KEY PERFORMANCE MEASUREMENT OF GREEN THIRD PARTY LOGISTICS TOWARDS MANUFACTURING SECTOR IN PENANG ISLAND MALAYSIA

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ABSTRACT

Globally, there is an observable surge of interest in the logistics industry, giving rise to stiff competition among third-party logistics (3PLs) service providers as matters become more competitive daily. Currently, the Malaysian logistics sector concentrates on logistics operation outsourcing and the development of 3PLs. In recent times, environmental challenges have attracted large attention from both academic and industrial circles. Going by these environmental challenges, business organizations, such as manufacturing firms, are potentially a major source of competitive advantage. In Malaysia, the manufacturing sector is a major contributor to the Gross Domestic Product (GDP). However, it is also a significant contributing factor to environmental deterioration and pollution. Thus, this study aimed to investigate the degree to which sustainability is part of 3PLs and manufacturing firms' strategy relative to green transport operations and assess the moderating impact of new innovation practices in the logistics operations of 3PLs services. A quantitative method of research using a questionnaire was administered to 333 managers and senior staff of randomly selected 3PLs logistics companies online . The results showed that innovative green logistics moderate the relationship between packaging services and operational performance. Likewise, the interaction of warehousing services with the innovation of green logistics moderates the relationship between warehousing services and financial performance. This study's finding from the perspective of establishing innovation in green logistics as a moderating factor in the relationship between 3PLs service provider's key performance factors and green logistics in the manufacturing industry of Malaysia is significant. All of these can be impactful in achieving the related goals eighth and ninth goals of the 2030 Sustainable Development Goals (SDGs) as well as the 2030 Shared Prosperity Vision (SPV), respectively. It is recommended that further studies on the moderating effect of innovative green logistics can be explored using more comprehensive quantitative methods.

Keywords: Third-party logistics service (3PLs, logistics performance, innovation green logistics, manufacturing.

ABSTRAK

Di peringkat global, terdapat lonjakan minat yang boleh dilihat dalam industri logistik yang menimbulkan persaingan sengit di kalangan penyedia perkhidmatan logistik pihak ketiga (3PL) apabila keadaan menjadi lebih kompetitif setiap hari. Pada masa ini, sektor logistik Malaysia menumpukan pada penyumber luar anoperasi logistik dan pembangunan 3PL. Sejak kebelakangan ini, cabaran alam sekitar telah menarik perhatian besar daripada kalangan akademik dan industri. Menerusi cabaran alam sekitar ini, organisasi perniagaan seperti firma pembuatan dianggap berpotensi menjadi sumber utama kelebihan daya saing. Di Malaysia, sektor pembuatan merupakan penyumbang utama kepada Keluaran Dalam Negeri Kasar (KDNK) , namun ia juga merupakan faktor penyumbang penting kepada kemerosotan dan pencemaran alam sekitar. Oleh itu kajian ini bertujuan untuk menyiasat sejauh mana kemampanan adalah sebahagian daripada strategi 3PL dan firma pembuatan berbanding dengan operasi pengangkutan hijau, dan menilai kesan penyederhanaan amalan inovasi baharu dalam operasi logistik perkhidmatan 3PL. Kaedah penyelidikan kuantitatif menggunakan borang soal selidik telah diberi kepada 333 pengurus dan kakitangan kanan syarikat logistik 3PL yang dipilih secara rawak atas talian. Keputusan menunjukkan bahawa logistik hijau yang inovatif menyederhanakan hubungan antara perkhidmatan pembungkusan dan prestasi operasi. Begitu juga interaksi perkhidmatan pergudangan dengan inovasi logistik hijau menyederhanakan hubungan antara perkhidmatan pergudangan dan prestasi kewangan. Dapatan kajian ini dari perspektif untuk mewujudkan inovasi dalam logistik hijau sebagai faktor penyederhana dalam hubungan antara faktor prestasi utama penyedia perkhidmatan 3PL dan logistik hijau dalam industri pembuatan Malaysia adalah signifikan. Semua ini boleh memberi impak dalam mencapai matlamat kelapan dan kesembilan dalam Matlamat Pembangunan Mampan (SDG) 2030 serta Wawasan Kemakmuran Bersama (SPV) 2030. Adalah dicadangkan bahawa kajian lanjut mengenai kesan penyederhanaan logistik hijau inovatif boleh diterokai menggunakan kaedah kuantitatif yang lebih komprehensif..

Kata kunci: Perkhidmatan logistik pihak ketiga, prestasi logistik, inovasi logistik hijau, pembuatan.

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LIST OF ABBREVIATIONS

3PLs	Third-Party Logistics
ASEAN	Association of South-East Asia Nations
AT	Agency Theory
BSC	Balanced Scorecard
CFM	Continuous Flow Manufacturing
COB	College of business
ECR	Efficient Consumer Response
EFR	Efficient Foodservice Response
EMR	Environmental Management Representatives
EPS	Earnings per Share
EVMS	Earn Value Management System
FDI	Foreign Direct Investment
FP	Financial Performance
GDP	Goss Domestic Products
GL	Green logistics
GPNM	Green Purchasing Network Malaysia
IBM	International Business Machine
ILS	Integrated Logistics Services
IMP	Industrial Master Plan
IT	Information Technology
JIT	Just In Time
KMO	Kaiser Meyer Olkin
LPM	Logistics Performance Measurement
MeV	Mediating Variables
MITI	Ministry of International Trade and Industry
MLC	Malaysian Logistics Council
MSA	Measure of sampling adequacy
NGO's	Non-governmental organizations
NIT	Neo-Institutional Theory
NT	Network Theory
OEM	Original Equipment Manufacturers
OP	Performance Management
PCA	Principal Component Analysis
PLS-SEM	Partial least squares - structural equation modeling
PM	Performance Management
QR	Quick Response
RBV	Based on Resource-Based View

RL	Reverse logistics
RMI	Risk Management Index
ROA	Return on Assets
ROE	Return on Equity
ROS	Return on Sales
SCP	Supply Chain Performance
SCPM	Supply Chain Performance Measurement
SIRIM	Standards Industrial Research Institute of Malaysia
SPSS	Statistical Packages for Social Science
SuSCM	Sustainable Supply Chain Management
TCT	Transaction Cost Theory
TCV	Transaction Cost View
UK	United Kingdom
USA	United States of America
VIF	Variance Inflated Factor

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

This chapter consists of the background introduction to the study and it is divided into sections, this is followed by background of Logistics and supply chain in Malaysia, third industrial master plan (2006-2020) (IMP3), Liberation of Logistics Sector under association of South East Asian nations (ASEAN). Also, the problem statement, research questions with aim and objectives of study follows immediately. Research hypothesis, significance of research study, scope of study and summary of the chapter conclude the chapter one.

1.1.1 Logistics and Third Party Logistics Providers

Logistics activities play significant role in ascertain an outstanding supply chain management (SCM) by means of an efficient and well-planned system. Many organizations commence by focusing on the core or major operations in their business and decide to outsource other section of their operations that are not in their mainstream operations, that is, mainly logistics operation. This particular view of the organization gives birth to third-party logistics (3PLs) with a strong platform to assess all the advantages and begin to give value- added services separate from the major logistics operations such as warehousing and transportation (Wahab, et al., 2018a). Theoretically, logistics are mere function of support in SCM, the 3PL service providers play a significant role in supply chain integration help and in some other cases, they are delegated to manage the whole process of supply chain (Jayaram & Tan, 2010). The development and expansion experiencing in the sector offers a new

dimension of reasons for more specific study on their operations and activities (Durst & Evangelista, 2018).

The current nature of global business setting is dynamic and impulsive, giving room for the organization needs to react by enhancing their effectiveness and efficiency. Inspite of pressures and challenges the sector is facing from the environment relative to attaining a competitive advantage, it still remain the organizations' responsibilities to meet all customers expectations (Lim et al., 2017).

The 3PL service providers have various services they rendered, these are transportation, cross-docking, packaging, warehousing, as well as freight forwarding (Gudehus & Kotzab, 2012). Other services by 3PLs services are the block train services (BTS), customs clearance, container yards, container repairs, break bulking activities, consolidation and heavy machinery rentals (Omotayo, Sabar & Melan, 2017).

As observed in some past research study, the issue of 3PLs performance and their logistics operations is very germane at these current competitive businesses (Wang, Jie & Abareshi, 2015). In addition, the overall logistics in the field of courier services was popular, engaging and significant with large number of stakeholders as well as the end users or the customers (Zahid, Sabar & Melan, 2019). The logistics activities and performance of 3PLs is very germane in the contemporary global competing commercial (Wang, Jie, & Abareshi, 2015).

Logistics performance measurement is critical in today's business management

environment. In the contemporary, environmental concern has generated intense reaction from both academic and industrial sector. Commencing from the inception of ISO 14000 Standard which has been accepted globally (Hasan & Chuan, 2014), industry stakeholder started expressing concern on environmental issues. Green logistics operations among the industry service provider have been observed as key significant issues which are connected fundamentally with change in climate, air pollution, noise and other environmental features (Abduaziz et al., 2015).

In Malaysia, logistics and supply chain operations are very significant to Malaysia economic growth. Moreover, 3PL activities in the capital and the industrial nerves of Malaysia, Selangor and Penang states are observed as the backbones in the development of industrial economic sustainability and it is a basic sector in the industry to drive market and trade growth in global trades sphere and business performance. In Malaysia, logistics operations are the key factor to drive the trade economic development by means of effective logistic networks, strategies and business (SME corp, 2015). The utilization of 3PLs in Malaysia has increased as a result of the development in global activities and involvement in the country. The development is along with an increase in the freight transport and increase in the demand for services of 3PLs in general. This signify that logistics is playing a key role in the economies (SME Annual Report 2017).

