should be given to entrepreneurs that fully use local agro products as their raw material. Therefore, price fluctuations due to currency change can be avoided. Low cost of materials will directly increase firm competitiveness.

The Malaysian government needs to establish a future market for raw materials from the agricultural sector. The transaction between buyers and seller for raw materials can be done in this future market. Therefore, local entrepreneur, food manufacturing can

avoid price increase due to currency fluctuations. Besides that, suppliers might avoid price falls due to an oversupply of raw material from the agriculture segment. Therefore, it will benefit both entrepreneur and suppliers. Through this, productivity of the agriculture sector will grow accordingly.

Malaysia should commercialize bio diesel, the alternative fuel for diesel throughout the country. Therefore, the national policy of biofuel should be implemented. When there's a hike in diesel price, food manufacturers will switch to bio diesel users. Through this, food manufacturer will indirectly contribute to the reducing of greenhouse effect. Using this green energy will benefit all the Malaysians.

Moreover, the Malaysian government has been encouraging businesses to use renewable energy sources for own consumptions and/or sell back to the national grid for the last few years. Sustainable Energy Development Authority (SEDA) and TNB are responsible to assist businesses to do so. For establishments that possess strong financial capabilities, solar energy system should be developed as the energy source for their factories. In the long run, the usage of solar energy will ensure sustainability in the development of the country. In the early stages this transformation will be costly but in the future the costs of solar-generated system will be reduced due to development in R&D. This move will result in reduced electricity expenditure supplied by third parties.

Thus, incentives and tax deduction should be given by the government to establishments investing in new machinery and energy-saving commercial vehicles. Besides that, the government should encourage R&D in efforts to reduce the cost of the implementation of solar energy system and lower the maintenance costs. Therefore, entrepreneurs have no excuse not to use this source of energy. In addition, the low cost of production will encourage household use of this energy thus helping the country in the green effort.

Second, poorly informed public policy would weaken the firm performance further and as such, intervention policy should recognize the issues of firm heterogeneity. In this sense, differences in productivity level among firms, as shown by this study, and how they behave would have a huge policy implication. In this sense, policy makers should recognize that heterogeneity exist within the manufacturing sectors and engaging firms with different levels of productivity at various stages are important. In other words, the current incentives and other assistance provided to the firms should be relooked as different forms of incentives and support would be required between firms at a lower productivity level than those at the higher levels. Therefore, it is crucial to understand development of the firms in terms of their productivity progress level. It has been reported that incentives take up are low in Malaysia and this might be due to the inappropriate structure of those incentives that do not match the current productivity levels of the firm. This neglected piece of information may drive policymakers to see firms as homogeneous and treat them as the same when comes to incentivizing the firms. One laudable approach would be to assist firms based on their current position and to facilitate them towards higher productivity level. In other words, support programs established for one setting may not prove to be adequate when applied elsewhere and it may need more targeting.

Consequently, price of inputs is the main determinant for TFP of the food manufacturing in Malaysia. High prices of fixed assets, energy and materials will reduce TFP in this industry. Therefore, government intervention is needed to ensure that these input prices are stabilized. Through this, the SMEs in this industry can be developed to a higher level. Besides that, entrepreneurs also play an important role in ensuring that their enterprises operate efficiently. Through this, the overall operational cost will be reduced, and it will further increase firm competitive in the global market.

Those establishments practicing capital-intensive in their production floor record significant relationship with profitability and competitiveness in today's modern world.

Therefore, the Malaysian government must formulate a suitable policy to transform those establishments that practice labour-intensive to capital-intensive in order to increase industry competitiveness. Government should provide low interest loans to enterprises for machinery purchases in order to assist enterprises that practice labour-intensive to transform to capital-intensive operation. Incentives such as tax deductions, subsidies in R&D and enterprise development grants should be given to local firms that produce machinery or equipment to increase food manufacturing productivity. In addition, incentives can be given to those enterprises that achieve high growth rates in food manufacturing to encourage competitiveness among entrepreneurs in this industry. Through this, overall performance and competitiveness for food manufacturing will be increased accordingly.

Third, we concur with the argument made by Teece (2019) that policy makers can use capability audit as an instrument to identify gaps in local support system. In a similar way, since we understand the main capabilities and its limits, the starting point would be for policy makers to further explore these capabilities. Indeed, we already know that firms do invest in these capabilities and exploring to see how they can better manage these capabilities would translate into productivity gains. Exposing and educating managers and owners on the best practices in human capital and capabilities building would translate into managerial decision to invest in those capabilities. A study in Indian textile plants by Bloom et. al (2012) clearly showed that managers are largely ignorant when it comes to managerial practices, and when they were exposed to them, it had improved the firm's productivity by at least 17%. This further suggests that policy makers should focus on eliminating imperfect information so that firms will be motivated to invest as they have better understanding of the importance on human capital and capabilities. Our study shows that investment in human capital and capabilities are still low as it shows that there are higher percentages of firms not investing in those capabilities.

Specifically, government intervention is needed to ensure that Buildings & Constructions for commercial purposes are reasonably priced. New laws need to be formulated to prevent the speculation of properties for commercial purposes. A certain percentage price deduction can be offered to entrepreneurs who are buying properties for the first time while for subsequent property buyers should be charged a price higher than the market value. Through this, new start-up enterprises would be able to avoid falling into financial difficulties that has been proven true by previous researches.

7.6 Recommendations for Policy, Industrial Practice, and Future Research

Based on the data analysis results and implications discussed in the previous subsections of this chapter, this thesis offers the following recommendations for policymaking, industrial practice and future research in assessing levels of productivity:

1. Targeted initiatives from the government should focus on policies that provide financial and institutional assistance to SMEs in order to improve innovation, research & development, and human capital.
2. Tax incentives especially for SMEs and their workers should be studied and considered to stimulate higher capital productivity and labour productivity.
3. Firm owners should invest in innovation through research & development programs for sustainable manufacturing.
4. Firm owners and managers should engage in capacity building by encouraging their employees to continuously engage in skills training either in their workplace or in technical-vocational institutions.
5. Although this study has identified indicators of productivity, future research on productivity may continue to explore other potential factors that may influence levels of productivity aside from the firm characteristics and capabilities mentioned in this thesis.

6. Given that the results of this thesis are based on data from Malaysia, further research could be conducted in other emerging economies or developed countries where food manufacturing plays a significant role in economic growth.

In general, this thesis concludes that targeting the human capital and capabilities improvements would make SMEs more competitive in many ways and not only for the improvement of productivity but also the positive externalities of the productivity improvements. The results from this study in Malaysia have provided some guidance for future researchers, industry players, and policymakers in the hopes that these could be further tested or even transferred in other manufacturing industries in other parts of the world. Based on the productivity factors examined in this study, policymakers can target and focus on these aspects as the future of economic policies rests not only in the Malaysian setting but also in other sectors and states where productivity can be measured and maximised.

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