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FACTORS AFFECTING LABOUR PRODUCTIVITY AND EXPORT OF GARMENT INDUSTRY IN MYANMAR (A CASE STUDY OF GARMENT FIRMS IN YANGON)

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Yangon University of Economics
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This thesis submitted in partial fulfillment of the requirements for the Ph.D in Economics

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ABSTRACT

The garment industry is one of the prioritized sectors in Myanmar and increasing its productivity is vital to Myanmar's economy. The labour productivity of the garment industry is hampered by various obstacles and it is affecting on the overall export performance of Myanmar's garment industry. In order to ensure the growth of labour productivity and promote its export to the global market, this study requires not only to find out the major influencing factors affecting labour productivity but also to analyze the relationship between labour productivity and garment exports of Myanmar. This study aims to determine the factors affecting on labour productivity of garment manufacturing firms, to examine the direction of causation between labour productivity and export of garment manufacturing firms, and to analyze whether the relationship between labour productivity and export are long-run or short-run. This study uses the descriptive and analytical research methods by using qualitative and quantitative approach. A panel regression model is applied to examine the relationship between labour productivity and export of garment firms. The data was collected from 172 sample garment exporting firms in Yangon. This study found that labour productivity of garment firms in Myanmar is determined by human capital, management practices of the firm, compensation and rewards structure of a firm, and employee welfare program or social factor, which are directly controlled by the firms themselves. On the other hand, the increase in the labour productivity of a firm is indirectly supported by some external variables as government regulations and policies, public utilities and infrastructure, and the national culture. These factors affect labour productivity to some extent, but firms cannot directly control these variables to promote employee productivity. The results of Granger Causality Test describe that there is short-run uni-directional causality where labour productivity causes to garment exports. This study suggests that Myanmar garment industry should have great efforts on increasing labour productivity by promoting the main influencing factors according to findings of this study. Because export growth of garment industry is mainly caused by its labour productivity growth.

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LIST OF ABBREVIATIONS

ABS	Australian Bureau of Statistics
ADF	Augmented Dickey-Fuller
ASEAN	Association of South East Asian Nations
CMP	Cut-Make-Pack
DICA	Directorate of Investment and Company Administration
EU	European Union
FDI	Foreign Direct Investment
FIL	Foreign Investment Law
FOB	Free-on-Board
GVA	Gross Value Added
GVC	Globa Value Chain
ILO	International Labour Organization
IMF	International Monetary Fund
LDCs	Least Developed Countries
MFA	Multifiber Arrangement
MGMA	Myanmar Garment Manufacturers Association
MIC	Myanmar Investment Commission
MIL	Myanmar Investment Law
MMK	Myanmar Kyat
MNCs	Multi-National Countries
MoU	Memorandums of Understanding
NES	National Export Strategy of Myanmar
NICs	Newly Industrialized Countries
TFP	Total Factor Productivity
UMFCCI	Union of Myanmar Federation of Commerce and Industry
UNDP	United Nations Development Programme
USD	United States Dollars
VAR	Vector Autoregressive
VECM	Vector Error Correction Model
WTO	World Trade Organiz

CHAPTER I
INTRODUCTION

1.1 Rationale of the Study

In any economy, increased productivity brings higher profit and accompanying for additional investment. For employees, increased productivity can transform to higher wages and better working conditions. Supply rises through productivity growth can decreases commodity prices and escalates real wages. With growth in productivity, an economy is able to produce and consume increasingly more goods and services for the same amount of work. And in the longer term, increased productivity is vital to economic growth.

Several studies have emphasized the importance of labour productivity growth to expand real output for manufacturing industries. Once, multinational companies decide to invest in developing countries, it is usually expected to increase the productivity of workers of the host country. However, enhancing productivity of workers in the manufacturing industries might be costly since it requires investment in human capital: education, training, knowledge, research and development. Among the manufacturing industries, garment industry may play the imperative role in human capital development and labour productivity in particular.

Moreover, the garment value chain has been a driver of early export-led industrialization in most developed and developing countries, which requires abundant, cheap labour and relatively simple production technologies. According to ADB working paper (2018), the developed economies like Germany, Italy, and Japan, had a comparative advantage in this sector from the 1950s till the 1980s. When rising the relative cost of labour in the developed economies, the comparative advantage shifted to the developing economies where labour is abundant. In the 1990s and the beginning of the 20th century, garment retailers from developed countries have started to source globally instead of manufacturing products domestically, which aimed to reduce production costs and become more competitive in the global market (OECD, 2019).

In addition, many policymakers in developing countries are increasingly turning to integrate with the Global Value Chain (GVC) as a means of driving development; including generating employment, raising personal income, and finally lead to increase GDP. OECD report (2019) indicated that there are high levels of unskilled-labour employment in GVC, especially in light industries like the garment industry. Therefore, the global garment industry becomes an important part of world trade, particularly for trade between developed and developing countries where garment forms a large proportion of exports. According to WTO report (2022), all merchandize export of Myanmar was US$ 1216.90 million, with textile and garment alone was worth US$ 138.78 million in 2021.

Nowadays, Asia has become a leading garment manufacturer in the world and Asian economies cover the third place of the top five world garment exporters (UNCTAD, 2018). The garment industry has significantly grown in Asia since 1990, and it is also growing in Myanmar after implementing the trade liberalization in the late 1990s. The character of the garment industry is typically labor-intensive, export-oriented, and uses standardized or uniform technology. Such appearances have created the garment industry that take the primary step on the industrialization ladder in several developing economies still as in Myanmar.

Moreover, garment industry has contributed significantly to socio-economic development in the global economy because its labor-intensive structure and employment-friendly nature. The garment industry can be utilizing the surplus labour to enter the labour market that creating employment opportunities, and generating income especially for women and low-skilled workforce in developing countries. Thus, it played a crucial role in providing a good paying job for future generations and facilitating for workers out of poverty (ILO, 2015). Moreover, garment industry has situated as an important driver of the export growth because it can be found one of the main export manufacturing industries of the country, also bringing substantial revenues and being the process of building an industrial economy (MGMA, 2015).

However, the globalization of the economy offers new opportunities and challenges for export manufacturing firms. The intensifying international competition has placed a huge pressure on the garment manufacturers to produce quality products at competitive prices and sending them to the market just-in-time. In this situation, garment manufacturers have to take place continuous improvement in production process. This improvement can be measured continually by labour productivity data

which may perhaps be a suitable indicator of the rate of improvement in production and the level of performance of the firms.

Thus, there is needed to consider the determining factor of labour productivity particularly for garment industry, and labour productivity is selected as a key variable in this study to access the export growth of garment industry in Myanmar.

1.2 Problem Statements

Garment industry performs as a vital role in enhancing employment opportunities and export earnings. It has contributed about 30% of Myanmar's exports after primary products (CSO, 2020). However, there is high competition in garment industry in line with ending the Multi-Fiber Arrangement (MFA), which was an international trade agreement of imposing quotas on the amount of garment and textiles export from developing countries to developed countries between 1974 to 2004. After abolishing the MFA since 2005, competition between garment exporting countries has increased as countries are forced to compete with more efficient suppliers among developing countries (Kudo, 2012).

After removing the economic sanctions of western countries on Myanmar, the demand for garment export of Myanmar has risen because Myanmar remains one of the world cheapest sources of labour among Asia, i.e., average monthly wages per worker is at around $80 - $108 per month, which is lowest among Asian countries compare with $170 in Cambodia, $ 144 in Laos, $176 in Vietnam and about $300 in Thailand. Although Myanmar garment industry has comparative advantage in low wage labour supply, the labour productivity of Myanmar's garment sector is still in low level. The main reason is that the lack of skilled-labour and poor human capital of garment workers. In Vietnam, Thailand and Malaysia, the garment sectors are productive 6 times, while Laos and Cambodia are 2-3 times more productive than in Myanmar, approximately (Frontier Myanmar, 2018).

Generally, many reputed garment buyers prefer the country for manufacturing of lesser labor cost with higher labour productivity. Therefore, Myanmar's garment industry is getting very competitive to attract the well-known buyers, and in today's competitive era, the Myanmar's garment manufacturers mainly need to be concerned about productivity, which is essential for lead-time, cost reduction, and standardized quality.

Moreover, assembling garment is a highly labour-intensive with sequential production process, where a great number of people participated. However, the labour performance and capability are not same, which means working capacity and skill can differs from man to man. As a result, the garment production process often gets very problematic to ensure its smoothness. Along the production process, some operators have been highlighted as the low performers who are producing a lesser amount of clothing as well as generating problems for the others. Therefore, a shortfall of skills among garment workers could also be a limiting factor for productivity.

In Myanmar, garment production is limited to cutting, making and packing (CMP) operations. These stages cover the lowest value-added in the garment value chain, and firms engage in CMP activities are defenseless to volatile demand fluctuations. Therefore, most garment firms often attempt to cost-cut whenever demand falls. In the case of Myanmar garment industry, productivity gains usually come from greater work intensity, which based on long hours by means of excessive overtime, shorter break and limited holidays, which can create disincentives to improve skills for output growth. According to the ILO report, wages offered by the national firms are about 30 percent less than those of foreign firms and workers are required to work 10 hours a day, and six days a week, on average (Bernhardt, 2017). In Myanmar, low wages and long working hours have caused high labour turnover. MGMA stated that the mobility of labour is higher for domestic firms than foreign firms, within the garment industry. Therefore, frequent labour turnover usually reduces labour productivity of garment firms (Eurocham, 2022).

Another problem currently faced in Myanmar is the lack of skilled labour. Even within the industry, workers are moving around where they can get more wages. In the case of garment industry, the wages are not significantly different from one factory to another as wage calculation based on minimum wage policy, but small differences in wages usually make high labour movement. Another reason for the workers' shifting is attraction to the garment factories at the Thai border area where the wages are much higher than those in Myanmar. Therefore, skilled workers from Myanmar garment firms can migrate to the Thai border area, and, depleting reserves of skilled labour have weakened the garment productivity in Myanmar (Myo & Rasiah, 2012). Thus, it creates difficulties for the garment factories to finish production in time with relevant quality. As a result, productivity of Myanmar garment firms is likely to fall, resulting in the further erosion of Myanmar's comparative advantage.

In this context, the labour productivity of garment firms has hindered by various obstacles and lower productivity disturbed the overall export performance of Myanmar garment industry. Therefore, to ensure the growth of labour productivity and promoting its export to the global market, this study requires not only to find out the major influencing factors on labour productivity but also to analyze the relationship between labour productivity and garment export of Myanmar.

1.3 Research Questions

Based on the problem statements, this study intends to find out the research questions of:

(1) What kind of factors are needed to be considered to promote labour productivity of garment manufacturing firms?

(2) What is the direction of causation between labour productivity and garment export?

(3) Is there a long-run relationship between labour productivity and garment export?

1.4 Objectives of the Study

According to the research questions, the main objective of this study is to find out the major influencing factors for labour productivity of garment manufacturing firms and its effects on garment export of Myanmar.

In order to fulfill the main objective, the specific objectives are:

- To determine the factors affecting on labour productivity of garment manufacturing firms.
- To examine the direction of causation between labour productivity and export of garment manufacturing firms.
- To analyze whether there is a long-run or short-run relationship between labour productivity and export of garment manufacturing firms.

1.5 Method of Study

The method of study is using a descriptive and analytical analysis through qualitative and quantitative approaches. This study has used both primary and secondary data. The primary data are collected through interviewing firm owners with

structured questionnaire. The data collection period is February to August, 2022. There are (172) sample garment exporting firms which is selected by using random sampling method. The secondary data is collected from Myanmar Garment Manufacturers Association (MGMA), Directorate of Investment and Company Administration (DICA), and Statistical Year Book, as well as the international sources like WTO and UN Comtrade Database. In this study, multiple regression model is used to examine the factors influencing on labour productivity of garment industry. Moreover, the Granger Causality test is also used to examine the direction of causation and analyze the relationship between two main variables: labour productivity and export, whether their relationship is long run or short run.

1.6 Scope and Limitations of the Study

The scope of this study covers on garment exporting firms which located in various industrial zones in Yangon. There are total (443) current operating garment firms in Yangon which registered as a member of MGMA. This study drawn out (206) garment exporting firms which operating men/women coat, jacket and formal suit/dress/trousers with firm age of over five years. Then, the sample size of (172) firms are selected from the population of (206) garment exporting firms by using random sampling method. The survey questionnaires are distributed to owners, managers and chief supervisor of sample garment manufacturing firms, thus, who may be the respondents of this study and they represented as the garment manufacturing firms of this study.

As a limitation, this study limits to collected data from sample garment exporting firms with a firm age of five years and above, which only produced overcoat, jacket, formal suit, dress, trousers. This is because studying labour productivity for different types of clothing can be confusing and controversial, thus, limiting the type of clothing can alleviates those controversies.

Moreover, this study limits to use the primary data to analyze the relationship between labour productivity and export of garment firms. Due to the lack of national data set (or secondary data) for labour productivity and export over twenty-five years, it is limiting to use the monthly data which has collected from sample garment firms of study area in order to fit the conceptual framework of this study.

1.7 Organization of the Study

This study has composed of five chapters. Chapter one is an introduction that provides a brief review of research background which is a rationale of the study, discusses the significance problems and objectives of the study, methods, limitations, and finally gives the organization of the paper. Chapter two reviews on literature relating with the study area. Chapter three presents current situation of Myanmar's garment manufacturing sector. Chapter four discusses about research methodology, including survey area, survey design, research model, and the description of variables. Chapter five states data analyses and results. Finally, Chapter six concludes with the findings and suggestions of the study.

CHAPTER II
LITERATURE REVIEW

2.1 Concept and Measurement of Productivity

Productivity is a key to maintaining competitiveness, at both the organization and country levels, and in ensuring sustainable socioeconomic development. “There are various productivity-enhancing tools, techniques, methods, and practices that have been developed and adopted over the years in the production of goods and services, which are essential to the dynamism of economies” (APO, 2015).

“The concept of productivity has evolved over the years and there are several ways of understanding productivity. Generally, productivity is the relationship between the quantity of output (goods and services produced) and the quantity of input (i.e., resources such as labor, materials, machinery, and energy) that are used in production” (Samuelson and Nordhaus, 2009, pp-671). In this concept, productivity is defined as “a ratio of a volume measure of output to a volume measure of input, that is;

$$\text{Productivity} = \text{Output}/\text{Input}$$

where productivity may rise when the volume of output increases more rapidly than the volume of input, and it may fall if the volume of input increases more speedily than the associated output. Here, the purpose of productivity is to maximize output and minimize input” (Samuelson and Nordhaus, 2009).

Moreover, the other concept of productivity is concerned with efficiency. If a product is made at the lowest cost with high quality and can be sold competitively in the market at a price higher than its cost of production, then its productivity level is considered as high. This relates to the attainment of the desired goals or outcomes set by the producer of a product or service. Therefore, productivity can be seen as a measure of effective and efficient way of an organization that is able to change its resources into highly marketable products. According to the concepts of APO (2008), productivity can be stated as;

Productivity = Efficiency + Effectiveness

In economics, productivity means as a ratio of some measure of output by an index of inputs. In other words, productivity is an arithmetic ratio of a produced quantity of goods and the quantity of resources that are used in the production (Samuelson and Nordhaus, 2009). The more specifically, in the principles of macroeconomics, the term "productivity usually refers to the productive efficiency and is often measured in terms of the amount of output per hour of labour (or machine) input" (Case & Fair, 2014, pp-353).

Generally, there are three key productive factors in economy, such as land, labour and capital which are the inputs into the process of production. Productivity enhancement are generally achieved through combined efforts of productive factors that can expand the overall production and consumption of all goods and services.

2.1.1 Measurement of Productivity

Many scholars stated a number of ways to measure productivity. "Different productivity measures may be useful for different analytical purposes, and no single measure provides a complete picture of an industry's productivity performance" (Murray, 2016). In real world, there are two dimensions to measure productivity: "multi factor productivity measures (relating a measure of output to a bundle of inputs) or single factor productivity measures (relating a measure of output to a single measure of input). The choice between them depends on the purpose of productivity measurement and, in some cases, it is depended on the availability of data" (OECD, 2001).

The former "relates to productivity that is defined as the relationship between output produced and an index of composite inputs; meaning the sum of all the inputs of basic resources as labour, capital and land resources" (Olaoye, 1985). Therefore, it can be defined as multi-factor productivity or total factor productivity (TFP), in economics. For the latter, output is related to any factor input that involved in the production process. For example, in labour-intensive sectors, input is associated to man per hour or per unit of labour, this definition of productivity is a partial productivity and it also named as labour productivity. In capital-intensive sectors, an increase in productivity may be generated by additional fixed capital and not by labour. Thus, for the capital-intensive sectors, productivity can be measured in terms of capital only, and it is also called capital productivity. These calculations of productivity are recognized as partial

productivity. In practices, “partial factor productivity is equally known as average product. It only measures how the output per unit has changed over time, ignoring the contributions from other factors to the detriment of production process” (Prokopenko, 1987).

Among the two productivity measures, the concept of total factor productivity (TFP) is closer to the concept of productive efficiency than partial productivity because it removes the contribution of capital deepening from the residual. In the study of long-run growth, many literatures focused on TFP as it is the pre-dominant measure of productivity. TFP growth is commonly associated with innovation and technological change, which are the long-run drivers of per-capita income growth. However, TFP have many events in relations of both theoretically and practical measurement. In that situation, “TFP explains for the use of a quantity of factor inputs in production and, therefore, are more suitable for performance measurement and comparisons across firms and for a given economy over time” (Coelli, 2005).

On the other hand, “partial productivity refers to the measure of produced output per unit of each input used. This indicator is calculated for each input separately, such as output per worker or per hour worked, or output per hectares of land. Although partial productivity measure is commonly used, it can be potentially misled and misrepresent the performance of a firm. In fact, when the proportion in which the factors of production are combined (e.g., labor and capital) undergoes a change, thus, partial measures of productivity provide a distorted view of the contribution made by these factors in changing the level of production” (Kathuria, 2013).

In practices, “there are different types of input when calculate the productivity, those are measured by different units (hours of work, hectares of land, barrels of oil, and etc.)”. Therefore, it needs different choices of calculation correspond to different designs of productivity (OECD, 2001).

Specifically, OECD (2001) stated the five most widely used productivity concepts, and pointed out major advantages and drawbacks for each measure. They are two different types of labour productivity measures (labour productivity - based on value added and labour productivity- based on gross output), two kinds of capital productivity (capital productivity - based on value added and capital labour MFP based on value added), and multi-factor productivity. The detail explanation for five different types of productivity concepts are follows;

(a) **Labour Productivity (based on value added):** it is "the ratio of the quantity index of value added to the quantity index of labour input. Labour productivity changes reflect the joint influence of changes in capital, as well as, technical, organizational and efficiency change within and between firms, the influence of economies of scale, caring degrees of capacity utilization and measurement errors. Labour productivity only partially reflects the productivity of labour in terms of the personal capacities of workers or the intensity of their effort. It aims to analyze the micro-macro links, such as the industry contribution to economy-wide labour productivity and economic growth. At the aggregate level, value added based labour productivity forms a direct link to a widely used measure of living standards, income per capita. Labour productivity translate directly into living standards, by adjusting for changing working hours, unemployment, labour force participation rates and demographic changes. From a policy perspective, value-added based labour productivity is important as a reference static in wage bargaining. One advantage of value-added based labour productivity is the ease of measurement and readability. Labour productivity isa partial productivity measure and it reflects the joint influence of other factors. Therefore, the drawback is easily misinterpreted as technical change or as the productivity of the individuals in the labour force. Also, value-added measures can include a double-counting procedure with fixed-weight indices" (OECD, 2001).

(b) **Labour Productivity (based on gross output):** "the definition stated that the quantity index of gross output of a firm is divided by the quantity index of labour input. Labour productivity only partially reflects the productivity of labour in terms of the personal capacities of workers or the intensity of their effort. Gross-output based labour productivity traces the labour requirements per unit of physical output. It reflects the change in the input coefficient of labour by industry and can help in the analysis of labour requirements by industry. It has the advantages of the ease of measurement and readability. In particular, the gross-output measure requires only prices indices on gross output, not on intermediate inputs as is the case for the value-added based measure" (OECD, 2001).

(c) **Capital Productivity (based on value added):** it is "defined as the ratio of the quantity index of value added to the quantity index of capital input. The value-added

based capital productivity measure tends to be less sensitive to processes of substitution between intermediate inputs and capital than gross-output based measures. Capital productivity is a partial productivity measure, and there is sometimes confusion between rates of return on capital and capital productivity" (OECD, 2001).

(d) **Capital-Labour MFP based on value added:** it can be "measured by the quantity index of value added divided by the quantity index of combined labour and capital input. This measure is applied in the purpose of the analysis of micro-macro links, such as the industry contribution to economy wide MFP growth and living standards, and analysis of structural change. The advantages of this productivity measure are the ease of aggregation across industries, simple conceptual link of industry-level MFP and the aggregate MFP growth. Moreover, it is easy to access data directly available from national accounts. But it is not a good measure of technology shifts at the industry or firm level" (OECD, 2001).

(e) **Multi-factor Productivity:** "the purpose of MFP is to analyze the industry-level and sectoral technical change. It shows that how productively combined inputs are used to generate gross output. It can be defined as the quantity index of gross output to the quantity index of combined inputs. Conceptually, MFP captures disembodied technical change. In practices, it reflects also efficiency change, variations in capacity utilization and measurement errors. The advantage of MFP is that it is the most appropriate tool to measure technical change by industry as the role of intermediate inputs in production is fully recognized. But MFP measure has required significant data, in particular timely availability of input-output tables that are consistent with national accounts" (OECD, 2001).

In many cases, productivity analysis has developed methods to deal with situations where one or several conditions are included. Once, productivity measures are theorized on the source of economic theory, there are numerous ways to go about its empirical implementation (OECD, 2001).

2.1.2 Benefits of Increased Productivity

Increased productivity is vital for sustaining the economic and social welfare for all economies. Generally, "productivity growth can contribute to benefits for the economy. Those benefits are;

(a) Higher wages: productivity growth allows firms to increase wages for firm workers. Unit labour costs can decline when labour productivity increases, meaning that firms can balance the outcome of wages increased on profits by increasing their labour productivity.

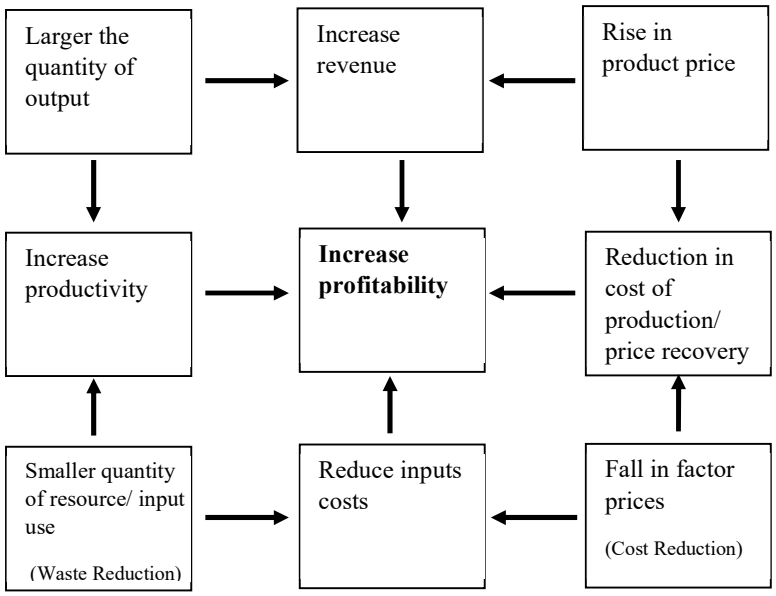
(b) Lower Prices: Firms can allocate its productivity growth to consumers through lower prices without reducing profits or wages. This also makes firms more competitive in world market.

(c) Higher Profits: when getting an increased in productivity, firms can also increase their profits by producing a given level of output. These profits can allocate to the firm owners, shareholders, or can make reinvestment into the firm.

At a firm level, higher productivity can be benefited to improve profitability and enhance a firm's competitiveness relative to its rivals. Thus, it enables a firm to expand its profitability through increasing productivity" (Syverson, 2011).

Then, Stainer (1997) also developed "the relationship between productivity and profitability", which is shown in below figure.

Figure 2.1 Relationship between Productivity and Profitability



Source: Stainer (1997)

The figure (2.1) was constructed based on the idea of Stainer (1997), there is a linkage between productivity, cost of production and profitability. In terms of technical efficiency, productivity is closely associated with the elimination of waste and cost reduction. It explained that change in productivity and change in cost of production equals with change in profitability, which can be decomposed into increase productivity or reduce cost of production that might be increased firms' profitability (Stainer, 1997).

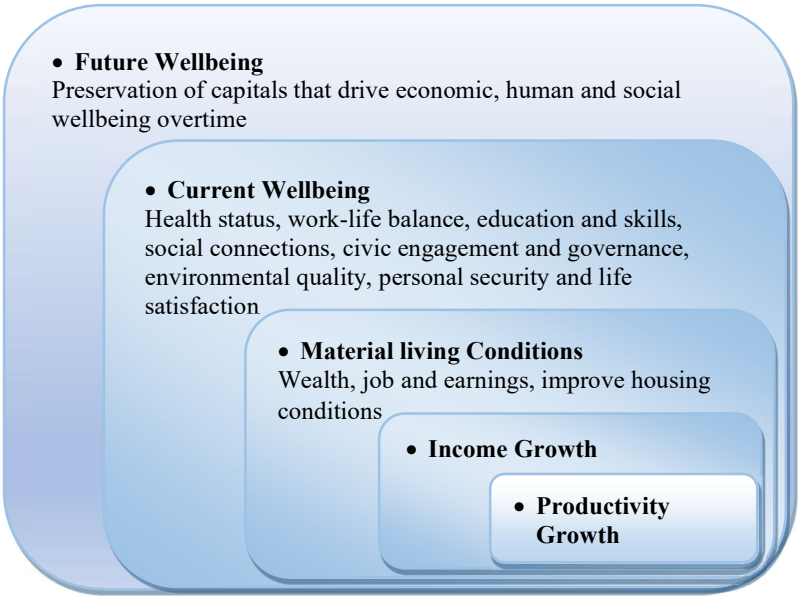
(d) Stronger Economic Growth: With growth in productivity, an economy is able to produce and consume increasingly more goods and services for the same amount of work. Thus, productivity can contribute to scale economy and it can provide competitiveness in export market, which in turn can accelerate the economic growth of a country. Moreover, increasing productivity can take the ability to raise output per worker and also contribute to an economy's ability to improve their standard of living.

For economy as a whole, Todaro (2012) stated that an increases in productivity allow firms to produce greater output for the same level of input, earn higher revenues, and it can be benefited to get higher per capita GDP, ultimately.

According to the Heckscher-Ohlin model, countries specialize in the production of commodities which use intensively the factors of production that are abundantly endowed with. Developing countries are abundant in unskilled labour but scare in skilled labour, which tend to specialize and export labour intensive manufacturers and primary products. For those countries, Heckscher-Ohlin theory predicted that an increase in the export of goods can improve productivity of unskilled- labour by means of specialization and better use of its abundant resources.

(e) Leading to Economic Development: Over the long term, increasing productivity is the only way to sustainably increase incomes. Productivity growth could be sustainable through technological advances as well as human resource development and entrepreneurship. Therefore, higher productivity is intended to higher incomes for society, which in turn contribute to material living conditions, as well as, productivity growth can also enhance some of the non-material influences on wellbeing, because people can have more leisure time to produce the same quantity of goods and services and fewer natural resources are required to produce the same quantity of output, meaning preservation of the environment (Conway 2016). This concept is also illustrated by figure (2.2).

Figure 2.2 Linkages between Productivity Growth and Wellbeing



Source: Sharon Pells (2018) as cited in OCED (2015)

According to the above figure (2.2), Sharon Pells (2018) demonstrated that enhancing productivity is highly relevant for developing countries to access future wellbeing and economic development in the long-run. Most developing countries possess poor productivity performance. Reasons for this poor productivity performance usually include small and limited domestic markets, weak international connections, capital shallowness, and weak investment in knowledge-based capital. This poor performance contributes to low productivity in developing countries. Therefore, improving productivity could become the major source for income growth, future wellbeing and finally access to economic development.

2.2 Overview on Productivity of Garment Industry

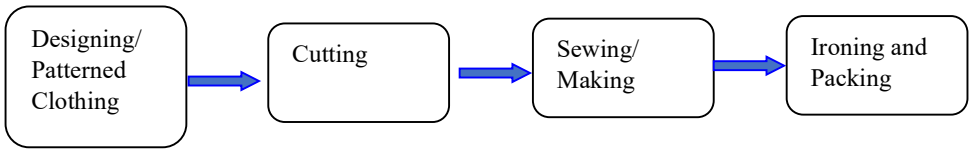
A garment is a portion of article of apparel which is manufactured from textile materials for protecting human body, in addition to decorated purpose. These materials contain live natural, cellulose in addition to synthetic fibers. “There are many types of garments like woven, non-woven and knitted. Garments could be classified based on several aspects, such as sometime based on the sex (male, female and children) garments, and, sometime it based on seasonal used (winter, summer, spring, autumn and late autumn). Generally, garments could be classified by shape or styling as dress, shirts, skirts and suits” (www.textilelearner.net).

2.2.1 Nature of Garment Manufacturing Process

The readymade garment (RMG) industry is a labour-intensive low-skilled assembly industry, which has motivated by international brands for outsourcing its production to low wage developing countries in Asia, Africa and South America. Recently, international buyers have shifted a part of production from China to Bangladesh, Myanmar, Cambodia and Ethiopia, seeking even cheaper labour force. However, the garment manufacturing has comprehended that outsourcing to countries with a cheap labour force is not secure for getting a permanent competitive advantage. As a result, international buyers are increasingly persuading garment manufacturers in developing countries to implement new manufacturing systems for productivity and quality improvements (Kader & Akter, 2014).

The garment production process is generally divided into four main stages: designing and clothing pattern generating, cutting, sewing, ironing and packing. This process is shown in below figure (2.3).

Figure 2.3 Simple Garment Manufacturing Process



Source: OECD (2004)

The figure (2.3) described that the production process of garment manufacturing firms in most developing countries. The garment industry begins its production by adopting the cut-make-package (CMP) model, in which a garment factory is contracted to cut fabric, produce or making a product such as a dress, and then package it to be ready for shipment to another country. Among the garment production process, the sewing process is the most important step for improve productivity because it comprises a series of workstations or sewing line where certain tasks in a given order are processed. For any garment firm, productivity growth is important because it can allow the firm to remain competitive within the industry. Therefore, raising productivity has been an attention for firm owners as well as policymakers.

In Asia, garment industry has to pay increased attention to its productivity growth in order to address the emerging challenges of strengthening the

competitiveness of the global garment industry. Productivity performances of garment industry across the counties vary drastically. Kurt Salmon (1999) provides that garment manufacturing productivity has received major attention in Western World since 1960's and 1970's. Bheda Rajesh (1997) pointed that productivity is a key to prosperity and all the developed countries have higher productivity. Rise in productivity results in higher production, which reductions cost per unit and allows decrease in sale price. It tends to increase wages for employees and enlarged revenue for firms. Productivity growth can help to reduce per unit cost and, thus, it also attracts to higher demand. Also, higher demand can create more employment opportunities, vice-visa (Mankiw, 2016). Therefore, increase productivity is vital for developing country because it can minimize level of unemployment and poverty.

2.2.2 Measuring Productivity of Garment Industry

The production of the garment industry can be determined in the same way as the productivity measurement of other manufacturing firms. It also has two dimensions: "partial productivity measure and total factor productivity". Also in a garment industry, the economic theory behind productivity measurement is based on a production function approach. "The production function is an equation that estimates what output level can be produced at particular time as a function of the economy's stock of capital, its labour force, and various combination of inputs. Therefore, output changes because of changes in the economy's capital stock, its labour force, or its level of multi factors" (OECD, 2001).

Many scholars' studies "stated that among industrial corporations, partial productivity measures are the most commonly used at all organizational levels, particularly in the plant or firm level productivity measures. Because it is easy to understand and use, as well as the data needed are both easy to obtain and easy to compute. Therefore, partial productivity is a good diagnostic tool for analytical improvement areas. But it has some drawbacks when it used alone. Partial productivity measure can be misleading and may lead to costly mistakes. Also, partial measures cannot be used to explain overall cost increases. On the other hand, total factor productivity (TFP) considers all the qualifiable output and input factors. Therefore, it is more accurate representation of the real economic picture of an enterprise. However, data for computation are relatively difficult to obtain" (OECD, 2001).

Moreover, ILO's action manual (1998) also stated "the standard productivity indexes, there are two commonly used approaches for measuring productivity for garment industry; partial productivity and total factor productivity. Moreover, ILO discussed the three ways to compute partial productivity indexes: physical productivity, value productivity and the value-added productivity methods, and total productivity indexes" (Hiba, 1998).

In many cases, "it is used both approaches to measure productivity performance. But enterprises or firms are usually devoted to partial productivity measures because it is easier to use and understand, require less data, and therefore it could be used as a tool for productivity measurement at firm level. Although productivity can be defined in many ways technically, the major concept of productivity is the relationship between output and input: where output refers to the goods produced by an enterprise and input refers to the resources used to produce the outputs. The main problem here is how to define the outputs, in other words, what are the unit of measure for inputs, such as material, labour, machine, energy, etc." (Hiba, 1998).

According to action manual by ILO, outputs are the finished units by an enterprise. Outputs should be tangible or measurable and should meet the quality specifications. "Both outputs and inputs are expressed either in physical units or in monetary terms. Ideally, both should be expressed in uniform physical units, and, monetary value is used but in real terms" (Hiba, 1998).