About 31% of Malaysia logistics users were affianced with logistics at international level through foreign logistics companies presence while 21% are locally engaged with local firms (Malaysia Productivity Corporation, 2015). All international logistics organizations are favoured based on some factors which includes, better network

coverage, global recognition, service reliability, and most significantly is the potential to offer integrated supply chain services to the end users. In spite of all these, foreseeing the ability of third party logistics sector, many global stakeholders in the logistics sector are entering into the market by means of alliances, acquisitions and direct investments to create their business based on the rapid development in both medium and small sized enterprises (SMEs) manufacturing sector in Malaysia(Malaysia Productivity Corporation, 2015). The rapid development and industrialization of Malaysian manufacturing industries have caused an increase in the logistics and supply chain operations and it is expected to developed, hence, the demand for third party logistics will definitely increase over time (Karia & Wong, 2012). The demand could be confronted by both unintended and intended actions from the side of the customers requirements as the characteristics require well-organized and planned objectives of logistics. Malaysian logistics operations are in a stage of evolving and there are underperformances of the existing third party logistics. Also, some organizations are lacks in competitive knowledge and too many medium and small size logistics providers in Malaysia.

The stress on 3PLs providers whether have the ability to generate an extensive comprehension of logistics market place and respond efficiently to meet the expectation of customers and demand with useful competitive potential is questionable. As it possess one of the developments catalyst for several industries economic development, a competitive advantage sequence will have higher impact on the 3PL competitive ability and survival. The impact of 3PLs logistics service level was addressed by Chen et al., and also the price on the cutomers order quantity. The researchers majorly ignored the financial benefit offered by 3PLs. Chen et al., (2019a)

examined a scheme of payment under which a system of logistics can strive.

1.1.2 Third Industrial Master Plan (2006-2020) (IMP3)

Recognizing the importance of the logistics sector in Malaysia's progress in international trade and internalization, the importance of the logistics industry has been officially recognized and emphasized in the Third Industrial Master Plan 2006-2020 (2005, IMP3). The government intends to achieve an overall growth rate of 8.6 percent by 2020. “This equates to nearly 12.1 % of GDP; to more than triple total marine cargo, more than double air cargo trade, and more than quadruple railway freight by 2020”.

1.1.3 Liberalization of Logistics Sector under Association of Southeast Asian Nations (ASEAN)

The regional body, ASEAN, takes precedence in improving the integration of the logistics service sector. The ASEAN Roadmap for Logistics Sector Integration, which includes coverage for logistics liberation services, includes specific measures as well as timelines for implementation, facilitation, and logistics sector liberation. Trade and customs facilitation; capacity expansion of ASEAN logistics service providers; human resource development; and increased investment in multimodal transportation infrastructure meanwhile, the Ministry of International Trade and Industry (MITI) is in charge of achieving ASEAN's liberation targets (MTI 2007:2008).

According to the focus of this research on Malaysia's logistics industry, it is well observed that Malaysia has recently liberalized creativity. These liberalization ideas have had an impact on both the service and logistics sectors, particularly Malaysia's obligation to the Association of South-East Asian Nations (ASEAN) structure

agreement services, World Trade Organization, and free trade agreements, which have necessitated the evaluation of policy and regulations to re-establish competition. Industrial practices such as just-in-time and point-to-point delivery, which necessitate the integration ofvarious modes of transportation to provide a continuous connection, have the potential to create a significant change in the logistics landscape by incorporating new innovation such as green logistics, which is the focus of this research.

Based on the country's rapid growth over the last decades, the Malaysian economy is expected to expand at a steadier and sustainable pace this year, with the manufacturing sector providing the primary impetus for growth, with double-digit growth expected. Malaysia has transitioned from a commodity-producing nation to an export-focused manufacturer of industrial products, with a track record of economic growth that exceeds 8% per year. The country is well-positioned to achieve its goal of becoming an industrialized nation by 2020. The country's transition from resource-based to non- resource-based industries strongly indicated the government's efforts to achieve their objectives (Asid, 2010). The impact of manufacturing sector which has been a significantly important as a contributor to the economy growth since 1980s cannot be over emphasized despite their environmental impact which is not encouraging. Hence,the need to study the impact of a new innovation as moderating factor in the relationship between the key performance measurement and green logistics of 3PLs in the manufacturing sector of Malaysia is germane.

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Performance measurement systems are an important tool for assessing 3PL success and identifying corrective actions required in the event of service failure. Logistics providers can be compared using performance metrics (LSPs). Selviaridis and Spring (2007) detailed performance measurement techniques such as conducting customer satisfaction surveys, access to LSP information systems, and the use of performance metrics for benchmarking in their classification framework study on third party logistics. Organizations must incorporate some parameters on service efficacy and operations proficiency when evaluating supply chain performance in the field of logistics to ensure abalanced framework (Lai et al., 2004).

The Supply Chain Operations Reference (SCOR) model considered efficiency and effectiveness, as well as internal and customer-related factors, when measuring

performance. The model suggests that performance be measured using five major supply chain procedures: source, plan, make, deliver, and return. In reality, performance metrics for individual supply chain firms, including 3PLs, as well as the entire network, can be advanced over these five procedures (Gunasekaran, Angappa, & Bulen, 2007). Although the SCOR model is widely used, it has never received serious consideration for the environmental impact of logistics services and academia. Based on the foregoing, the purpose of this research is to investigate the key performance measurement of 3PL firms in Malaysia's manufacturing sector in relation to green logistics (Gunasekaran, Angappa, & Bulen, 2007).

1.2 Problem Statement

In the recent time, environmental problem has attracted large attention from both academic and industrial circle. Beginning from the introduction of ISO 14000 standards which has been accepted globally (Hassan & Chan, 2014), many players and stakeholders in industry began to be agitated on the issue of environment. Green logistics practices within the players of industry have been earmarked as one of the vital issues which are connected majorly with the climate change, noise, air pollution as well as other environmental features (Abduaziz et al., 2015).

The issues of environment preservation have become a subject of great concern for governments, people in the society, business stakeholders and organizations. Going by the environmental challenges like ozone depletion, global warming, air pollution and solid waste, business organization and particularly, manufacturing firms are viewed to be a major source of environmental challenges. In Malaysia, the manufacturing sector is one of the major contributors to the growth of the economy

but unfortunately, it has been the cause of environmental deterioration (DOE, 2010). The reason behind this is because their line of operations yields more emissions when compared to other industries in the process of fulfilling consumer's needs, (Rozar, Mahmood, Ibrahim, & Razik, 2015). This needs to be checked adequately and a research study as this that dealt with green logisticsof 3PLs providers is important.

Research conducted by Ali et al. (2008) on Malaysia logistics industry, resulted in the listing out of several constraints of logistics development in the country. Among the constraints were lack of sophisticated management techniques and information technology (IT) systems in association to EDI pricing and charges, as well as the system functionality and performance. It also includes lack of trained and skilled manpower lack of established logistics data and information, lack of regulatory forms to ease the industry and lack of information dissemination.

Traditional green concepts in Malaysia are often associated with a slew of flaws and issues. For example, the end-of-the-pipe method does not truly eliminate pollutants; rather, it simply converts them from one material medium to another (Sarkis, 2006). Another issue is that focusing on green practices within a company may expose it to the poor environmental performance of other companies in its supply chain. For example, a small supplier's environmental performance can have a negative impact on the image and The Supply Chain Operations Reference (SCOR) model considered efficiency and effectiveness, as well as internal and customer-related factors, when measuring performance. The model suggests that performance be measured using five major supply chain procedures: source, plan, make, deliver, and return. In reality, performance metrics for individual supply chain firms, including 3PLs, as well as the

entire network, can be advanced over these five procedures (Gunasekaran, Angappa, & Bulen, 2007). Although the SCOR model is widely used, there is still need for more consideration for the environmental impact of logistics services and academia. Based on the foregoing, the purpose of this research is to investigate the key performance measurement of 3PL firms in Malaysia's manufacturing sector in relation to green logistics (Gunasekaran, Angappa, & Bulen, 2007).

1.3 Research Questions

This study will look critically at the relationship between performance measurement and green logistics practices of 3PLs in the manufacturing sector of Malaysia with the moderating impact of new innovation, the following research questions are proposed.

1. What is the current operation performance measurement of 3PL service providers in the manufacturing sector of Malaysia relative to green logistics?
2. To what degree is the sustainability engagement of 3PLs and manufacturing organization's strategy relatively to greening the transport operations?
3. What is the moderating effect of new innovation practices in the logistics operation of 3PLs service provider in the manufacturing sector of Malaysia?

1.4 Research Aim and Objective

The purpose of this study is to investigate the relationship between 3PL service provider, performance measurement and green logistics, as well as the moderating effect of new innovation in Malaysia's manufacturing sectors. This is because green logistics is a key component of sustainable development in which environmental and social standards must be met by 3PLs in order to remain within logistics frameworks, while major performance measurement is expected to be used to evaluate the

significant decisions required to remain competitive.

To achieve this aim, the following objectives are stipulated.

1. To determine the current operation performance measurement of 3PL service providers in the manufacturing sector of Malaysia relative to green logistics.
2. To investigate the degree to which sustainability is part of 3PLs and manufacturing organization's strategy relatively to greening the transportoperations.
3. To evaluate the moderating effect of new innovation practices in the logistics operation of 3PLs service provides in the manufacturing sector of Malaysia.

1.5 Significance of Research study

3PL on their key performance delivered the impact of new innovation in this study. Secondly, this study contributes to the body of knowledge on the key performance measurement of 3PLs service provider relative to the new innovation of green logistic asa moderating factor. The findings of this study can help the manufacturing sector in Malaysia to be more sustainable and environmentally friendly in all their operationactivities. It will also assist the manufacturing sector to be more proactive among the regions business gladiators hence increase their rating.

Academically, with the green-SCOR components in this study, the SCOR-model, which was established as the diagnostic tool for logistics and supply chains, can favorably serve as a strategic assessment tool for the environmental performance gauge of 3PLs service providers in the manufacturing sector of Malaysia. The clear evidence of environmental considerations in the engagement of green-SCOR model by the 3PLs service providers inthe manufacturing sector of Malaysia can be revealed.

Impactive and effective logistics performances through an antecedent like business analytic has become hypothetically valuable and sure means of securing competitive advantage and enhance logistics services. The study addressed the issue of dart of empirical study by assessing the moderating effect of green logistics relative to the key performance measurement of 3 PLs service providers in the manufacturing sector of Malaysia.

Generally, physical impact of this research will be to the advantage of the 3PL service provider in all sectors to lay more emphasis on the issue of green strategy as tool for advance performance. Through this, its belief that they will be able improves on their performance in term of efficiency and competitive advantages. Modeling, planning, and evaluating a 3PL logistics network (Tyan et al., 2003; Ko & Evans, 2007; Changsu et al., 2008, investigation of 3PL/customer relationships) Tyan et al., 2003; Ko & Evans, 2007; Changsu et al., 2008; Cai et al., 2013, and finally 3PL selection and evaluation. Razzaque & Sheng (1998), Maloni and Carter (2006), Selviaridis and Spring (2007), and Marasco (2008) have all published reviews of the literature on logistics outsourcing in general. Studies on performance measurement (PM) which is referred to as the practice of computing proficiency and efficiency of action according to Neely et al. (1995) as well as the PM and management, which is termed the procedure of using measurement data for assisting managers in decision- making procedures targeting to link scheme to tasks as defined by Taticchi et al. (2008) has curiously amplified in the last three decades

1.6 Scope of the Study

This study will look critically at the performance measurement of the effectiveness of

green logistics of 3PLs in the manufacturing sector of Malaysia. The manufacturing sector of Malaysia was chosen because of their contribution to the growing economy of Malaysia and because of their negative environmental impact through their operationsand business activities.

1.7 Structure of Thesis

This study consists of five chapters and chapter one is the introduction and it discussed about the contextual of the study, problem statement, research objective, research models,hypotheses, conceptual framework and theoretical framework, scope of research and the benefits of the study. In the chapter the main framework of the study shall be laid out.

Chapter two discusses the literature reviews where details of related study shall be highlighted, it will contain reviews on key performance measurement like SCOR and others, third party logistics services providers, green logistics, manufacturing sector of Malaysia, and the conceptual framework.

Chapter three shall detail the research methodology whereby the methods to be adoptedin the analyses of all the variables of this topic shall be explained and detailed. It gives details of the quantitative methods and the analyses to be used in this study.

The chapter four of this study reveals the findings, the overview of the data collected and the data analysis. The chapter gives detail the full interpretation of the result after the analyses of the data. While chapter five shows the discussion, recommendation and conclusion of the study based on the outcome of the analyses as mentioned in chapter four. The discussion of each finding based on the variables analysis results will be fully elaborated. Then recommendation shall follow in the chapter, and this shall be according to the research output and discussion. The chapter shall be

completed with conclusion.

1.8 Summary of Chapter

In summary, this chapter explains the introduction of the study which the key performance measurement is of the third-party logistics services in green logistics of manufacturing sector of Malaysia. The details of the background of the study, the problem statement and research objectives were explained. It made mention of the research questions, research models and the hypotheses. It also highlights the conceptual and theoretical framework. Conclusively, it also includes the structure of the thesis thereby given the details of each section of the study.

1.9 Chapters Summary

Summarily, this chapter of the thesis gives details of the study's introduction which consists of the background of study, background of logistics and supply chain in Malaysia, Third Industrial master plan, and the liberalization of logistics sector under association of Asian nations. It also includes the studies problem statement, highlighted research questions, aim and objectives of the study, and the studies research hypothesis. The significance of the study was well outlined with the scope of the study, and it was concluded with structure of the thesis.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter centers on the deliberation of ideas related to the current study. The reviewof the relevant literature also covered previous findings which are divided into six sections, which provide the basis for the models used in this study. This chapter comprises a review of previous works major on performance measurements, third party logistics service providers, logistics, green logistics, and the manufacturing sector of Malaysia. Changes in the logistics system of Malaysia with the operations of 3PL service providers are also reviewed.

2.2 Overview of Performance Measurement

This is because green logistics is a key element of long-term development in which environmental and social standards must be met by 3PLs in order to remain within logistics frameworks, while major performance measurement is assumed to be used to evaluate the important decisions required to remain competitive. For businesses such as logistics firms, performance measurement is critical. Logistics performance could be thought of as a subset of a broader concept of company performance (Chow, Heaver & Henriksson, 1994). There are numerous and inconsistent areas to consider when it comes to logistics performance, as well as numerous service metrics such as lead time, low logistics cost, and on-time delivery. As a result, there are numerous explanations and measurement systems for logistics performance (Toyli et al., 2008).

The study of Folan & Browne (2005) explained PM development through three phases such as recommendations, frameworks, and systems. Neely et al. (2003), on the other hand, compared first-, second-, and third-generation performance measurement systems, emphasizing the importance of third-generation performance measurement in directing business toward strategic business goals. Third-generation project management systems can measure progress in a consistent manner, allowing a company to derive real value from measuring both tangible and intangible business performance (Nitisaroj & Liangrokapart, 2020).

The economic issues involve product quality, profits, costs, mobility and lead time. Thesecriteria centered on logistics operations. Initially, companies stressed costs and profits when evaluating business operation. Currently, companies have to address environmentaland social issues to establish their long-term benefits. In the sphere of sustainable logistics system, the environmental aspect tackles the insignificant influence of such issues like energy usage, water usage, pollution, land use, emissions and raw material use. The social aspect, which is sustainable logistics that centered on human resources elements established in a traditional logistics system focusing on the wants of intra- organizational stakeholders and inter-organizational stakeholders (which includes customers, suppliers and communities). The social sphere may be categorized into two separate type, quality of life, as well as health and safety (Dey, 2011).

Life quality is disturbed with accidents, the conditions of the work, training and education that influence a company's communities and employees. The Initial stage of sustainable logistics system is basically views from both outputs and inputs that are necessary for the analysis of sustainability. Hence, the outputs and inputs can

be categorized in respect of the resources flow that is established in the traditional logistics system. The logistics flow connects the main elements unite each logistics activity in the system.

Striking an adequate balance between economic contribution and environmental protection is seen as an immediate step to be taken in the logistics industry as it an issueof concern for government and environmental stakeholders and institute globally. To resolve this great challenge of environmental pollution that causes global warming, green logistics has been advanced. In a general view, organizations executives implement green logistics, its successful operation relies heavily on the operation details of the organization and the employees' values of the green logistics policy (Kim & Choi, 2013). Hence, a research based green logistics awareness and the character tendencies of thosein charge of implementing the green logistics policies, particularly in Malaysia, are important and germane. The research can offer insight regarding the operation and practices of green logistics, standardize organization green logistics behavior in Malaysia and as well promote the organization policy making. Hence the important of this researchin Malaysia third party logistics service provider context.

By focusing on interacting information rather than raw data, this can also help with decision-making. Table 2.1 shows the comparison between the PM systems.

Table 2.1
Features of Performance Measurement

Performance Measurement	Features
First-generation performance measurement	To provide a framework for supplementing traditional measures in their organization's performance measurement system with non-financial measures. This includes a balanced scorecard failed to adequately illustrate the relationships between various performance measures
Second-generation performance measurement	Aids decision-making dynamics and provides a link between intangible assets and business values/market valuation. It includes a strategy map as well as a performance prism (which provides four different views of the four perspectives in BSC) Fails to connect the business-oriented methodology and real cash flow, which is a pillar of the business .
Third-generation performance measurement	The criteria of information adequacy and organisational alignment link the non-financial and intangible dimensions of organisational performance and extend the measurement of cash flow. Emphasises the importance of having the right information at the right time and integration of the performance model with the process .

Table 2.1 shows different generations of performance measurement which signify that there are still challenges on arriving at the appropriate performance measurement tools or parameter for the logistics sectors. This goes to show that the key performance measure of logistics service provider is germane as pointed out in this study.

However, there are few shortcomings associated with PM frameworks such as lack of methodical measuring design, determination of performance standards, determination of connections among the performance criteria, lack of guideline implementation for the systems of performance measurement, and framework adaptation in respect of long term environmental changes (Bassioni, 2004). According to Caplice & Sheffi

(1995) stressedthat PM is identified with six structures:

- Comprehensive, that is if it embraces all stakeholders and the constituency'sprocedures.
- Casually oriented; this is when it tracks the activities and indicators which impactfuture and present performance.
- Vertically integrated; this is when it translates the general strategy of theorganization to the firm's decision-makers.
- Horizontally integrated; this is when it involves pertinent operations, functions,and the departmental process.
- Internally comparable; this is when it permits a tradeoff between all theperformance dimensions.
- "Useful; when it is readily understandable by all decision-makers and offers aguide for actions to be implemented".

Based on this, it can be observed that there are few shortcoming mentioned in the review as lack of methodical measuring of design, determination of performance standards, to mention but a few. What this indicated is that there are still means of improvement on performance measurement in the field of logistics. The existing frameworks still need improvement to be able to meet the current need of logistics sector and most importantly, the sustainability of their operations.

2.2.1 Performance Measurement Classification

PM is encountering growth awareness from both academic and decision-making realms. Furthermore, project management is transitioning from a cost-based

categorization to onebased on determining and controlling concept value, and thus on non-cost performance. This is accomplished by reflecting on the performances not from a trade-off standpoint, where some performances benefit at the expense of others, but by cooperatively chasing the performance outcome on various phases. The innovation PM system influences both macro and micro organizational features based on the measures and organization precisely. According to a study conducted by De Toni and Tonchia (1996), the acceptance of management through process focused on cross-functional performance as opposed to single function performance. Similarly, performance appraisal is vital inrelation not to the pre-strong minded standard but to the nonstop enhancement to be accomplished (Daniels & Burns, 1997; Schmenner & Vollmann, 1994). De Toni and Tonchia, (2001) found five typologies as discuss below:

- Models that are classified based on cost and non-cost performance at various stages of aggregation, until they eventually become economic-financial, and the first hierarchical model was that of Gold (1955), which attaches productivity and ROI.
- Balanced scorecard models, in which multiple discrete performance indicators are measured independently; these indicators correspond to various perspectives such as financial, internal business processes, customers, and analysis learning/growth. Brown's (1996) model has been enhanced with vertical associations ranging from operational to financial measures.
- A frustum is a model in which low-level measures are combined into higher-level indicators, but without the ability to translate non-cost performance into financial performance. The economic-financial metrics are kept separate from the overall customer satisfaction metrics (Lynch and Cross, 1991; Hronec,

1993). At the lowest levels, the frustum method distinguishes vertical architecture by linking performance aggregation and synthesis, whereas at higher levels, it distinguishes horizontal architecture.