In the garment manufacturing firms, "examples of outputs are: pieces of jackets, pieces of shirts, pieces of baby dresses, and others. As well as, the examples of inputs are: meters of fabric, number of workers, kilowatt-hours, worker-hours, machine-hours and others. Labour input is usually measured in units such as number of total labours worked in production process, worker-hours, worker-days, etc. In general, the labour productivity of a sample garment manufacturing firm is usually calculated by

Labour productivity = volume of output/ labour input *[1]

[1] For example: suppose a sample garment firm produces 230 jackets by employing 77 people at 12 hours per day with 1 hour overtime.
Labour productivity = volume of output/ labour input
Labour Productivity per worker = 230 jackets/ 77 workers
= 2.98 jacket/worker (approx. 3 pieces/worker)
Then,
Labour productivity per worker per hour = 230 jackets/ (77 workers x 13 hrs)
= 0.23 jacket/worker-hour

In the above equation, labour productivity of garment manufacturing firm has calculated by ILO's productivity manual for garment manufacturing firms. There are many reasons for the lack of data among garment enterprises, thus, ILO has widely used the labour productivity measures to analyze the firms' performance" (Hiba, 1998).

Moreover, according to the Australian Bureau of Statistics (ABS) describes a measure of output and inputs for different industries and sectors in many economies. "ABS defined productivity which is not measured directly but it is calculated by dividing a measure of output by a measure of inputs. In this calculation, output refers to a quantity of goods and services produced in a given time period. Output for an industry is usually measured by gross value added (GVA), which is the total value of goods and services produced less those goods and services used in the production process (known as intermediate goods)" (www.rba.gov.au).

In the case of inputs, ABS used labour and capital, which are two main types of inputs. But it widely uses the labour input to measure productivity that enables an enterprise to assess the efficiency of conversion of its resources to goods and services (output). In this concept, labour input can be measured as either the number of employed persons or the number of paid hours worked by employees. ABS typically preferred hours worked measures as a proxy of labour input because it captures changes in standard working hours, leave, overtime and flexible work arrangement (www.rba.gov.au).

Therefore, ABS widely used the above calculations of labour productivity to assess the firms or enterprises' performance. "Generally, partial productivity can be computed for any input. But, in practices, the most common partial productivity measure is labour productivity, which is obtained by corresponding to the number of labour hours used by the firm during the specific period, as well as, corresponding to growth of the firm's output per hour of labour input" (Murray, 2016). Among productivity measures, "labour productivity is particularly important for economic analysis of a country". Therefore, Murray (2016) stated that "labour productivity is a useful one among several economic indicators because it is an essential measure of economic growth, competitiveness, and living standards within an economy". Moreover, the ILO action manual (1998) suggested that it is suitable to use of "partial productivity measures" like labour or machine productivity in garment industry.

2.3 Determinants of Labour Productivity in Garment Industry

Many scholars have made an analysis for the determinants of productivity growth for various manufacturing firms. Adam Smith identified four key factors for basic and positive labour productivity. These key factors are labour division, skill, expertise and experience. Then, Smith acknowledged the importance of technical separation and specialization of different work steps in improving labour productivity. The separation of individual work steps included a diversification and development of different professions and industries, and therefore enhance specialization. According to Smith, division of labour improves labour productivity while using the same manpower (Smith,1776 as cited in Hanah, 2019).

The other economists, Karl Marx (1867) defined labour productivity as "the increase of labour productivity is supposed to be a change of working process that reduces the working time for the production of a product. Therefore, less work is needed to produce a bigger amount of practical value". Then, Marx pointed the concept of value added, and, also described that only such a worker is productive that created the added value for the capitalist. Marx equated the value of work with the ability to produce the amount of provisions needed to survive. As such, value must be divided into the absolute value added and the relative value added. The absolute value added represented the work of the labourers to earn their wages, while the relative value added represented the rationalization of the actual working steps. Therefore, labour productivity determined by Marx was achieved through the labourer himself as well as the production and working conditions created by the employers (Marx, 1867 as cited in Hanah, 2019).

Recent world, the various researchers found the different factors that have been affecting the labour productivity, which can be mainly divided as internal factors and external factors, in this study.

2.3.1 Internal Factors on Increased Productivity

Internal factors have directly effect on labour productivity of a particular firm by operating within the firm. Generally, firm-level indicators include the importance of workers' human capital (men-power) in explaining productivity differences, the productivity effects of working hours, wages and incentive pay, managerial talent and practices, productivity effects of different skill workers, line balancing and connections among co-workers, and, social factor as well.

(a) Human Capital on Increased Labour Productivity

Generally, human capital refers to the aggregate stock of a nation's population that can be drawn upon for present and future production and distribution of goods and services.

And, "the United Nations Economic Commission for Africa (UNECA) describes human capital as the knowledge, skills, attitudes, physical and managerial effort required to manipulate capital, technology, and land that required to produce goods and services for human consumption. In other words, human capital is the entire human potentials (knowledge, skills, and attitude), inherent within a nations' human capital stock. If human capital is properly developed, a country would yield a high level of labour productivity" (UNECA, 1990).

Regarding the labour productivity, Krugman argued that "labour productivity data is used to investigate the impact of product and labour market regulations on economic performance. There are various measures of productivity and the choice between them depends on the purpose of the productivity measurement. One of the most widely used measures of productivity is Gross Domestic Product (GDP) per hour worked. This measure captures the use of labour inputs better than just output per employee. In principle, the measurement of labour inputs should also take into account differences in workers' educational attainment, skills and experience" (Krugman, 1999).

On the other hand, deteriorating labour skill is one of the influential factors on downturn productivity. Abdullah (2005) also "recognized that low literacy rate, lack of formal institutionalized and non-institutionalized training is the major reason for low productivity. Hance, most of the developing countries are further challenged because most of the labors are unskilled with low productivity which results in increased per unit cost of production". Moreover, Fukunishi (2011) pointed out "that each country should specialize in the production of goods in which they have a comparative advantage. Developing countries should be emphasized on garment industry to access the economic development where has a lack of capital formation and bulk amount of low skilled labour".

Case & Fair (2012) stated that "increase in the quality of labour supply can boost labour productivity in the context of developing economies where has insufficient capital stock. Since 1940, labour productivity of United State has increased because the

quality of labour has increased through more education. In the case of developed economies, policy makers are concerned about the ability to generate long run productivity growth through human capital improvements".

Generally, "human capital can be developed in numerous ways. The first way is through formal education. The second is through on-job training where the firms or government invests in human capital by providing vocational training programs and on-job training. The third way concerns individual, or self-development. This arises when individuals seek to attain greater knowledge, skills or capacities through preparation on their own initiatives. In the case of garment industry, a prominent productivity gap among the garment firms can be occurred by relatively poor skill base" (Acevedo, Robertson & Raymond, 2012).

Then, Kudo (2013) advocated "the importance of human capital for increased labour productivity in any garment firms that "...to increase productivity of the garment industry while maintaining high-quality standards, employers need to focus on innovative business processes, invest in firm-level training and attract and retain a skilled workforce". Moreover, the researcher also presented that innovative human resource practices can raise workers' productivity in garment manufacturing firms. Therefore, worker quality could be another potential source of differences in labour productivity and income levels in many countries".

Sayre and Morris (2015) also "stated that labour productivity is mainly based on the labour quality what economists called human capital, which is defined as the accumulated skills and knowledge of human beings".

Therefore, many scholars evaluate that abundant human resources can generate comparative advantage but the quality of the labor force is generally low in most developing countries. Thus, human capital or man power can be a core driver for labour productivity growth of garment manufacturing firms in this study.

(b) Employees' Compensation and Rewards

This part exposes some literature supports to examine whether there is any relationship between compensation of employees and labour productivity of a firm. Many scholars observed that compensation and various forms of rewards can lead to better performance of employees, improve employees' satisfactions, and reduce the cost of staff turnover. Therefore, compensation and reward practices of a firm is being designed to have greater involvement of employees, maximize organizational

integration, and employee commitment, that contributed to innovative and productive capacity of the employees.

Therefore, the impact of compensation on employee productivity is very strong. When a firm gives more reasonable compensation to employees, the higher the productivity of employees. Conversely, if it given lower compensation for employees, the lower the productivity of the employee (Mohrman, 1996).

Regarding the compensation of employees, IMF defined as "the total remuneration, in cash or in kind, payable by an enterprise to an employee in return for work done by the latter during the accounting period. There are two main components: (a) Wages and salaries payable in cash or in kind; and (b) Social insurance contributions payable by employers such as social security schemes and employment-related social insurance schemes" (IMF, 2008).

Generally, "compensation means the cash rewards paid to employees in exchange for the services they provided. It usually includes basic salary, hourly wages, incentives or commission, and bonus, etc." (https://www.ilo.org). As a wages of employes, the ILO have supported the concept of minimum wages and labour productivity, which presented that "minimum wages not only help to reduce wage dispersion and to channel productivity gains into higher wages, but they also can contribute to higher labour productivity – both at the enterprise level and at the aggregate economy-wide level". Moreover, at the firm level, "workers may be motivated to work harder and they may also stay longer with their employer, gaining valuable experience and also encouraging employers and employee to engage in productivity-enhancing training. At the aggregate level, minimum wages can result in more productive firms replacing least productive ones – and surviving firms becoming more efficient. These mechanisms can increase overall economywide productivity" (https://www.ilo.org/global/topics/wages).

Although many researchers agreed the positive relationship between minimum wages, workers' efforts and labour productivity, a large number of studies have supported the idea of Akerlof (1982), who advocated that workers may deliver higher effort levels in response to higher wages, it can be called as "efficiency wage" theory. In addition, most of the studies have focused on basic pay levels of individual firms, "showing that higher pay compared to elsewhere can attract more experienced and motivated applicants. Thus, higher pay or efficiency wages can ensure greater labour productivity from existing employees" (Ehrenberg and Smith, 2009).

Moreover, the minimum wage and overtime regulations in garment industry should be viewed as a first step to fill the gap between workers' wages, employment condition and export productivity (Huynh, 2015). In addition, Huynh evaluated that "it needs to pay the wage premium or efficiency wages for garment sector employees in high-skill occupations relative to low and medium-skill occupations, after controlling for differences in demographics, education, geography and economic sector" (p-24). For example, "in Vietnam, the earnings of high-skilled employees in garment production were around 27 per cent higher than for less skilled employees" (ILO, 2015, p-3). Therefore, wage premium can attain the skilled workers, which tends to reduce labour turnover and maintain the labour productivity growth for garment industry.

On the other hand, Kudo (2013) analyzed the working hours and wages for garment industry, which stated that "improving productivity in the garment manufacturing is dominated by competitiveness, but productivity gains must be driven by greater efficiency – not work intensity" (p-12). However, among developing countries, excessive working hours in the garment industry are common for increase productivity to access export share. Greater production volume in garment manufacturing is mainly based on long hours and excessive overtime (Kudo, 2013). Staritz and Morris (2013) argued that "boosting productivity driven by efficiency instead of intensity is critical to offset wage increases and ensure that unit labour cost remains competitive and that overall price levels stay attractive" (p-10).

Another author, Bilton (2013) argued that garment manufacturing client was experiencing difficulties in meeting orders in time and labour was in short supply locally in some season. Thus, weekend working is also the norm, that can be leading to adverse cost discrepancies on labour productivity.

Moreover, John Pencavel (2014) abstracted in his research to observe the connection between total output and working hours. The author stated that "the observations on garment workers, most of them are women. Thus, the relationship is nonlinear: below an hour's threshold, output is proportional to hours, but above a threshold, output rises at a decreasing rate as hours increase. The findings also link up with the effects of long working hours on accidents, injuries, increase defect rate and lead to decrease labour productivity.

Garment defects are also "one of the most common issues for garment manufacturers across the countries. After completing a garment, some defects may exist in such as loose buttons, holes, discoloration, stains, inappropriate trimming, loose

threads, poor ironing, etc" (Bredan Multala, 2022). In addition, Cooper (2022) "identified the different types of garment failure by assessing discarded items at end of life, explains the causes of such failure and reveals potential solutions. The study concluded that "the most common causes of garment defects are pilling and colour dying. Other causes included fabric hold, accidental damage, loss of dimensional stability, logo damage and stitching holes". After analyzing, the author showed that increase in garment productivity is attainable through effective control of production processes" (Cooper, 2022).

In addition, as one of the compensation system, piece rates are frequently used in the garment manufacturing sector. Properly designed piece rates pay can motivate the employees and hence increase labour productivity and wages (Niklas and Dara, 2020). The research work by Niklas and Dara (2020) indicated that piece rate can promote labour productivity 8 to 10 percentage points, while turnover decreased distinctly. But, ILO (2018) argued that the extent of benefits from piece rate system for employers and employees can be depended on the design of wage policy and regulatory framework of the country (ILO, 2018).

On the other hand, :absenteeism of employee is also a major challenge for any organization in the current competitive world. Shortening absenteeism can helps organizational achievements of target and increases labour productivity. Absenteeism and labour turnover have long been major causes of worry among the garment manufacturers. Every garment firm is trying to put its efforts and polices to limit the absenteeism which is causing a major obstacle to the organization. Thus, the authors, Hogg and Tannis highlights the importance of absenteeism for increase labour productivity and examined the major causes of absenteeism in the production division of a garment industry under various conditions. After taking an analysis by authors, their study showed that the important factors such as wages and other source of income, poor relationship with supervisors contributed to significant employee absenteeism from work. In addition, the authors also reported that work environment, organizational culture, relationship and collaboration, compensation and rewards, facilities provided by the firm and job satisfaction can reduce the labour productivity in many garment firms" (Hogg and Tannis, 1997).

Therefore, "it can be supported that employees' compensation and rewards can be one of the effective techniques to promote employees' motivation, which can reduce the operation time and improve labour productivity in most garment firms. However,

poor compensation scheme can reduce the productivity of employees" (Hogg and Tannis, 1997).

(c) Management Practice

Several studies analyzed that "management practices play an important role on labour productivity of garment firms. Management practice of firms in garment industry concerns with line layout, workstation layout, and, line balancing including team-work, skills of co-workers and proportion of skilled-labour over un-skilled labour" (Sohel Ahmed, 2018).

In garment sewing section, operation process can be divided by several lines, such as long, medium and short operation lines and operators also allocated on specific tasks based on workers' performance, skills level and experiences. If the operators fail to make the best use of resources adeptly, those operators fail to achieve target line's production and efficiency may fall. Therefore, productivity improvement of individual operators needs to be superior and mismatch of skilled-labour over un-skilled labour creates under capacity of line production (Sohel Ahmed, 2018).

Moreover, there is some operator who normally takes more time than standard established-time, as well as, who produce lesser than target quantity, which creates constraint for smooth flow of production within the firm. This kind of operator is termed as low performer and who creates bottlenecks for production process, while causing defects and the reworks need to be done. The operation management can improve the labour productivity of firms through identifying the low performers, causes of bottlenecks and eliminating those by giving the proper training (Farhatun Nabi, 2015).

Kaes & Azeem (2009) also made another important discussion which is the managerial efficiency of garment firms. Some firms are not expanding their current capacity of production because of their management inefficiency of low-skilled labour force (Kaes & Azeem, 2009).

On the other hand, Bloom (2013) was looking at medium size manufacturing firms in Europe and the US, which found that good managerial practices are strongly associated with superior firm performance in terms of productivity, return on capital employed and sales growth. The authors found that enterprises run by high ability managers were more likely to survive and have higher revenue (Bloom, 2013).

Therefore, adopting the optimal management practices can be raised labour productivity through improved quality, efficiency and reduced inventory (Bloom, 2013).

(d) Employee Welfare or Social Factor

The issue of low labour productivity has remained a serious problem for manufacturing firms. Many studies have recognized different factors that generate low labour productivity, among them, labour welfare measures or social factors have not received enough attention. Mayank Gupta (2018) identified some factors contributed to labour welfare; provisions for health and medical insurance, hygiene and sanitation, leave and benefits, employee welfare and social policies, remuneration and accommodation facilities. In this study, social factors are measured by arranging formal training, providing medical treatment and workplace medical assistance, have a plan of employee welfare program, attention for occupational health and safety, hygiene and sanitation, leave and benefits, accommodation, staff ferry, etc. (Mayank Gupta, 2018)

In addition, Chris Hearle (2016) has studied to encourage labour productivity of garment and construction sectors by promoting the skills of employees. The author argued that a shortage of skills among manager and employees can constraint for labour productivity and export competitiveness. The author stated that increase in productivity can achieve not only from greater work intensity which based on long hours and excessive overtime, but also it needs to be compromising with workplace safety and health. Hance, the author analyzed the consequences of effective training and firm support schemes on labour productivity and their impacts on workers. After examining the effects of skills development training in the RMG sector on the labour productivity level, she found that on-job training has resulted in the most favourable outcomes for increase labour productivity in garment sector rather than construction sector (Chris Hearle, 2016).

Moreover, Mohammad Nurul Alam (2018) and his colleagues studied the social compliance factors affecting on employee productivity in RMG sector of Bangladesh. They revealed the issues of low productivity of workers and social factors. In this research, seventeen social compliance factors were considered and among them nine factors, such as harassment and abuse, leave and holidays, workplace safety, forced labour, welfare and employment supports, women's right, child labour, OSH

management system and providing on-job training are most significantly affect on labour productivity (Mohammad Nurul Alam, 2018).

(e) Workstation or Workplace Design

A workstation is a place occupied by a worker when performing a job. … "The place may be one occupied all the time or may be one of several places where work is done. An example of a workstation for a particular garment firm is the area covered by a sewing machine, a chair, containers with incoming parts and finished pieces, and the nearby space in which the worker needs to move. A well-designed workstation is important for productive work" (ILO, 1998).

Furthermore, "workplace design refers to the process of designing, organizing, and planning a workplace area in order to enhance employees' performance, productivity, safety, health and wellbeing" (Maarleveld, 2011).

Most garment firm workers repeat the same or similar production processes, if employees can perform efficiently and quickly, the firm can take in higher productivity. Each workstation should be designed to suit the needs of a worker, the machine and the task to be performed. A well-organized workplace minimizes material handling, improves efficiency and reduces worker fatigue. ILO (1998) advocated six rules for designing efficient, comfortable workstations and good quality products, which are described in the book of an action manual for improving working conditions and productivity in the garment industry. Those rules for design of efficient, comfortable workstations includes: (1) putting materials, tools and controls within easily reach, (2) improving work posture for greater efficiency, (3) designing sample garments for easily assembly, low waste and high quality, (4) using guides to easily check measurements of pieces and garments, (5) using jigs and other devices to save time and effort, and (6) providing upgraded displays and controls to minimize mistakes (ILO, 1998).

Therefore, it is important for timely production and it can help to reduce defaults clothes for each garment manufacturing firms. In this study, workstation design covered the area of material storage and handling, productive machine safety, maintenance and environmental control, lighting, etc. (ILO, 1998)

2.3.2 External Factors for Increasing Productivity

The previous section discussed factors that "operate within the firms to determine productivity levels. In this section, it reviews that firms' operating

environment can influence its productivity level. These are called as external factors of the firms that can affect labour productivity of the firms, which are not under the control of project managers. Thus, external factors may not operate directly on firms' productivity, but those factors can influence the firm's incentive to apply the internal factors efficiently for improved labour productivity of the firms" (World Bank Enterprise Survey, 2016).

Many authors pointed out that "external environment of the firms is one of the influencing factors for labour productivity of those firms. World Bank Enterprise Survey provided that there are eleven external constraints which are directly or indirectly influence on labour productivity of the firms" (World Bank Enterprise Survey, 2016). This Enterprise Surveys "focus on several aspects of the business environment for developing countries, which can be helpful or constraint for firms and perform an important role for firms to operate efficiently. The topics included under the external factors of World Bank's Enterprises Survey are; infrastructure, trade regulations, finance, taxes and business licensing, corruption, crime and informality, and other perceptions of obstacles to doing business" (World Bank, 2016).

Based on the Enterprise Survey of World Bank (2016) and other related literatures, this study has drawn out the external variables which can be influencing on the labour efficiency of garment firms. Measuring external factors for this study included as follows.

(a) Policies and Regulatory Framework

Government policies, strategies and regulations greatly affect productivity of garment industry through policies of government agencies (regional trade policy, exchange rate policy), regulations (such as price control, labour law, income and wage policies), and fiscal measures and incentives (interest rates, tariffs, taxes), etc.

The Enterprise Survey of World Bank (2016) stated that macroeconomic environment, regional and country-specific policies, regulations and institutions can constrain and encourage the development of the manufacturing industries in the region. Beyond these macroeconomy and political concerns, a country's fiscal, technological and human-resource policies, and the regulatory framework are governing the establishment and functioning of corporations and economic activities (World Bank, 2016).

However, few countries have a clear policy for promoting labour productivity and competition. In most countries, the garment manufacturing has repeatedly been affected by some regulations such as workers' rights and child labor laws (Hsieh, 2015). Moreover, political factors disturbing the textile and garment industry usually include import-export policies, tariff and commodity taxes. Islam, Bagum & Rashed (2012) also found that governments' trade policies, production shutdown caused by political action and power supply problem are the major contributor to low productivity of garment industry (Islam, Bagum & Rashed, 2012).

Therefore, this study focuses the role of government, and the effects of various policies and regulations when the firms desire to promote the productivity of their employees.

(b) Global Trends

The nature of the garment industry is recognized for buyer-driven industry, so, the garment production has extremely forced by global competitive market. In order to remain successful in this competitive world, the garment firms should work more efficient and competent ways. In particular, garment firms in Asian countries have experienced productivity-enhancing structural change, after abolishing the MFA by competing among garment exporting countries (www.shenglufashion.com).

Recently, "structural changes in global economy can dramatically influence the national productivity. Such changes are not only the result of changing productivity but also a cause of economic and social development of each nation. International trade increases productivity in three important ways. First, imports increase the competitive pressure on domestic firms, and give them access to more and better inputs. Second, exporters increase their productivity by learning from foreign customers and by exposing themselves to competition from foreign producers. Third, trade encourage not only firm productivity, but also the reallocation of resources between firms, towards more productive firms" (Margaret McMillan and Dani Rodrik, 2011).

Numerous literatures indicate that "global trade, in particular participation in the global value chain (GVC), has a significant impact on labour productivity in the medium term. However, trading also requires firms comply with customs and trade regulations, and often firms must obtain export and import licenses as well. Given the increasing availability of data on GVC participation, recent literature examines the

relationship between productivity and firm interactions within global supply chains. Two mechanisms suggest productivity gains from firm interactions within global supply chains. First, outsourcing part of the production to international suppliers brings efficiencies in the form of lower cost or higher quality and increased productivity. Secondly, integration into international production chains is usually accompanied by a transfer of knowledge that reducing the distance to the technological frontiers and thus increases firm-level productivity" (World Bank Enterprise Survey, 2016).

Any garment firm "employs various techniques to make its hold stronger in the world market and to reap more and more profits. The apparel supplier tends to open more and more stores when the business is successful, and the garment manufacturer opens multiple production units when there is a high demand for the product. After attracting the large number of customers at a particular place, the firm may access the other geographical locations. This process helps the firm in spreading its reach all over the world gradually. Physical stores and manufacturing units help the firm establish itself in the global garment and textile industry" (European Central Bank, 2017).

However, these "traditional business techniques also have disadvantages, such as setting up retail stores and manufacturing facilities in different locations, which require huge amount of cash flows. Besides, it is not guaranteed if the stores would bring in the success expected outcome. Firms take risks by setting up stores at not so familiar locations. This step can result in huge losses to the firm. In addition, the newly created stores require a large number of employees and meet infrastructure requirements, which ultimately increases the overall cost of the clothing store. However, at the IT age, technology has made the world as a smaller place. It has facilitated long distance communication by making the process cheaper, faster, and easier. Internet can promote business to supply to a global consumer without any major investment. Customers can also purchase apparel and garment products (e.g fashion clothing) from the website. Suppliers can also display their products on e-commerce websites and social networking sites, thereby attracting more and more buyers. Therefore, recent popularity of online media can help the garment and apparel firms to take their products world-wide with minimum investment of fixed cost" (www.shenglufashion.com).

Recently, "the global garment and apparel industry has become a new trend. Digital innovation, rising globalization, and changes in consumer spending habits are key determinants of modifications in garment and apparel production. Moreover, it is

also due to the pandemic of coronavirus diseases, the garment and apparel sector is significantly depended on e-commerce and online marketing. Worldwide experts predict that the e-commerce and popularity of online shopping for garment and apparel products has increased at a compound annual rate of 10.6% from $481 billion in 2017 to more than $713 billion by 2022" (www.commonthreadco.com).

Moreover, "clothes became cheaper due to competitiveness among garment manufacturing firms, and shopping became a form of entertainment, the purchasing rates for garment and apparel products are constantly rising, with garment products being the most in demand. This is reflected through the consistent use of online shopping and e-commerce globally, with 77% of South Korean and 76% German customers using online platforms to carry out their shopping needs for clothing" (www.commonthreadco.com)..

Now a days, "China is currently the primary consumer of garment products as evidenced by revenue, however further growth is expected in Asia due to increased global online access and smartphone penetration" (www.commonthreadco.com)..

Hance, recent study emphases on the effect of changing global trend on production and competition of garment manufacturing firms.

(c) Public Utilities and Infrastructure

"Public utilities are essential services that play an important role in socio-economic development of a country. A well-developed physical infrastructure, including roads, electricity, water and telecommunications, is essential for the competitiveness and growth of the economy. Quality infrastructure can be efficiently connecting firms to markets for inputs, products, and technologies. It can reduce the cost of production, increase productivity and enhances the competitiveness of firms in domestic and international markets" (www.ilo.org).

"In most market places for garments and apparel products, competition has now intensified, not only between individual firm but also between networks of related suppliers, known as global supply chains. Consumer demands are also changing more often and firms have to react quickly when new trends and consumer requirements are appeared, thus the competition becomes more time-sensitive. This is especially true for the apparel and garment industry due to time is a key factor. It can make the difference between the successful or failure firm in this business environment" (Gustafson, 2005).

Moreover, the world Bank Enterprise Survey (2016) approved that “the challenges faced by manufacturing sectors in middle income and Asia-Pacific region, where, it needed to provide a strong infrastructure for electricity, water supply and telecommunications. Operation of manufacturing sectors usually require a reliable supply of public utilities (such as electricity), and inadequate provision of public utilities can increase costs, disrupt productivity, and reduce profitability. Further, inadequacies of public services or infrastructure (such as roads and public transportation) can impose additional costs on labour productivity of firms, logistics costs and may act as barriers to entry and investment” (World Bank, 2016).

Thus, this study deals with “the development of a public utilities and infrastructure, which can improve supply chain for garment and apparel retailers by focusing on short lead-times and reducing costs to compete garment export to the world market” (World Bank, 2016).

(d) National Culture

Most of the garment firms are occupied by female with low-skilled labour. Therefore, their society culture can be strongly influenced on labour productivity of garment firms. Culture is considered one of the most powerful forces that shape human behaviour and thus also economic activity. Porter (1990) argued that the elements of national culture under the factor conditions, which are more important for industry production and in determining a country's competitive advantage than naturally inherited factors such as land and natural resources (Porter, 1990).

Then, Bakas (2000) was examined the impact of cultural background of a nation on labour productivity over a long period of three decades (1980, 1990 to 2000), and his analysis based on the sample of 34 OECD countries. Then, the author explored the impact of various dimensions of a society’s civic culture on labour productivity. In his research, the author measured the six distinct forms of cultural traits: interpersonal trust, control, work ethic, obedience, competition affinity and honesty (Bakas, 2000).

Moreover, in the recent decades, globalization generates the notable changes in the composition of the non-native workforce in the labour market, and it has been diversified by means of nationalities and cultural backgrounds where the foreign workforce is composed. This situation of cultural diversity of employees among different nationalities has substantially increased the effects on skill compositions of

the employees and supervision team-work in their workplace. Therefore, cultural diversity of employees can lead to different level of labour productivity of the firms in that area (Jens, 2014).

2.4 Relationship between Export and Productivity

Growing productivity in all sectors is essential to put the country on the growth path. Recently, changing global trend towards more trade liberalization and openness which has forced the industrial sector to meet new standards of price and product competition. Productivity analysis provides a significant tool for assessing how an individual activity of the firms contribute to changing structure of the economy. Increased productivity is essential for increasing exports, achieving export-led growth, attaining economic development and generating wealth for investment, consumption and social-welfare (Sharon Pells, 2018).

In this case, export could be a major driver to increase the productivity of the firms, because it emphasized the experiences from foreign markets in terms of buyer-seller relationships, and increased competition with foreign suppliers, or adapting and improving product quality to suit foreign preferences. The idea of learning by exporting has risen from the successful experiences of export promotion strategy in Newly Industrialized countries (NICs) in the 1960s and 1970s (World Bank Report, 1993).

According to learning-by-exporting matter, the export market can encourage firms to be more productive due to knowledge flows from foreign buyers to exporting firms and technology spillovers in international markets. Therefore, learning-by-exporting stipulates to increase the labour productivity as a consequence of exporting (Bernard and Jensen, 1999).

Therefore, many researchers advocated that exporters are more productive than non-exporters. Exporting firms can enjoy higher productivity performance, this is caused by benefits from scale economies and learning by doing or learning by exporting effects. The interactions between export behaviour and productivity are become an important understanding for policymakers. Thus, policymakers have been argued that export promotion is beneficial to economic growth through its productivity growth (David Greenway, 2004).

2.4.1 Labour Factor and Other Determinants of Export Growth

Garment exports contributed significantly in obtaining foreign exchange for developing countries. Thus, various researchers explored the determinants of export growth and its effect on labour productivity of garment firms for many countries. When the countries liberalized in international trade, there is great competition among garment and textile industries. On the other hand, competition both in local and international market is hindered by manpower underdevelopment, and high cost of production.

However, there is no only factor to determine nations' competitiveness for export growth. There are also four major different ways to determine export competitiveness of garment exporting firms. The first is the relative export price, which are one country's export prices in relation to other countries, expressed as an index. The second is a country's terms of trade, which is an index of a country's export ratio to import prices. In addition, the third one is the labour productivity, that is usually expressed as GDP per worker, or GDP per hour of employment. Then, the last is the unit labour costs, which are the cost of employee per unit of production. (Khanna, 1993)

But labor costs are not the only comparative advantages for garment exporting countries but also to compete the global market of garment and textile industry. Quality products, labours' skill and process of technology are also be the important factors that buyer firms need to care about for garment industry (Handfield, 1994).

Many industry level literatures described that low-cost labor is no longer the significant comparative advantage for garment manufacturing in Asian countries, such as, China, Thaiwan, South Korea and Japan, etc. These countries have experienced losing export competitiveness, due to increasing labor costs and it created negatively impact on their textiles and garment export performance (Jin, 2004).

Although many research studies found various determinants for export growth of garment industry (such as industrial, economics and trade factors, number of employees, labour costs, lead time, logistic performance, exchange rate, quotas and tariffs, etc.), increasing the share of low-cost labor was an important route through which export performance of the garment firms was enhanced (Abraham, 2014). In his point of view, he argued that … "human capital or workers' skills might be a major factor of the garment exporters for establishing their manufacture schedules closer to the selling period based on quick response strategy that links garment retailing and

manufacturing operations to make available the standard quality products at right time" … (Abraham, 2014).

Further, Hansi (2017) analyzed the major factors affecting the export growth of garment industry. After detailed analysis in garment industry of Sri Lanka, the author found that wage of workers and number of unskilled migrants have strongly influenced on the garment exports of Sri Lanka firms (Hansi, 2017).

After reviewing on the empirical studies of various scholars, this study can be summarized that export performance of a country is not only related with the factor endowments of the country, but it also depends on the competitiveness in global market. Therefore, garment industry in various countries has been trying to compete with each other in the global market. Early literatures indicated that labour cost is mainly driven the export growth of garment firms, but newly researchers argued that other endogenous variables such as firms' characteristics, decision makers' characteristics, technology of the firms, wages and skills of workers, investment in workforce training, and research and development activities are determining the export growth of garment firms. On the other hand, resent researchers pointed out that macroeconomic variables, such as GDP of a country, inflation rate, exchange rate, supporting infrastructure, trade and government policies, etc. are newly interested areas to promote the export of garment industry. However, in this study, it limits to find the effects of labour factor on export growth of garment industry (Hansi, 2017).

2.4.2 Productivity Growth and Long-run Export Growth

Economic growth can occur when an economy's production at full employment level increases. It can push an outward shift of production possibility fronter (PPF). Therefore, this study aims to analyze the factors that can be made an increase in labour productivity and then it put outward shift of PPF. Many literatures found out the results that indicate the growth of productive capacity depends on the rate of growth of labour productivity and technological progress (Robert, 2011).