- Models that distinguish between internal and external performance are later viewed directly by customers (Thor, 1993; Bolwijn & Kumpe, 1990).
- Value chain models are in relation to previous ones, which is known as the internal customer-supplier relationship (Sink & Tuttle, 1989; Moseng and Bredrup, 1993).

2.2.2 Performance Measurement Risk and Issue

Performance measurement risk can be regarded as the possibility that a product, services, program, the project will not deliver as much value as it was desirable, this can be applied to the outsourced project, purchase of a product, and internal project. This risk can likewise be regarded as any uncertain happening or incidence which might affect the accomplishment of the initial aim. Besides, risk evaluation before decision-making was long ago initiated by the Athenians (Bernstein & Bernstein, 1996). However, the notion of risk management is moderately new between the space of 40-50 years ago (Aven, 2016). Researchers have defined risk as a negative and positive occurrence, whereby negative risks are threats while positive risks are an opportunity (Denney, 2020; Řeháček, 2017) conducting risk management from various fields.

All business purpose comes with risks and has affected businesses in one way or the other. Risk management oftentimes helps project managers and owners in categorizing, assessing, and minimizing the project risks (Firmenich, 2017).

Strategy in risk management can visibly progress the project success, but it is likewise vital to preserving the measurements of risk management performance on daily basis. Diverse criteria are in place in measuring the performance and efficacy of any organization or manufacturing activities (Shahbaz et al., 2018).

The study of Goh (2012) emphasized that the core purpose for PM is to make the organization to be more effective while advancing its performance. Bradley et al. (2010) pointed that whenever a principle is being selected measurement must take place and should endure throughout the project period. Four major components comprise PM such as performance index, duty, performance goal, and strategy goal (Seon-Gyoo Kim, 2010).Rahman & Adnan (2020); Brandon, (2005) mention on four most popular risk management procedures such as key performance index, balanced scorecard, risk management index, and earned value management system. Without proper valuation of risk management, organizations are incompetent to track the advancement on risk extenuation which leads to project letdown. Hence, it's vital to recognize risks, as proper means to manage them and in conclusion, measure risk management performance accurately.

- **Key Performance Index (KPI):** Used in measuring the performance of a business. A study by Carreño, Cardona, & Barbat, (2007) stated that KPI can be used in measuring risk management system performance and its success". "When emerging KPI for project performance, four (tangibility, flexibility, standardization, and objective focus) characteristics must be taken into consideration .
- **Balance Score Card (BSC):** Kaplan & Norton (1991) introduce BSC, even though BSC is a strategic management technique and appropriate for analyzing

old-style finance and accounting performance.

- **Risk Management Index (RMI):** This is based on four indicators namely risk identification, risk reduction index, disaster management index, government, and financial protection index.
- **Earn Value Management System (EVMS):** This is the most widely used performance among other techniques . There are three main variables in EVMS such as planned value budgeted value for the project, actual cost of the work done, and earned value of work completed" (EVM, 2017). Fernando et al. (2013) came up with four types of variance analysis of EVMS cost variance (CV= EV- AC), schedule variance (SV= EV-PV), cost performance Index (CPI= EV/AC), schedule performance index (SPI=EV/PV).

2.2.3 Performance Measurement of Third-Party Logistics (3PL) Service Providers

Performance Management (OP) has emerged since the 1980s but was firstly use in thehuman resources management sector in the year 1990, concentrating mainly on how to improve the performance of an employee in a universal model. Logistics businesses hireboth external that carry out logistics activities in achieving high-quality professional services to their various clients. 3LPs develop efficient inventory management and capture economies of scale which are result from the high volumes attained byaggregation demand across the huge number of the market (Man, 2006). Because 3PLsservices improvement is a broad and complex system, it cannot be distinguished by asingle major criterion (Batarlien & Jaranien, 2017). Transportation, packaging, cross- docking, inventory management, freight forwarding, and warehousing are some of the services offered by 3PLs (Gudehus & Kotzab, 2012).

PM might be diverse in various firms, and there are numerous means in measuring performance in logistics firms. For this study, logistic achievement measures concentrate on the transport and cargo industry in form of courier services, which implies transporting express small parcels from one place to another destination, and the performance variable is based on-time delivery (Forslund, 2012). A good 3PL customer's services do not just improve services of the supply chain rather it enriches the performance effectiveness. Meanwhile, an effective quality evaluation in 3PL services would offer a good connection between 3PL service providers and their supply chain partners. This study explores the links between the bases of logistics service quality and the identification in terms of the organizational structure of 3PLs key performance among its providers and customers. Despite the fact that the proposed framework for this study is easily applicable to all business contexts, this study focuses on 3PLs because logistics companies' organizational performance is dependent not only on the service provider, butalso on its upstream and downstream partners. Therefore, the service performance of 3PL service providers is germane for the purpose of fulfilling their social and economic responsibilities. It means the key performance of 3PL service provider must be keen examined.

2.2.4 Performance Measurement in Commercial Supply Chains

Supply Chain Management is causing havoc in established organizations (SCM). Strategy across all industries can be improved through supply chain as a critical component. Assessment of Supply Chain Performance Measurement (SCPM) is vital for every company’s operations because the initial purpose of SC is to lessen the created overall values (Delic & Eyers, 2020). Moynihan (2018) stressed that assessment of performance does not just handpick rather its likewise appraises

indicators to offer a review of the companies' situation and recognize possible enhancements. Besides, SCMis associated with the operation of the company under analysis with a distinct concentration on the central processes interrelated to other SC members. However, SCM can be a tactical model that supersedes logistics when participating in business operations and the administration of key processes in the SC from the advancement of services to marketing. Thus, it can be emphasized that SCM is multifunctional, and involves management production aspect, marketing, purchases, and logistic.

According to Leoczuk (2016), the various measures used in the SC are internal and donot reflect the overall performance of the chain. Few studies on performance measures in the SC have been identified by previous researchers (Gunasekaran, Patel, & Tirtiroglu, 2001; Holmberg, 2000; Beamon, 1999). Similarly, an effective integrated and balanced SCPM can engulf the organization's performance measurement system like a car or drive any organisational change. SCPM can facilitate inter-knowledge and integration among SC members. "This necessitates an indispensable involvement in SCM decision-making, particularly in re-designing business goals, approaches, and processes" (Leoczuk, 2016). Leoczuk (2016) identifies four areas that must be advanced to ensure the advancement of the chain performance measurement system: delivery performance, flexibility and customer feedback, logistics costs, and asset performance. However, one limitation of the performance measurement system that must be considered is the lack of connection between the embellishment of the performance indicators and the final fulfilment of the customers. This is extremely important because performance measures in a business element or even in a SC should be spread beginning with their strategic

objectives. As a result, the strategic goals should be directly related to the characteristics that determine customer satisfaction. Figure 2.1 depicts performance measurement as a component of supply chain management (Dobroszek 2012).

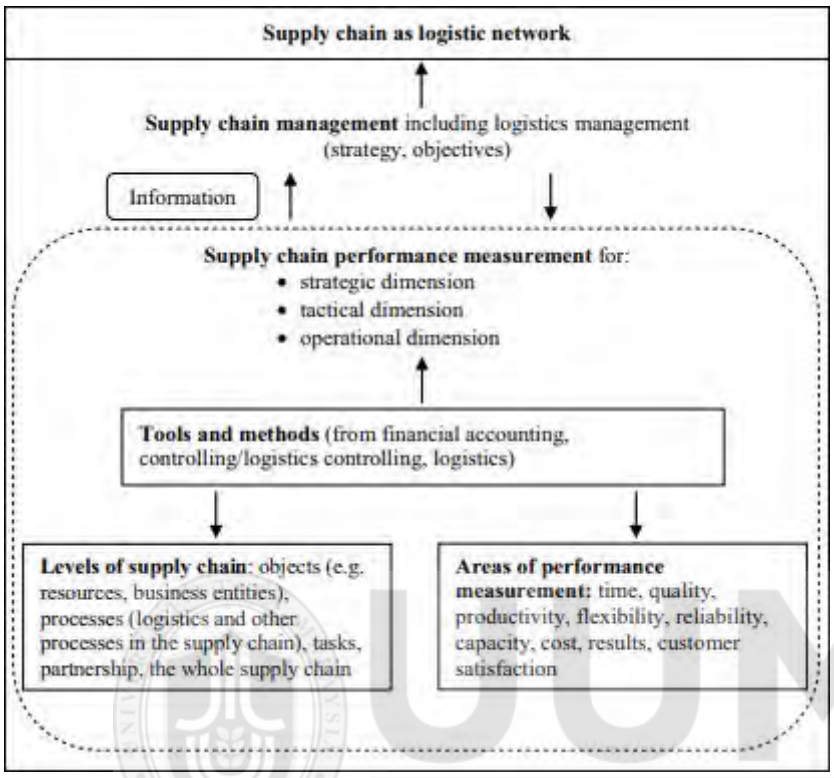

Figure2.1: Performance measurement of management in the supply chain (Dobroszek2012).

In respect of the above assertions, performance assessment of Supply chain management of logistics service must focus on the appraiser indicators instead handpicking based on experience or other factors. Hence, in the field of logistics and operations of 3PLs service providers, the local peculiarity should be put into considerations.

2.2.5 Performance Measurement in Humanitarian Organizations

Performance measurement in Humanitarian Organizations has yet to be analytically designed or implemented in commercial or military organizations (Vega, 2018). Beamon and Balcik (2008) emphasized several issues that arose when dealing with

PM and management. The design and implementation of a supply chain PM system at humanitarian organizations is a difficult task due to the imperceptibility of the services provided, the immeasurability of their projects, unknown outcomes, and the diversity of stakeholders' interests and standards (Abidi, de Leeuw, & Dullaert, 2020; Beamon, et al., 2008).

Likewise, humanitarian organizations require to have a procedure in place that certifies that, as circumstances varied, PM can grow further (Anjomshoae, Hassan, & Wong 2019; Abidi, et al., 2014). Besides, PM is important in the humanitarian sector since countless actions are contesting for higher demands for accountability of donors, media, and the public. Enhancing the right PM can promote humanitarian organizations in recognizing the bottlenecks in their logistic procedures, developing attentiveness, and backup operations, easing disaster suffering victims and maintaining donor funds more efficiently in relief and enhancement activities (Beamon, et al., 2008).

Previous research on humanitarian performance measurement has concentrated on determining the outcome of the characteristics (Buckmaster, 1999). Santarelli et al. (2015) conducted a study that established a performance measurement system based on case study literature and was able to test its key performance indicators with eleven Hos . Meanwhile, D'Haene et al. (2015) conducted a study on the execution PM in the field of HO and discovered that most of the previous frameworks are not well established. WhileTatham and Hughes (2011) noted that project management in the humanitarian field is much less advanced than in the commercial world, there is no widely accepted project management framework.

However, Abidi et al. (2014) stressed that most prevailing measures are results-based and might not be supportive in progressing humanitarian organization operations, which face several doubts owed to countless features beyond the control of just one organization. For the humanitarian supply chain to be productive, PM and indicators are important. As a result, no single humanitarian supply chains despite the fact that distinct supply chains may adhere to the classification shown in Figure 2.2. As a result, PM was already identified as a tool for improving and closing identified gaps in humanitarian logistics.

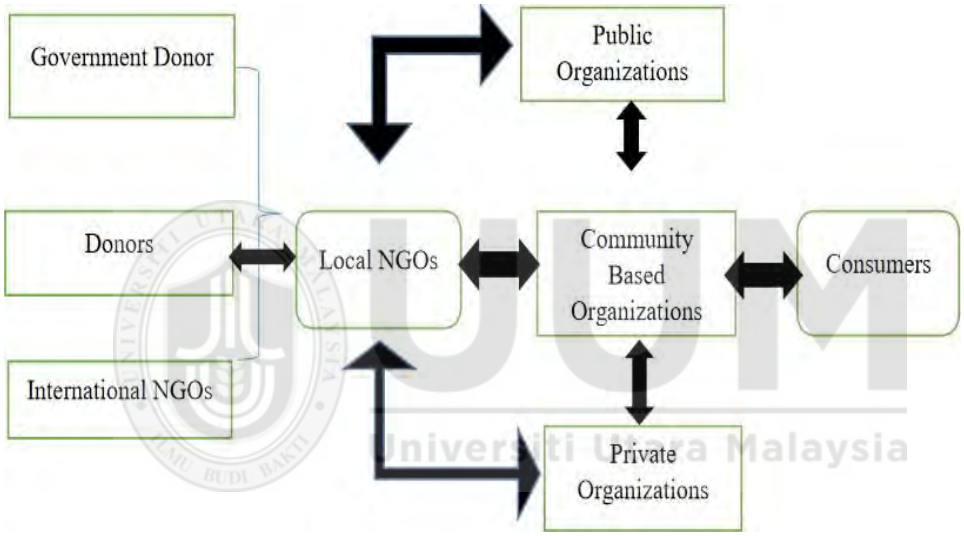

Figure 2.2: A typical humanitarian supply chain (Chandraprakaikul, 2010)

Even when the performance measurement of humanitarian organization is not clearly established yet the organization's procurement and performance measurement should be done based on the objectives of the organization as many of the organizations are effective and efficient in their aim and objectives.

2.3 Evolution of Outsourcing and Third-Party Logistics

2.3.1 Evolution of Outsourcing

Evidence from the late 1980s and early 1990s suggests that businesses turned to outsourcing to save money and gain a competitive advantage. Outsourcing, according to Ronan (2006), is a significant cost-cutting and performance-improvement strategy. Jussi (2009) defined outsourcing as the transfer of previously performed internal activities and procedures to an external party, and he clarified that outsourcings can be performed through local or international arrangements. Previous research findings indicate that organizations are focusing more on emerging competencies through outsourcing in order to spur value formation and gain viable benefits. According to Williamson (1979), outsourcing decisions are influenced by economic factors. The conclusions of previous researchers about organizational motivation for outsourcing may be more relevant in explaining the Resources Based View (RBV) than the Transaction Cost View (TCV). RBV emphasized the firm's ability to create value and gain a competitive advantage. Walker and Poppo (1991) "emphasized the importance of a hybrid connection that combines the economic aspects of TCV and the rational view of RBV, which has been supported by research (Hoetker, 2005; Jacobites & Winter, 2005), implyingthat TCV and RBV are related. As a result, it has evolved into a genuine understanding of what motivates outsourcing decisions, necessitating investigation from both the TCV and RBV.

Outsourcing was observed to be a significant cost-cutting strategy that enhance performance, yet if not manage and monitor very well, it can be the opposite of the establish fact. Hence, organizations are now laying greater emphasis on evolving competencies by means of outsourcing so as the enhance value formation and as well acquire better benefits.

2.3.2 Third-Party Logistics (3PLs) Outsourcing

Third-party logistics (3PL) has become an important source of competitive advantage, particularly for supply chain organizations, as a result of globalization and emerging technological advancements. Logistics activities in the past decades have progressively been allocated out to specific 3PLs (Hofmann & Osterwalder, 2017). However, new unruly business models and digital technology have increasingly posed a threat to 3PLs. Both cargo and uber freight, for example, enable real-time, cost-effective on-demand transportation measures which reduced the realm of logistics services. Amazon, which previously collaborated with 3PLs, has begun to develop their own online-based logistics solution. Similarly, manufacturers have begun to exit their obsolete business and provide their own digitalized fleet management and mobility services, which were previously the domain of third-party logistics providers (3PLs). According to Oliver Wyman (2017), logistics began with high financing volume in Asia and the United States, transforming a whole logistics industry and putting intense pressure on traditional logistics markets with well-known market players like Sweden, Netherlands, and Germany (World Bank, 2016).

Experiences from other companies show that digital disruptions can transform entire markets in a short period of time. As the world changes, organizational models that have been dominant for decades are being replaced by new ones (Hofmann, et al., 2017).

"The global 3PLs market was worth $1,027.71 billion in 2019 and is expected to be worth $1,789.94 billion by 2027, growing at a CAGR of 7.1 % from 2020 to 2027.

Allied Market Research" (Allied Market Research, 2020). Besides, 3PLs is the function through which manufacturers outsource events interrelated to logistics and delivery. Organizations with 3PLs can offer services for instance door-to-door delivery, inventory management, packaging of products, and cross-docking. 3PLs market is predicted to witness substantial growth, owing to enhancement of e-commerce industry which the service is expected to intensify in future to come owing to growth in the focus ofmanufacturers and retailers on their core business proficiencies. The rise in competition has side-tracked the focus of various manufactures to endorse respective specialization in both distribution and production. Moreover, 3PLs service of scope is projected to grow during the prediction period, been a productive gain in SC in terms of cost and trustworthiness that can be generated with the support of IT and managerial expertise offered by 3PLs organizations (Allied Market Research, 2020). However, loss of direct control on logistic service and potential loss of reputation is the dangerous factors that limit the rise of this market. Hence, intensification in trading happenings owing toglobalization fuels the growth of the 3PL market.

The formation of 3PL and their sourcing is paramount and that is in addition to their function by which manufacturers outsource for operations related to logistics and delivery. The 3PLs market is predicted to witness substantial growth but in some circumstances. This has not been the case due to some factors bothering on local issues and international competition.

2.3.3 Impact of Covid-19 Pandemic on 3PLs

The covid-19 pandemic has brought massive difficulties for the logistics industry making businesses face massive challenges. The Covid-19 pandemic and lockdown across the world drastically affected the supply chain, cash management, and created logistical challenges. The physical effect of Covid-19 has continued to have a profound impact on human life, as a result, constraint in controlling its spread, the supply chain has been overturned globally from halted and suspended production lies and warehouses to stock outrages, shuttered retailers, and backed up shipping ports once shipments began moving again (Market Analysis Report, 2020). Because of the current global pandemic crisis, the role of e-commerce has been expanded and enhanced (Wang, Dang, Nguyen, & Le, 2020).

Besides, Ivanov (2020) carry out an imitation study to predict how Covid-19 would disturb worldwide supply chain operations. Meanwhile, Choi (2020) logically sightsees the bring-service near-your-home novel business models under Covid-19 and was able to discuss how technologies such as block chain can play a part to aid support the bring- service near-your-home operations. Amankwah-Amoah (2020) recommends a planned framework for airlines to appropriately reply to challenges brought by Covid-19.

The impact of environment on the services of logistics and 3PLs service provider is significant and this informed the assessment of Covid-19 on the services rendered by 3PL relatives to logistics. A lot of challenges came up with Covid-19 and the impact was significant on their operations. This is a visible evidences recorded against their operations and the way out of it.

2.3.4 Measuring Logistics Performance Management

Logistics Performance Measurement (LPM) systems can be viewed as the application of business PM in the logistics industry with its vital role (Özoğlu, & Büyükkeklik, 2017). However, they have been modified to integrate the distinctiveness of logistics operations, business PM systems subsidize immensely to the evolution of LPM systems. Logistics Performance (LP) denotes the ability of an organization to accomplish cost advantage and services advantage that is not incorporated by their competitors (Karia, 2011; Karia, Asaari & Wong, 2014). A study by Tuan, (2017) defined LP as the stage of modification and competency associated with the attainment of logistic activities. PM has a significant role in the organization. Accordingly, several researchers have a focus on performance logistics outsourcing activities which are either measure through 3PLs and judgments of customers (Zailani et al., 2017; Karagöz & Akgün, 2015; Karia & Wong, 2013; Mothilal et al., 2012). Besides some of their studies focus on performance logistics activities performed through organizations whose main business is not on logistics (Özoğlu, et al., 2017). Fugate, Mentzer, and Stank's (2010) study depicts the interdependence of logistic efficiency, effectiveness, and differentiation within the logistic performance and overall organization performance as shown in Figure 2.3.