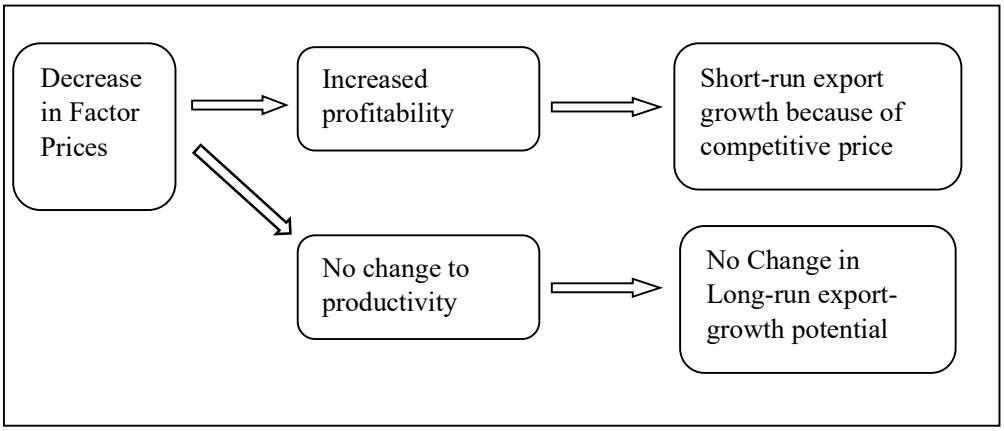
In the modern world, the role of exports in economic growth is obviously importance. For example, the standard neoclassical trade argument would postulate a substantial positive impact of exports and trade on economic performance due to better allocation of resources. Recent economic development models would also suggest an important positive role of exports in economic development due to an attenuation of the foreign resource gap. However, the Marxist or the neo-Marxist stances may treat trade

as one mechanism for exploitation of the least developed countries (LDCs) by the industrialized West (Robert, 2011).

Michaely (2000) analyzed 41-LDCs to examine the annual growth of per capita GNP by using the annual increasing share of exports in GNP during 1950-1973, which indicates a positive association between the rates of growth of per capita GNP and export share.

Again, according to Porter (2003), productivity is the best measure of export competitiveness, and, there are some circumstances that would lead to a productivity growth. Since garment firms are in business, those firms usually want to make profits. In order to make an increase in profit, "… firms will produce more at the same price only if their costs of production fall, and this will happen only if productivity increases or factor prices fall" (Sayre and Morris, 2015, pp- 162). This concept is described in figure (2.4).

Figure 2.4 Effects of Decreasing Factor Prices



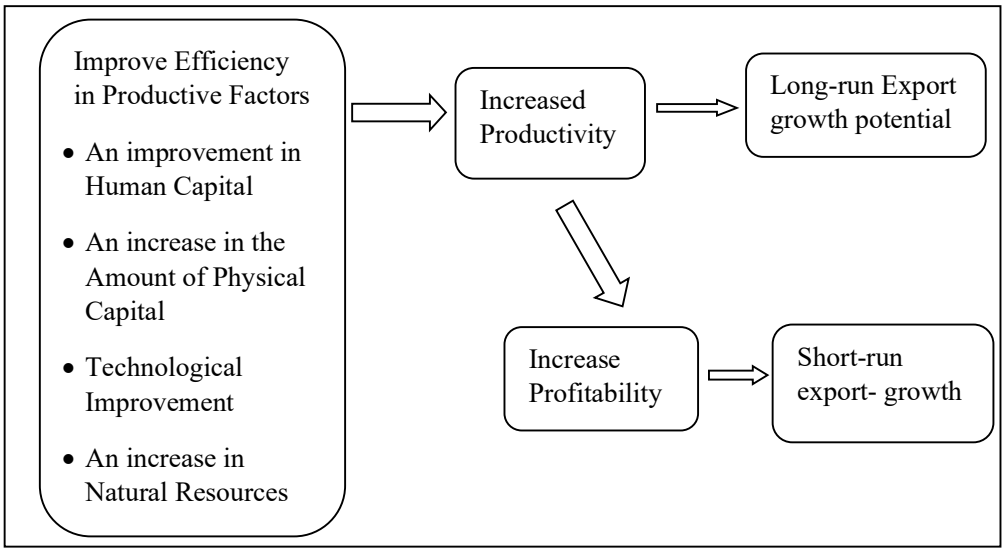
Source: Sayre and Morris (2015)

Accordingly, the concept of Sayre and Morris, "producers are able to produce at lower per unit costs and thus make greater per-unit profits. Since profits are higher, firms are willing and able to produce more without the incentive of higher price, and thus, which would also lead to increase its potential exports by means of increase in competitive advantages. But, on the other hand when an increase in factor prices (such as wage rates in garment firms) which lead profits to fall and lead to a reduction in its productivity in the long-run. Therefore, it does not affect firms' potential exports growth in the long-run" (Sayre and Morris, 2015).

Therefore, the figure (2.4) revealed that a decrease in factor prices, such as, decrease in wage rates, which can only create lower the costs of production and therefore increase the export, while potential productivity growth and the long-run export growth is unaffected. (Sayre and Morris, 2015)

On the other hand, recent researchers criticize the idea of reducing factor costs cannot be further suitable to promote productivity of any manufacturing firms. Then, Sayre and Morris (2015) also argued again that when an increase in the quality of the labour force, an increase in the amount of capital stock and natural resources, or as improvement in technology, which will increase the productivity and shifts the production possibilities curve to the right. It also equally increases the amount of quality exports in the long-run (Sayre and Morris, 2015). This concept is described in figure 2.5.

Figure 2.5 Effects of Increasing Efficiency in Productive Factor



Source: Sayre and Morris (2015)

The figure (2.5) described that manufacturing firms should contribute to improve efficiency in productive factors, such as provide workplace training for employees and other welfare facilities, that lead to an improvement in human capital. In some cases, firms have to utilize improved technology or emphasize on advanced technology and R&D. Furthermore, some firms try to modification of their managerial practices to efficient utilization of their own resources like human resource, financial capital and natural resources (Sayre and Morris, 2015).

However, in case of developing countries, which have a lack of physical capital and technology. Therefore, those countries should be depending on an improvement in human capital and upgrading the managerial practices to be an efficient utilization of owned resources to increase productivity and export growth in the long-run (Sayre and Morris, 2015).

2.4.3 Causality Approach: Relation between Labour Productivity and Exports

The most important factor affecting exports of an industry is evolution of labour productivity. It can be such an important variable in productivity measurements.

Robert and Dalia (1989) reviewed several explanations for the causal relationship between exports and productivity. "First, exports concentrate investment in the most productive sectors of the economy where the country has a comparative advantage. Greater specialization in these sectors is perceived to increase productivity. Second, higher export growth is allowed the country to benefit from a scale economy, since the incorporation of the international market into the domestic market. Thirdly, increasing exposure to international competition would increase pressure on export industries to keep low costs and bring about technological changes that improve productivity. Fourth, an increase in exports should have a stimulating effect on the productivity of the economy as a whole through externalities of exports on other sectors. The researchers then examined the causal relationship between productivity and exports from Austrian data using a time series analysis. Their results suggest that there is no causal relationship from exports to productivity" (Robert and Dalia, 1989).

In addition, "international trade theory has suggested a potential source of productivity gains where an outward-oriented trade regime for production across exporting goods. Krugman (1985) stated that international trade theory saw the growth of exports as stimulating production across the economy through technological spillovers and other externalities. Thus, the rate of export growth can cause productivity gains in economy" (Krugman, 1985).

On the other hand, one of the important implications of the neoclassical growth theory contended that all countries eventually would converge towards the same level of productivity. Romer (1986) presented that "new growth theories are characterized by the endogenization of technology. A justification of causality from productivity to exports that can be found in New Trade theories. It is argued that productivity leads to greater exports by motivating the technological factors to get more exports. In other

words, international technological differences are important factors of international competitiveness and trade performance of developed countries" (Romer, 1986).

Although "the new trade theory reflects the link between productivity gains and exports, the effect of export on greater productivity is primarily ambiguous and doubtful in model of imperfect competition and increasing return to scale. Exports are expected to increase technical efficiency to greater degree in smaller economies and those with fewer new firms can be entering the markets. Furthermore, productivity improvements are more likely to result from an increase in exports if incentives are created to invest in R&D" (Dhiman & Sharma, 2019).

However, "examining of causality for productivity and exports in industrialized countries shows that countries are successful in their export performance seem also to be successful in their productivity performance, and vice versa. A number of studies have found a positive relationship between exports and productivity growth" (Dhiman & Sharma, 2019). At the macro-level, Marin (1992) "found that there is unidirectional causality from exports of manufacturing goods to labour productivity for developed countries, such as Germany, Japan, the UK and, US. On the other hand, at the micro-level, firms with higher productivity are more expected to sell in the export market, especially for developing countries" (Marin, 1992).

In practices, "the relationship between exports and productivity is an interesting prospect. Exports may rise from the realization of economies of scale due to productivity gains, then, the rise in exports may further create cost reductions which may result in further productivity gains. Alternatively, export expansion leads to improved skills and technology. This increased efficiency creates a comparative advantage for a given country, which facilitates exports" (Hatemi & Irandoust, 2001).

2.5 Review on Previous Empirical Studies

Garment manufacturing is still considered a highly labour-intensive industry, and factors of production like labour is still a great extent tend to determine the location choices in the garment manufacturing. The industry characteristic also explains the footloose nature of retailers, some of whom are constantly in search of the next emerging low-cost location. Therefore, many researchers from different countries have made various analyses for improve labour productivity and compete for export share between countries based on comparative advantages of the countries.

Yoko ASUYAMA (2010) studied the Cambodian Garment Industry. The author examined the productivity of 164 garment exporting firms in 2003 and 123 firms in 2009. The researcher used Törnqvist's index, which compared total-factor productivity (TFP) of garment firms in two periods through the translog production function. The researcher has examined the changes on the firm performance, especially in the welfare and training of workers between the two research periods. Moreover, it is also examining of employment, wages, and other working conditions. The research found that the relative wages of low-skilled workers such as operators and helpers has risen after getting the training, and the wage gap narrowed between low-skilled and high-skilled workers. Therefore, skill improvement can be contributed to improvements in the productivity of the Cambodian garment firms (Yoko ASUYAMA, 2010).

Soukavanh VIXATHEP (2011) made research of efficiency and productivity change in Lao Garment Industry by a non-parametric approach. The dataset contained 33 garment firms (including Lao firms, Foreign-owned enterprise and Joint venture firms) which survived in the transition period from quota to post-quota era. This research stated the problem of the garment industry, which was needed for improving efficiency and labour productivity aiming at retaining its competitiveness and coping with labor shortage and competition from other much larger rivals in the post-MFA. In recognizing this issue, this research evaluated the productivity and its determinants by calculating in changes of total factor productivity (TFP) and the sources of such changes for garment firms. In this research, the data envelopment analysis was applied to firm-level data of 2004-2005 to calculate firm efficiency and the Malmquist TFP index. The study found that there was an urgent need to promote human capital to enhance firm efficiency and labour productivity for garment firms. Furthermore, the role of human capital is somewhat evident for regression with labour productivity for garment firms (Soukavanh VIXATHEP, 2011).

Moreover, Shanmugas and Panchanatham (2011) were also studied the factors affecting the labour productivity of the Apparel industry. This research focused to collect the primary data from 36 garment exporting firms in export processing zones of India (which covered 25% of total 144 garment exporting firms). The research method used weighted method and it has found that absenteeism of the employees, labour turnover, socio-eco background of employees, working conditions of the firm, buyer's order or change the volume of order, frequent change style and operator to helper ratio were mainly related to labour productivity of garment exporting firms. Then, the

researchers also suggested that labour productivity can be improved by promoting knowledge and skills to the workforce by arranging training programmes (Shanmugas and Panchanatham, 2011).

In the case of Ethiopia, Tsegay and colleagues have made research of "Productivity Determinants in the Manufacturing Sector in Ethiopia: Evidence from the Textile and Garment Industries" (Tsegay, 2018). This study aimed at exploring the determinants of labour productivity by using structured survey instrument of 137 garment firms including medium and large firms in the garment industry in Ethiopia. The study revealed that human capital, agglomeration effects, and incentive systems to be core drivers of labour productivity. This study used panel fixed and random effect estimators by complementing OLS and Levinsohn and Petrin estimators to compute the productivity. The research found that human capital was one of the strong correlates of labour productivity of garment firms. The result indicated that close interaction between the private sector and the government to identify the skill gap in the economy and improve labour-market information systems can help better matching of supply of and demand for skills (Tsegay, 2018).

Then, Estegenet Mitiku (2018) also examined the major determinant factors to affect labour productivity of garment industry in Ethiopia. The author found that factors affecting on labour productivity of garment industry are insufficient training & development, unavailability of skilled and trained manpower, inadequate compensation & benefits packages, personal socio-economic problems, low educational level of employee, management and technological problem (Estegenet Mitiku, 2018).

Khin Nann Yu Aung (2019) analyzed the labour productivity by balancing of sewing line and work sharing among different-skilled labour in garment firms. In this research, the researcher studied that "… floor managers need to consider the balance of the line by assigning tasks as equal as possible to the workstation. Tasks will be given to the operators according to workers' different skill level limits. The line managers or production controllers use his/her experience in work assignments for the sewing line, skill level, and standard period required to complete each task …" (p-1). After analyzing, the researcher found that the workers should have an appropriate skill for production process, suitable training and supervision that are crucial for greater productivity (Khin Nann Yu Aung, 2019).

In addition, the empirical study for the relationship between export and labour productivity has been conducted by many studies.

Abdulnasser Hatemi-j and Manuchehr Irandoust (2001), examined the relationship between productivity (LP and TFP) and export performance based on time-series perspectives, using OECD data (1960-1997), which test for Germany, Italy, Sweden, UK and France. The authors applied six steps for the process of causal analysis: test for the order of integration in real export and labour productivity by Augmented Dicky Fuller Test, test for optimum lag length by Akaike Information Criterion (AIC), test for the existence of long run equilibrium relationship between export and labour productivity by Johansen and Juselius Co-integration Test, test for assessing the short run disequilibrium by Vector Error Correction Model, examine for the direction of causality between export performance and productivity by Granger Causality Test, and analyze for Residual Diagnostic by Residual Diagnostic Tests. The author used two different calculations of productivity; labour productivity and total factor productivity. Then, the researchers found that cointegration and causal relationship between exports and two alternative measures of productivity, and causally related in the long-run. Moreover, causality test between labour productivity and export performance indicated that export growth can caused the labour productivity growth, which was prominent for France, Germany, and Sweden. In UK, the flow of causality between two variables is bi-directional. On the other hand, causality test between TFP and export performance pointed that there was a bidirectional relation between two variables in UK, Germany and Italy. But there was one-directional causation that is productivity (TFP) to export growth in the France, and also one- directional causality runs from export growth to productivity growth in Sweden (Hatemi & Irandoust, 2001).

On the other hand, Wondu Adugna (2018) identified and analyzed the internal and external factors that can affect the export performance of textile and garment sector in Ethiopia. The researchers used the OLS regression method for analyzing export performance of firms during the time-period of 27 years (1991-2017). This result found that export performance of firms could be affected by external factors (GDP, FDI, real exchange rate, trade openness), and internal factors (firm characteristics and export marketing strategy) (Wondu Adugna, 2018).

Furthermore, Rahul Dhiman and Manoj Sharma (2019) examine the relationship between labour productivity and export for the Indian textile and garment industry in the post-liberalization period of 1991 to 2015. The authors applied six steps for the process of causal analysis: Test for the order of integration in EC and LP by Augmented Dicky Fuller Test, Test for optimum lag length by Akaike Information

Criterion (AIC), analyze for the existence of long run equilibrium relationship between export competitiveness and labour productivity by Johansen and Juselius Co-integration Test, estimate the short run disequilibrium by Vector Error Correction Model, examine for the direction of causality between export competitiveness and labour productivity by Granger Causality Test, and finally make a Residual Diagnostic by Residual Diagnostic Tests. In this study, export has considered as the share of textile and garment exports in its total output. In the case of measuring labour productivity, the authors have used the total number of clothes produced as output, and total number of employees as labour input to calculate labour productivity. In this study, the authors explained the direction of causation between the labour productivity and Export for Indian Garment and Textile Manufacturing Firms in 1991 to 2017 (Rahul Dhiman and Manoj Sharma, 2019).

In addition, Yan Zeng (2020) studied the factors determining on the competitiveness challenges of export-oriented garment industry. The author used the primary data with the sample size of 211 exported oriented garment firms in Thailand, where the respondents were garment supervisor and managers who worked over 5 years of firm age. In this research, export growth used as a proxy for export competitiveness and the research method was regression analysis to test the research hypothesis. There were six indicators such as labour productivity, shorten lead-time, collaboration, capability of opportunity identification, ability of quick response in market, ability of risk identification in market, which are influenced on export growth of garment firms (Yan Zeng, 2020).

2.6 Conceptual Framework of the Study

Since the purpose of this thesis is to analyze the factors that influencing on increase labour productivity of garment firms. Based on this concept, the possible influencing factors are firstly described and then the most possible influencing factors on labour productivity growth are analyzed. Therefore, the conceptual framework is showed the relationships between the variables that have studied in this study.

In any modern economy, Sayre and Morris (2015) stated that export competitiveness become an important factor to access the long run export growth of the economy. Therefore, many firms try to get the export competitiveness by using the different ways. In the global context, the concept of competitiveness is generally understood in terms of the price at which the seller offers the product in the market.

Thus, the seller is competitive when the price of his goods is lower than the price charged by his competitors. Accordingly, price depends on the cost of production, thus, firms can produce their products at a lower relative cost.

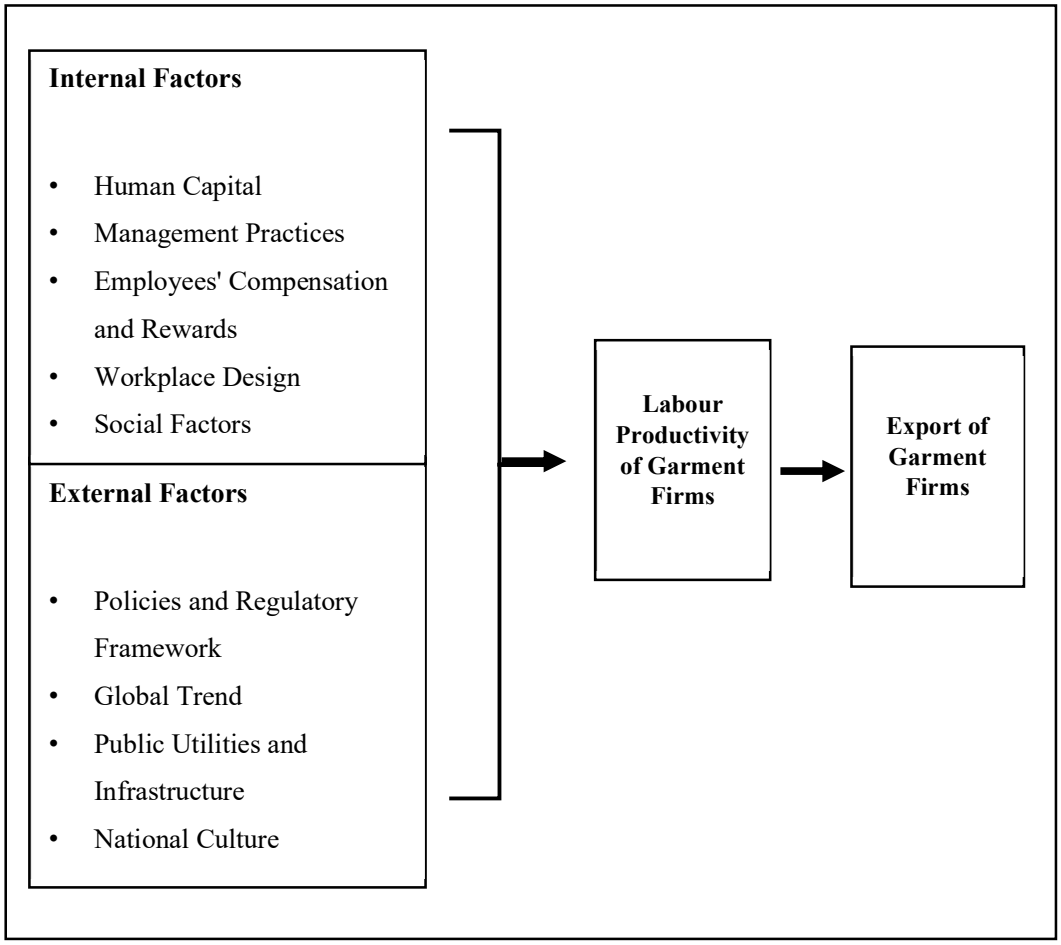
Among the different ways to reduce the costs of production, most of the firms usually use the technique of decrease in factor prices to access the export competitiveness in the global market. It is also occurred in the garment manufacturing, where most of garment firms reduced the factor costs to access the price competitiveness in global apparel/garment market by using the low-cost unskilled labour, reduced welfare and social cost, minimum wages and more overtime, etc.

However, some researchers have criticized that factor price reduction may not ensure for export competitiveness in the long term (Sanyal, 1993). They argued that it has to improve efficiency in productive capital such as expand investment in human capital and physical capital, and, improved technology can be the certain driven sources for increase productivity with competitive prices. The purpose is that effective uses of productive capital can be generated the lower per unit cost through mass production. It turns to be enforced to increase export with competitive price in the global market, and, eventually, it can be contributed to export growth over the long-run.

Therefore, this study is going to analyze the factors that can be increased on labour productivity of the garment firms, firstly. Then, it also examines the linkages between the labour productivity and export, and assess that this relationship could be truthful over the long-run or not, in this study.

According to the conceptual literatures and the objectives of the thesis, the framework for analysis can be drawn out as follows, in figure (2.6).

Figure 2.6 Framework for the Analysis



Source: own compilation

In the study, there are two main factors which can be influence on the labour productivity of the garment exporting firms, such as internal and external factors. Internal factors can be directly affected on labour productivity of garment firms, including human capital or men power, management practices of the firms, employees' compensation and rewards, workplace design, and social factors. But, there are additional factors that cannot be directly promote the labour productivity of the firms, but it can be indirectly support to increase the production of the firms. Therefore, those factors can be called as external factors, which can also be contributed to increase labour productivity of the firms. In this thesis, the external factors are government policies and regulatory framework of a country, changing global trend, current conditions of public utilities and infrastructure of this country, and the social inheritance conditions of workforce or national culture of a country. Therefore, those internal and

external factors could be the independent variables and the dependent variable is the labour productivity of garment firms, in this study.

Thus, according to the first objective of the study, it needs to analyze the factors that determine on the labour productivity of the garment firms by using the multiple regression model.

On the other hand, this study needs to analyze the condition of export, whether it would also be contributed to the labour productivity or not. The main reason of why export is studied separately from the other factors is that some literature states that export is one of the factors for increasing labour productivity, but in some literature, it is observed that increasing export is caused by increasing in labour productivity of the firms, vice-versa. In this case, the method of analysis for relationship between labour productivity and export can be suitable with the Granger Causality Test. Therefore, the next part of the analytical framework is to examine the relationship and direction between labour productivity and export by using the Granger Causality Test, in this study. After that, this study continues to examine whether the relationship between labour productivity and export of the firms is long-run or short-run, which is the last objective of this study.

CHAPTER III
OVERVIEW OF MYANMAR GARMENT INDUSTRY

3.1 Emergence and Role of Garment Industry in Myanmar

The garment sector has recognized to be a driver of economic and occupational growth in many Asian economies. Myanmar's garment and textile industry is one of the fastest growing industries in Southeast Asia since 1990s. Although agriculture is the backbone of Myanmar's economy as a land rich in culture and with abundant natural resources, the most popular handicraft in Myanmar is traditional textile weaving and it is still possible to produce excellent clothes. Recent world, garment and textile markets become wider and wider with increasing population and the global garment industry forms an important component of world trade flows. Particularly, some developing countries like Myanmar, where garment accounts for a large proportion of nation's total exports (Kudo, 2013).

Kudo made an assessment of the Myanmar garment sector that breaks down its evolution into five phases: a Pioneer Period (1990 – 1993), a Steady Growth Period (1994 – 1997), a High Growth Period (1998 to 2001), a Stagnation Period (2001 to 2005), and then a Recovery Period (2006 onwards). The U.S. and European economic sanctions imposed on Myanmar in the early 2000's drastically impacted the sector. Export decreased until 2005, when a shift occurred, Eastern countries like Japan and Korea began to increase imports from Myanmar. The overall total value of exports managed to grow from 2005, even if the growth levels have not yet reached the pre-sanctions period. Growth expended again in 2011 when Myanmar began to liberalize its economy. As Western international brands turn their attention to the country once more, a number of local and international entrepreneurs are seeing investment opportunities in the Myanmar's garment sector (Kudo, 2013). The below table shows that the structure of the garment sector, which has evolved responding to both internal political changes and to the international reactions that followed.

Table 3.1 Evolution Phases of Myanmar Garment Industry

	1990-1993 Pioneer Period	1994-1997 Steady Growth	1998-2001 High Growth Period	2002-2005 Stagnation Period	2006 on wards Recovery Period
Major Player	JVs between state-owned and military-related enterprises and Korean and Hong Kong firms.	JVs between state-owned and military-related and Korean and Hong Kong firms; 100% foreign owned firms	Domestic private firms; "Spin out" Korean and Hong Kong Businesses; Taiwanese buyers	Foreign-affiliated firms; Widening disparity among firms	Foreign-affiliated firms
Policy Environment	Virtual Prohibition of 100% foreign ownership; Monopoly of quotas by state-owned and military-related enterprises.	Monopoly of quotas by state-owned and military related enterprises. Lifting of prohibition on 100% foreign ownership.	Allocation of quotas to private firms; Expansion and misuse of CMP; Privileges of MIC approved firms; Import of equipment by deferred payment.	Obligation to register with MIC; Tightening of regulation and taxation.	Obligation to register with MIC; Tightening of regulation and taxation.
Global Economic Environment	MFA regime, no sanctions by US and EU	MFA regime, no sanctions by US and EU	MFA regime; Brisk markets in US and EU; Worsening trade relations with US and EU; ILO warning for sanctions.	Slowdown of US market; Abolition of MFA regime (Jan 2005). US economic sanctions (from Jul 2003). Disappearance of major EU buyers	No access to US market. China plus orders from Japan and Korea
Export by Type of Firm	State-owned and military-related JVs 95%, foreign-owned 0%, and Domestic private 5%	State-owned and military-related JVs 90%, foreign-owned 5%, and Domestic private 5%	State-owned and military-related JVs 15%, foreign-owned 20%, and Domestic private 65%	State-owned and military-related JVs 10%, foreign-owned 25%, and Domestic private 65%	State-owned and military-related JVs 10%, foreign-owned 25%, and Domestic private 65%

Source: Kudo (2013)

Before Myanmar became subject to the EU and US sanctions in 2003, the brand investors such as Zara, H&M, Primark, C&A, Walmart and Arrow were already sourcing from their home country. However, during the sanctions, Myanmar shifted its focus to manufacturing for Japanese and South Korean brands. Post-sanctions, major

European brands, started to establish garment supply chains from 2013 onwards. Global companies sourcing in Myanmar has included Adidas, Arrow, Deuter, Esprit, GAP, Marks & Spencer, New Look, Primark, and Top Shop. Over a quarter of total garment firms of Myanmar are accredited and operated under the suppliers of these European brands (Kudo, 2008).

However, Myanmar's garment exports had been seriously damaged by the United States' sanctions of 2003 because the US market was lost. The garment industry was unfavorably affected by changing in the country's taxation and regulations. Moreover, the international agreement on textiles and garments was running out in 2005. In addition, some reasons like the emergence of China and Bangladesh become the leading garment exporters could contributed to stop many producers from expanding or renovating the factories to become more competitive. In 2000, Myanmar exported more than eight times the garment to the United States than Vietnam, which was two years before the United States' import ban imposed on Myanmar. The United States' market size is much larger for Myanmar's garment export than that of Japan. Moreover, the United States' markets are easier for garment firms in developing countries to enter since the quantity of orders are large, designs are simple, and customers and buyers are not particular about sewing quality (Goto and Kudo, 2012).

After falling to the lowest level of export in 2005, Myanmar's garment exports have gradually recovered due to Asian Demand, which was unaffected by Western demand. Unlike the EU, Asian countries' customers generally are not controversy to human rights issues of garment-exporting countries. As a consequence, Asian countries did not reduce purchasing garments from Myanmar despite Western imposed sanctions. The recovery of Myanmar's garment exports has been first led by orders from Japan, followed by those from South Korea. It took opportunity for garment firms in Myanmar to enter the Japanese market (Myo Myo Myint, 2012).

According to the UN Comtrade repot (2014), Myanmar garment export to Japan was only US$ 4.6 million in 2005. Then, the value of garment exports to Japan has steadily increased and it has been reaching US$ 408.2 million in 2012, it has increased of 89.4 times compared with the garment exports in 2005. During this period, Kudo (2013) described that most of the garment produced in Myanmar for the Japanese market are men's suits, men's shirts, men's overcoats and work wear and so forth, thus, garment that require neither frequent style changes nor quick delivery. Most garments for the Japanese market have been produced by either 100 per cent foreign-owned firms

or a joint venture with Myanmar's firms. However, Japanese customers and buyers are careful about sewing quality, strict on delivery, and order small quantities with complicated designs, although the sewing charges are a little higher than those for the United States' market. Therefore, the United States' markets were very attractive to garment firms in Myanmar at that time (Kudo, 2013).

In addition to the United States' markets, EU markets were also affected by the economic sanctions. The EU (15 member countries only) imported US$90.7 billion worth of garments in 2012, which was 16 per cent larger than imports by the United States. Myanmar's garment exports to the EU increased from US$94.1 million in 1997 to US$457.4 million in 2004, an increase of 4.9 times. However, Myanmar's garment exports to the EU continuously declined, by around 60 per cent in 2011. The decline was apparently caused by the United States' sanctions of 2003 even though it was not directly targeting EU markets. Moreover, some buyers for EU markets became reluctant to purchase made-in-Myanmar garments. Therefore, Myanmar garment exports were limited to US$180.0 million in 2011, that was 60 per cent decline from 2004. (UN Comtrade, 2014).

Then, EU postponed its sanctions on Myanmar in April 2012 for one year, and in July 2013, the EU decided to bring Myanmar back under the preferential trade regime, which grants duty-free and quota-free access to the European market for all products except weapons and bullets. Therefore, Myanmar's garment industry has restored its access to Western markets and many American and European garment firms started to visit Myanmar for seeking business opportunities (Kudo, 2013).

(a) Growing Number of Garment Firms in Myanmar

According to MGMA, about half of the existing garment factories operate in the Yangon Region. Especially in the Hlaing Thayar industrial zone and Thilawa Special Economic Zone. The other key locations where garment factories are operated at Bago, Pathein, Hpa-an and Mandalay. The garment manufacturing industry in Myanmar is dominated by export-oriented factories, all operating under the Cut-Make-Pack (CMP) system with the majority of raw materials being imported (MGMA, 2021).

According to Myanmar Garment Manufacturers Association (MGMA, 2021), there are 502 garment factories registered in Myanmar, in which 90% of factories are primarily focus on the export market. The number of garment factories has increased significantly over the past few years because of Myanmar's rising attractiveness in low-

cost garment manufacturing and strategic location. The compound annual growth rate (CAGR) of Myanmar's garment industry has risen 18% from 2012 to 2018 (MGMA, 2019).

With increasing demand from exporting countries as well as a large domestic population, garment manufacturers in Myanmar have provided to both local and export markets. However, the local demand is primarily provided by tailors operating small shops in residential areas or in the neighborhood, lower disposable personal income, and, lower-quality unbranded ready-made garment (RMG) are imported by other small importers. As a result, the majority of garment manufacturers focus on the export market rather than investing in developing local brands. However, export-oriented firms often receive local orders during the low-ordered seasons of January to February and September to October, when there is relatively lower export demand due to the gap between summer and winter seasonal (www.myanmargarments.org). The following table show the increasing number of garment factories in Myanmar.

Table 3.2 Number of Garment Firms in Myanmar

Year	Number of Garment Firms
2010	199
2011	226
2012	258
2013	296
2014	361
2015	421
2016	476
2017	541
2018	600
2019	675
2020	733
2021	742

Source: MGMA (2022, May)

According to data from MGMA (2022), the above table (3.2) shows that the number of garment factories are sharply increased during the period of 2010-2021. In 2021, the total number of garment factories were 742 factories, which is increased by

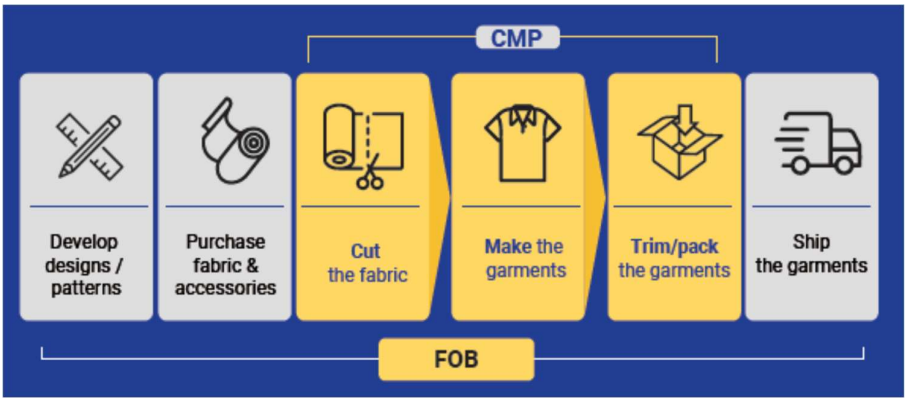
about four-fold compared from 199 factories in 2010. Among them, the vast majority of Myanmar garment manufacturers are concentrated in industrial zones in and around Yangon area because they can access to the ports in Yangon within 1to 2 hours by road transportation. In this study, there are total 443-garment firms are operated in Yangon, which can cover about sixty percent of total garment firms of Myanmar. The left firms are operated in the area of Mandalay, Bago, Pathein, and others districts of Myanmar (Appendix Table 3.3, 3.4, 3.5).

In practices, there are active 502 garment firms are operated under the report of MGMA (2022) and the majority of them are from China and Korea. Therefore, current operating firms of Myanmar garment industry is only covered by 67.6% (502 firms out of 742firms) of total garment firms of Myanmar. The rest of garment firms are closed due to the economic and political instability after Covid-19 Pandemic (Appendix Table 3.5).