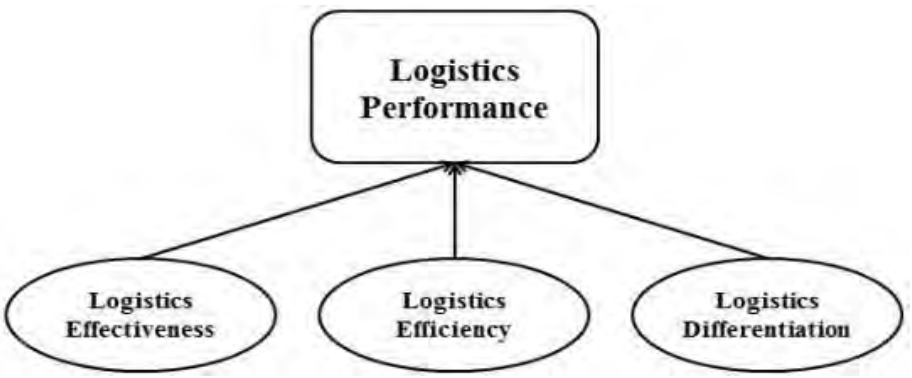

Figure 2.3: Assessing Logistics Measurement

Manufacturing executives are increasingly concerned with gradually outsourcing logistics functions to third-party logistics service suppliers in order to decrease distribution network difficulties, costs, and overheads (Dhayanidhi, Azad, & Narashiman, 2011). “Previous research identified warehousing, in-plant material handling, freight forwarding, scrap disposal, fleet management, order entry and processing, customs clearance, demand forecasting, inventory management, product labelling, packaging, channelling, after-salessupport, procurement, and distribution as significant 3PL services used by manufacturers” (Dhayanidhi, et al., 2011; Sohail, 2006; Sohail & Sohal, 2003). According to Karia et al. (2014), logistics service providers for PM should be multidimensional in order to replicate operations and avoid misleading conclusions. Based on Porter's (1980) theory of competitive advantage, Karia (2011) developed and conceptualized logistics service provider performance into two competitive performance metrics: competitive costs or cost leadership; and competitive services or customer service innovation (Ayesh, Mahmood, Baroto, & Mubarak, 2021). Furthermore, Liu and Lyons (2011) understood a relative analysis from the perspective of two parties by collecting data from both 3PL providers and customers (large manufacturing firms). Similarly, Zailani et al. (2017) investigated Malaysian electrical and electronics firms' logistics performance.

Mothilal et al. (2012) and Liu et al. (2011) conducted research on financial and operational performance variables. Karia and Wong (2013), on the other hand, used variables directly related to logistics services, such as better services, a higher percentage of on-time and precise delivery, quick responses, more unique solutions, higher satisfaction with the service level, more additional services, lower facility cost,

and lower distribution cost. In a study conducted by, 3PL customers were asked to rate their service performance, overall satisfaction, and loyalty to the provider (zolu et al. 2017). Financial performance (market share) data, on the other hand, was gathered from 3PLs. As a result, logistics providers should strive to reduce the number of resources used in comparison to the results obtained (efficiency), achieve the predefined goals (effectiveness), and achieve a higher market position (differentiation). Table 2.3 shows few studies on key items of LP

Table 2.2
Key items of logistics performance

Author (Year)	**Focus/Content**	**Companies where the Data were Collected**	**Key Items of Logistics Performance**	**Analysis**
Zailani et al., (2017)	"Evaluate the impact of the extent of logistics outsourcing practices on logistics outsourcing performance"	Electrical and electronics companies in Malaysia	**"Strategic Focus** (concentration on core competence areas, able to prioritize types of business and operations, able to rationalize resources allocation)" **Operative Ability** (inventory level, order-to-delivery lead time, quality of logistics functions, production flexibility, best logistics technologies and experience, responding quickly, delivery reliability, customer service, geographical coverage for distribution) **Financial Benefit** (lower cost of production, acceleratecapital turnover, cost reduction due to economies of scale, increase sales growth, improve net annual profit relative to performancegoal)	Partial least squares (PLS) technique of structural equation modeling

Karagöz & Akgün, (2015)	"Correlation between information technology capability and organizational culture with logistics performance and firm performance"	International logistics companies located in Turkey	**"Overall Logistics Performance** (there isn't any information about variables of logistics performance)"	Partial least squares (PLS) technique of structural equation modeling
Karia & Wong, (2013)	Impact of logistics resources on the performance of 3PLs	3PLs in Malaysian	**"Overall Logistics Performance** (on-time and accurate delivery, quicker responses to customers, better services, lower distribution cost".	'Exploratory factor analysis and stepwise multiple regression analysis"
Mothilal et al., (2012)	"Relationships of the key success factors with operational and financial measures"	3PLs in India	**"Operational Performance** (on-time delivery) Financial performance" (revenue growth and profit growth)	Multiple regression analysis
Liu & Lyons, (2011)	Relationship between the service capabilities and performance	"3PLs and customers (large manufacturers) in Taiwan and UK"	**"Operational Performance** (quality, cost, flexibility, delivery, innovation) Financial performance" (gross profit margin and sales growth)	"Cluster analysis, simple regression analysis, and multiple regression analysis"
Wang et al., (2010)	"Performance drivers of 3PLs"	3PLs in China	**"Operational Performance** (cost performance and service performance" (quality, flexibility, on-time delivery, İnnovation) **Financial Performance** (growth rate in market share, growth in annual sales, growth in return on sales, and growth in return on assets)	

Fugate et al., 2010	Relationship between logistics performance and organizational performance	Manufacturer	**"Overall Logistics Performance"** (comparison to major competitors) **Logistics Differentiation** (damage-free deliveries, finished good inventory, forecasting accuracy, line item fill rate, on-time delivery, total inventory turns, time on backorder)	Structural equation modeling

		Logistics Efficiency (lineitem fill rate, percent of orders shipped on time, percent of shipments requiring expediting, inventory turns per year, average order cycle time) **Logistics Effectiveness** (sales, transportation costs, warehousing costs, inventorycosts, and total logistics costs)

Because service enhancement is such a wide and complicated system, it is impossible to differentiate one main requirement (Batarlien, & Jaranien, 2017). In today's business world, there is a tendency to eliminate side activities by relocating them to specialized organizations. 3PL services are defined as the transfer of a company's logistics activities to a specialized organization (Batarlien et al., 2017). The top twenty organizations' financial results all over the world are presented in Table 2.4 (Langley, 2016; Armstrong & Associates, 2017).

Table 2.3
Top 20 financial organization worldwide

Company Name	**Program Name**	**Strategy Based on**	**Gross Revenue2016 (US$ Millions)**
DHL Supply Chain & Global Forwarding	First Choice	Lean and Six Sigma	26,105
Kuehne + Nagel	Out+ Perform	"Continuous improvement, Streamlining end-to-end operations, Customer satisfaction, People, Innovation, Quality, Security, Compliance, Results"	20,294
Nippon Express	Quality / Security / Environment Management	Global Human Resource Development, Quality, Environment, Risk, Safety, Corporate Social Responsibility	16,976
DB Schenker	FLEX –Flawless	Sustainable improvement culture, Quality,	16,746

	execution	Operational Excellence, Six Sigma, Eco Excellence, Knowledge Excellence	
C.H. Robinson	TMC (dedicated division)	Technology, Process Management, Innovation, Six Sigma, Operational Excellence	13,144
DSV	DSV Sigma	Quality Management, Customer, Lean, Six Sigma, Change Management	10,073
XPO Logistics	XPO Operating System	Lean management, Six Sigma	8,638
GEODIS	Stakeholders' Total Satisfaction	Business excellence (EFQM), Environment, Quality	6,830
UPS Supply Chain Solutions	General Strategy	Quality, Efficiency, Safety, Business Process re-engineering, Innovation, Lean Six Sigma	6,793
CEVA Logistics	Operational Excellence	Business Process Management, Business Process Improvement, Quality, Lean, Business process re-engineering	6,646
DACHSER	General Strategy	Standardization, Ecology, Social	6,320
Hitachi Transport System	General Strategy	Compliance, Customer Focus, Innovation and Excellence, Safety, Environment	6,273
J.B. Hunt (JBI, DCS &ICS)	General Strategy	Lean	6,181
Expeditors	General Strategy	Excellence, Environment, People, Processes, Technology	6,098
Toll Group	One Toll	Operational excellence, Safety, Environment	5,822
Panalpina	LogEx	Lean manufacturing, Operational Excellence, Performance, Innovation, Environment	5,276
GEFCO	Gefco Management System	Quality, Safety, Lean management, Environment	4,800
Bolloré Logistics	N/A	Quality, Safety, Environment	4,670
Kintetsu World Express	N/A	Quality	4,373

In the current global business, there is possibility to sideline any other activities by releasing them to specialized organization. Hence, 3PL services are expressed as transfer of a company's logistics activities to specialized organizations. The strategies on this can be as a result of Lean and Six sigma, streamlining of end to end operations, continuous improvement, people, customers satisfaction, security, quality, results and competence

2.4 Logistics Performance in Malaysia

Malaysia's logistics industry may benefit from the Malaysian government's various initiatives. One of the organizations formed to monitor the growth of the logistics industry is the Malaysia Logistics and Supply Chain Council (MLSC). In 2019, the Asia- Pacific region accounted for the lion's share of the global 3PL market (Allied Market Research, 2020). Furthermore, Malaysia's logistics industry has received international recognition. Malaysia ranked 25th out of 166 countries in the World Bank's global logistical performance index in 2014. Arvis et al., (2014) despite numerous studies on logistics service quality (Rahmat & Faisol, 2014), logistics development (Zuraimi, Mohd Rafi, & Dahlan, 2013), and logistics issues and challenges (Ali, Jaafar, & Mohamad, 2008) in the Malaysian sector, the current study examines logistics performance from a set of users . Customers, as identified by Estampe et al. (2013), are the ultimate judge of how much value is generated at the logistics level. As shown in Table 2.5, few studies have focused on logistic performance in the Malaysian domain.

Table 2.4
Logistics performance studies in Malaysia's context.