(b) Contract Nature of Garment Firms in Myanmar

On the other hand, the contract nature of garment industry is usually finds as FOB and CMP. In Myanmar, nearly all of the orders of garment manufacturers are carrying based on a Cut-Make-Pack (CMP) contract. Under CMP contract, garment manufacturers receive a limited profit margins because manufacturers do not provide value-added services of designing, supplying all raw materials, storing them in the own warehouses, or shipping the finished products (MGMA, 2020). Thus, marginal profits from a CMP contract usually limit the manufacturers' ability to promote investment in advanced machinery or upgrade skills of the labours, those are necessary for expansion of the business (Eurocham, 2020). The below figure (3.1) indicates the contract nature for FOB and CMP of typical garment industry.

Figure 3.1 Contract Overview for Garment Industry



Source: EUROCHAM Myanmar, Garment Guide, 2020

For the garment manufacturers in Myanmar, they have to move from CMP to FOB extensive where it need to updates the existing production facilities. FOB suppliers would need to independently manage their material supply chain and source materials from China, India or Thailand. In addition, FOB suppliers would have to employ a merchandising in order to render buyers' product requirements into manufacturing processes. (Eurocham, 2020)

Moreover, the majority of garment factories are mainly influenced by foreign-owned which usually include Japan, South Korea, China and Taiwan, due to the comparative advantages in wages, production costs, and tax exemptions in Myanmar. Among them, a small proportion of these foreign-owned manufacturers are gradually moving to FOB because profit margin under CMP has continued to decline with rising competition from new factories (Eurocham, 2020).

According to Garment Guide (2020), it stated that there are about 70% of garment firms are CMP, among them approximately 10% have started transitioning towards FOB. However, in terms of output value, the FOB contribution remains less than 5%, because there is a significant gap for knowledge and technology transfer (Eurocham, 2020).

According to MGMA (2022) statistics, the majority of the ready-made garment manufacturing factories are foreign direct investment which represented about (440) factories, that is 59.30% of total garment factories. Under this ownership type, some factories are handled Free-On-Board (FOB) orders while their head office make outsourcing, and most factories are handled CMP orders to Myanmar for standardized manufacturing. The second largest percentage of ownership type is local factories, which contributed about 35.58% of 742 factories (MGMA, 2022).

The smallest percentage of factories are joint venture factories, which covers only 5% of total garment factories. However, most joint venture companies source orders from their corresponding parent head office in home country. The headquarters would offer and secure FOB contracts, and sourcing the raw materials which imported primarily from China. Then, the headquarter signs contracts with the Myanmar Joint Venture entity on a CMP basis (MGMA, 2022).

The number of garment factories with their ownership type are detail presented in the following table (3.3).

Table 3.3 Number of Garment Firms by Ownership Types

No	Year	FDI	Local	JV	Total
1	2010	34	152	13	199
2	2011	5	21	1	27
3	2012	14	18	-	32
4	2013	22	14	2	38
5	2014	45	11	9	65
6	2015	46	9	5	60
7	2016	48	5	2	55
8	2017	56	8	1	65
9	2018	46	10	3	59
10	2019	63	10	2	75
11	2020	55	3	0	58
12	2021	6	3	0	9
	Total	**440**	**264**	**38**	**742**

Source: MGMA (2022, May)

There are yearly increasing of FDI firms in Myanmar after 2010 onwards. However, it is declined again in 2020-2021 due to the global pandemic of Covid-19, when overall performance of garment industry has declined over the world (MGMA, 2022).

(c) Garment Manufacturing and Export

Myanmar's garment manufacturing industry is dominated by exported-oriented firms, which operating under the CMP (Cut - Make - Pack) system, where most of the raw materials are imported. Myanmar experienced a remarkable development of its garment industry after removing of political sanction by Western countries. Since that time, garment sector has become a key contributor to GDP of Myanmar's economy along with agricultural products, fishery and natural gas. Therefore, garment production is one of the largest manufacturing activities in Myanmar in terms of the number of firms involved, number of employees, and increasing number of exports. According to statistical year book (2018), percentage share of GDP at current price has composed of 23.3% by Agriculture Sector, 36.3% by Industry Sector and 40.4% by Services Sector. Among them, the share of GDP by Industry Sector comprised with 3.8% of Energy, 1.0% of Mining, 23.9% of processing and manufacturing, 1.3% of Electric Power and 6.3% of Construction (CSO, 2018).

Therefore, in the case of Industry Sector, processing and manufacturing contributes the highest share of GDP, in which CMP garment and textile industry create a major portion of Myanmar's manufacturing sector and which covered about 75% of total manufactured products (ADB, 2019).

In the past few years, Myanmar's garment sector was the second largest export item after the natural gas. But, recent years, the garment sector contributes the largest share of export among principal export commodities of Myanmar. According to the Central Statistical Organization's Statistical Year Book (2020), the contribution of export by garment sector has increased significantly, which was sharply increased from US$ 272 thousand million in 2005-06 to US$ 4,830 thousand million in 2018-19. Therefore, it was increased over ten-times during the period of 2005-06 to 2018-19 (CSO, 2020).

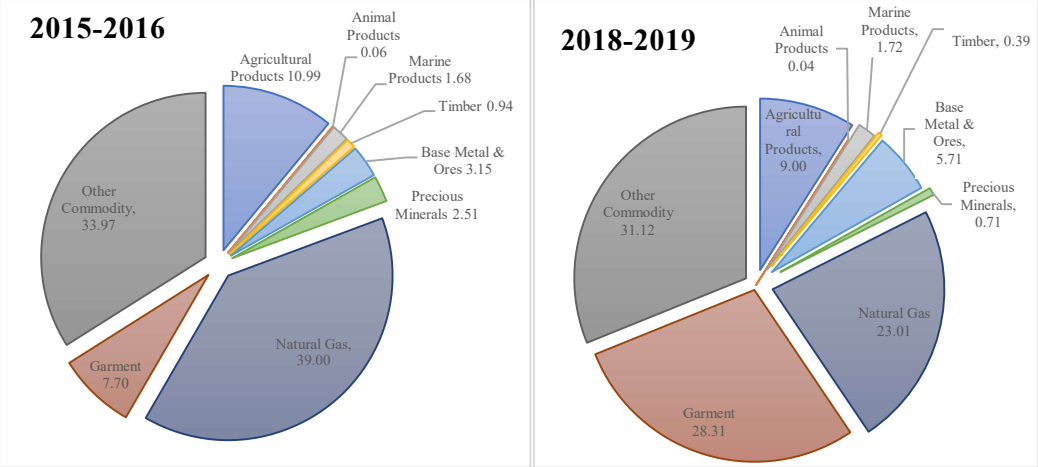
However, Myanmar's exports have influenced by primary sector products, in which agricultural products and natural gas exports were major supports of Myanmar's export until 2015-2016. The amount of agricultural products export was US$ 1,228 thousand million and natural gas export was US$ 2523 thousand million, while the garment export covered only US$ 379 thousand million, in 2010-2011. Although the garment sector could not take the leading role of Myanmar's export, it can be contributed about US$ 4,830 thousand million in 2018-19. This is much lower than primary sector exports of which US$ 1,535 thousand million by agricultural products

and US$ 3,925 thousand million by natural gas exports in 2018-19 (see Appendix Table: 3.1) (CSO, 2022).

Now a day, garment export has taken the leading role of Myanmar's commodity export and its exports increased from US$ 857 thousand million in 2015-16, US$ 1867 thousand million in 2016-17 to US$ 4830 thousand million in 2018-19, respectively (CSO, 2020).

On the other hand, the export amount of garment sector is over two-fold larger than the amount of agricultural sector export, as well as, it is also nearly one-fourth times greater than the export amount of natural gas, in recent years. The more significantly, the contribution of export by type of principal commodities is compared with percentage share in the below figure (3.2) (CSO, 2022).

Figure 3.2 Percentage of Export Share by Principal Commodities



Source: Central Statistical Organization, Statistical Year Book (2020)

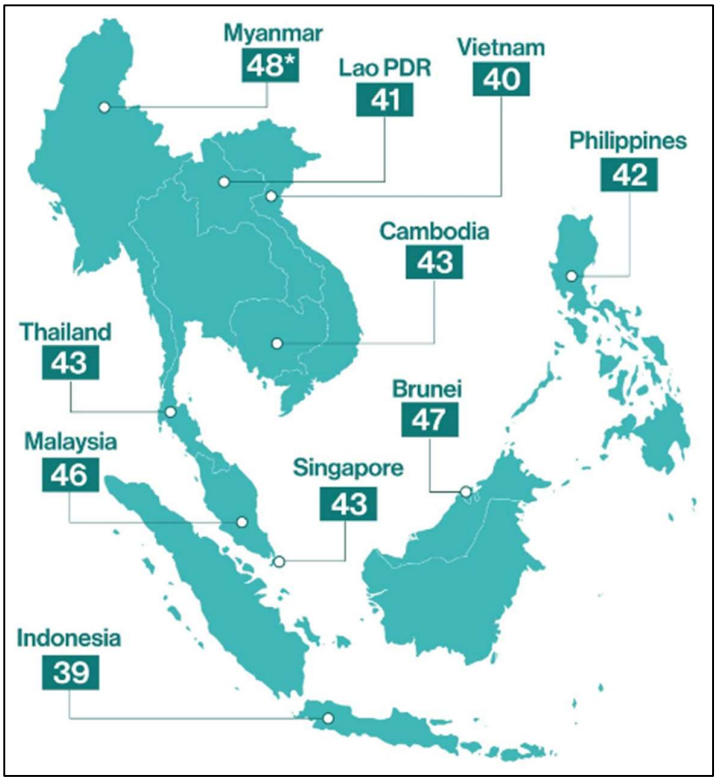
According to the figure 3.2, the largest percentage of Myanmar's export share was contributed by natural gas which accounts for 39% of total export in 2015-16 and 23% of total export in 2018-19. Then, the garment export contributed about 7.70% of Myanmar's principal commodities export in 2015-2016, which was the second largest export commodity of Myanmar at that time (CSO, 2020).

However, in 2018-2019, the percentage share of garment export was increased to 28.31% of total commodity export and it was greater than the export of other principal commodities of Myanmar, i.e., Natural Gas (23.1%), Agricultural Products (9%), Base Metal and Ores (5.71%) and Marine Products (1.72%) (CSO, 2020).

3.2 Garment- Related Rules, Regulations and Policy

"There are three ASEAN countries which are placed in the top 10 countries for the highest working hours per week, with Myanmar having the second highest working hours among them. This list was released by the International Labor Organization (ILO) in last quarter of 2020, and it included nine Asian countries and two ASEAN countries. In the nine Asian countries on the list, the minimum working hours per week are 45 hours. Average working hours per week for ASEAN countries is presented in the following figure" (ILO, 2020).

Figure 3.3 Average Working Hours Per Week



Source: The ASEAN Post, Dec 2020.

Among the top ten highest working hours countries, Qatar, which is the country in the middle east of Asia, ranks first with 49 hours per week, then, followed by Myanmar and Mongolia with 48 hours. Brunei Darussalam and Bangladesh took the third place with 47 hours. Malaysia China and Mexico have 46 hours a week. Although not in the top-10, Thailand and Singapore, which are in the top-20, are members of ASEAN and work 43 hours per week (ILO, 2020).

In addition to the working hours, the garment industry has other essential rules and regulations, such as labour law, standard working hours and holidays, workplace safety, social security and medical benefits, etc., which are compromise with the ILO standard and government rules of Myanmar (ILO, 2020).

(a) Labour Laws and Employment Regulations

Myanmar became a member of the International Labour Organization (ILO) in 18 May 1948, and has recently signed a Memorandum of Understanding (MoU) with the ILO in September 2018 for implementing the Myanmar Decent Work Country Programme 2018-2022. The three key priorities under this MoU include:

(i) "Employment, decent work and sustainable entrepreneurship opportunities are available and accessible to all, including for vulnerable populations affected by conflict and disaster;

(ii) Application of Fundamental Principles and Rights at work is strengthened through improved labour market governance;

(iii) Social protection coverage is progressively extended, especially for vulnerable workers and populations". (www.ilo.org)

Moreover, "the government of Myanmar has established multiple labour-related laws covering working hours, welfare and benefits, salaries and other factors over the years to protect rights and benefits of employees. Existing labor laws and standards in Myanmar include the Factory Act Law 1951 (with 2016 amendments), Minimum Wages Law 2013, Employment and Skills Development Law 2013, Payment of Wages Act 2016 and the Social Security Law 2016. Additionally, the 2012 Settlement of Labour Disputes Law grants employees the legal right to take action through a process of negotiation, conciliation and arbitration with the Workplace Coordinating Committee. If unresolved, the dispute is escalated to the Township Conciliation Body and thereafter to the state/division Arbitration Body. Moreover, child labour, i.e., under the age of 14, is strictly prohibited in the garment industry. The specific descriptions of employment regulations for garment industry covered the area of working hours, overtime, minimum wage, holidays and paid leaves, medical benefits, and social security, etc." (Factory Act Law, 2016).

Working Hours: The standard working hours for a garment worker is maximum 8 hours per day or 44 hours per week, and workers may work for maximum 6 days per week. Moreover, it needs to takes minimum 30 minutes interval after each 5 working

hours. Thus, total working hours and interval time shall be less than 10 hours per day, as well as, workers may enjoy one day as holiday in each week (Sunday or substitution) (Factory Act Law, 2016).

Overtime: The government allows to the maximum 16 hours per week for overtime or 12 hours per week for continuous work. However, the wages for overtime have to calculate as double the basic wage (Factory Act Law, 2016).

Minimum Wage: The minimum wage for a typical worker has determined as MMK 4,800 per 8-hour day (US$ 3.13/day) or US$ 94 per month. Moreover, 50% of minimum wage have to be paid to completely unskilled newly hired worker for maximum 3 months, and 75% of the minimum wage have to be paid during the second 3 months of employment/probationary period (Factory Act Law, 2016).

Holidays and Paid Leave: Employees may enjoy 21 public holidays, and 6 days for casual leave, that is maximum 3 days at a time. Moreover, they also enjoy 10 days earned leave which can be accumulated for 3 years (Factory Act Law, 2016).

Medical Benefits: In addition to the holidays and paid leave, employees can enjoy 30 days of medical leave with full pay, and 14 weeks maternity leave for women labour force. Moreover, employees may have a right to take medical treatment up to 26 weeks at permitted hospital or clinic (Factory Act Law, 2016).

Social Security: There is 2% employer-employee contribution for social security benefits. Moreover, employees have to contribute to injury fund (1% from Employer) who get maximum salary of MMK 300,000 per month to qualify. From the employer's side, they need to emphasis on skills and development of employees in addition to health and safety measures (Factory Act Law, 2016).

(b) Work Place Safety, Health and Environmental Standard Law

The Occupational Safety and Health Law has enacted in March 2019 and the Factory Act 1951 ensure the welfare in the garment factories in Myanmar. Individual violation of the specific measures under these acts may lead to up to two years of detention. However, implementation has gained importance in recent years due to

compliance audits required by international buyers, especially when Myanmar gained access under the EU's GSP scheme. In addition, the legal statement of employment regulations is needed to follow by garment manufacturers in Myanmar, which including the workplace safety and health law, and regulations for the welfare of the employees. The detail descriptions for each legal statement are shown as below table (Factory Act Law, 2016).

Table 3.4 Legal Statements for the Garment Industry

Type of Legal Statement	Description
Workplace Safety and Health Law	• Factories are required to provide a safe and hygienic working environment with proper ventilation, light and heat, access to toilets and clean drinking water for all workers. • Floors, stairs and paths must be well-built with hand rails and necessary covers must be placed. • They are also required to make arrangements for any power cuts, with generators and auxiliary units to be kept undercover. • Females and young workers are not allowed to handle weaving/spinning machines or lift heavy loads. • In every factory, escape routes and fire alarms must be well maintained.
Employees' Welfare	• Factories are required to provide washing and cleaning facilities for workers. • Factories must provide sufficient seats for workers if a chance is given for sitting. • Factories must always stock sufficient First Aid boxes. • If the number of workers exceeds 250, doctors or nurses in clinics are to be made available. • If the number of workers exceeds 100, factories are required to provide recreation centers and canteens for food. • For more than 100 female workers, factories are required to provide a nursery center for children under 6 years of age.

Source: MGMA, 2019

Therefore, the government of Myanmar enforces law and regulations to protect the welfare of employees. On the other hand, for international investors and entrepreneurs, the government of Myanmar has also enacted the Investment Laws by aiming to encourage the investments of local employers, as well as, inviting the foreign

investment that need to promote the Myanmar's garment industry and export performance. Such government schemes can boost the growth of garment industry and invite more foreign investments and international buyers to Myanmar (Factory Act Law, 2016).

3.3 Employment and Firm Size of Garment Industry

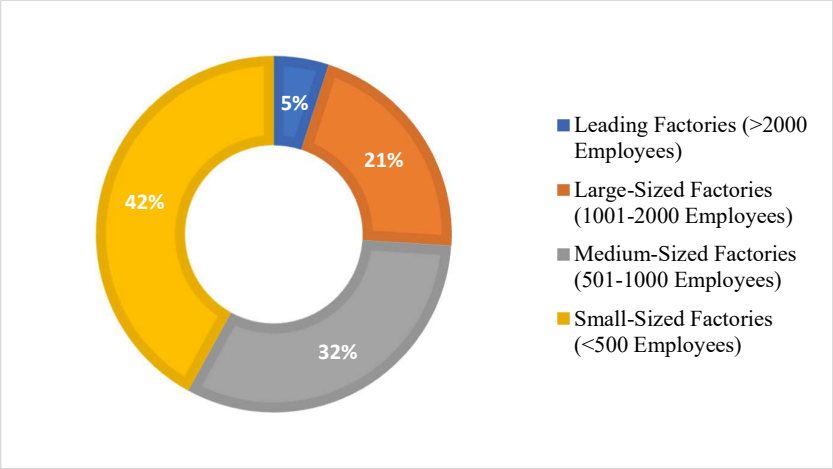
The garment industry has the potential to create large-scale job opportunities because it is so highly labor-intensive nature. But the Industrial Sector of Myanmar is still a relatively small part of the economy, accounting for 35.1% of GDP and 16.6% of employment in 2018 (Statistical Year Book, 2019). The Industrial Sector of Myanmar has driven primarily by food processing and garment manufacturing export which contributed about 75% of the Myanmar's Industrial Sector. The key driver for garment Industrial sector is Foreign Direct Investment (FDI) and a wage of employees (Myanmar Business Guide, 2019).

Before the Covid-19 pandemic, the industry employed approximately 700,000 people and about 90% of the employees in the garment sector are women, the majority between 18 and 23 years old. Among them, 76% of sector workers are migrants from rural Myanmar. The Myanmar Government has set a new daily minimum wage of MMK 4,800 per day (MMK 600 per hour for an eight-hour day) in May 2018, which is applicable to enterprises across all sectors and industries in Myanmar. This is a 33% increase from the previous minimum wage of MMK 3,600 per day in 2015. However, Myanmar still has a very low minimum wage compared with other Asian countries (EUROCHAM Myanmar, 2021)

According to MGMA, about 60% of garment factories are operated under foreign direct investment and 80% of garment workers are employed in FDI firms. Generally, the average employee size of foreign-owned companies is 912 while the average size of local companies is 409 employees in 2018 (MGMA, 2018). This indicates that there is a much larger scale of operations of foreign-owned companies in Myanmar compared to local manufacturers. The foreign-owned companies have been successful in storming up their operations and output, leveraging on the experience and expertise of respective parent companies. Therefore, foreign-owned firms could be better equipped to improve productivity by adopting global industry standards and enhancing their technical capabilities in Myanmar (Garment Guide, 2020).

In order to study the firm size, the European Chamber of Commerce in Myanmar analyzed that only 5% of factories were leading factories with more than 2000 employees, out of the total 742 garment factories in Myanmar. The detail explanation is shows in figure (3.4) (Garment Guide, 2020).

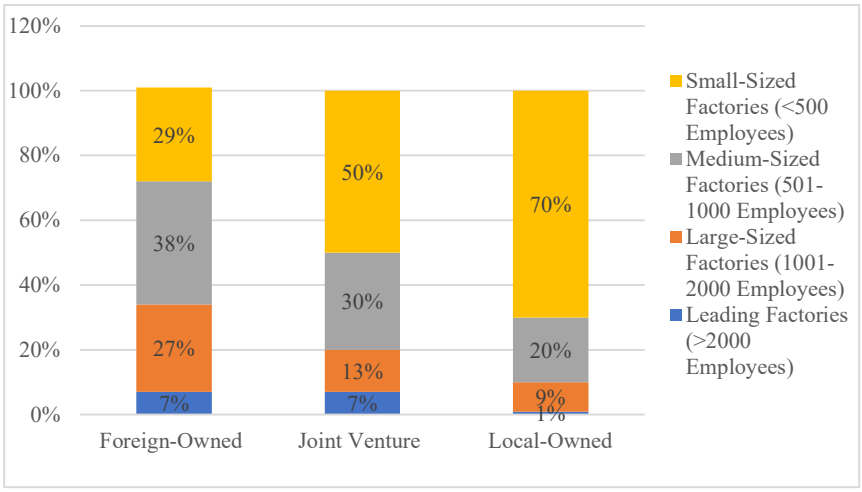
Figure 3.4 Size of Garment Firms Based on Number of Employees



Source: EUROCHAM Myanmar (2020).

According to EUROCHAM Myanmar (2020), the largest percentage of garment factories are small-sized factories with fewer than 500 employees, which account for 42% of the total garment factories in Myanmar. Moreover, the medium size factories with larger scale of operations both in terms of labour and output accounted for 32% of the total garment factories, in which 501-1001 employees were employed. The other 21% out of the total 742 garment factories in Myanmar were large-sized factories with 1001-2000 garment workers. Then, only the left 5% of garment factories are leading factories with over 2000 employees (Eurocham, 2020). It can be illustrated in figure (3.5).

Figure 3.5 Garment Firms by Number of Employees and Ownership Types



Source: EUROCHAM Myanmar, 2020

According to EUROCHAM Myanmar (2020), the garment firms can be categorized by means of the number of employees and ownership types. Figure (3.4) stated that 34% (i.e., 7% plus 27%) of foreign owned factories have employed more than 1000 workers, reflecting the larger scale of operations in terms of labour. For joint venture firms, large scale of operation accounted about 20% and it is about 10% for local-owned factories. On the other hand, the small size factories (i.e., less than 500 employees) have accounted for 29% of total foreign owned factories compared to 50% of joint venture firms and 70% of locally-owned firms. Moreover, 80% of total garment workers are employed in foreign-owned firms, 15% are working for local owned firms, and the rest 5% of employees are working in joint venture firms of Myanmar garment industry. Therefore, FDI can be seen as a key driver to provide employment opportunities in Myanmar (Eurocham, 2020)

3.4 FDI Inflow and Myanmar Garment Industry

Historically, during the socialist period, the Myanmar government pursued self-reliance in both political and economic terms for many years. The idea of self-reliance was translated into a closed-door or inward-looking policy, which actually suited the control-oriented socialist economic system. Therefore, in the absence of inflows of foreign capital, agriculture was the most important sector, and indeed almost the only reliable resource for financing government's industrial projects (Kudo, 2013).

Then, the socialist government started to accept foreign aid in the late 1980s. At that time, some Western Companies, Japan and West Germany were pleased to provide

considerable amounts of official economic assistance to Myanmar. Then, Myanmar's Foreign Investment Law was created in 1988 and offered foreign investors with various privileges. Foreign Investment Law permits 100 percent ownership by foreign companies and allows joint ventures with SEEs or private firms. During the 1990s, Myanmar's exports mainly consisted of primary commodities. Among them, cash crops such as beans and pulses and sesame, and marine products such as fish and prawns occupied the greatest share of Myanmar export (Kudo, 2007). However, after the late 1990s, the export structure was apparently changed, and garment exports were accelerated, followed by an expansion in natural gas exports (Jinsun Bae, 2018).

According to the data of DICA (2020), FDI inflows from 51 countries, among them FDI from 21 countries are flow into garment industry of Myanmar (DICA, 2020). However, most of the FDI are particularly sourcing from China, Japan, and South Korea, as well as from Canada, Australia and the US. Asian countries are the main attraction for foreign investment because the relatively easier access to the country and logistical cost advantages. With higher financial capabilities and supports from host country's head offices, most foreign-owned factories operate large venues, increasingly outsourcing labour-intensive work through CMP contracts to Myanmar (DICA, 2020).

3.4.1 FDI Inflow into Various Sectors in Myanmar

After enacting the FDI law in 1988, many investors inflowed to Myanmar and participated in the light manufacturing industries such as garment because Myanmar has an apparent comparative advantage in labor-intensive industries. The foreign direct investment inflows into Myanmar between 1989-2008 is shown as below table (3.5) (Kudo, 2008).

Table 3.5 FDI Inflow by Country

Sr No	Country	1988-89 to 2010-11	2011-12	2012-13	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	Total (US$ million)	%
1	Singapore	1804.0		418.2	2300.1	4297.2	4251.2	3820.8	2164.0	2409.6	1859.2	23324.3	27.42
2	China	9596.8	4345.7	231.8	56.2	511.4	3323.9	482.6	1395.2	634.6	553.3	21131.4	24.84
3	Thailand	9568.1		1.3	529.1	165.7	236.2	423.1	123.9	221.4	79.2	11347.9	13.34
4	Hong Kong	6308.5		84.8	104.0	625.6	225.2	213.7	252.0	456.4	1422.3	9692.4	11.39
5	U.K	2660.0	99.8	232.7	156.9	850.8	75.3	54.3	211.2	23.3	425.2	4789.4	5.63
6	South Korea	2916.9	25.6	37.9	81.2	299.6	128.1	66.4	253.9	89.4	94.2	3993.2	4.69
7	Viet Nam	23.6	18.1	329.4	142.0	175.4	4.7	1386.2	20.8	14.6	57.8	2172.7	2.55
8	Malaysia	975.1	51.9	4.3	616.1	6.7	257.2	21.4	21.9	1.8	5.3	1961.6	2.31
9	Japan	211.9	4.3	54.1	55.7	85.7	219.8	60.4	384.1	42.8	768.5	1887.3	2.22
10	Netherlands	238.8		10.3		302.4	438.0	5.0	533.9	32.4	11.2	1572.1	1.85

11	India	189.0	73.0	11.5	26.0	208.9	224.2		11.0	5.0	3.3	751.9	0.88
12	France	469.0			5.4	67.3		0.8	7.3	0.5	5.6	555.9	0.65
13	U.S.A	243.6				2.0	2.6		128.7	98.3	43.6	518.8	0.61
14	Indonesia	241.5					13.2	9.0	9.9		8.5	282.1	0.33
15	Canada	39.8		2.1		153.9	1.3	5.2	1.4			203.6	0.24
16	China(Taipei)				0.8	5.5	8.3	10.5	17.2	81.2	63.1	186.5	0.22
17	U.A.E	41.0			4.5	1.7			100.5			147.7	0.17
18	Philippines	146.7				0.5						147.2	0.17
19	Australia	82.1			17.7		29.7	16.3				145.8	0.17
20	Samoa					30.2	0.5	22.1	38.6	4.9	32.3	128.5	0.15
21	Brunei Darussalam	2.0		1.0	2.3	43.9	26.5	18.0	8.1	10.2	12.6	124.6	0.15
			4618.4	1419.4	4098	7834.4	9465.9	6615.8	5683.6	4126.4	5445.2	85064.9	100%

Source: DICA, 2020

According to the data from DICA (2020), FDI inflows into Myanmar has gradually increased after 2010. In 2005-06, it reached the high level recorded in the country's history. After that FDI declined markedly and became stagnant until 2009. In 2010-11, FDI inflow dramatically increased and reached its highest level. Such growth was not sustained and declined again (Kudo, 2008).

In November 2012, Myanmar's new Foreign Investment Law (the new FIL) was enacted, which replaced the previous Union of Myanmar Foreign Investment Law of 1988. In accordance with the new FIL, the Foreign Investment Rules and also the Classification of Types of Economic Activities Notification were revealed on 31 January 2013. The Rules deliver further direction on the new FIL by step-up the rights and duties of foreign investors under the new FIL, and, instructive the kinds of activities that foreign investment are prohibited or restricted (Kudo, 2008).

Moreover, the 2012 FIL permitted all foreign investments to be individually approved by the Myanmar Investment Commission (MIC), which comprised ministers and deputy ministers with the Directorate of Investment and Company Administration (DICA) as its secretariat. The 2012 FIL provided foreign investors the right to lease land for 50 years (renewable up to 70 years) and to remit capital and profits. The FIL law also provided incentives to all MIC-approved foreign investors, including income tax exemption for the first five years and import duties exemption (Myanmar Business Guide, PWC, 2017).

Under this FIL (2012), the MIC's approval to foreign investors has depended on its evaluation of the domestic economic impact of the investment, taking into account employment and living standards, value added, and imports of capital

equipment. The law also specified employment quotas with all unskilled labour required to be local from the beginning, and the share of local skilled labour rising to reach 75% by the fifth year of operation. The 2012 FIL was followed (rather than preceded) by a Myanmar Citizen's Investment Law passed in 2013 and providing the same benefits to local firms (Kudo, 2008).

In 2014, the government began to work on a new investment law, intended not only to further liberalize the investment regime but also address the redundancy of two distinct investment laws. A draft consolidated investment law was published in early 2015, and a revised draft in early 2016, under the supports of the government in that time. The new investment law was finally approved in October 2016 (Stephen Gelb, Linda Calabrese and Xiaoyang Tang, 2017).

In 2016, the Government of Myanmar introduced a new Myanmar Investment Law (MIL). The new Myanmar Investment Law came into effect on 18 October 2016, which was consolidated and replaced the previous Foreign Investment Law 2012 and the Citizens Investment Law 2013. The MIL provided the overall legal framework, which was followed by the more detailed Myanmar Investment Rules 2017 (Investment Rules) which came into effect on 30 March 2017 as well as two notifications: Notification 13/2017 dated 1 April 2017 (Classification of Promoted Sector) (Notification 13) and Notification 15/2017 dated 10 April 2017 (List of Restricted Investment Activities) (Notification 15). These two statements together represented the body of the current Myanmar foreign investment law (https://www.dica.gov.mm/).

The Investment Rules provided significant additional detail in relation to the operation of the MIL and the business activities in which foreigners are permitted to engage, the restrictions that apply, application procedures, the use of land, the transfer of shares, foreign currency remittance, and the taking of security on land and buildings and labour relations. In MIL, the Investment Rules and the Myanmar Companies Law (2017) are the key pieces of legislation underpinning the Government's efforts to attract foreign investment to Myanmar (https://www.dica.gov.mm/).

In addition, statistics from Myanmar Investment Commission pointed that there are twelve sectors benefit from the inflow of FDI into Myanmar. These sectors are power, oil and gas, manufacturing, real estate, hotel and tourism, mining, livestock and fisheries, transport and communication, industrial estate, construction, agriculture and other services (MIC, 2019)

According to the data of DICA (2020), among the FDI by top 20 countries, Singapore, China and Thailand are significantly leading on all other countries, which contributed about, 27.43%, 24.84% and 13.34% of total FDI respectively. Then, Hong Kong and UK stands fourth and fifth place with its investment value of about US$ 11.39% and 5.63, respectively. South Korea and Vietnam have taken the sixth and seventh place with about 4.69 and 2.55, respectively. Then, Malaysia is the at the eighth place with about 2.31%; and Japan stands is ninth place with 2.22% of total FDI. In addition, Netherlands stands at the tenth place with about 1.65% of total FDI inflow to Myanmar. Among the top investor countries, majority are from ASEAN, such as Singapore, Thailand, Vietnam, Malaysia, Indonesia, Philippine and Brunei. In addition, five countries are from other part of Asia, like India, China, south Korea, Japan, and Hongkong. Among them, two are from EU, as Netherland and France. Moreover, the USA and UK are the only other country outside of these regions (DICA, 2020).

Since Myanmar has relatively intelligent, hardworking and cheap labor source, it has comparative advantage in relation to other countries in the garment sector. However, the major bottleneck in this sector is delay in export and complex import procedures, which affect the lead time for exporting garments and substantially reduce the country's competitive edge. By removing unnecessary delays in this process, the country's competitiveness in the garment industry will be greatly improved in future (Kudo, 2008).

3.4.2 FDI Inflow into Garment Industry in Myanmar

In Myanmar, the manufacturing sector particularly covered the area of light industries which include textiles, foodstuffs, pharmaceuticals, ceramics, rubber, paper and chemical. Currently over 60 percent of all manufacturing outputs in the country fallen under food and beverage. With FDI and private sector involvement, the manufacturing sector is expected to increase and diversify from basic domestic industries to more export-oriented and dynamic ones. In the light industries sector, joint ventures also have been formed with companies from Hong Kong, Korea, Singapore, Thailand, and the UK. Among them, the garment and textile industry are a major recipient of FDI in Myanmar. FDI in light industry has been dominated by companies from Hong Kong, Singapore, and Thailand while heavy industries have been dominated by Japan (Kudo, 2013).

Especially for Myanmar Garment Industry, international brands as well as international investors are interested to make an investment, because of the features of its strength a sizeable low-wage labour force, which compare to other Asian countries. The official data from MIC states that there are twelve sectors benefit from the inflow of FDI into Myanmar. These sectors are power, oil and gas, manufacturing, real estate, hotel and tourism, mining, livestock and fisheries, transport and communication, industrial estate, construction, agriculture and other services (Kudo, 2013).

The number of garment producers in Myanmar has increased rapidly since the easing of sanctions began in 2012, and entry by Chinese firms has largely been in this period. In the mid of 2015, about fifty-five percent of officially registered garment firms in Myanmar were known to be fully or partly foreign-owned, with about twenty-five percent of the foreign firms from China and seventeen percent from Hong Kong. In Myanmar, many investor entrants have set up operations in a joint entry decision with key customers, which are often global corporations in branded clothing or retail. Foreign-linked firms supply almost all garment exports, and these have risen rapidly in recent years, especially since EU sanctions were lifted in 2012. Export growth is likely to continue as US sanctions were lifted in 2016. Recently, the garment industry is a major job creator, with over 400,000 employed in total. But foreign-owned firms have very few local managers, reflecting Myanmar's shortage of high-level skills (Gelb, Stephen & Calabrese, Linda & Tang, Xiaoyang, 2017)

Moreover, several European brands, including H&M, C&A, Marks and Spencer, Adidas, and Lidl, have begun to source to Myanmar. Only one US brand, The Gap, has entered Myanmar since September 2016. Asian OEM (original equipment manufacturer) producers have also entered, such as Bogart Lingerie, a Hong Kong firm with factories in Beijing and Guangdong, which has set up three factories in Myanmar since 2013 and planned to employ with total 5,000 workers in Myanmar by end of 2016, producing for Victoria's Secret and Elle (Barrie, 2016).

In addition, the Chinese National Federation of Industries from Taiwan has signed two Memorandums of Understanding (MoU) with the Union of Myanmar Federation of Commerce and Industry (UMFCCI) in mid-2018. The MoUs has being implemented in 2019 aim to facilitate technology transfer and training programmes for workers, supervisors and technical staff at factories across the country. As of 2019, there are approximately 40 Taiwanese textile and clothing manufacturers in Myanmar, most of which are large-scale. Taiwanese manufacturers who previously favoured

Vietnam and Cambodia as investment destinations. Then, those investors have been increasingly investing in Myanmar driven by labour shortages and rising costs in Vietnam and Cambodia. With the US lifting economic sanctions against Myanmar, the Taiwan Textile Research Institute also anticipates that there is an increase in orders for Myanmar from American brands. Additionally, the Ayeyarwady Development Public Co. Ltd. signed an agreement in January 2019 with Hong Kong-based China Textile City Network Co. Ltd. to establish approximately 50 garment factories by the end of 2020 in Pathein Industrial City (EUROCHARM Myanmar, 2020).

After regulating the Foreign Investment Law (FIL) 2012 and Myanmar Investment Law (MIL), the number of orders placed for international brands in Myanmar is increasing at a rapid pace. Market-players have been engaging in the country with different operating models. Some rely on existing strong supply networks built in neighbouring Thailand or Vietnam and simply assemble in Myanmar, while others manage their procurement directly through an established office in the country. The below table describes the number of foreign investment firms in Myanmar garment industry in 2022 (Kudo, 2008).

Table 3.6 Number of FDI Firms in Garment Industry (by Country, 2021)

No.	Investing Countries	No. of Firms
1	Korea	57
2	China (Taiwan, Hong Kong)	280
3	Austria	1
4	Belgium	1
5	British Virgin Island	2
6	Brunei	1
7	Cambodia	1
8	Canada	2
9	Germany	1
10	Ireland	1
11	Japan	17
12	Malaysia	3
13	Singapore	4
14	Thailand	3
15	Seychelles (East Africa)	1

Source: MGMA (2022, May)

Among the FDI in garment industry of Myanmar, China (including Taiwan and Hong Kong) is the major investor in Myanmar garment industry, which have 280 firms in 2022. After that, Korea garment firms (i.e., 57 firms) are the second major contributor of FDI in Myanmar garment industry (MGMA, 2022).

With the garment sector being prioritized as a focus industry for investments and export promotion under the Myanmar National Export Strategy (NES) 2015–2019 as well as NES 2020–2025, there are significant available opportunities for investors. Myanmar benefits from factors such as low labour cost, presence of a large young population, proximity to China and Thailand, as well as, favorable trade access. Additionally, with the US-China trade war, rising costs in Vietnam and safety concerns in Bangladesh, Myanmar is emerging as an attractive alternative manufacturing destination for garments manufacturing (EUROCHARM Myanmar, 2020).

3.5 Export Performance of Myanmar's Garment Industry

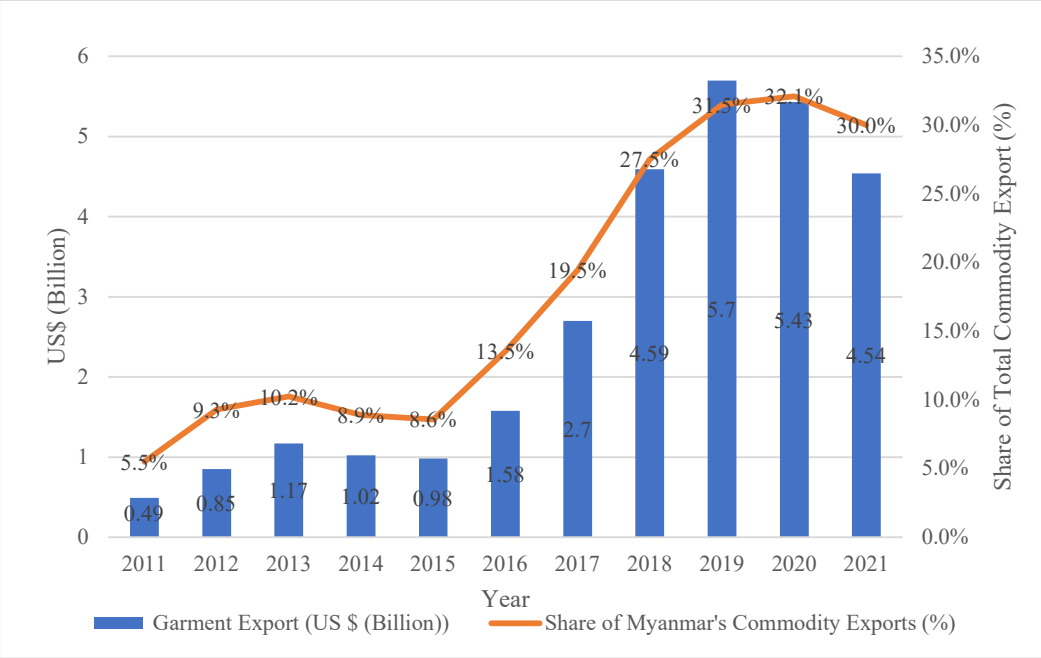
Myanmar has been exporting garments since the late 1980s, when the first Myanmar garment exporting was operated under the joint venture between a Myanmar military-owned firm and a South Korean firm. Because of the cheap labour cost, investors began to interest of Myanmar to set up factories and produce garments for Western Markets, especially for US and EU markets. Since the adoption of open-door policy in 1989, Myanmar garment industry has been one of the main drivers of industrialization as other Asian economies and, it arrived peak in 2001. Over the period of 1990-2001, Myanmar's garment industry increased its exports by sixty-nine times. United States offered the largest market in 2000-2001 and it absorbed more than fifty percent of Myanmar's garment exports. The EU provided the second largest market and it was the recipient of nearly fourty percent in the same year (Kudo, 2013).

However, this successful condition of garment export was terminated when the US imposed economic sanctions on Myanmar in 2003 according to the Burmese Freedom and Democracy Act of United State in 108th Congress. This sanction led to a drastic decline in Myanmar's garment exports, in which garment export of Myanmar was contracted to thirty-eight percent compared with value of 2001, the peak year. As a result, garment firms in Myanmar started to explore Asian markets (Fukunishi, 2012).

In 2007, Japan has become the largest market for Myanmar's garment exports, and it absorbed about fifty percent of all Myanmar's garment exports in 2012. Garment export share to South Korea has also increased from 2010 onwards, and it accepted

about one-third of Myanmar's garment exports in 2012 (Kudo, 2013). The yearly export growth of Myanmar garment industry is shown in figure (3.6).

Figure 3.6 Garment Export of Myanmar



Source: UN Comtrade (2022)

According to the UN Comtrade Database (2022), figure 3.4 presents the value of garment export and its percentage share in all commodity export of Myanmar. The value of Myanmar's garment export was sharply increased during the period of 2011–2019, which indicated that the garment export of Myanmar was US$ 0.49 billion in 2011. Then, it was slightly decreased in 2014-2015, but the export amount in 2015 was US$ 0.98 billion, which is greater than the export amount of 2011. After 2015, the value of Myanmar's garment export has gradually increased and it arrived US$ 4.59 billion in 2018. Therefore, Myanmar's garment industry has increased its export over 10 times during the period of 2011 to 2018, and garment industry became one of the largest manufactured export-led industry of the Myanmar. Then, Myanmar garment industry exported US$ 5.7 billion in 2019, which arrived the peak situation of export value for garment industry of Myanmar. A critical reason for export growth in that period has been tariff-free access to European and North American markets. More than half of the apparel and garment exports produced in Myanmar is mostly sent to the European Union in that time. (EuroCham Myanmar, 2021).

Moreover, UNComtrade (2022) describes that Myanmar's apparel and garment exports to the world reached an impressive growth during 2015-2019, in which

Myanmar's garment exports to the EU (97% annual growth) and the United States (78% annual growth) have grown rapidly during this period. In addition, some of the top fashion brands (such as United Colors of Benetton, Next, Only, H&M, Guess, and Jack & Jones) have brought "Made in Myanmar" clothes to their home countries. There are several reasons why fashion companies source garment from Myanmar, including invitation of FDI, trade regulations of WTO preferential for LDC which can enjoy duty-free market access in the EU, Japan and South Korea. Then, the wage level of the Myanmar garment industry is still also an attractive factor that remains one of the lowest in the world, in which the monthly minimum wage in Myanmar stands at around $95 per month (UNComtrade, 2022).

However, Covid-19 pandemic is also impact on Myanmar's garment industry, while Myanmar's garment exports to the world has declined about $ 0.3 billion in 2020 and about $1.2 billion in 2021 compared with the garment export in 2019 (WTO Center VCCI, 2021). The decline of garment export is due to the outbreak of Covid-19, that has attacked the Myanmar's garment industry by means of lockdowns, supply chain disruptions, and order cancellations contributed to widespread layoffs and factory closures. As a result, there are 26 percent reduction in workforce of garment labour in 2020, while the remained labour employed faced income loss driven by cuts to overtime hours.

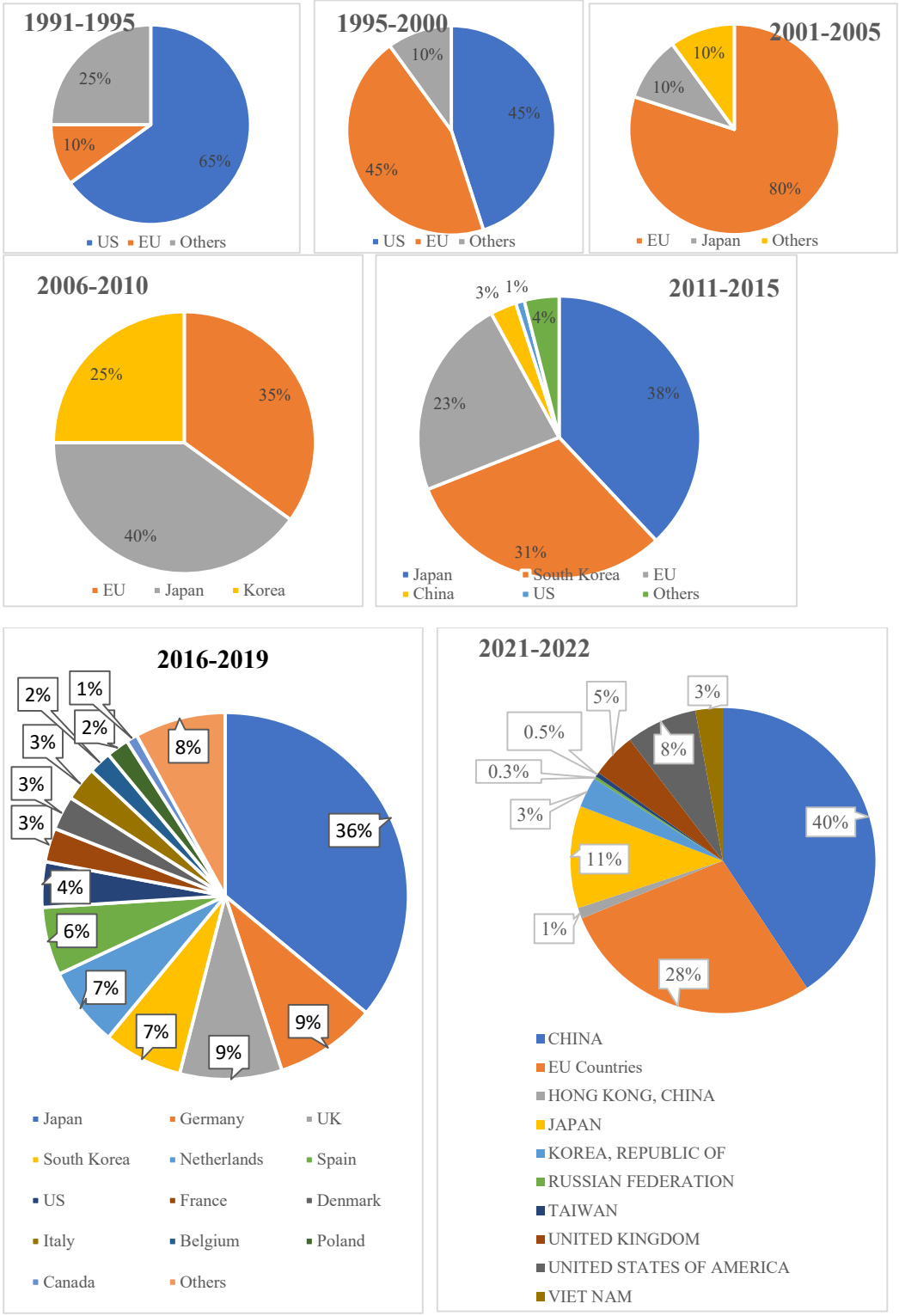
(a) Major Export Destination of Myanmar Garment Industry

Exports of Myanmar garment industry is principally made by large factories, which are either foreign owned or operating through joint venture agreements by local and foreign companies. However, garment exports of Myanmar is highly depended on imports of raw materials because nearly all of the orders of garment manufacturers in Myanmar are carried out on a CMP contract. Therefore, the nature of CMP contract does not provide the value-added services of designing, supplying raw materials, control over value chain, and thus it limits the higher profitability of manufacturers (MGMA, 2020).

Myanmar's garment industry was exported its products mainly to China, South Korea, Japan and other Asian countries during 2016 to 2019. On the other hand, some of the garment products are exports to European Countries, it can be accounted over 45% of total garment exports from Myanmar. Recently, most of garment exports are

directed to Japan, EU countries and China (MGMA, 2020). The major exporting countries and its export share is discussed in figure 3.7.

Figure 3.7 Major Garment Exporting Countries from Myanmar (1991-2022)



Source: Kudo (2013) and MGMA (2022)

According to figure (3.7), major garment exporting countries are changed over the years. During the periods of 1990s, major garment exporting countries from Myanmar is mainly to US and EU, when there were no sanctions were imposed by US. However, during the period of 2000s, Myanmar's garment export to US market was slow down and the trade relations with US and EU were worsening at that time. Moreover, US economic sanctions were started in 2003, and there was an abolishing of MFA regime in 2005. Those conditions created the loss of US market and Japan, Korea and China introduced a new market for garment export of Myanmar. Thus, in the late 2000s, there is no access to US market and disappearance of major EU buyers at that time. During 2011-2015 period, garment export to Japan and South Korea was 38% and 31% respectively and garment export to China was about 3% at that time (Kudo, 2013).

In 2016-2019, Japan became a largest market for Myanmar's garment export, which accounted for 36% of total garment export of Myanmar. Nowadays, Myanmar's garment mainly exports to China, which covers 41% of garment products. The second largest export destinations of Myanmar garment product are EU countries which contribute about 28% of garment export from Myanmar. Then, Japan and US are third and fourth important countries for Myanmar's garment exports, which cover about 11% and 8% of Myanmar's garment product, respectively. The former major exporting countries, such as UK, Korea and Vietnam has taken the fifth and sixth place of Myanmar garment export, and it contributes about 3% to 5% of garment export share in 2019 (Kudo, 2013).

(b) Competitive Advantages for Garment Export

"Garments are currently the fourth most important export in Myanmar. The national export strategy developed by the Ministry of Commerce plans to capitalize on the momentum enjoyed by the garment sector and work to increase competitiveness by:

- Supporting strategies that will help local manufacturers evolve from CMP producers to FOB producers so they are able to capture a higher value for their products.
- Increasing the quality of production by establishing a set of national quality standards in compliance with international criteria.

- Developing the currently insufficient export infrastructure (deep sea ports) as well as production locations (sector-dedicated economic zones).
- Developing a regulatory and legal framework to protect workers' and producers' rights" (Kudo, 2013).

Moreover, an assessment of the export competitiveness of Myanmar's garment industry can be examined by availability of productive factors, labour productivity and logistics costs. However, the other external factors can also be influenced on the performance of Myanmar's Garment export, such as preferences to LDCs and locational advantages (Kudo, 2013).

(i) Preferences to LDCs

Availability of preferential treatment for advanced nations also affects the competitiveness of garment industries in developing countries as well as Myanmar. Special and preferential treatment of garment exports from least developed countries (LDCs) makes a difference in success for those countries. For example, the African Growth and Opportunity Act (AGOA) offers preferential access to the United States markets for imports from Sub-Saharan African countries and helps to create urban-based manufacturing employment in beneficiary countries. According to this principle, LDCs are entitled to divert preferential treatments given by importing countries. As an LDC, Myanmar was eligible for those preferences (Sachs, 2005).

Myo Myo Myint (2012) described that Myanmar's garment exports have long enjoyed tariff exemptions from Japan. Japan offers a scheme of special preferential treatment for LDCs, and never deprived Myanmar's status even under the military regime. While China and Vietnam have to bear a 7.4 to 10.0 per cent tariff on woven shirts and blouses, along with other LDCs, Myanmar does not have to pay such tariffs as long as it meets the rules of origin. Therefore, the tariff exemption has far promoted garment exports from Myanmar to Japan (Myo Myo Myint, 2012).

(ii) Locational Advantages

The simple way to attract more garment firms to Myanmar is to enhance the location's advantages and reduce its disadvantages for potential investors which includes both foreign and domestic investors. Myanmar's most important location

advantage is the availability of low-wage labor and long coastal for transport services (Myo Myo Myint, 2012).

Moreover, according to Moe Kyaw (2001), Myanmar's government can reduce costs related to infrastructure and administrative services. The government can improve infrastructure services by instituting better public policies and promoting more public investment. The electricity supply become the first priority for garment industry as well as for manufacturing sector of Myanmar. The rehabilitation and improvement of the Port of Yangon is also important for reducing transport costs and times. Transport services tend to enjoy economies of scale, thus, the government has attracted more business establishments and plants, domestic and foreign, to Yangon. As demand for transport services have increased, agglomerated firms enjoyed better transport services with cheaper prices and greater frequency. It enhanced the competitiveness of firms located in Yangon and eventually attracted more firms (Moe Kyaw, 2001).

However, on the other hand, Yangon port have to determine to get rapid, frequent, cheaper, and more reliable access to Singapore Port. The Yangon port is a major Asian hub from which "Made-in-Myanmar" products can be exported to global markets (Thandar Khaing, 2008).

CHAPTER IV
RESEARCH METHODOLOGY

After analyzing the labour productivity and export of garment industry by descriptive method, this chapter provides an analytical approach to analyze. It includes the overview of the research methodology, survey area, survey design or method of data collection, variable description, model specification, and, instrument and techniques to be used for data analysis of this study.

4.1 Survey Area

The survey area focused to garment exporting firms in the various industrial zones of Yangon. At present, there are twenty-five industrial zones and one SEZ are conventional in Yangon because it is the business capital and it has more develop transport and infrastructure services than other areas. Moreover, a number of seaports that handle most of the merchandise trade of the country. As a result, most of Myanmar's labour-intensive and export-oriented industries are concentrated in Yangon. Accordingly, the large number of garment manufacturing firms are also operating in Yangon, thus, this study accesses to Yangon as a survey area of this thesis (MGMA, 2022). The detail number of garment firms in various states and divisions are described as follows.

Table 4.1 Garment Firms in Various States and Divisions of Myanmar

Sr. No	States and Divisions	No. of Garment Firms	Percentage
1	Magway	4	0.80
2	Naypyitaw	1	0.20
3	Karin	2	0.40
4	Ayeyarwady	11	2.19
5	Mandalay	10	1.99
6	Bago	31	6.18
7	Yangon	443	88.25
	Total	**502**	**100.00**

Source: MGMA (2022, May)

According to MGMA data (2022), there are total (502) garment firms are located in various state and division of Myanmar. The specific number of current

operating garment firms are presented in table (4.1). In this table, Yangon has the largest number of firms among different states and divisions of Myanmar, where the total number of 443 firms (about 88% of garment firms) are operating in various industrial zones of Yangon. Then, the second and third largest numbers of firms are located in Bago and Ayeyarwady Division, which covers about (31) firms and (11) garment firms, respectively. Therefore, there are about 88% of firms are operating in Yangon, thus, it has chosen the Yangon as a survey area of this study. In addition, the numbers of garment firms in different townships of Yangon are stated in table (4.2), (MGMA, 2022).

Table 4.2 Garment Firms in Different Township of Yangon

Sr. No	Townships	No. of Garment Firms	Percentage
1	Bahan	2	0.45
2	Dagon	54	12.19
3	Dawbon	1	0.23
4	Hlaingthayar	185	41.76
5	Hlegu	1	0.23
6	Hmawbi	20	4.51
7	Htantabin	1	0.23
8	Insein	6	1.35
9	Kamayut	1	0.23
10	Latha	1	0.23
11	Mayangon	3	0.68
12	Mingaladon	35	7.90
13	North Okkalapa	23	5.19
14	Shwepyitha	96	21.67
15	South Okkalapa	2	0.45
16	Taikkyi	1	0.23
17	Thanlyin	8	1.81
18	Thaketa	2	0.45
19	Yankin	1	0.23
	Total	**443**	**100.00**

Source: MGMA (2022, May)

According to data of MGAM (2022), a large number of garment firms are located in Hlaingthayar township, which covers nearly half of total garment firms because it is one of the largest industrial zones of Yangon. The specific numbers of garment firms in different townships and industrial zones of Yangon are presented in appendix table (4.3).

Among the garment firms in Yangon, this study mainly focuses to firms which mainly produce men/women coat, suit, jacket and formal trousers. In this study, there are two main reasons for only focusing the product type of garment exporting firms; this is due to alleviate the controversies for calculation of labour productivity among various types of clothing, and Myanmar is the 5th and 6th largest exporter of non-knit women and men official coat, jacket and trousers in the world in 2020. Moreover, non-knit women coat is the 3rd most and men coat is the 8th most exported product of Myanmar at the same year of 2020 (www.oec.world).

4.2 Survey Design

This study is used the survey method to collect primary data from different industrial zones in Yangon. In this study, two various sources of the data are used; secondary data has got from annual report and official data from Myanmar Garment Manufacturer Association (MGMA), and the Ministry of Industry, as well as, the primary data is collected through questionnaire survey to sample garment firms from different industrial zones of Yangon (MGMA, 2022).

A sampling design is based on the simple random sampling method. There are (443) garment firms of Yangon out of total (502) current active operating garment manufacturing firms in Myanmar, which are got from the official member list of MGMA 2021-2022, which included both exported-oriented firms, non-exporting (for domestic market only) firms, garment accessories suppliers, and inspector companies, etc. Among them, this study only access to (206) garment exporting firms, which are operating the product type of coat, jacket, and formal suit/ dress/ trousers, those standard minute value (SMV) ranged was 35 minutes to 55 minutes. From this total (206) garment exporting firms, the sample size of (172) firms are collected by using

simple random sampling method. The sample size is calculated by using the Taro Yamane's sample size calculating formula (Taro Yamane, 1967). *[2]

The next part of the survey design is the questionnaire design. The questionnaire is the basic instrument usually use for primary data collection. In this study, (90) questions are divided into four main parts of questionnaire. First part deals with the respondent's and firm's information, and second part concerns the internal influencing factors, which can be controlled and managed entirely by the owner or manager of garment firms. The next part of the questionnaire includes the external influencing factors that cannot be controlled by the garment firms but it can affect the overall garment production process and export of the firms. Finally, the last part is the general questions which may have some effects on labour productivity and export of garment firms (Own Survey, 2022).

The five-point Likert scale is used to calculate the mean score for each factor; a scale from 1 (strongly disagree) to 5 (strongly agree), where a respondent rates the variables which they perceived to be an effect on labour productivity of garment manufacturing process. The questionnaires are identified through literature review, and it has operated by reliability-test for the validity of questionnaires (Own Survey, 2022).

The reliability test is indicated by the reliability coefficient. Cronbach's alpha gives a simple way to measure whether or not a score is reliable. Cronbach's Alpha ranges between 0 and 1, with higher values indicating that the survey or questionnaire is more reliable. The reliability test of this study shows that the Cronbach's Alpha is range from 0.5 to 0.94. This range can be acceptable, but, Cronbach's Alpha of the 'work place design' questionnaire is 0.505. Therefore, it means that this variable: work place design, is poor consistency among the variables. Then, the other variables have

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[2] Therefore, (N= 206) and, then, the number of sample garment firms (n) was calculated by using the Taro Yamane sample size calculating formula. According to Taro Yamane (1967), the sample size of this study should be at least 136 firms.

$$n = \frac{N}{1+N*(e^2)}$$

$$= \frac{206}{1+206*(0.5^2)}$$

$$= 135.9 \approx 136$$

where, n = the sample size
N = the population size
e = the acceptance sampling error (95% confidence level)

acceptable and good internal consistency, which can be interpreted as except the workplace design, the other variables can be reliable to use in this study. The questionnaire and summary result of reliability test are attached in the Appendix B and C (Lee Cronbach, 1951).

4.3 Model Specification

This section provides an overview of the key features of the model, when it is used to examine the objectives of the study. In this study, two different kinds of econometrics models are used: Multiple Regression Model and Granger Causality Test. The specific models are described as follows:

(i) Multiple Regression Model

According to the objective of the study, it intends to find out the determinants on labour productivity of garment manufacturing firms, firstly. Therefore, labour productivity of the garment manufacturing firms is dependent variable, and some influencing factors (i.e., external and internal factors) are independent variables. This analysis is based on the Cobb-Douglas types production function, because it can reflect the relationship between its inputs (generally physical capital and labour) and the amount of output produced (Paul Douglas, 1927).

This study assumes that "the production process of the garment manufacturing firms can be represented by a production function, that relates firms' output (Y) to two factor inputs: labour (L) and capital stock (K). In some cases, it also adds technology and entrepreneur into the production function. Thus, in economics, a simple form of production function can be written as:

$$Y = f(K, L) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.1)$$

where, Y is the quantity of output, K is the amount of capital, and L is the amount of labor used in production process. This production function describes that a firm can produce one unit of output for every unit of capital or labor it employs. This production function explained that the industry has constant returns to scale, i.e., the amount of output will increase proportionally to any increase in the amount of inputs. In above equation (4.1), the relationship between output and factor inputs can be approximated by Cobb-Douglas type production function, which was developed by Charles Cobb and Paul Douglas during 1927–1947" (Paul Douglas, 1927).

Then, the standard methodology of growth studies begins with the neoclassical production function, which was developed by Robert Solow (1957). "Solow described that labour productivity is the most important determinant for nation's level of income, and labour productivity has a close relationship with economic growth and it can be a determinant of economic stability. In his model, technological progress became the residual factor which explaining the long-term growth, and it was determined exogenously, that is, independently of all other factors in the model. Formally, the standard explanation of the Solow model used an aggregate production function in which:

$$Y = K^{\alpha}(AL)^{1-\alpha} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.2)$$

where, Y is aggregate output, K is the stock of capital (which may include human capital as well as physical capital), L is labor, α and (1- α) are the output elasticities of capital and labor, respectively, and 'A' represents the productivity parameter of labour, which grows at an exogenous rate" (Solow,1957 cited in Todaro, 2014).

Since the Solow model "focused on per capita form, thus, the right-hand side and the left-hand side of equation (4.2) should be divided by labour input (L). Therefore, the production function can be written as:

$$\frac{Y}{L} = \frac{K^{\alpha}(AL)^{1-\alpha}}{L} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.3)$$

$$y = k^{\alpha}A^{1-\alpha}l^{-1-\alpha} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.4)$$

In equation (4.3) and (4.4), $\frac{K}{L}$ or k is capital per worker, and, $\frac{Y}{L}$ *or* y is output per worker and it can be used as a proxy for labour productivity" (Solow,1957 cited in Todaro, 2014).

Further, the emergence of endogenous growth theory explained by Romer (1986) suggested that other endogenous factors such as accumulation of knowledge, idea, technology spill over and the role of R&D, can determine the output growth. According to Romer (1986), endogenous growth paradigm advances the role of productivity factors in the growth process which are captured by parameter, *A*, in equation (4.2), (4.3) and (4.4) (Romer, 1986).

Recalling equation (4.4), and combining the fundamentals of endogenous theory with previous studies and theoretical review of the study, the labour productivity is determined by the parameter, *A*, which can be determined by the proxy variables of men power of a firm, employees' compensation and rewards, management practices,

social factor, work place design, and external environment of firms. Thus, the equation (4.5) can be written as:

$$A = \beta_0 + \beta_1 HumCapi + \beta_2 MgmtPrtic + \beta_3 CopnRwd + \beta_4 SoFct + \beta_5 WsDgn + \beta_6 PoliRegu + \beta_7 GlobTred + \beta_8 PubUtili + \beta_9 NatCulre + \mu \ldots\ldots\ldots\ldots\ldots (4.5)$$

By combining equation (4.3) and (4.5), the labour productivity equation can be respecified as equation (4.6):

$$\frac{Y}{L} = \beta_0 + \beta_1 HumCapi + \beta_2 MgmtPrtic + \beta_3 CopnRwd + \beta_4 SoFct + \beta_5 WsDgn + \beta_6 PoliRegu + \beta_7 GlobTred + \beta_8 PubUtili + \beta_9 NatCulre + \mu \ldots\ldots\ldots\ldots\ldots (4.6)$$

where, $\frac{Y}{L}$ or y = output per labour input as a proxy for labour productivity

HumCapi = Human Capital
MgmtPrtic = Firms' Management Practices
CopnRwd = Employees' Compensation and Rewards
SoFct = Social Factor
WsDgn = Workstation Design
PoliRegu = Policies and Regulatory Framework
GlobTred = Global Trend
PubUtili = Public Utilities and Infrastructure
NatCulre = National Culture
μ = Error term
β_0 = Constant
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$ = Coefficient

In order to examine the first objective, multiple regression model is suitable to make an analysis in this study. Because multiple regression model can accommodate many explanatory variables that may be correlated. Obviously, if the study adds more factors to the model that help to explain *y*, it can also explain grater variability in *y*. Thus, multiple regression analysis can be used to build better models to predict the labour productivity (dependent variable) in this study.

(ii) Causality Test

After analyzing the influencing factors on labour productivity, this study continues to examine the causal relationship between the labour productivity and export of the garment firms, that is another objective of this study which need to be analyzed. In this analysis, labour productivity is measured by dividing monthly output (number of clothes produced per month) to monthly labour input (total labour hours) of sample garment firms. In addition, export of garment firms can also be measured by the total number of exporting clothes per month by the sample garment firms of the study area (Granger, 1969).

Granger causality test is an econometric model that used to verify the usefulness of one variable to forecast another. A variable is said to be Granger-cause another variable if it is helpful for forecasting the other variable. However, it fails to be Granger-cause if it is not helpful for forecasting the other variable. The Granger causality test is a test for determining whether one time series is useful for forecasting another. In this test, the procedure to determine the existence of causality is to test for significant effects of past values of x on the present value of y (Granger, 1969).

In preparing the Granger causality test, the following steps are included:

(a) **Augmented Dickey-Fuller (ADF) Unit Root Test**

It is conducted in order to examine whether the two variables are stationary or not. When a study makes a model for forecasting purposes in time series analysis, it requires a stationary time series for better prediction. Unit root test is applied to certify the data is stationary or not. Testing for unit root is frequently checked by Phillips Perron Test and Augmented Dickey-Fuller (ADF) test. This study uses the ADF test to examine the two variables are stationary or non-stationary (Dickey and Fuller, 1979).

While examining the ADF Test, the null hypothesis is always that the variable has a unit root (i.e., there is non-stationary) and the alternative hypothesis is that the variable has not a unit root (i.e., there is stationary between variables) (Dickey and Fuller, 1979).

"There are three major versions to make for unit root test:

$\Delta Y_t = \delta Y_{t-1} + u_t$ (*Yt* is a random walk)

$\Delta Y_t = \beta_1 + \delta Y_{t-1} + u_t$ (*Yt* is a random walk with drift)

$\Delta Y_t = \beta_1 + \beta_2 T + \delta Y_{t-1} + u_t$ (*Yt* is a random walk with drift around a deterministic trend)

where, β_1 and β_2 denote the drift (constant) term, δ is the coefficient of time-trend, T represents a deterministic trend (time or trend variable) and u_t is the residual which is required to be approximately white noise" (Dickey and Fuller, 1979). In general, "ADF test consists of estimating the following regression:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{t=1}^{k} \gamma_i \Delta Y_{t-i} + u_t$$

Dickey and Fuller's test procedure employs in above equation, where the number of autoregressive lags k is chosen to ensure that u_t is white noise. Thus, k will be determined on the basis of the test. The value of k taken is the smallest which makes the residual white noise" (Dickey and Fuller, 1979).