Authors	Types	Sampling/Industry	Area
Abu Bakar et al. (2014)	Conference Paper	LSP and Manufacturer	Trade Facilitation
Zakariah and Pyeman (2013)	Journal	Manufacturing	Logistics Cos
Zuraimi et al. (2012)	Journal	LSP and Users	Logistics Development
Lu & Lin, (2012)		Manufacturer	Trade Facilitation
Gupta, Goh, Desouza, & Garg (2011)	Journal	LSP and Trade Association	Trade Friendliness

Malaysia was able to attain annual growth in the transport and storage subsector, generating additional high skilled jobs, aiming to meet five strategies such as (Unit,

2015):

- **Strengthening the institutional and regulatory framework:** the ability to strengthen institutional structure and reduce regulations in order to reduce disorganization and repetition (Nadarajah, 2015).
- **Enhancing trade facilitation mechanisms:** increasing the competence of trade facilitation mechanisms, specifically through improvements in cargo clearance systems, paperless trading, and trade document security, which will increasetrading activity and lower the cost of doing business

- **Evolving infrastructure and freight demand:** Combine cargo volume via a well-known hub-and-spoke system, improving connectivity to entry points, optimizing use of existing infrastructure, and promoting modal shift from road to rail.
- **Establishing technology and human capital:** Increase the use of technology to reduce the need for manual documentation and to improve transportation movements. This deliberate shift also emphasizes the enhancement of human resource competencies within the logistics organization by appealing to,nurturing, and recalling skilled talent.
- **Internationalizing logistics services:** Advance competencies of logistic services providers thru solidifying internal competencies and external willingness to qualify them to vie at a global level.

Following that, logistics service providers include facilitation (freight forwarders, customs brokers, shipbrokers, shipping agents, consolidators, and non-vessels operating common carriers), distribution, and transportation (warehousing and transporting, inventory management, and domestic and regional distribution and courier companies). However, integrated logistics services (3PL and lead logistics

providers) and business support services (ICT service providers, banking and insurance, education and training, equipment handling, maintenance and repairs, and security) are available (Jumadi & Zailani, 2010).

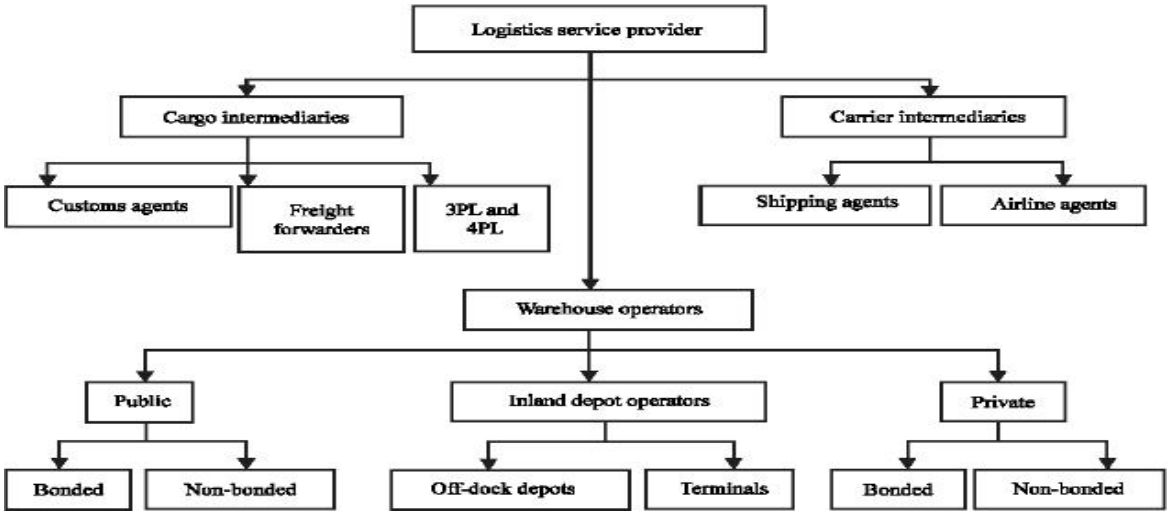

Figure 2.4: Structure of Logistics Services Providers in Malaysia

According to Zuraimi, Mohd Rafi, and Dahlan (2012), who focused on the progression of logistics in the eastern region and discovered that logistics infrastructure constraints affect logistics development in the east corridor. Previous research has found that cost logistics is one of the most important issues affecting the logistics industry (Ali et al., 2008; Zuraimi et al., 2012). There is no detailed explanation elucidating the factors causing these issues. According to Mima (2008), in order to achieve cost attractiveness and achieve economies of scale, several manufacturers outsource their production function. The outsourcing policy does more than just satisfy customers; it also allows for competitive advantages. Meanwhile, 3PL services provide a critical role in maintaining outsourced logistics and production. As a result, manufacturers should be able to focus on their core business while maintaining the lowest possible production cost.

Although, there is a record that Malaysia was able to attain yearly growth in the field

of transport and storage subsector whereby there is generation of extra high skilled jobs, targeting to attain five strategies. Notwithstanding, there are still room for development by the sector in Malaysia. This is with the view that Local logistics organization is seriously competing with foreign logistics organizations which are subsidiaries of their parent body overseas. This is an issues that call for thorough attention as foreign affiliated logistics organizations are open for international competition.

2.4.1 Manufacturing Sector of Malaysia

Malaysia began industrialization as a key area of economic advancement shortly after gaining independence in 1957. As a result, Malaysia's manufacturing sector is the fastest growing and the driving force behind the country's expansion. Malaysia's economy has undergone structural transformation, shifting from a primary commodity exporter to a producer of high-value-added manufactured goods (Kamaruddin & Masron, 2010). Malaysia's unprecedented rapid economic growth has coincided with a visible structural transformation of the Malaysian economy. Manufacturing firms' contribution toMalaysia's economy had become critical by the mid-1980s. Several transformations have occurred in the commodity-producing country in order for it to become a manufacturing industrial product geared toward exports (Kamis & Anuar, 2016). Malaysia's economy is projected to grow at a more sustainable rate as the year progresses, with the manufacturing sector providing the primary impetus, with double-digit growth anticipated. Since the mid-1980s, Malaysia has been transitioning from resource-based tonon-resource-based businesses, demonstrating the government's serious efforts to achievethe status of manufacturing country. As shown in the Malaysian manufacturing sector profile, falling value-added

shares in resource-based compositions clearly demonstrated this. Since their inception, Malaysian manufacturing companies have been classified into four major stages which are as follows:

Export-oriented industrialization based on export-processing zones

- Heavy-industry import substitution industrialization in the early 1980s
- In the late 1980s, there was liberalization and a second round of export push, andin the 1990s, there was a consistent shift toward more market-oriented policies.
- Increasing global attractiveness by focusing on transforming and innovating the manufacturing sector in the millennial generation. The emphasis will be on the service sector and establishing links between the clusters.

Based on the aforementioned phases, both (2and3) were identified as Malaysian industrial development evolutions. The former approach had served Malaysia well in the early stages of its industrialization drive. However, as the process of industrialization becomes more difficult, the government decided that an industrial master plan method should be developed to strengthen the process. On the other hand, logistic services in Malaysia serve as the country's economic lifeline. Similarly, logistic services in Malaysia have played an active role not only in international trade but also in local transportation. As far as Malaysia is concerned, there exist four modes of transportation in Malaysia such as air, road, rail, and sea. The Malaysia logistics sector has contributed close to 3.8% to the nations GDP in 2019. Over the past decades, trade events in Malaysia have significantly increase with a record CAGR of 6.5% from 2013-2018. Transportation operations have also increased in the last years at a 3% CAGR from 2013-2018. Accordingly, the Government of

Malaysia initiative programme under the umbrella of the National Logistics Trade Facilitation (NLTF), 2015-2020 as well as National Transport Policy (NTP), 2013-2030 desire to increase GDP contribution for services through logistics desires to enhance the GDP contribution for logistics services to 8.9% for 2020 and beyond and to also internationalize the logistics sector in the country by means of regional integration of trade. As at 2015, which was the last edited records, Malaysia was having over 22,000 industries, including the logistics industry, which is expected to grow by 11.5 percent annually. (Market Watch, 2022).

However, the expect percentage growth of industries in Malaysia does not correspond with the reality on ground as at now, especially, those in the logistics sector even when the industry has contributed immensely to the economic situation in Malaysia. Hence, there is need to assess the performance of Logistics industry in Malaysia for better performance under the guise of sustainability and for proper competitive advantages.

2.5 Logistics Process Review

2.5.1 Warehousing

Warehouses are critical in providing value-added services in supply chain management (Sainathuni, Parikh, Zhang, & Kong, 2014.). Warehousing activities are more important in today's operations, and their wise use has aided in moving organisations from mere paperwork to profits (Varila, Seppänen, & Suomala, 2007). Warehouses serve as an interface between the production line, the market, customers, suppliers, and the business environment. The primary goal of warehouses is to improve goods movement through the supply chain to end users, particularly

consumers. It is one of the most recent supply chain components. It generally consists of administrative functions as well as physical functions associated with the storage of materials and goods.

There are two basic means by which warehousing performance can be assessed, either by economic means which is related to cost and technical means which has to do with outputs and inputs. But (Koster, & Balk, 2008.) indicated that assessment based on economic values of warehousing performance is very tasking because warehouses typically support supply chain but do not generate revenue. Meanwhile, the technical assessment involves issues that are peculiar to internal perspectives, these are, safety and housekeeping, utilization of space, accuracy of inventory and external matters e.g., accuracy of order, stock-outs and performance issues complaints, such as feedbacks, goals and competence. Though, some organizations seem to assess their progress in term of fiscal parameters such as cash flow, sales growth, return on investment, etc. Eventhose measures are not necessary and do not have anything to do with quality, continuous and service enhancement. In overall, evaluation of performance offers feedback on proposal design quality and more importantly, how to improve on operational policy (Gu, Goetschalckx, & McGinnis, 2010).