(b) **Optimal Lag Length Selection**

A typical model in the selection of the optimal lag length is an approximation of the VAR model. The selection of appropriate number of lags are important for many empirical research. In this case, the optimal lag length should be properly selected because too few lags may lead to over rejecting while too many lags may reduce the power of test to reject the null hypothesis. The appropriate lag order selection can be determined by using two distinct strategies: model selection based on specific sequential likelihood ratio test (LR) for the comparison of a model and model selection based on theoretic information criteria (IC) (Davidson, 2004).

Especially, the selection procedure of optimal lag length can be based on LR test statistics, Final Predictor Error Test (FPE), Akaike Information Criterion (AIC), Schwarz Bayesian Information Criterion (SBIC), and Hannan Quinn Information Criterion (HQIC). The likelihood ratio (LR) test was presented by Neyman and Pearson in 1928, it evaluates the maximum likelihood of alternatives tests under the hypothesis. The use of sequential LR tests requires the explicit choice of a significance level. The resulting tests are denoted by LR1 (for the nominal 1% LR test) and LR5 (for the nominal 5% LR test) (Sims, 1980). Arguably, the biggest concern to likelihood ratio tests is that it is based on significant levels are problematic if many test are to be made which are not nested within a model are not possible (Burnham and Anderson, 2002).

Therefore, information criterion IC approach is established by Akaike (1973), which is well known as AIC and this approach does not rely on some predefined significance level, nor does it matter whether or not a model is nested within another.

The reason is to fit several competing models to a dataset and the IC will select the model which fits the data best. In general, the model that minimizes AIC and SBIC values is selected as the optimal lag length (Akaike, 1973).

In this study, the model that minimizes SBIC and AIC is operated to choose the optimal lag length for the analysis.

(c) **Johansen Co-integration Tests**

A test for co-integration is needed when the variables are non-stationary in the analysis. There are various methods of co-integration test, among them Johansen Co-integration test is the most suitable test to analyze the series have varying variances and means overtime. When the series have cointegration, there is long-run relationship among the variables. Under the Johansen Tests, there are two test statistics for co-integration; trace test and maximum eigenvalue test (Johansen, 1988).

Then, Johansen (1988) derives "the distribution of the trace statistic-

$$-T \sum_{i=r+1}^{K} ln(1 - \lambda i)$$

where T is the total observations, r is number of cointegrating equations and the λ_i is the estimated eigenvalues. Let $\lambda 1, \ldots, \lambda K$ be the K eigenvalues applied in calculating the log likelihood at the optimal. If there are $r < K$ cointegrating equations, α and β have rank r and the eigenvalues $\lambda r+1, \ldots, \lambda K$ are zero" (Johansen, 1988).

The null hypothesis for the trace test is that the number of cointegration vectors is $r = r^* < k$, and the alternative that $r = k$. Testing proceeds sequentially for $r^* = 1,2$, etc. and the first non-rejection of the null is taken as an estimate of r. On the other hand, the null hypothesis for the maximum eigenvalue test is as for the trace test but the alternative is $r = r^* + 1$ and, again, testing proceeds sequentially for $r^* = 1,2$, etc., with the first non-rejection used as an estimator for r (Johansen, 1988).

When the series have cointegrating equation, it can operate long-run relationship among the variables. On the other hand, if the series have no cointegrating equation, a study can be analyzed by using the short-run relationship among the variables (Johansen, 1988).

(d) **Vector Error Correction Model (VECM)**

Vector Error Correction Model is a cointegrated VAR model. Vector Error Correction Model (VECM) consists of a VAR model at first differences level of the variables, and an error-correction term derived from the estimated cointegrating relationship. Through VECM, a study can take long term and short-term equations. But it needs to examine the number of cointegrating relationships. When the variables are co-integrated, a study can be used a vector error-correction model (VECM) (Sargan, 1964). A VECM for two variables can express as the follows;

$$\Delta y_t = \beta_{y0} + \beta_1 \Delta y_{t-1} + \cdots + \beta_{yp} \Delta y_{t-p} + \gamma_{y1} \Delta x_{t-1} + \cdots + \gamma_{yp} \Delta x_{t-p} - \lambda_y (y_{t-1} - \alpha_0 - \alpha_1 x_{t-1}) + v_t^y$$

$$\Delta x_t = \beta_{x0} + \beta_{x1} \Delta y_{t-1} + \cdots + \beta_{xp} \Delta y_{t-p} + \gamma_{x1} \Delta x_{t-1} + \cdots + \gamma_{xp} \Delta x_{t-p} - \lambda_x (y_{t-1} - \alpha_0 - \alpha_1 x_{t-1}) + v_t^x$$

In this model, $y_t = \alpha_0 + \alpha_1 x_t$ is the long run co-integration between two variables, and λ_y and λ_x are the error correction parameters (Sargan, 1964).

(e) Vector Autoregressive (VAR) Model

Vector Autoregressive (VAR) model is an econometrics model that used to evaluate the relationship among multiple variables when those variables are change over time. It looks like a simultaneous-equation modeling in which it considers several endogenous variables together (Gujarati, 2009).

The VAR model was introduced by Sims (1980), in which each variable of the model is displayed as a linear combination of past values of itself and the past values of other variables in the system. Mathematically, a VAR model with exogenous variables X_t is given by (Abrigo, 2016):

$$Y_t = v + A_1 Y_{t-1} + \ldots + A_p Y_{t-p} + B_0 X_t + B_1 X_{t-1} + \ldots + B_s X_{t-s} + u_t \text{ , } t \in \{-\infty, \infty\}$$

where $Y_t = (Y_{1t}, \ldots, Y_{Kt})$ is a $K \times 1$ random vector, A_1 through A_p are $K \times K$ matrices of parameters, X_t is an $M \times 1$ vector of exogenous variables, B_0 through B_s are $K \times M$ matrices of coefficients, v is a $K \times 1$ vector of parameters, and u_t is assumed to be white noise or error terms. In the above equation of VAR model, the time series Y_t is affected by current and past values of X_t, as well as, the time series X_t is affected by current and past values of Y_t. Thus, VAR model can be used when there is simultaneity between

several variables, and cannot differentiate between the dependent variable and of which the independent variables (Sims, 1980 cited in Abrigo, 2016).

(f) Granger Causality Test

It is an econometrics model to examine whether one timeseries variable is useful to forecast the future of another time-series variable. Moreover, it is usually performed to determine the direction of causality, such as unidirectional or bidirectional, as well as, non-directional between the selected variables in the short-run and long-run (Wooldridge, 2013).

Granger (1969) developed a causality in economics that can be tested by measuring the ability to investigate the future values of a time series using previous values of another time series. Granger causality is rather testing whether *X* causes *Y* than it is testing whether *X* forecasts *Y*. A time series X_t is said to granger cause Y_t when a series of t-tests and F-tests on lagged values of *X*, where those *X* values provide statistically significant information about future values of *Y*. If the F-statistics is greater than the critical value of the chosen significant level, it is considered to reject the null hypothesis, and vice versa (Granger, 1969).

The Granger causality test assumes that the information relevant to the prediction of the respective variables, (i.e., labour productivity *Y* and garment export *X*) are contained solely in the time series data on these variables. When a study has two series; X_t and Y_t , the equations look like, (Granger, 1969),

$$X_t = \delta_0 + \beta_1 X_{t-1} + \gamma_1 Y_{t-1} + \beta_2 X_{t-2} + \gamma_2 Y_{t-2} + \cdots + u$$

and

$$Y_t = \theta_0 + \alpha_1 Y_{t-1} + \lambda_1 X_{t-1} + \alpha_2 Y_{t-2} + \lambda_2 X_{t-2} + \cdots + u$$

where each equation contains an error that has zero expected value given past information on *X* and *Y*. Those equations allow to test whether past *Y* help to forecast X_t. Generally, it can be said that *Y* Granger causes *X* (Wooldridge, 2013).

The Granger causality test for two stationary variables involves estimating the following pair of regressions:

$$Y_t = \delta_0 + \sum_{i=1}^{k} \beta_i X_{t-i} + \sum_{j=1}^{n} \gamma_j Y_{t-j} + u_t$$

$$X_t = \theta_0 + \sum_{i=1}^{k} \alpha_i Y_{t-i} + \sum_{j=1}^{n} \lambda_j X_{t-j} + v_t$$

where, Y_t is dependent variable, X_t is explanatory variable, u_t and v_t are the error term.

If $\sum_{j=1}^{k} \alpha_{ij}$ and $\sum_{j=1}^{k} \beta_{ij}$ equal to zero for i=1, 2; it can be supposed that *X* and *Y* do not help each other (i.e., non-causality). If $\sum_{j=1}^{k} \alpha_{ij}$ and $\sum_{j=1}^{k} \beta_{ij}$ are not equal to zero for i=1, 2; it can be described that *X* and *Y* contribute to each other (i.e., bidirectional causality). If $\sum_{j=1}^{k} \alpha_{ij}$ equal to zero for i=1, 2 and $\sum_{j=1}^{k} \beta_{ij}$ is not equal to zero for i=1, 2; past values of X_{t-j} affects to Y_t. It can be interpreted that there is unidirectional causality from *X* to *Y* exist (Granger, 1969).

However, sometimes the cause and effect between these two variables can be linked indirectly each other; and the third party or third factor can be occurred in the causality regression. In this situation, the outcomes of the causation can be wrong. Therefore, it has to ensure that there is no omitted variable in the analysis. Moreover, the choice of the lags in the causality regression is also essential. If the lag chosen is different from the real lag, the result can lead to biased or inefficient condition. In this regard, the validity of the granger causality test depends on the right choice of the number of lags and the stationary of the applied variables of the study (Granger, 1969).

4.4 Variable Description

After studied the model, the dependent variable and various explanatory variables, which are controlled in the empirical estimation, are briefly described in this section.

4.4.1 Dependent Variable

Labour Productivity: labour productivity can be measured in a number of ways, depending on the definitions of output and labour input measures.

In this study, labour productivity is measured according to OECD and ILO's method, it is measuring by the ratio of output to labour input. According to ILO and OECD, the outputs are the finished units by an enterprise. It should be tangible or measurable, but it should meet the quality specifications. Labour input is usually measured in units such as worker-hours, worker-days, worker-months and worker-years. From a perspective of productivity analysis, and ignoring quality differences for the moment, labour input is most appropriately measured as the total number of hours worked (OECD manual, 2001).

Therefore, in this study, labour productivity is calculated by means of output to labour input; Y/L, where the total gross output of the garment manufacturing firm

(number of clothes) divided by the total number of worker-workers in that firm (OECD manual, 2001).

Export: in this study, export has been calculated as the total number of garment exports (total number of clothes per month), which has collected through survey question of sample garment exporting firms (OECD manual, 2001).

4.4.2 Independent Variables

In order to measure the numerous independent variables affecting on labour productivity, policy makers and researchers from academic and industry sector usually conduct surveys and questionnaires to find answers to specific and relevant questions. In fact, questionnaires surveys are an effective data collection tool. After the variables of interest have been identified and conceptually defined, it is necessary to choose a particular type of scale. One of the most widely used scaling methods is the attitude scale and Likert scale. Among them, the Likert scale is used as one of the most basic and widely used instruments in the research area of sociology, psychology, information systems, politics, economics and many others (Taherdoost, 2019).

In this study, independent variables can be divided as internal and external factors. The key factors affecting on labour productivity are identified from the perception of firm owners, managers, and supervisors of sample garment firms. The critical factors affecting labour productivity are ranked based on their relative important that is calculated by mean score of each variable (Nguyen Van Tam, 2021). The detail description can be described as follow;

(a) Variable Description for Internal Factors

This study determines the five major categories of internal factors including human capital, employees' compensation and rewards, social factors, management practices, and workplace design.

Human Capital: According to literature review of this study, labour productivity of a typical firm is influenced by the educational background and experience of workers, it can be used as a proxy of human capital. In this study, men-power or human capital of sample garment manufacturing firm has measured by mean score of variables likes experiences of sewing workers, average schooling years of its workers, quality of

labour force, having skilled-labours, and employees' aspiration to accept new ways of working style. On the other hand, human capital of a firms also concerns with its man-power related problems, such as frequently labour turnover, personal problems of its work-force, misunderstanding among workers and workers' failure to follow the work-related rules of their firms (Meta, 2022).

In this case, both skills and qualities are types of personal characteristic but they are slightly different. Skill can be defined as a specific ability to do something competently in a general context. While skills can be learnt through practice, qualities are considered to be characteristics and personality behaviors which are to some extent in-built or inherent (Meta, 2022). Therefore, both variables of skills and quality are contained within the questionnaire survey of this study.

Management Practices: The literature review of this study already presented that management practices play an important role on labour productivity of manufacturing firms. In this study, the proxies used for management practices are including the mean score of team-working, learning by doing among co-workers, line balancing, mis-matching of high-skilled and low-skilled worker, managing or maintaining skilled labour, supervision or dealing low performers who create the bottle-neck along the sewing process and providing the required tools to increase the productivity of garment workers (Bloom, 2013).

Employees' Compensation and Rewards: Employees' compensation is usually base on OECD's measurements. It is stated that compensation of employee has two main components: wages and salaries in cash or in kind, and, employment-related social insurance scheme. On the other hand, rewards for employees are usually based performance related bonus payment including target piece-rate bonus and attendance awards, etc. Therefore, based on literature review, this study measures employees' compensation and reward by calculating the mean score for wage rate based on workers' ability, overtime of employees, piece rate reward, bonus for special days, attendance bonus and wage reduction for defect work (Alam, 2018).

Employee Welfare or Social Factors: The problem of low labour productivity has persisted a serious problem for manufacturing firms. From the literature review, this study has been recognized several factors that cause low labour productivity, among

them, labour welfare measures or social factors have poor attention. Therefore, in this study, social factors are measured by the mean score of respondents' opinion for providing formal training, workplace medical assistance and employee welfare program, attention for health and safety, leave allowance, and, providing accommodation and staff ferry (Mayank Gupta, 2018).

Workplace Design: It is important for timely production and it helps to reduce the defaults clothes. This study is used the mean score of each indicator under the work place design, such as a firm has well-prepared workstation for timely production, arrange sample model of clothes, frequently checking machine, arrange wide working surface and lighting, providing various size of necessary tools, put warning signs on out-of-order machine and arrangement of group/ line workstation design (ILO, 1998).

(b) Variable Description for External Factors

From the economic point of view, external environment of the firms can be one of the influencing factors for labour productivity of those firms. In this study, measuring external factors can be divided as the policies and regulatory framework of the country, changing global trend, public utilities and infrastructure, as well as, the national culture of the country, which can be used as a proxy for external factors (World Bank, 2016).

Policies and Regulatory Framework: policies and regulation of the government include the government's customs and trade regulations, variations in interest rate and exchange rate policies, political and economic conditions of a country, industrial regulations, labour law, and wage policies of a country. This study calculates the mean score for those indicators and denoted as policies and regulatory framework of a country.

Global Trend: Now a days, changing global trend is essential indicator for garment exporting industry. In this study, it can be measured by the mean score of substantial changes in global apparel/ garment market, depending on export order, depending on imported raw materials, and quality and design of clothes by international buyers, and, popularity of online shopping and e-commerce.

Public Utilities and Infrastructure: It is one of the supportive factors on production and export of garment firms. Public utilities and infrastructure are measured by mean score of the respondents' opinion score on local transportation, public transportation for workers, shortage of power supply and water distribution, and internet and telecommunication condition of a country (World Bank, 2016).

National Culture: Culture is defined in different ways. One of the widely accepted definitions is that it is the common form of the thinking patterns of the group members that distinguishes them from the non-members (Hofstede, 2010). A well-defined organizational culture is crucial for successful organization. However, multinational companies (MNCs) bring investments to host countries when global value chain is accelerated recently. Along with those MNCs, organizational culture tends to brings across countries, but it does not work well when it is applied in the MNCs of host country (Hofstede, 2010).

In the workplace of MNCs in host countries, the influence of national culture is crucial, where decisions are made by foreign company that are implemented by domestic managers and employees. It creates possible problems on cooperate activities, particular to local managers who are in direct communication with head quarter of home country (Radostina, 2016). In this case, the national culture is more important factor for an organization to attain greater performance of employees, especially in multicultural organization. On the other hand, advocators of organizational culture believe that organizational culture influences on organizational performance, employee satisfaction, and organizational effectiveness. Every proponent of national culture and organizational culture has compelling arguments that one side has greater influenced over the other (Pratikno, 2019).

In this study, most of the garment manufacturing firms are foreign direct investment firms. Thus, it limits to study on national culture rather than organizational culture, which can also be influenced on labour productivity of a firm.

Therefore, according to literature review of this study, national culture of a firm can be measured by the mean score of family and social background of workers, interpersonal trust between workers and managers, workers' ethic on their work, obedience of workers, and cultural and social norms of women workforce.

4.5 Method of Analysis and Econometric Models

This section presents econometric models to analyze the objectives of the study. This study focusses to determine the influencing factors on labour productivity, and then, it also examine the relationship between labour productivity and export of garment manufacturing firms.

According to the objective of the study, the method of study includes two parts. At first, this study aims at examining the determinants of labour productivity. In this case, a panel regression model is used for survey data based on Cobb-Douglas type production function. Required data is collected by current operational data from (172) sample garment manufacturing firms in Yangon through distribution of structured questionnaire.

Then, for second and third objectives, the Granger causality test is analyzed to examine the direction of causation between the selected variables of this study: labour productivity and export of garment manufacturing firms. In preparing the process of Granger causality test, Augmented Dickey-Fuller (ADF) unit root test is conducted in order to examine whether the variables are stationary or not, and then, Vector Autoregressive (VAR) model is applied for lag length selection. Subsequently, Vector Error Correction Model (VECM) and Johansen Co-integration test had used for long-run relationship between variables. Finally, Granger causality test is accomplished to examine the direction of causation between the selected variables in the short-run and long-run. This analysis can be based on time-series data (i.e., monthly data), in which labour productivity and export data are collected for 64 consecutive months (January, 2017 to April, 2022) through the survey data from sample garment manufacturing firms.

CHAPTER V
DATA ANALYSIS

5.1 Profile of Respondents

The descriptive statistics for the respondents' profile include the characteristics of individual firm owner, manager and supervisor who represent their garment exporting firm of the survey area.

Table 5.1 Demographic Characteristics of the Respondents

Sr.	Characteristics	No. of Respondents	Percentage (%)
1	**Gender**		
	Male	34	19.8
	Female	138	80.2
	Total	**172**	**100%**
2	**Age**		
	20-40	103	59.88
	40-60	57	33.14
	60 and above	12	6.98
	Total	**172**	**100%**
3	**Marital Status**		
	Single	42	24.3
	Married	127	73.8
	Other	3	1.7
	Total	**172**	**100%**
4	**Level of Education**		
	Graduate	160	93.1
	Masters'	9	5.2
	Other	3	1.7
	Total	**172**	**100%**
5	**Designation**		
	Supervisor	32	18.6
	Manager	122	70.9
	Owner	8	4.7
	Other	10	5.8
	Total	**172**	**100%**

Source: Own Survey Data (2022)

In the table (5.1), most of the respondents are managers with its percentage of (70.9%) of total respondents, followed by the designation of supervisor (18.6%), then other designation which concerns the relatives and family members of owners (5.8%), and the rest respondents (4.7%) are owners of the garment manufacturing firms.

Among the demographic characteristics of the respondents, gender of the workforce of garment firms are prominent for garment manufacturing firms. According to the survey data, 19.8% of the respondents are male and the others 80.2% are the female. It means that most of the workforce in management level of garment firms are operated by female manager or supervisors. Because the employment nature of garment industry is dominated by female labour force, and it may reflect on the importance women's contributions towards the country's economy. With this result, it needs to advocate for more sophisticated strategic policies and activities to empower women.

Then, the age of the respondents is categorized by age range of 20-40, 40-60 and above 60 years old. According to the survey result, the respondents who are counted in the age range of 20-40 years old are the highest percentage of 59.88% of total respondents. Among the respondents, 33.14% are counted in the age range between 40-60 years old, and, then, 6.98% of the respondents with the age range of over 60 years old. In this study, the age of the respondents can be assumed that it is a measure of managing expertise of the firms. In most developing countries, the knowledge of the managers is mainly based on their work experience only. In addition, the nature of exported oriented garment manufacturing firms are strongly depend on the supply chain process with the various stages of clothes manufacturing. In Myanmar garment industry, the supply chain includes everything from sourcing the raw materials to the distribution of finished clothes to the end users. In this case, the management level of a garment firms needs to connect all the organizations, that involved in turning raw materials into finished clothes and distributing garments to customers. Therefore, the survey result points out that the knowledge of innovative and efficient management techniques is needed to properly constructed for export-oriented garment manufacturing firms. In this prediction, professionally run training courses are essential for developing management skills for young-aged managers of garment firms in Myanmar to promote their garment export.

As of marital status, the majority of the respondents (73.8%) are married, followed by (24.3%) of respondents are still single among them. Moreover, according to the educational level of the respondents, the majority of the respondents about

(93.1%) are attained the Bachelor Degree Education, then, (5.2%) of the respondents got the Master Degree. In this study, there is a few respondents (1.7%) who attained the other degree of education, such as Diploma in Fashion Design, etc.

5.2 Profile of Firms Characteristics

For garment industry, the basic information about the firm characteristics usually concerns about the firms' production, total number of labour input, and average working hour per day. In this study, the total number of clothes produced per day (i.e., output per day) is a proxy for firms' production of the sample garment firms. The descriptive statistics of sample garment firms in the survey area are presented in table (5.2).

Table 5.2 Output and Input of Sample Garment Firms

Sr	Firms' Information	Mean	Minimum	Maximum	Std. Dev
1	Output Per-day (No. of Clothes)	5857	300	105000	11781.45
2	Labour Input Per-day (No. of Sewing Workers)	596	25	6600	779.8524
3	Working Hour Per-day (No. of Hours)	8.87	8.00	11.00	0.923
4.	Labour Productivity (Per-hour)	0.975	0.38	1.97	0.3709
5.	Labour Productivity (Per-month)	234.13	93.6	472.8	89.23

Source: Own Survey Data (2022)

According to the survey data, average number of clothes produced per day is range from 300 to 105000 clothes, and hourly labour productivity of a typical worker from sample garment firms is range from 0.38 to 1.97 clothes per hour. Moreover, the other information about the specific characteristics of the sample garment firms is discussed in table (5.3). The other firms' characteristics are included as firm age, firm location, and ownership types of a firm.

Table 5.3 Characteristics of Sample Garment Manufacturing Firms

Sr.	Firm Characteristics	No. of Respondents	Percentage (%)
1	**Firm Location**		
	Hlaing Thar Yar	95	55.2
	Shwe Pyi Thar	30	17.5
	Others	47	27.3
	Total	**172**	**100%**
2	**Firm Age**		
	5-10	99	57.6
	10-15	38	22.0
	15-20	21	12.2
	20-25	12	7.0
	25 and above	2	1.2
	Total	**172**	**100%**
3	**Firm Ownership**		
	Domestic	21	12.2
	Joint Venture	44	25.6
	FDI	107	62.2
	Total	**172**	**100%**

Source: Own Survey Data (2022)

According to the survey results, over the half of sample garment firms (55.2%) are located in Hlaing Thar Yar Industrial Zone, because it is the largest industrial zone in Yangon and more than 90% of garment firms are operated in this industrial zone. In this survey, the industrial zone other than which located in Hlaing Thar Yar and Shwe Pyi Thar zones are categorized as "Other Industrial Zone": South-Dagon, East-Dagon, Dagon Seik Kan, Mingalardon, and HmawBi-MyanungDagar industrial zones are included, which counted as about (27.3%) of the sample garment firms. Then, the rest of the sample firms are operated in Shwe Pyi Tar Industrial Zone, that is about (17.5%) of the sample garment manufacturing firms of this study.

Firm ownership is essential in garment production since it can also reflect the ownership of assets which could take the form of capital flows for investment, new technology, access to new foreign markets, better management practices and use of advanced technology. Therefore, the level of productivity may be different based on

their firms' ownership types. In this survey, there are (62.2%) of firms are operated under the ownership type of Foreign Direct Investment (FDI), 25.6% are joint venture firms and the other (12.2%) are operated under domestic ownership.

5.3 Analysis of Factors Affecting on Labour Productivity

This part of study is presented for the result of regression analysis between dependent and independent variables. In this analysis, the Cobb-Douglas type production function is used when estimate the coefficients of variables used in the production function.

5.3.1 Descriptive Statistics of Internal and External Factors

The descriptive statistics of the determinants of labour productivity are described in table (5.4). In this study, labour productivity is estimated by nine different variables under two main concepts of internal and external factors. Under the concept of internal factors, the variables such as human capital, management practices, compensation and rewards, and social factors and workplace design are included. In addition, policies and regulatory framework of a country, changing the global trend, public utilities and infrastructure and nation's cultural background are appropriate as external factors of the firm.

Table 5.4 Descriptive Statistics of Variables for Sample Garment Firms

Sr.	Variables	Min	Max	Mean	Std. Dev
1	Labour Productivity Per Month	93.60	472.80	234.13	89.23
2	Human Capital	1.20	5.00	3.0087	.87149
3	Management Practices	2.57	4.00	3.6175	.44037
4	Employees' Compensation & Rewards	1.14	5.00	3.2167	.93776
5	Social Factors	1.70	5.00	3.4635	.83684
6	Workplace Design	1.26	5.00	3.5573	.42439
7	Policies and Regulatory Framework of a Country	1.40	5.00	3.5866	.82096
8	Changing the Global Trend	1.12	5.00	3.4867	.87634
9	Public Utilities and Infrastructure	2.20	5.00	3.8201	.76528
10	National Cultural	1.20	5.00	3.2873	.89942

Source: Own Survey Data (2022)

According to the survey result in table (5.2), the average labour productivity of sample garment firms is about 235 clothes per month, which range between a minimum of 93 clothes per month to a maximum of 472 clothes per month.

In this study, independent variables are measured by five-point Likert scale and those variables are estimated by the score of respondents' opinion on how much each indicator may affect the labour productivity of a firm. The survey results of descriptive statistics show that the mean scores for all independent variables are over 3.0, which means that most of the respondents are agreed for labour productivity of a firm could be somewhat influenced by those independent variables.

5.3.2 Results of the Regression Analysis

The multiple regression analysis can be taken when a study needs to prove the extent of the possible influencing factors on labour productivity of the sample garment firms. After making the multiple regression analysis, the following factors might be influenced on the dependent variable of labour productivity per month. Table (5.5) presents the results for labour productivity per month and its influencing factors.

The results of an effect of influencing factors on labour productivity are presented in above table. In the empirical analysis, the number of observations is included by 172 sample garment manufacturing firms. There is a significant impact for most independent variables on labour productivity except the variables of "changing global trend" and "work place design" of garment firms. Among the variables, human capital, management practices of firms, employees' compensation and rewards, and national culture are statistically significant at 1% level, while social factors, policy and regulatory framework of a country and public utilities and infrastructure are significant at 10% level, respectively.

According to the results of multiple regression analysis, the value of Adjusted R-Square is 0.920 with a significant p value ($p = .0000$) at 99% confidence level. Therefore, the model is better to predict the variables in this analysis because the higher Adjusted R-Square value can indicate the goodness-of-fit (model accuracy) measure for linear models. In addition, the value of R-Square (i.e., $R^2 = 0.924$) indicated that there is about 92% of the variance in the dependent variable can be explained by the independent variables of this study.

Moreover, this study continually examines the other main assumptions of multiple regression model, such as (1) a test for no multicollinearity, (2) normality of

residuals, (3) linearity for autocorrelation, and (4) homoskedasticity. Diagnostic plots can be used to detect whether these assumptions are satisfied. A test for no multicollinearity assumption is verified by using Variance Inflation Factor (VIF) values. In this study VIF value of all variables are less than 5, which means that all independent variables are not highly correlated with each other. In the second assumption, the residuals between observed and predicted values should be normally distributed, which can be checked by drawing a histogram. Then, a test for linearity between the outcome variable and the independent variables by using the P-P Plot of regression. The final assumption of multiple linear regression is a test for homoskedasticity, which can be checked by using the scatterplot. The results of the test (Histogram, p-p Plot and Scatterplot) are presented in the Appendix C-2 of this study.

In the Appendix C-2, the shape of Histogram described that the residuals are normally distributed. Then, P-P Plot states that there is linear relationship between dependent and independent variables of this study. And, Scatterplot diagram shows that the variances of error terms are similar across the values of the independent variables because the all points are equally scattered in the diagram.

Then, the results of multiple regression analysis between labour productivity and various independent variables are presented in table (5.5).

Table 5.5 Regression Results of Labour Productivity and Various Influencing Factors

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
Variables	**Coefficient**	**Std. Error**	**Beta**			
Intercept	-176.07***	18.266		-9.639	0.000	
Human Capital	34.39***	3.562	.391	9.654	0.000	3.495
Management Practices	34.32***	6.965	.189	4.929	0.000	3.138
Employees' Compensation & Rewards	19.45***	3.923	.240	4.959	0.000	4.988
Social Factors	5.35*	2.723	.065	1.965	0.051	2.324
Workplace Design	-2.78	4.038	-.029	-.690	0.491	3.803
Policies and Regulatory Framework of a Country	7.41*	4.037	.069	1.837	0.068	2.983
Changing the Global Trend	1.09	3.778	.014	.291	0.772	4.782
Public Utilities and Infrastructure	7.98*	4.285	.069	1.864	0.064	2.889
National Cultural	17.66***	3.884	.195	4.549	0.000	3.907
R^2			0.924			
Adjusted R^2			0.920			
P-value			0.0000			
Number of Observations			172			

Source: Own Survey Data (2022)

Note: * Significant at 10%, ** Significant at 5%, and *** Significant at 1% level.

Once, in a multiple regression model, the result of adjusted R-square is 0.920 with significant p-value of (p=0.000), it means that about 92% of the variance of the labour productivity (dependent variable) is explained by the various of the independent variables.

In addition, the coefficients of independent variables allow to take comparisons between independent variables to determine which variable has the most influence on

the dependent variable. The predictable coefficients of different variables are shows in table (5.5).

In this study, the standardized coefficient of human capital on labour productivity is the greatest and positive (0.391) with significant p-value (p=0.000) at 1% significant level. It can be interpreted that human capital is the most influenced factor on labour productivity of garment firms. It is reliable with the labour-intensive nature of garment industry. Therefore, garment exporting firms have to promote their human capital if the firms want to increase their labour productivity.

Moreover, workers' skills and year of experiences are proxy indicators for human capital, thus, firms have necessary to retain their skilled or experienced workers to increase their labour productivity. In addition, years of schooling or average years of formal education also be a proxy indicator for human capital, but about one-third of the garment workers have a primary education or at most a secondary education (UNDP, 2022). Garment firms should encourage or participate in regular training programs to learn and promote practical skills and real experience of their workers (Nguyen Van Tam, 2021). Therefore, stakeholders of garment industry, especially MGMA usually having programs of workshop and training that aim to enhance the labourer's experiences and managerial skills of the supervisors/ managers form garment firms (www.myanmargarments.wordpress.com). Moreover, other critical indicators under the human capital factor such as work discipline (follow work related rules), workers' aspiration and personal problems, that are also found to be important indicators on increased labour productivity of garment firms.

Secondly, employees' compensation and rewards variable have an effect on labour productivity of garment firms, since the standardized coefficient of employees' compensation and rewards is (0.240) and significant at 1% level (p=0.000). According to the literature, well prepared compensation and reward system could be an important for increase labour productivity of a firms. In this analysis, compensation and rewards system of typical garment firms are determined by wages paid based on workers ability, piece-rate rewards or piece rate pay, bonus for special days, attendance bonus, wage deduction for defeat garments and overtime. Thus, in recent years, a growing number of firms propose a compensation package that can be linking pay to performance (i.e., salary based on worker's ability or performance). It can help to raise job satisfaction, lower absenteeism and turnover rates, which in turn effect on firms' performance. Moreover, some garment exporting firms of neighbouring countries are introduced the

team-based rewards system, because it can reduce free-rider problem among the co-workers and contribute to care about their co-workers, that can motivate employees and their working team that lead to increase labour productivity of a firm (Claudio, 2022).

As expected, in terms of the standardized coefficients, management practices of firms are a positively relationship and third most influential internal factor on the labour productivity of sample garment exporting firms. In an empirical analysis of this study, the coefficient of management practices is positively and statistically significant at 1% level (p=0.000), which indicating that better management practices are also essential to increase labour productivity of a firms. According to the working nature of garment industry, it needs better or suitable managerial practices like line balancing by skills and experiences of workers, arrange team work, identifying the low performers who create the bottle-neck for sewing process and carefully monitoring in mismatch of skilled labour over unskilled labour (Farhatun et al., 2015, Sohel, 2018).

At fourth, the standardized coefficient of social factors is (0.065) with significant p-value of (p=0.051), indicating that improving social factors of a firm can lead to increase labour productivity of a firm at 10% significant level. Based on the literatures, if the social factors of a firm become stronger, it may help to increase productivity of the workers. In this study, well develop training program, provide a workplace medical assistance, arrangement of employee welfare program, attention occupational health and safety conditions, and other welfare and social indicators are suitable proxy indicators for social factors of a firm. Moreover, ILO action manual recommends the low-cost work-related welfare facilities and benefits, that are often ignored in the workplace, such as sanitary facilities (clean toilet, providing soap, and toilet paper) prepare ready for emergency (provide first-aid box and medical assistance), give the short break taken to rest (serve coffee break and rest areas), and other facilities (providing work clothes, lockers, drinking water, eating areas or canteens, etc). Those small establishments of welfare facilities can help workers to reduce tiredness and having strong effects on increased labour productivity (ILO, 1998).

However, the variable, workplace design of a firm has not a significant effect on labour productivity of a firm because the coefficient for workplace design of sample garment exporting firm because of its insignificant p-value of (p=0.491). In this study, workplace design of garment manufacturing firms means the arrangement of indoor working environment that has potential to increase labour productivity. The main

reason for insignificant effect of this variable is due to the same nature of work place design for every sample garment firm of this study. Moreover, the same technology or same model of sewing machine, same preparation for sewing lines of the garment firms is also contributed the indifferent workplace design among the garment firms. Therefore, there is no variations of data among more productive firms and less productive firms, and that can create insignificant effect on labour productivity of sample firms.

On the other hand, the specific external factors can also have strong effects on labour productivity of garment exporting firms.

Among the external factors, the background of national culture of an employee is the most influencing external factor to increased labour productivity of garment exporting firms. It has a positive effect on labour productivity of garment exporting firms and it is statistically significant at 99% confidence level (p=0.000). This is indicating that cultural background of employees, such as family and social background of workers, interpersonal trust between co-workers, workers' ethical behaviour, obedience of workers and cultural and social norms of women workforce are strongly influenced on the labour productivity of garment exporting firms in this analysis. This is proved by Ukachukwu (2013), who investigated the impact of cultural differences on the productivity of employees within organizations. Variety in cultural background or national cultural diversity creates challenges in the workplace which lead to conflicts and affect team work if the firm do not properly managed. It advocated that cultural diversity could be significantly affects the ability of employees when building or working in teams, and this consequently affects their labour productivity.

Moreover, policies and regulatory framework a country has a positive effect on labour productivity of a garment exporting firm. In an analysis, the standardized coefficient of policies and regulatory framework of a country (0.069) is statistically significant at 10% level (p=0.068). It means that government policies and regulatory framework of a county would help to increase the labour productivity of sample garment exporting firms. In this study, changing in macroeconomic policies, such as custom and trade policies of a country, interest rate and exchange rate policy, labour law and industry regulations, as well as, political and economic environment of a country can have a significant effect on labour productivity of garment firms. Although policy variable is strongly effects on labour productivity, firms cannot control over the

indicators of policies and regulatory framework, practically. Therefore, firms have to adapt their production process in consistent with government policies.

On the other hand, the public utilities and infrastructure is also positively affected on labour productivity of garment firms. In this study, the public utilities and infrastructure is statistically significant at 10% level with the standardized coefficient of (0.069). Therefore, it can be implied that better improvement in public utilities and infrastructure, such as electricity and water supply, better internet and telecommunication, and better public transportation can support to increase the labour productivity of garment manufacturing firms in this study.

However, changing the global trend is found to be not related to labour productivity of garment exporting firms. Although the effect of changing global trend might be crucial for exports condition of garment firms, it is not directly effect on the labour productivity of sample garment manufacturing firms of the study area.

Therefore, this study determines the nine independent variables to analyze the labour productivity of garment exporting firms in study area. The results of analysis by multiple linear regression model explained that there is a strongly relationship between labour productivity and other seven independent variables except the global trend and workplace design. Their relationship is significant at 1% and 10% level. Thus, the regression model for empirical analysis of this study can be written as:

$$y = \beta_0 + \beta_1 HumCapi + \beta_2 MgmtPrtic + \beta_3 CopnRwd + \beta_4 SoFct + \beta_5 WsDgn + \beta_6 PoliRegu + \beta_7 GlobTred + \beta_8 PubUtili + \beta_9 NatCulre$$

$$= -176.073 + \underset{(0.000)}{34.393}\ HumCapi + \underset{(0.000)}{34.328}\ MgmtPrtic - \underset{(0.000)}{19.454}\ CopnRwd + \underset{(0.051)}{5.351}\ SoFct - \underset{(0.491)}{2.787}\ WsDgn + \underset{(0.068)}{7.415}\ PoliRegu + \underset{(0.772)}{1.099}\ GlobTred + \underset{(0.064)}{7.986}\ PubUtili + \underset{(0.000)}{17.665}\ NatCulre$$

As for negative intercept of the analysis, the model predicts that if a firm has unsounded internal and external factors would decline about 176 clothes per month for their labour productivity of a firm in the study area. The weakening of independent variables is also occurred due to the data collection period of sample garment firms, that is during the Covid-19 pandemic period and unexpected situation of political

environment. These conditions can contribute to reduce the productivity of garment firms. Therefore, enhancement of independent variables (i.e., both internal and external factors) can help to increase the labour productivity of garment exporting firms in this study.

5.4 Analysis of Causality Test Between Labour Productivity and Export of Garment Exporting Firms

In an econometric analysis for some economic variables, it needs to know whether changes in one variable would have an impact on changes other variables, sometimes. When a study needs to find out this phenomenon more accurately, it should use a Granger Causality Test (Wooldridge, 2019).

In order to analyze the relationship between the labour productivity and export of the sample garment exporting firm, this study operates Granger Causality Test by using time-series data (i.e., monthly export, monthly production, and monthly numbers of workers) for 64 consecutive months during the period from January-2017 to April-2022.

Causality Test between Labour Productivity and Export

The aim of this study is to analyze the relationship between labour productivity and export of sample garment firms in the study area. The analysis includes the following steps.

(i) Results of Unit Root Test (Testing for Stationary)

Before examining the causality between the variables of labour productivity and export of garment firms, this study needs to perform the unit root test to analyze the variables are stationary or non-stationary. In order to test the variables, Augmented Dickey-Fuller (ADF) test is applied in this study. The test is undertaken for labour productivity per month (total output is divided by total labour inputs) and monthly export (total no. of clothes exported per month). The results of ADF tests are presented in table (5.6), as below.

Table 5.6 Results of Augmented Dickey-Fuller Test

Variables	With Trend		With Drift		Results
	t-statistics	p-value	t-statistics	p-value	
ADF of Labour Productivity	-5.420***	0.000	-2.166**	0.0172	Stationary
ADF of Export	-4.859**	0.004	-2.816**	0.0033	Stationary

Source: Own Survey Data (2022)

*** Significant at 1% level

** Significant at 5% level

In order to analyze the ADF unit root test for stationary, this study propose the hypothesis as follow:

H0: The series has a unit root (i.e., There is non-stationary between two variables)

H1: The series has not a unit root (i.e., There is stationary)

According to the table, the results of unit root test for both export and labour productivity described that it has a negative coefficient with significant p-value at 5% level. In this analysis, the negative coefficient means that the model is valid and the absolute value of Test Statistics for both Export and Labour Productivity are higher than its critical values at 5% level, which occurred both in terms of regress with trend and drift.

Therefore, the results of ADF test can be indicated that this study can reject the null hypothesis because the test statistics is significantly large and negative. Thus, the series is stationary, which means that the series have not a unit root. Since all variables are stationary, the rest parts of the causal analysis can be continued to test.

(ii) Results of VAR Lag Length Selection

In this section, the Vector Auto Regression (VAR) lag order selection method is utilized to determine the optimal lag length.

Table 5.7 Determine the Optimal Lag Length by VAR

Lag	Log L	LR	FPE	AIC	HQIC	SBIC	p-value
0	-1079.95		1.6e+13	36.0651	36.0924	36.1349	
1	-961.493	236.92	3.5e+11	32.2498	32.3317	32.4592***	0.000
2	-956.579	9.8295	3.4e+11	31.2193	32.3558	32.5683	0.043
3	-948.043	17.071**	2.9e+11**	32.0681**	32.2593**	32.5568	0.002
4	-944.199	7.6881	2.9e+11	32.0733	32.3191	32.7016	0.104

Source: Own Survey Data (2022)

Denote: ** Significant at 5% level

*** Significant at 1% level

According to results of an analysis, the above table presents the optimal lag length by VAR model which determines the number of lagged for the cointegration test of this study. The optimal lag-length can be determined by using the test statistics of LR, FPE, AIC, SBIC and HQIC tests, where the selection criterion is based on the lowest value of those tests. However, it also needs to adjust with significant p-value. After making an adjustment of data by VAR, this study found out the criterion three has a lowest value with a significant p-value among them. In table (5.7), many of the tests-statistics, especially the AIC test indicated to choose “three lags” which can be suitable for this model to determine both variables; export and labour productivity of garment exporting firms in this study, because Lag-3 of AIC has lowest value with significant p-value at 5% level.

(iii) Johansen Cointegration Test

The Johansen Cointegration test can be estimated whether there is a long-run relationship or not between the variables. Before performing this test, the variables have to been stationary. According to the ADF unit root test, variables are stationary, and, thus, the result allows to operate the cointegration test. The results of the Johansen Cointegration test are shown in table (5.8).

In this test, the Null Hypothesis (H_0) stated that there is no cointegration between two variables, and the Alternative Hypothesis (H_1) stated that there is a cointegration between two variables. In the analysis of Johansen Cointegration test, the

rule of interpretation is based on the value of trace statistics and max statistics (maximum-eigenvalue statistics) with its critical value at 5% confidence level.

Table 5.8 Results of Johansen Test for Cointegration

Maximum Rank	Eigenvalue	Trace Statistic	5% Critical Value
0	-	35.2674	15.41
1	0.43492	1.0205**	3.76
2	0.01686	-	-
Maximum Rank	**Eigenvalue**	**Max Statistic**	**5% Critical Value**
0	-	34.2470	14.07
1	0.43492	1.0205**	3.76
2	0.01686	-	-

Source: Own Survey Data (2022)

** Denotes rejection of the hypothesis at the 0.05 level

According to the results of Johansen test in table (5.8), the test starts from the maximum rank zero, the trace statistics at Maximum-Rank=0 of 35.2674 exceeds its 5% critical value of 15.41, which means that the trace statistics can reject the null hypothesis and accept the alternative hypothesis. Although the results of trace statistics accept the alternative hypothesis of H_1: there is cointegration among the two variables, the zero-maximum rank in Johansen test presents that there is zero cointegrating equation (i.e., no cointegration) among the variables in this study.

Further, the trace statistics at Maximum-Rank=1 of 1.0205 is also less than its critical value of 3.76. Therefore, the null hypothesis cannot be rejected and accept the null hypothesis. It means that the two variables of this study are not cointegrated, which described that they are not moving together in the long-run. Thus, this study should be used the unrestricted VAR model instead of VECM because the two variables (i.e., labour productivity and export) are not cointegrating in the long-run and they have only short-run relationship among the variables in this study.

Similarly, the maximum-eigenvalue statistics (i.e., max-statistics) of Johansen Cointegration test also presents the similar results of trace statistics for the variables of this study.

(iv) Estimation of Short-Run Relationship by VAR Model

The analysis of Johansen test indicated that this study should run unrestricted VAR Model instead of VECM because the variables of this study are not cointegrated. It means that the variables such as labour productivity and export of sample garment firms are not related over the log-run and their relationships are significantly occurred only in the short-run.

The data for VAR analysis involves two variables: the labour productivity and exports of garments firms for sixty consecutive months between 2017 to 2022. According to the results of analysis by the VAR Model, all the lag values of export do not have significant effect on labour productivity because its p-values are not significant even at the 10% level. It means that there is no short-run causality from export to labour productivity of garment firms in this study (i.e., export does not cause labour productivity). However, the constant p-value (p=0.033) is significant at 5% level, which means that both of the variables are jointly determined on labour productivity of garment firms in the short-run.

On the other hand, the export would be considered as the dependent variable, where the p-value of labour productivity (L_3) p=0.002 is significant at 1% level. It can be described that the export of garment firms is significantly influenced by its labour productivity during the three months periods of time to export. Therefore, the time lag between labour productivity to export is considered as 3 moths for garment industry of Myanmar. In this study, a significant lag 3 value means that the relationship between variables (causation from labour productivity to export) are 3 months apart or firm's lead time to export is 3 months from its labour productivity growth. Therefore, this study can be described that there is a causal relationship from labour productivity of garment firms to export, which is occurred in three months lags.

(v) Results of Granger Causality Test

In this section, Granger Causality Wald test is operated to analyze the short-run causation of variables for this study. The results of Granger Causality Test of paired variables of labour productivity of garment firms and its export are presented in the following table (5.10).

Table 5.9 Results of Granger Causality Wald Test

Granger Cause	No. of Obs	Chi-sq	df	Prob > Chi-sq
Export ⟶ Labour Productivity	61	2.9467	3	0.400
Labour Productivity ⟶ Export**	61	9.3706	3	0.025

Source: Own Survey Data (2022)

**denotes highly significant at 5% level.

The table (5.9) presents the results from Granger Causality of short-run relationship between the variables. According the results of causality test, only the labour productivity of garment firms has "Granger Cause" to the exports of garment firms at 5% significant level. However, garment export does not "Granger Cause" the labour productivity of garment firms in this study. Therefore, there is unidirectional effect from labour productivity to export in the short-run for this study. It means that, Labour Productivity has causal effect on Export at 5% level, however export of firms has no causal effect on Labour Productivity of garment firms.

Then, in order to check whether the VAR Model is fit or not fit for the variables of this study, it operates the VAR Diagnostic Test, such as LM Test for Residual Autocorrelation Test is performed. The results of LM test are presented in the below table.

Table 5.10 Diagnostic Test of VAR

Diagnostic Test	Lag	Chi-sq	Prob.
LM Test for Residual Autocorrelation	L_1	5.7933	0.21512
	L_2	4.8999	0.29772

Source: Own Survey Data (2022)

H_0: no auto correlation at lag order

According to the results of LM Test, the p-value of lags (L_1 and L_2) are not significant. It means that it cannot reject the null hypothesis and it has to accept the null hypothesis of there is no autocorrelation at lag order (see Appendix C-4). Therefore, the model does not have any autocorrelation, which means that the model is desirable and fit for the variables of this study.

Therefore, this study can be concluded that only 3 lag value of Labour Productivity variable has causality fit on Export at 5% level. Thus, there is uni-directional causal relationship from Labour Productivity to Export for 3-month lag. This relationship occurs only in the short run and it may change over the long-run for this study. It can be described that increased labour productivity can cause the garment export growth that is prominent for three-month lag, which can valid for only short-run.

CHAPTER VI
CONCLUSION

6.1 Findings

Garment industry is one of the prioritized sectors in Myanmar by means of its contributions to large share of export earnings and providing employment opportunities for local people. However, the type of currently garment export of Myanmar is based on CMP (Cut-Make-Pack), due to a global value chain process nature of the garment industry. In this type of export, all materials – including threads, buttons, zips, labels, linings and even the packaging – are imported and have to be provided by the buyer or client. The local factory is only able to assemble the predesigned article, package and export it. Therefore, it limits the profit-margin of garment firms and the export market potential is mainly depended on the labour productivity of garment firms.

Thus, this thesis examines the various forces that causes for increasing labour productivity of a garment firms. The perspective on the growth Myanmar's garment industry may come from the growth of labour productivity of each firm. On the other hand, recent trend of globalization is also become an essential factor while promoting labour productivity of garment industry for every economy. In this consideration, dispersion in labour productivity can cause the variation in output for export and the size of the export market share.

However, sometimes exporting firms have more productive capacity and those firms can promote its labour productivity through an efficient way. Thus, the second research question concerns what is the direction of causation between labour productivity and export of garment firms in Myanmar. Then, examining whether the relationship between those two variables (labour productivity and export) are long-run or short-run is the third important research question of this study.

In this study, survey data is collected from (172) sample garment exporting firms in various industrial zones of Yangon, from which (95) firms are located in Hlaing Thar Yar, 30 garment firms are operated in Shwe Pyi Thar Industrial zone and the other 47 firms are located in different industrial zones such as South Dagon, East Dagon, Dagon Seikkan, Mingalardon and HmawBi_MyanungDagar industrial zones of

Yangon area. As of the ownership types of firms, there are 107 firms (62.2%) of total firms are operated under the ownership type of Foreign Direct Investment (FDI), 44 firms (25.6%) are joint venture firms and the other 21 firms (12.2%) are operated under domestic ownership. Among the sample garment firms, nearly half of the firms (57%) have ages between five to ten years, and (8.2%) of firms have ages over twenty years of firm age. Moreover, the average labour productivity of sample garment firms is about 235 clothes per month.

After undertaken an empirical analysis for factors affecting on labour productivity of garment firms, only eight hypothesized explanatory variables are found to be statistically significant at 1%, 5% and 10% level.

The results of multiple regression model described that the factors, such as human capital of a firm, firms' management practices, employees' compensation and rewards are the most significant factors which internally influencing on labour productivity of firms. Because those variables have significant p-value at 99% confidence level with high coefficient value. Then, this study finds that social factor can be also a positively effect on labour productivity of firms. However, the left internal variable, workplace design of garment firms is not significant effect on labour productivity, in this study.

On the other hand, the external variables like national culture have strongly influenced on labour productivity of garment firms in this study, with its significant p-value at 99% confidence level with high coefficient value. The other external factors, policy and regulations of a country and required infrastructures provided by a country, are found to be significant in influencing on labour productivity of firms by means of positively effects. Therefore, those variables are reliable with theorize factors from the literature of external and internal influencing factors of this study.

Based on these findings, this study can be concluded that garment firms should be contributed to better management practices and suitable employees' welfare program, because those variables became the first prioritized factors for promoting labour productivity of garment firms in this study. Moreover, government policies and regulations of a country, especially for garment manufacturing firms, are also important when a firm try to promote its labour productivity of a firm.

However, only one external variable as changing the global trend is found to be insignificant among the variables and it means that there is no consequence to influencing on labour productivity of garment firms in this study. Therefore, this

finding can be concluded that changing global trend variable is not directly promoting to labour productivity of firms because it can be only concerned with the exports of garment manufacturing firms and it may have indirectly effects on labour productivity of firms in this study.

Then, this study continued to presented the findings of Granger Causality Test for analyzing the causation and relationship between the major two variables of this study like labour productivity and export. Under the analysis of the causality test, the Augmented Dickey-Fuller (ADF) unit root test found the series of variables are stationary. Then, according to the results of Vector Auto Regressive (VAR) model, the lag selection found to choose three months lags is occurred for relationship between labour productivity and export of garment manufacturing firms in this study. Then, Johansen Cointegration Test presented that labour productivity and export of garment firms are not cointegrating in the long-run which means that their relationships are occurred only in the short-run.

Therefore, the causation from the labour productivity to export is concerned only for short-run, which can be analyzed by restricted VAR Model. The results of VAR Model found that labour productivity of garment firms can cause the export of garment firms is significantly with three months lag. Finally, the Granger Causality Test found the unidirectional causal relationship form labour productivity to export of sample garment firms which is significant at 5% level in this study. Therefore, this study can be concluded that an increase in labour productivity in three months ago is related to the enhancement of current period's exports for Myanmar's garment industry. In this study, this kind of relationship occurs only in the short run and it may be change over the long-run.

These findings of Causality Test are consistent with the conceptual framework of the study that based on review of literatures for this study. Moreover, the constant coefficient of the multiple regression model is also found as negative, which means that when the determinants of labour productivity are weak, labour productivity may decline. However, when the determinants of labour productivity may strong over the long-run, the coefficient of labour productivity model can be positive. Based on these two findings, the conclusion can be drawn is that the Myanmar Garment Industry needs to increase its labour productivity in order to achieve long run export growth. According to the literatures for this study, increasing labour productivity is only possible when the

hypothesized variables of this study are strengthened, and through this, exports of Myanmar Garment Industry may be increased in the long-run.

6.2 Suggestions

The nature of ready-made garments manufacturing is the most labor intensive, and thus best suited to Myanmar's comparative advantage of youth workforce with low labour costs. If it is appropriately applied, garments manufacturing can contribute significantly to the country's growth, by means of creating well-paid jobs and improving the trade balance. Moreover, in view of gradual declined in labour intensive garments manufacturing and exports of developed countries due to its rising labor costs, and consequently a large garment export market is opening up for developing countries like Myanmar. Therefore, the potential of Myanmar Garment Industry is brightened but it can be strongly depended on the labour productivity of garment firms.

Most of the studies about labour productivity are focused only for the firm level, but this study also reflects the effects of external indicators. Thus, in this study, external influencing factors have been added and combined with internal influencing variables, when it determines the labour productivity of garment firms in Myanmar.

The findings of the study described the influential factors for declining labour productivity of Myanmar Garment Industry. Thus, this study needs to identify the potential policies to fill the output gap based on those influencing variables when promoting labour productivity of Garment Industry of Myanmar. The main reason for differences in labour productivity between the firms is due to differences in productive factors they have used. Among the factors of production utilized by the firms, garment industry is mainly depended on human capital or men-power of a firm because the nature of garment manufacturing is labour-intensive and it is assumed to be used of the same technology of sewing machines. Therefore, human capital is the most important factor of production to increase the labour productivity of a firm, but there is a need for other supporting factors that will motivate or persuade human capital (labour) to increase their productivity. Especially, firms have to provide the on-job training and other skills improving training program that will support to increase labour productivity of their firms.

According to the findings of the study, compensation and rewards scheme is the second most influenced variable. According to this, firms should adopt a compensation package that can be linking to workers' performance rather than minimum wage. It can

help to raise job satisfaction, lower absenteeism and turnover rates, and finally, it can be effect on firms' performance. Moreover, firms should be introduced the team-based rewards system, because it can reduce free-rider problem among the co-workers and learning by doing between them, that can motivate employees and their working team that lead to increase labour productivity of a firm. It is not only the compensation scheme, but firm's rewards system also has a significant effect. Accordingly, the reward system (such as target piece rate bonus, attendance bonus and new year bonus, etc.) can motivate the employees and it can help to increase labour productivity of garment firms.

Moreover, management practices of firms and firms' supporting nature of employee welfare programs for their employees are helpful indicators to improve the labour productivity of firms. Therefore, managerial practices of garment manufacturing firms should be improved by promoting the team-work, monitor the mismatching of high-skilled and low-skilled workers, supervise the line-balancing to avoid the bottle-neck along the sewing process, and finally it is carefully providing the adequate supply of materials that is necessary to timely production and help to increase labour productivity. In addition, various form of employee welfare programs should be arranged to increase the labour productivity of the firms.

On the other hand, external variables such as government policies and regulations, local infrastructure and public utilities, and national culture are also found to be important in increasing labour productivity of garment manufacturing firms. Those variables are not directly impact on labour productivity of firms but it improves the performance of the firms and thereby indirectly helps to increase their labour productivity.

Since garment manufacturing of Myanmar is usually operated within the global textile value chain process, government's trade policies and custom procedures, tariff and non-tariff barriers on various kinds of fabrics and other raw material imports are limit the manufacturers to produces output (garments/ clothes) and garment exports consequently. Therefore, government should provide a number of incentives to garment exporters that can improve their competitiveness in global apparel market and volume of exports in the long term. In addition, government still needs to supports more business-friendly custom procedures which remain a fundamental concern because customs procedures can cause delays and are costly. In this case, macroeconomic stability (less variations in exchange rate and interest rate) is also essential for garment

investment, production and exporting process of garment firms because the leading garment manufacturing firms of this study are FDI firms.

In addition, government provisions of basic infrastructure (provide reliable energy, clean water, public transports, internet and telecommunication, and other public utilities) can help to decrease or increase the cost of production for garment manufacturers in Myanmar, which making them more or less competitive in global market.

Moreover, in this study, increased labour productivity can cause the export growth of garments, which has proved by the result of causality test. Therefore, under the CMP nature of garment industry, increased labour productivity of garment firms can help to attract the buyers' order from global garment value chain process, which in turn can help to increase the garment exports of Myanmar. Thus, in order to increase the garment exports, garment firms of Myanmar have to promote its labour productivity by encouraging and strengthening the influencing variables which has found in this study. When those variables are strengthened or firms can efficiently use of their productive factors, Myanmar can access the long-run export growth of its garments in the global apparel market.

In addition, Myanmar garment industry should be promoting the "local brand garments" in order to access the global apparel market in recent world. Accordingly, the government and related stakeholders of garment industry of Myanmar should encourage the export promoting strategies for local textile and garment products, intensively.

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APPENDIX A

Table (3.1) Export by Type of Principal Commodities (US$ million)

Commodity	2005-06	2010-11	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Agricultural Products	435	1228	1058	1240	1224	1414	1324	1535
Animal Products	4	13	11	8	7	7	7	6
Marine Products	197	287	206	160	187	224	256	294
Timber	474	594	898	40	105	118	88	66
Base Metal & Ores	112	42	107	426	351	473	911	974
Precious Minerals	233	2028	604	280	280	154	304	121
Natural Gas	1080	2523	3299	3707	4343	2970	3506	3925
Garment	272	379	883	1022	857	1867	2559	4830
Other Commodity	751	1767	4138	5639	3783	4725	5896	5309

CSO- 2018, pp-458/653, Table 14.04

CSO- 2020, pp- 481/700, Table 13.04

Table (3.2) Myanmar Garment Export by Country (US$ in Million)

Country	2021 Myanmar CMP Export (Actively run after Sep)	2021-2022 Myanmar CMP Export (up to march 2022)- 3Months
CHINA	1191.33859	456.54954
EU Countries	468.8619	315.11357
HONG KONG, CHINA	21.26948	12.8294
JAPAN	217.16692	121.71163
KOREA, REPUBLIC OF	70.32549	36.09919
RUSSIAN FEDERATION	5.16235	3.20712
TAIWAN	7.82345	5.37211
UNITED KINGDOM	88.64246	53.337
UNITED STATES OF AMERICA	142.73524	84.6745
VIET NAM	51.02757	32.55052
Grand Total	**2264.35345**	**1121.44458**

Source: MGMA (2022, May)

Table (3.3) Country and Company Types of Member Firms

Myanmar Garment Manufacturers Association		
Member List (31 May 2022)		
No.	**Country and Company Type**	
1	Korea	57
2	China (Taiwan, Hong Kong)	280
3	Austria	1
4	Belgium	1
5	British Virgin Island	2
6	Brunei	1
7	Cambodia	1
8	Canada	2
9	Germany	1
10	Ireland	1
11	Japan	17
12	Malaysia	3
13	Singapore	4
14	Thailand	3
15	Seychelles	1
16	MC (CMP)	67
17	JV	26
18	Inspection	5
19	Local Market	25
20	Sub-Contract/Co-op	7
21	Association	1
22	Textile	4
	Total	**510**

Source: MGMA (2022, May)

Figure (4.1) Industrial Zones of Yangon

Source: MGMA (www.myanmargarments.org/press-released/)

Table (4.1) Membership Garment Factories in Various States and Divisions of Myanmar

တိုင်းဒေသကြီး /ပြည်နယ်အတွင်းရှိ Current Operating အထည်ချုပ်စက်ရုံများစာရင်း			
စဉ်	တိုင်း/ပြည်နယ်	အရေအတွက်စုစုပေါင်း	မှတ်ချက်
၁	မကွေးတိုင်း	၄	
၂	နေပြည်တော်ကောင်စီနယ်မြေ	၁	
၃	ကရင်ပြည်နယ်	၂	
၄	ရှောဝတီတိုင်း	၁၁	
၅	မန္တလေးတိုင်း	၁၀	
၆	ပဲခူးတိုင်း	၃၁	
၇	ရန်ကုန်တိုင်း	၄၄၃	
	စုစုပေါင်း	၅၀၂	

Source: MGMA (2022, May)

Table (4.2) Summary Member List (30th June, 2021)

		2003-2019	2020	2021 (June)		Total	Remark
Current Operating	Operating			467		502	ဖေဖော်ဝါရီလနောက်ပိုင်းတွင်လူလျော့စက်ရုံ ၃၅ ရှိခဲ့ပါသည်။ မီးလောင်ခဲ့ သည့် Member စက်ရုံ ၁၅ ရုံတွင်လည်ပတ်ဆဲ ၆ ရုံရှိခဲ့ပါသည်။
	Laidoff			29	6		
Completely Closed		110	22	10	1	143	မီးလောင်ခဲ့သည့် Member စက်ရုံ ၁၅ ရုံတွင် အပြီးပိတ် ၁ ရုံရှိခဲ့ပါသည်
Temporary Closed		2	20	33	8	63	မီးလောင်ခဲ့သည့် Member စက်ရုံ ၁၅ ရုံတွင် ခေတ္တပိတ် ၈ ရုံရှိခဲ့ပါသည်
Not Active (No Contact)				34		34	ဖုန်းဆက်သွယ်၍မရ /နှစ်စဉ်ကြေးပုံမှန်မသွင်
Total						742	စုစုပေါင်းအသင်းဝင်စက်ရုံ

Source: MGMA (2022, May)

Table (4.3) Current Operating Firms in Yangon

ရန်ကုန်တိုင်းဒေသကြီးအတွင်းရှိ Current Operating အထည်ချုပ်စက်ရုံများစာရင်း					
စဉ်		မြို့နယ်/စက်မှုဇုန်	အရေအတွက်	စုစုပေါင်း	မှတ်ချက်
	(၁)	ဗဟန်းမြို့နယ်	၂	၂	
	(၂)	ဒဂုံမြို့နယ်	၅၄	၅၄	
	(၃)	ဒေါပုံမြို့နယ်	၁	၁	
	(၄)	လှိုင်သာယာမြို့နယ်			
		(က) လှိုင်သာယာစက်မှုဇုန် (၁)	၁၀		
		(ခ) လှိုင်သာယာစက်မှုဇုန် (၂)	၂၃		
		(ဂ) လှိုင်သာယာစက်မှုဇုန် (၃)	၁၉		
		(ဃ) လှိုင်သာယာစက်မှုဇုန် (၄)	၁၃		
		(င) လှိုင်သာယာစက်မှုဇုန် (၅)	၁၅		
		(စ) လှိုင်သာယာစက်မှုဇုန် (၆)	၂		
		(ဆ) အနော်ရထာစက်မှုဇုန်	၇		
		(ဇ) မြစ်ဓိုးရောင်စက်မှုဇုန်	၅		
		(ဈ) ရွှေသံလွင်စက်မှုဇုန်	၁၉		
		(ည) ရွှေလင်ဇန်းစက်မှုဇုန်	၅၅		
		(ဋ) ငွေပင်လယ်စက်မှုဇုန်	၁၃		
		(ဌ) စက်မှုဇုန် (ပြင်ပ)	၄		
		ပေါင်း	၁၈၅	၁၈၅	
	(၅)	လှည်းကူးမြို့နယ်	၁	၁	
	(၆)	မှော်ဘီမြို့နယ်			
		(က) မြောင်းတာကာစက်မှုဇုန်	၉		
		(ခ) စက်မှုဇုန်ပြင်ပ	၁၁		
		ပေါင်း	၂၀	၂၀	
	(၇)	ထန်းတပင်မြို့နယ်	၁	၁	
	(၈)	အင်းစိန်မြို့နယ်	၆	၆	
	(၉)	တာမွေတ်မြို့နယ်	၁	၁	
	(၁၀)	လသာမြို့နယ်	၁	၁	
	(၁၁)	မရမ်းကုန်းမြို့နယ်	၃	၃	
	(၁၂)	မင်္ဂလာဒုံမြို့နယ်			
		(က) မင်္ဂလာဒုံစက်မှုဇုန်	၉		
		(ခ) ပျဉ်းမပင်စက်မှုဇုန်	၄		
		(ဂ) ရန်ကုန်စက်မှုဇုန်	၁၆		
		(ဃ) စက်မှုဇုန် (ပြင်ပ)	၆		
		ပေါင်း	၃၅	၃၅	
	(၁၃)	မြောက်ဥက္ကလာပမြို့နယ်			
		(က) မြောက်ဥက္ကလာပစက်မှုဇုန်	၈		
		(ခ) ရွှေပေါက်ကံစက်မှုဇုန်	၁၁		
		(ဂ) စက်မှုဇုန် (ပြင်ပ)	၄		
		ပေါင်း	၂၃	၂၃	
	(၁၄)	ရွှေပြည်သာမြို့နယ်			
		(က) ရွှေပြည်သာစက်မှုဇုန် (၁)	၁၉		
		(ခ) ရွှေပြည်သာစက်မှုဇုန် (၂)	၆		
		(ဂ) ရွှေပြည်သာစက်မှုဇုန် (၃)	၉		
		(ဃ) ရွှေပြည်သာစက်မှုဇုန် (၄)	၁၁		
		(င) သာခုကန်စက်မှုဇုန်	၁၇		
		(စ) ဝါးတစ်ရာစက်မှုဇုန်	၂၁		
		(ဆ) စက်မှုဇုန် (ပြင်ပ)	၁၃		
		ပေါင်း	၉၆	၉၆	
	(၁၅)	တောင်ဥက္ကလာပမြို့နယ်			
		(က) တောင်ဥက္ကလာပစက်မှုဇုန်	၁		
		(ခ) စက်မှုဇုန် (ပြင်ပ)	၁		
		ပေါင်း	၂	၂	
	(၁၆)	တိုက်ကြီးမြို့နယ်	၁	၁	
	(၁၇)	သန်လျင်မြို့နယ်			
		(က) အထူးစီးပွားရေးဇုန်	၁		
		(ခ) စက်မှုဇုန် (ပြင်ပ)	၇		
		ပေါင်း	၈	၈	
	(၁၈)	သာကေတမြို့နယ်	၂	၂	
	(၁၉)	ရန်ကင်းမြို့နယ်	၁	၁	
စုစုပေါင်း				၄၄၃	

Source: MGMA (2022, May)

APPENDIX B

Questionnaire

I am a Ph.D (Economics) Student which conducted by Yangon University of Economics. This questionnaire has been prepared for gathering data for my thesis which should be submitted as a fulfillment of partial requirement for the degree. Therefore, I request from you as providing true and correct information for the success of my research.

Please take (√) being a front of the correct answer.

This is concerned for **Garment Firm Owner/ Manager**/ **Authorized Person** and their opinion on their firm workers.

Name of Your Firm ----------

Firm Location ----------

Your Firm is an Exporting Firm ☐ Yes ☐ No

Section (A)

Respondent's and Firm's Information

(a) Details of Respondent

1	Gender	o Male o Female
2	Age	o 20-40 years old o 40-60 years old o ≥ 60 years old
3	Education Level	o University Graduate o Masters' Degree o Ph.D Degree o Others ----------
4	Marital Status	o Married o Single o Divorced o Other ----------

5	Designation	○ Supervisor ○ Manager ○ Owner ○ Other ----------

(b) Firm's Information

6	Firm location	○ Hlaing Thar Yar ○ Shwe Pyi Thar ○ Thilawa SEZ ○ Mingalardon ○ South Dagon ○ East Dagon ○ Dagon Seikkan ○ Other ----------
7	Firm ownership	○ FDI ○ Joint Venture ○ Local firm
8	Firm Age	○ 5-10years old ○ 10-15 years old ○ 15-20 years old ○ 20-25 years old ○ 25 years old and above
9	Product Type/ Types of Garments that your firm produce	○ Women/ girls Blouse/ Shirt ○ Women/ girls Suits/ Jacket ○ Women/ girls Overcoat ○ Men/ Boys Shirt ○ Men/ Boys Suit/ Jacket ○ Men/ Boys Overcoat ○ Polo Shirt ○ Formal Trouser ○ Others …….

10	Percentage of skilled-workers in your firm	----------
11	Percentage of unskilled-workers in your firms	----------

(c) Firm Production and Export (for 64 Months)

Sr No	Particular	M1	M2	M3	M4	M5	M6	M7..	…M64
12	Total Numbers of Sewing workers + helpers								
13	Total Numbers of Line Manager/ Supervisor								
14	Working Hours Per Workers Per Day (Office hour+ overtime)								
15	Total Output (no. of clothes) Per Day & Per Month								
16	Total Output (value of $ or MMK) Per Month								

17	Total Amount of Firm Export Per Month (No of clothes)								
18	Total Firm Export Per Month (Value of $ or MMK)								
19	Average total costs for monthly wages for sewing workers (per month) MMK								

Section (B)

Internal Factors

Below questions are constructed based on **"Likert Scale". Please (√) your opinion** that indicate to what extent following factors could affect labour productivity of your garment firm.

Strongly Dis-Agree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

(d) Human Capital						
	Please (√) your opinion	**SDA**	**DA**	**N**	**A**	**SA**
20	Experiences of sewing worker is important for increase labour productivity of your firm.	1	2	3	4	5
21	Workers' failure to follow the work-related rules established by your firm will decrease the labour productivity.	1	2	3	4	5
22	Misunderstanding among workers can decrease the labour productivity of your firm.	1	2	3	4	5
23	Have to reduce labour turnover to increase labour productivity of your firm.	1	2	3	4	5
24	Personal problem of garment workers will decline the labour productivity.	1	2	3	4	5
25	Having skilled labour can help to increase labour productivity of your firm.	1	2	3	4	5
26	Quality of labour force is important to consider to increase labour productivity.	1	2	3	4	5
27	Increasing labour productivity can be depending on average schooling years of sewing workers (Formal Education).	1	2	3	4	5
28	Increasing labour productivity can be depending on the level of competence or job experiences of garment workers.	1	2	3	4	5
29	Increasing labour productivity can be depending on workers' aspiration to accept the new way of working	1	2	3	4	5

(e) Employees' Compensation and Rewards						
Please (√) your opinion		**SDA**	**DA**	**N**	**A**	**SA**
30	Give salary based on workers' ability can increase your workers' productivity.	1	2	3	4	5
31	Cost cut/ wage reduction for defect work/reject clothes can increase your workers' productivity.	1	2	3	4	5
32	When a peak season, working with overtime can increase your workers' productivity.	1	2	3	4	5
33	Attendance bonus may decrease the absenteeism of sewing workers.	1	2	3	4	5
34	Piece rate reward can be a motivation to reduce defect clothes and increase workers' productivity.	1	2	3	4	5
35	Bonus for special days (e.g-new year) can be used as a motivation for increased your workers' productivity	1	2	3	4	5
(f) Employee Welfare or Social Factors						
Please (√) your opinion		**SDA**	**DA**	**N**	**A**	**SA**
36	Planning for employee development through training program can promote your workers' productivity.	1	2	3	4	5
37	Providing workplace medical assistance can promote your workers' productivity	1	2	3	4	5
38	Arrange for Employee welfare program can promote your workers' productivity	1	2	3	4	5
39	Attention for Health and Safety, Hygiene and Sanitation can promote your workers' productivity.	1	2	3	4	5
40	Arrange accommodations and ferry for remote workers can promote your workers' productivity.	1	2	3	4	5
(g) Firms' Management Practices						
Please (√) your opinion		**SDA**	**DA**	**N**	**A**	**SA**
41	Team work is important for labour productivity growth of garment workers.	1	2	3	4	5

42	Managerial practices to maintain the skilled labour of a firm are strongly associated with firms' performance for greater labour productivity.	1	2	3	4	5
43	More clothes will be defective because mismatch of high-skilled and low-skilled workers.	1	2	3	4	5
44	It may take more time for production when some of the unskilled workers create bottle-neck along the sewing process.	1	2	3	4	5
45	Learning by doing among co-workers is important for increased labour productivity.	1	2	3	4	5
46	Line balancing with high-skilled and low- skilled workers is very important for increase productivity of garment workers.	1	2	3	4	5
47	Providing the adequate number of required materials (small tools, etc.) is necessary to increase productivity of garment workers.	1	2	3	4	5
(h) Organizing better work stations (Workstation Design)						
Please (√) your opinion		**SDA**	**DA**	**N**	**A**	**SA**
48	Workstation design is important for timely production.	1	2	3	4	5
49	Our firm provides samples or models of output in each sewing workstation to ensure stable production quality, and increase workers' productivity.	1	2	3	4	5
50	We always checking machines that are not operating slowly because of wear and tear.	1	2	3	4	5
51	Wide work-surface and enough lighting are necessary to increase labour productivity.	1	2	3	4	5
52	We always provide good quality and adequate-size required tools/ materials.	1	2	3	4	5
53	We have placed warning signs on out-of-order sewing machine.	1	2	3	4	5
54	We always consider a group/line work station or have arrangement to avoid delay processing time or for better use of work area.	1	2	3	4	5

Section (C)

External Factors

Below questions are constructed based on **"Likert Scale". Please (√) your opinion** that indicate to what extent following factors could affect labour productivity of your garment firm.

Strongly Dis-Agree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

(i) Policies and Regulatory Framework						
Please (√) your opinion		**SDA**	**DA**	**N**	**A**	**SA**
55	Changes in the government's customs and trade regulations may have some effect on the labour productivity of garment firms.	1	2	3	4	5
56	Variations in Interest rate and exchange rate policies may have some effect on the labour productivity of garment firms.	1	2	3	4	5
57	Political and economic conditions of a country may have some effect on the labour productivity of garment firms.	1	2	3	4	5
58	Compliance industry regulations can increase labour productivity of your garment firm.	1	2	3	4	5
59	In order to increase labour productivity, it is important to follow the labour law, income and wage policies established by the government.	1	2	3	4	5
(j) Global Trend						
Please (√) your opinion		**SDA**	**DA**	**N**	**A**	**SA**
60	Labour productivity of our firms may change due to the substantial changes in global apparel/ garment market.	1	2	3	4	5
61	Labour productivity of our firm is depending on export order.	1	2	3	4	5

62	Labour productivity of our firm is depending on imported raw materials from international suppliers.	1	2	3	4	5
63	Labour productivity of our firm is depending on the specific quality of required work by international buyers.	1	2	3	4	5
64	Labour productivity of our firm is depending on design of clothes that ordered by buyers.	1	2	3	4	5
65	Popularity of online shopping and e-commerce may have some effects on increased labour productivity of our firm.	1	2	3	4	5
(k) Public Utilities and Infrastructure						
Please (√) your opinion		**SDA**	**DA**	**N**	**A**	**SA**
66	Import delay for raw materials because of local/ regional transportation delay may decline the labour productivity of our firm.	1	2	3	4	5
67	Inadequate public transportation for workers may decline the labour productivity of our firm.	1	2	3	4	5
68	Shortage of power supply may decline the labour productivity of our firm.	1	2	3	4	5
69	Water inefficiencies in typical area may decline the labour productivity of our firm.	1	2	3	4	5
70	Internet and telecommunication are not fully available in your area may decline the labour productivity of our firm.	1	2	3	4	5
(l) National Cultural Background						
Please (√) your opinion		**SDA**	**DA**	**N**	**A**	**SA**
71	Family and social background of workers may have some effects on labour productivity of our firms.	1	2	3	4	5
72	Interpersonal trust between workers and managers may have some effects on labour productivity of our firms.	1	2	3	4	5

73	Work ethic of garment workers may have some effects on labour productivity of our firms.	1	2	3	4	5
74	Obedience of workers may have some effects on labour productivity of our firms.	1	2	3	4	5
75	Cultural and social norms on women workforce may have some effects on labour productivity of our firms.	1	2	3	4	5

Section (D)
General Questions

How important are the following points in your firm? Please (√) your level of important.		
76	How much percentage of sub-contracting Intensity is emphasized to increase productivity?	----------
77	How much percentage of technology intensity is emphasized to increase productivity?	----------
78	How much percentage of capital intensity of the firm to increase productivity?	----------
79	How much percentage of budget used for training to increase labour productivity of your firm?	----------
80	How much percentage of budget used for employees' welfare programme to increase labour productivity of your firm?	----------

(81) How much percentage of clothes can be exported per 100 garments?

---

(82) In general, how many clothes will be rejected per 100 garments?

---

(83) Which line usually make the reject garments?

- o Skilled-labour line

- Unskilled- labour line
- Training line
- Mix of skilled and unskilled labour line
- The line which away from the supervisor/ line manager
- Others ……..

(84) How does your firm make for reject clothes?

- Rework
- Sold in domestic market
- Others …….

(85) How does your firm do when you got more export order?

- Hire part-time workers
- Sub-contract
- Overtime
- All of above
- Others ……..

(86) In what seasons/ months are more export order that your firm usually get?

---

(87) Other comments on factor affecting labour productivity of your garment firms.

A) ---

B) ---

C) ---

Thank you for your kind cooperation and information provided for my thesis.

****

APPENDIX C

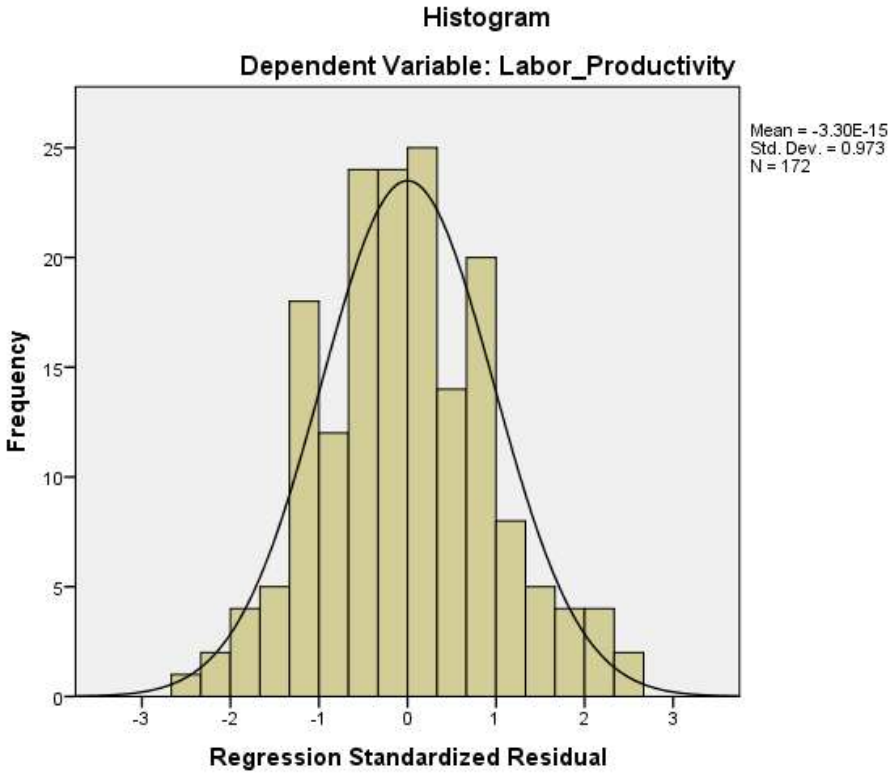
Appendix (C-1) Reliability Test for Independent Variables

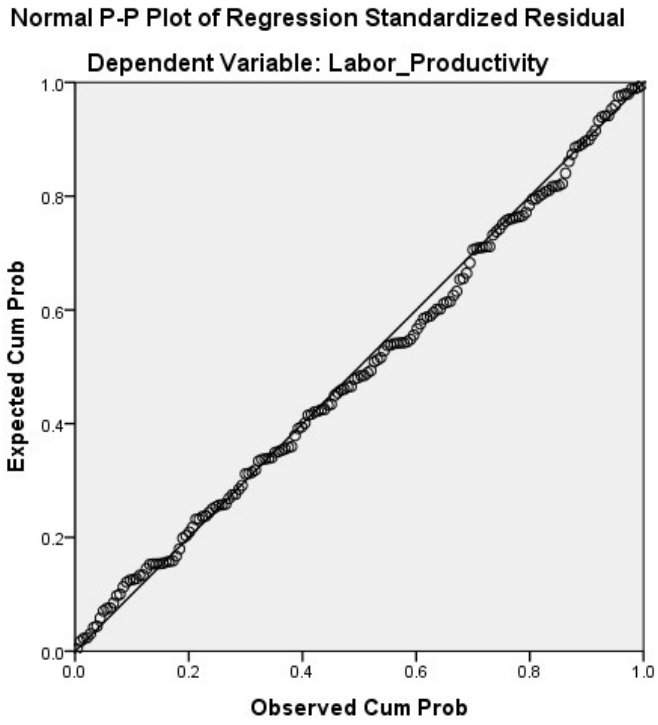
Internal Factors	Cronbach's Alpha	No. of items
Human Capital	0.871	10
Employees' Compensation and Rewards	0.606	7
Social Factors	0.664	7
Firms' Management Practices	0.948	7
Work Place Design	0.505	7
External Factors	**Cronbach's Alpha**	**No. of items**
Policies and Regulatory Framework	0.810	5
Global Trend	0.899	6
Public Utilities and Infrastructure	0.674	5
National Culture	0.805	5

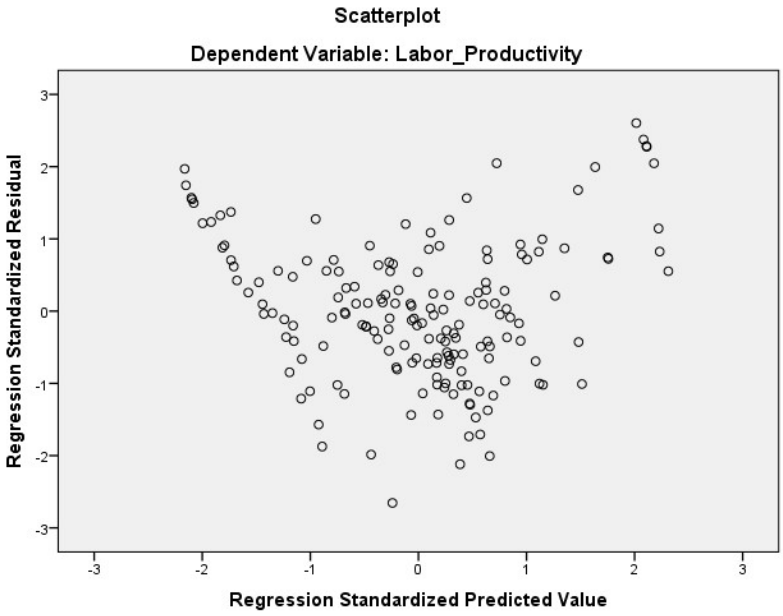
Source: Calculation based on Own Survey Data

Appendix (C-2) **Test for the Assumptions of Multiple Regression Model**

Charts




Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Labor_Productivity
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Scatterplot
Dependent Variable: Labor_Productivity
Regression Standardized Residual
Regression Standardized Predicted Value
-3
-2
-1
0
1
2
3

Appendix (C-3) Results of Multiple Regression Analysis

```
[DataSet1] C:\Users\USER\Desktop\Assumptions_Revised_172, Defence
Calculations Data.sav
```

Descriptives

	N	Minimum	Maximum	Mean	Std. Deviation
Labor_Productivity	172	93.60	472.80	234.1256	89.23583
Human_Capital	172	1.20	5.00	3.0087	.87149
Social_Facts	172	1.70	5.00	3.4635	.83684
Managerial_Practics	172	2.57	4.90	3.6175	.44037
WorkPlace_Design	172	1.26	5.00	3.5573	.42439
Compensation_and_Rewards	172	1.14	5.00	3.2167	.93776
Policy_Regulation	172	1.40	5.00	3.5866	.82096
Global_Trend_Changes	172	1.12	5.00	3.4867	.87634
Infrastructure	172	2.20	5.00	3.8201	.76528
Cultural	172	1.20	5.00	3.2873	.89942
Valid N (listwise)	172				

rrelations

		Labor_Productivity	Human_Capital	Social_Facts	Managerial_Practics	WorkPlace_Design	Compensation_and_Rewards	Policy_Regulation	Global_Trend_Changes	Infrastructure	Cultural
Pearson Correlation	Labor_Productivity	1.000	.802	.603	.845	.804	.775	.794	.644	.791	.765
	Human_Capital	.802	1.000	.320	.693	.665	.416	.679	.269	.639	.475
	Social_Facts	.603	.320	1.000	.488	.548	.744	.472	.632	.525	.505
	Managerial_Practics	.845	.693	.488	1.000	.713	.676	.683	.555	.665	.655
	WorkPlace_Design	.804	.665	.548	.713	1.000	.719	.700	.671	.706	.732
	Compensation_and_Rewards	.775	.416	.744	.676	.719	1.000	.629	.793	.689	.707
	Policy_Regulation	.794	.679	.472	.683	.700	.629	1.000	.591	.690	.669
	Global_Trend_Changes	.644	.269	.632	.555	.671	.793	.591	1.000	.575	.798
	Infrastructure	.791	.639	.525	.665	.706	.689	.690	.575	1.000	.659
	Cultural	.765	.475	.505	.655	.732	.707	.669	.798	.659	1.000
Sig. (1-tailed)	Labor_Productivity	.	.000	.000	.000	.000	.000	.000	.000	.000	.000
	Human_Capital	.000	.	.000	.000	.000	.000	.000	.000	.000	.000
	Social_Facts	.000	.000	.	.000	.000	.000	.000	.000	.000	.000
	Managerial_Practics	.000	.000	.000	.	.000	.000	.000	.000	.000	.000
	WorkPlace_Design	.000	.000	.000	.000	.	.000	.000	.000	.000	.000
	Compensation_and_Rewards	.000	.000	.000	.000	.000	.	.000	.000	.000	.000
	Policy_Regulation	.000	.000	.000	.000	.000	.000	.	.000	.000	.000
	Global_Trend_Changes	.000	.000	.000	.000	.000	.000	.000	.	.000	.000
	Infrastructure	.000	.000	.000	.000	.000	.000	.000	.000	.	.000
	Cultural	.000	.000	.000	.000	.000	.000	.000	.000	.000	.
N	Labor_Productivity	172	172	172	172	172	172	172	172	172	172

	Human_Capital	172	172	172	172	172	172	172	172	172	172
	Social_Facts	172	172	172	172	172	172	172	172	172	172
	Managerial_Practics	172	172	172	172	172	172	172	172	172	172
	WorkPlace_Design	172	172	172	172	172	172	172	172	172	172
	Compensation_and_Rewards	172	172	172	172	172	172	172	172	172	172
	Policy_Regulation	172	172	172	172	172	172	172	172	172	172
	Global_Trend_Changes	172	172	172	172	172	172	172	172	172	172
	Infrastructure	172	172	172	172	172	172	172	172	172	172
	Cultural	172	172	172	172	172	172	172	172	172	172

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Cultural, Human_Capital, Social_Facts, Infrastructure, Managerial_Practics, Policy_Regulation, WorkPlace_Design, Global_Trend_Changes, Compensation_and_Rewards[b]	.	Enter

a. Dependent Variable: Labor_Productivity

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.961[a]	.924	.920	25.27426	.924	128.851	9	162	.000

a. Predictors: (Constant), Cultural, Human_Capital, Social_Facts, Infrastructure, Managerial_Practics, Policy_Regulation, WorkPlace_Design, Global_Trend_Changes, Compensation_and_Rewards

b. Dependent Variable: Labor_Productivity

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1258194.861	9	139799.429	128.851	.000[b]
	Residual	103483.707	162	638.788		
	Total	1361678.567	171			

a. Dependent Variable: Labor_Productivity

b. Predictors: (Constant), Cultural, Human_Capital, Social_Facts, Infrastructure, Managerial_Practics, Policy_Regulation, WorkPlace_Design, Global_Trend_Changes, Compensation_and_Rewards

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-176.073	18.266		-9.639	.000					
	Human_Capital	34.393	3.562	.391	9.654	.000	.802	.604	.209	.286	3.495
	Social_Facts	5.351	2.723	.065	1.965	.051	.603	.153	.043	.430	2.324
	Managerial_Practics	34.328	6.965	.189	4.929	.000	.845	.361	.107	.319	3.138
	WorkPlace_Design	-2.787	4.038	-.029	-.690	.491	.804	-.054	-.015	.263	3.803
	Compensation_and_Rewards	19.454	3.923	.240	4.959	.000	.775	.363	.107	.200	4.988
	Policy_Regulation	7.415	4.037	.069	1.837	.068	.794	.143	.040	.335	2.983
	Global_Trend_Changes	1.099	3.778	.014	.291	.772	.644	.023	.006	.209	4.782
	Infrastructure	7.986	4.285	.069	1.864	.064	.791	.145	.040	.346	2.889
	Cultural	17.665	3.884	.195	4.549	.000	.765	.337	.099	.256	3.907

a. Dependent Variable: Labor_Productivity

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions									
				(Constant)	Human_Capital	Social_Facts	Managerial_Practics	WorkPlace_Design	Compensation_and_Rewards	Policy_Regulation	Global_Trend_Changes	Infrastructure	Cultural
1	1	9.716	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	2	.102	9.743	.01	.09	.04	.00	.00	.03	.00	.04	.00	.01
	3	.059	12.881	.09	.14	.03	.01	.01	.01	.00	.00	.00	.02
	4	.046	14.491	.00	.04	.40	.00	.00	.02	.00	.05	.00	.11
	5	.019	22.352	.00	.03	.46	.00	.00	.52	.00	.02	.04	.16
	6	.016	24.398	.01	.00	.00	.00	.45	.00	.55	.01	.00	.00
	7	.014	26.097	.00	.00	.01	.00	.26	.04	.17	.20	.15	.44
	8	.012	28.848	.03	.43	.04	.04	.26	.04	.19	.29	.20	.03
	9	.011	29.856	.01	.04	.00	.03	.01	.14	.08	.39	.57	.20
	10	.004	49.956	.85	.22	.02	.91	.00	.18	.00	.00	.04	.03

a. Dependent Variable: Labor_Productivity

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	48.6133	432.4306	234.1256	85.77800	172
Residual	-67.09041	65.79726	.00000	24.60016	172
Std. Predicted Value	-2.163	2.312	.000	1.000	172
Std. Residual	-2.654	2.603	.000	.973	172

a. Dependent Variable: Labor_Productivity

Appendix (C-4) Results of Granger Causality Test

```
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                                                                      [R]
                  Statistics/Data Analysis

                        User: 172 Regression Results

1 . tsset monthly
        time variable:  monthly, 2017m1 to 2022m4
                delta:  1 month

2 .
3 . reg LabourProductivity Export
```

Source	SS	df	MS		
Model	1.3224019	1	1.3224019	Number of obs	= 64
Residual	8.02857849	62	.129493201	F(1, 62)	= 10.21
				Prob > F	= 0.0022
Total	9.35098039	63	.14842826	R-squared	= 0.1414
				Adj R-squared	= 0.1276
				Root MSE	= .35985

LabourProd~y	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Export	1.23e-08	3.84e-09	3.20	0.002	4.59e-09	1.99e-08
_cons	-.2644694	.1028732	-2.57	0.013	-.4701099	-.0588288

```
4 .
5 . estat dwatson

  Durbin-Watson d-statistic(  2,    64) =  2.219526

6 .
7 . dfuller LabourProductivity , trend regress lags(1)

  Augmented Dickey-Fuller test for unit root         Number of obs   =        62
```

	Test Statistic	Interpolated Dickey-Fuller: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-6.975	-4.124	-3.488	-3.173

MacKinnon approximate p-value for Z(t) = 0.0000

D.LabourPr~y	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
LabourProd~y						
L1.	-1.456971	.2088958	-6.97	0.000	-1.875121	-1.038821
LD.	.1403394	.1306312	1.07	0.287	-.1211474	.4018262
trend	-.0004492	.0027138	-0.17	0.869	-.0058815	.0049831
_cons	.0589689	.1010318	0.58	0.562	-.1432681	.261206

```
8 .
9 . dfuller LabourProductivity , drift regress lags(1)

  Augmented Dickey-Fuller test for unit root         Number of obs   =        62
```

	Test Statistic	Z(t) has t-distribution: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-7.032	-2.391	-1.671	-1.296

p-value for Z(t) = 0.0000

Statistics/Data Analysis

User: 172 Regression Results

```
. tsset monthly
        time variable:  monthly, 2017m1 to 2022m4
                delta:  1 month

.
. reg LabourProductivity Export
```

Source	SS	df	MS		
Model	1.3224019	1	1.3224019	Number of obs	= 64
Residual	8.02857849	62	.129493201	F(1, 62)	= 10.21
				Prob > F	= 0.0022
Total	9.35098039	63	.14842826	R-squared	= 0.1414
				Adj R-squared	= 0.1276
				Root MSE	= .35985

LabourProd~y	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Export	1.23e-08	3.84e-09	3.20	0.002	4.59e-09	1.99e-08
_cons	-.2644694	.1028732	-2.57	0.013	-.4701099	-.0588288

```
.
. estat dwatson

Durbin-Watson d-statistic(  2,    64) =  2.219526

.
. dfuller LabourProductivity , trend regress lags(1)
```

Augmented Dickey-Fuller test for unit root Number of obs = 62

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-6.975	-4.124	-3.488	-3.173

MacKinnon approximate p-value for Z(t) = 0.0000

D.LabourPr~y	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
LabourProd~y						
L1.	-1.456971	.2088958	-6.97	0.000	-1.875121	-1.038821
LD.	.1403394	.1306312	1.07	0.287	-.1211474	.4018262
_trend	-.0004492	.0027138	-0.17	0.869	-.0058815	.0049831
_cons	.0589689	.1010318	0.58	0.562	-.1432681	.261206

```
.
. dfuller LabourProductivity , drift regress lags(1)
```

Augmented Dickey-Fuller test for unit root Number of obs = 62

	Test Statistic	Z(t) has t-distribution 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-7.032	-2.391	-1.671	-1.296

p-value for Z(t) = 0.0000

D. LabourProductivity	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
LabourProductivity						
L1.	-1.455478	.2069737	-7.03	0.000	-1.869632	-1.041325
LD.	.1395826	.1294707	1.08	0.285	-.1194876	.3986528
_cons	.0443292	.0484385	0.92	0.364	-.0525959	.1412544

```
10 .
11 . dfuller Export, trend regress lags(1)
```

Augmented Dickey-Fuller test for unit root Number of obs = 62

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		Interpolated Dickey-Fuller		
Z(t)	-4.859	-4.124	-3.488	-3.173

MacKinnon approximate p-value for Z(t) = 0.0004

D.Export	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Export						
L1.	-.7248978	.1491716	-4.86	0.000	-1.023497	-.4262984
LD.	.0763397	.1298171	0.59	0.559	-.1835175	.3361968
_trend	328295.6	87783.33	3.74	0.000	152578.2	504013.1
_cons	7474074	2357091	3.17	0.002	2755844	1.22e+07

```
12 .
13 . dfuller Export, drift regress lags(1)
```

Augmented Dickey-Fuller test for unit root Number of obs = 62

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		Z(t) has t-distribution		
Z(t)	-2.816	-2.391	-1.671	-1.296

p-value for Z(t) = 0.0033

D.Export	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Export						
L1.	-.2806106	.0996523	-2.82	0.007	-.4800144	-.0812068
LD.	-.1513738	.1266428	-1.20	0.237	-.4047855	.102038
_cons	7535385	2603545	2.89	0.005	2325704	1.27e+07

```
14 .
15 . varsoc LabourProductivity
```

Selection-order criteria
Sample: **2017m5 - 2022m4** Number of obs = **60**

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	**-28.6121**				.157111	.987069	1.00072	1.02198
1	**-26.1752**	4.8738	1	0.027	.149766	.939173	.96648	1.00898
2	**-25.5918**	1.1667	1	0.280	.15187	.953061	.994022	1.05778
3	**-18.0089**	15.166	1	0.000	.121962	.733631	.788245	.873254*
4	**-16.0212**	3.9754*	1	0.046	.118034*	.700708*	.768976*	.875236

Endogenous: LabourProductivity
Exogenous: _cons

```
16 .
17 . varsoc Export
```

Selection-order criteria
Sample: **2017m5 - 2022m4** Number of obs = **60**

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	**-1057.51**				1.2e+14	35.2837	35.2974	35.3187
1	**-1040.17**	34.685	1	0.000	7.2e+13	34.739	34.7663	34.8088*
2	**-1039.4**	1.5371	1	0.215	7.2e+13	34.7467	34.7877	34.8514
3	**-1039.27**	.27269	1	0.602	7.4e+13	34.7755	34.8301	34.9151
4	**-1035.46**	7.6122*	1	0.006	6.8e+13*	34.682*	34.7502*	34.8565

Endogenous: Export
Exogenous: _cons

```
18 .
19 . varsoc LabourProductivity Export
```

Selection-order criteria
Sample: **2017m5 - 2022m4** Number of obs = **60**

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	**-1079.95**				1.6e+13	36.0651	36.0924	36.1349
1	**-961.493**	236.92	4	0.000	3.5e+11	32.2498	32.3317	32.4592*
2	**-956.579**	9.8295	4	0.043	3.4e+11	32.2193	32.3558	32.5683
3	**-948.043**	17.071*	4	0.002	2.9e+11*	32.0681*	32.2593*	32.5568
4	**-944.199**	7.6881	4	0.104	2.9e+11	32.0733	32.3191	32.7016

Endogenous: LabourProductivity Export
Exogenous: _cons

```
20 .
21 . vecrank LabourProductivity Export, trend(constant) lags(4)
```

Johansen tests for cointegration
Trend: constant Number of obs = **60**
Sample: **2017m5 - 2022m4** Lags = **4**

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	**14**	**-961.83288**	.	**35.2674**	**15.41**
1	**17**	**-944.7094**	**0.43492**	**1.0205***	**3.76**
2	**18**	**-944.19916**	**0.01686**		

```
22 .
23 . var LabourProductivity Export, lags(1/3)
```

Vector autoregression

Sample: 2017m4 - 2022m4 No. of obs = 61
Log likelihood = -965.9431 AIC = 32.12928
FPE = 3.09e+11 HQIC = 32.31915
Det(Sigma_ml) = 1.95e+11 SBIC = 32.61374

Equation	Parms	RMSE	R-sq	chi2	P>chi2
LabourProducti~y	7	.341855	0.3250	29.36856	0.0001
Export	7	8.0e+06	0.5239	67.12043	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
LabourProductivity						
LabourProductivity						
L1.	-.3241908	.6553648	-0.49	0.621	-1.608682	.9603005
L2.	.0768189	.6562128	0.12	0.907	-1.209334	1.362972
L3.	-.4210588	.1174294	-3.59	0.000	-.6512161	-.1909014
Export						
L1.	-4.92e-09	2.89e-08	-0.17	0.865	-6.15e-08	5.16e-08
L2.	-1.51e-08	3.21e-08	-0.47	0.637	-7.80e-08	4.78e-08
L3.	1.26e-08	2.85e-08	0.44	0.658	-4.32e-08	6.85e-08
_cons	.2407372	.1129191	2.13	0.033	.0194198	.4620546
Export						
LabourProductivity						
L1.	1317430	1.53e+07	0.09	0.931	-2.87e+07	3.13e+07
L2.	3783616	1.53e+07	0.25	0.805	-2.62e+07	3.38e+07
L3.	-8352481	2740824	-3.05	0.002	-1.37e+07	-2980564
Export						
L1.	.4791305	.6734548	0.71	0.477	-.8408166	1.799078
L2.	-.0487396	.7491227	-0.07	0.948	-1.516993	1.419514
L3.	.3643349	.6650358	0.55	0.584	-.9391114	1.667781
_cons	6220249	2635554	2.36	0.018	1054659	1.14e+07

```
24 .
25 . vargranger
```

Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
LabourProductiv~y	Export	2.9467	3	0.400
LabourProductiv~y	ALL	2.9467	3	0.400
Export	LabourProductiv~y	9.3706	3	0.025
Export	ALL	9.3706	3	0.025

```
26 .
27 . varlmar
```

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	**5.7933**	**4**	**0.21512**
2	**4.8999**	**4**	**0.29772**

H0: no autocorrelation at lag order

```
28 .
```