2.5.2 Inventory Management

Inventory management has come to be recognized as a critical function in determining warehouse performance (Baker, 2007). Their influence on business performance in today's supply chain practitioners (Kannan, & Tan, 2005). Operations managers are accountable for overseeing the daily operations of the inventory system

at each point of distribution (Stevenson, & Sum, 2015). Orders will be required to be placed in order for stock to be replenished. Deliveries will be tracked, and storage will also be provided. Despite this, models for resolving inventory control challenges have been proposed. This model was first proposed by (Harris, 1913), who stated that inventory management is fundamentally concerned with the decision of when and how much order to place. Currently, the most cost-effective system is required to determine the best price to be paid and quantity considered necessary for orders under certain constraints and uncertainties in demand. Importantly, the best inventory management system seeks the best balance between the disadvantages and benefits of stock holding and payment of the best price relative to the discount obtained from purchasing in bulk.

It is critical to maintain the highest possible inventory levels. Holding so many inventories resulted in inventory holding costs. Fixed and variable costs such as inventory rent/space, cost of item position on shelves, utility charges such as water and power, damaged items, and pilfering all contribute to the costs. However, holding a smallinventory is very expensive during a period of unexpected demand. Customers may switch to competitors if you are unable to meet their needs (Fitzsimons., 2000).

The main goal of upright inventory administration is to have customer gratification and torespond to different or multiple requisitions in an efficient manner, resulting in optimal stock and meeting customer demands. In conclusion, it can be argued that inventory serves some important functions in an organization while focusing on keeping overall costs to a bare minimum.

2.5.2.1 Review system of Inventory

It is germane to hold the optimal phase of inventory but holding too much inventory generates holding costs on inventory. These costs are because of fixed and variable costs such as utility charges which involves running water and power, inventory rent space, cost of items on shelves, items damages and pilfering. But holding small inventory is very costly during the period of demands that is unexpected. The inability to meet up with the needs of customers may trigger customers to turn to competitors (Fitzsimons, 2000). The basic aim and objective of good inventory management is to guarantee customer satisfaction and immediate response to customers' acquisition in efficient manner, hence, getting an optimum stage of stock and meeting customers demand efficiently. Optimization of inventory tools assists organizations, particularly in logistics and transport sectors, to create reliable decisions in products ordering. In the opinion of Tanthatemee, & Phruksaphanrat, (2012), there are two most utilized inventory systems which is based on fluctuation of demand, they are perpetual or continual and periodic inventory system. In perpetual inventory system, order is placed for purchase for aperpetual quantity every time on hand inventory gets to the point of reorder stage,meanwhile, in the system of periodic inventory, order for purchase is placed for variable quantity after a definite fixed interval time (Syntetos, Babai, & Gardner, 2015). Meanwhile, perpetual or continuous system is usually utilized for class A items, which is the greater percentage of the total value of the stock inventory. On the other hand, it was stated earlier that periodic review is utilized with medium to low items value in high level volume. Inventory in class A category form the least relative to stock quantity and the items damages enlist them at the highest risk. Summarily, inventory accomplishes severalsignificant impacts in an organization and seems to keep total costs at minimal

level.

2.5.3 Packaging in Logistics

Packaging is recognized as a component that can support and encourage development and innovation in supply chain management. Packaging appears to be one of the pivotal overarching elements that supports the implementation of sustainable supply chain policies (Garca-Arca, Comesaa-Benavides, Gonzalez-Portela Garrido, and Prado-Prado; Dominic CAS, stlund, Buffington, Masoud, 2015, Plsson, and Hellström, 2016). Furthermore, packaging is an innovation source relative to products, materials and processes, thereby reinforcing its strategic involvement in competitive enhancement (Hellström, & Nilsson, 2011). Many researchers acknowledge three basic function in the packaging process, a commercial one, environmental one and productive one (Bramklev, 2009). Meanwhile, other researcher has subsequently increase these three basic functions to nine several sub functions, which are highlighted as protection, commercial, production, packaging, logistics, environmental, purchases, legal and ergonomic (Lindh, Williams, Olsson, & Wikström, 2016). Meanwhile, the perfect integration of all these made up the concept of sustainable packaging logistics system.

2.5.3.1 Packaging Role in the Disposition of Economic Sustainability

The selection of the best packaging is normally linked with factors of enhanced sales and minimized costs. Packaging should be seen as an invisible salesperson with products characteristics that is tangible or intangible, enhancing the level of differentiation and subsequent sales (Rundh, 2016). Likewise, packaging has impact on the green image of the products (Seo, Ahn, Jeong, & Moon, 2016; Chen, Hung,

Wang, Huang, & Liao, 2017). Packaging should be designed to enhance the efficiency of the products at a level of productive and logistics. Packaging design influence costs, direct and indirect costs. Direct cost involves waste management and packaging purchases, while indirect costs involve transport losses, storage, handling and packaging.

2.5.3.2 Packaging Role in the disposition of Environmental Sustainability

Packaging design efficiency is also considered from an environmental aspect (Dickner, 2012). Returnable packaging promotion, waste recovery or recycling from packaging and the reinforcement of product protection so that there won't be losses (Williams, Wikström, & Löfgren, 2008; Verghese, Lewis, Lockrey, & Williams, 2015).

2.5.4 Transportation

Transportation is the important aspect of the efficiency of warehousing, (Murphy, 1986, Bowersox, Closs, &Cooper,2002). A major issue on the critical management of transportation is modal selection. In most past research work, the significant of performance capabilities in modal selection was identified. But most commonly identified that accessibilities, reliability, transit time, and safety of the products as the main determinants in mode selection. Then, cost is seen as another major criterion to consider in selection of model (Coyle, Gibson, Langley, & Novack, 2013). The study, "Seven Rs" Heskett, & Shapiro, (1985.) "Identify the scope and focus of quality service transportation KPIs" at the target time and right time, "in the right condition" focuses on protection of freight and at the rightful cost which is relevant to accuracy billing issues".

2.5.4.1 Delivery Time

Most study conclude that delivery-on-time is a very important requirement KPI utilized by buyers of transportation to assess their 3PLs (Gunasekaran, Patel, & McGaughey, 2004; Christopher, 1992, Rushton, & Oxley, 1989). The concentration on lean supply chains and the issue of delivery on-time as a critical requirement. Inventory rationalization is facilitated by timely service by means of lower levels of stock safety, offers persistent renewal to minimise out-of-stock challenges, and subdue uncertainty of supply chain and the attending bull whip influence. On-time measures of delivery in the ratio of shipments as expressed by the carrier (Coyle, Gibson, Langley, & Novack, 2013). Most buyers of transportation lay down 95% as an acceptable performance level from their logistics partners with average targeted goal of 98 percent and above that level. A deviation from those carriers are not offering services adequate enough, hence, correctiveaction need to be taken.

2.5.4.2 Defects as per Transit

The protection of the freight is another main element of transportation service appraisalof quality (Kenderdine, & Larson,1988) as any damages to goods in transit can result to returns of products (Min, Ko, & Ko, 2006). It is not sufficient to get the products shipped to destination as fast as possible to the destination, it must get to destination completely and safely. When freight is damaged, destroyed or loss, money and time are sacrificed. In-time operations and continuous retail distribution supported by a supply chain may encounter delivery difficulty because they do not keep a small amount of safety stock on hand to replace goods lost in transit (Christopher, 2016). Nonetheless, free-delivery claims are a key freight protection indicator. The transportation buyer compares the number of claims-free deliveries to

the total number of deliveries (Coyle, Gibson, Langley, & Novack,2013). Perfection is the primary goal in this situation; most organisations will not accept anything below 99 % claim-free deliveries. A high level claim indicates that carriers or third-party logistics providers are not careful enough to protect the freight or that there is insufficient freight packaging. To avoid future claims, service failures must be diagnosed and corrected as soon as possible in such cases. Perfect delivery execution is the highest level of service (Gunasekaran, Patel, & McGaughey, 2004). Transportation delivery that is defect free eliminates rework exercise, reduces administrative interception, and also promotes satisfaction of customer, reduction of inventory and minimised supply chain variation.

2.5.4.3 Aggregate Efficiency

Because the quality of logistics services is critical for customer satisfaction (Ho, Teik, Tiffany, Kok, & Teh, 2012), businesses must strike a balance between their need for service and the costs associated with the cargo. Transportation costs must be kept low in comparison to the value of the goods, or there will be no competitive landing cost.

Because transportation is the most expensive unit expense in logistics services (Thomas& Griffin,1996). It is critical that an organisation gets the most bang for their buck when engaging in transportation. Aggregate efficiency assesses the emphasis on transportation expenses based on the measurement. It is a rough estimate of the total freight cost divided by the number of units shipped. This type of measurement establishes a baseline from which to make improvements.

All the aforementioned sections of third party logistics are having specific functions and performance assessments. However the assessment was not in the light of

sustainability and deeper or peculiar assessment needs to be addressed and be implemented

2.6 Overview Theories of Third-Party Logistics

Theories are applied in academic research as an integrated opinion of notions linked to the subject under inquiries. Theories are linking to manufacturing sectors which have been offered such as Transaction Cost Theory (TCT), Agency Theory (AT), Network Theory (NT), Resources-Based View (RBV) and Neo-Institutional Theory (NIT) allfocus on key performance and competitive advantages (Panayides & So, 2005b; Skjoett-Larsen, 2000; Ford 1997; Hakansson & Snehota 1995; Eisenhardt, 1989; Wernerfelt, 1984; Williamson, 1979). Meanwhile, researchers have claimed that theyhave been useful to the 3PLs services in any organizations (Nitisaroj, et al., 2020;Jothimani, et al., 2014; Dhayanidhi, et al., 2011; Sohail, et al., 2003)

2.6.1 Transaction Cost Theory

Transaction Cost Theory (TCT) stated precise activities are secure from the market, also TCT refers to as exchange across a technological interface, whenever a transaction is carried out, several costs arise as a result of resistances in the economic system (Williamson, 1975, 1985). Furthermore, TCT has been around for nearly seven decades, and it has recently gained some prominence after Ronald Coase was awarded the Nobel Prize in Economics for his research on TCT (Coase, 1937). The ideal situation is for 3PL providers to be outsourced once there is a chance of lowering transaction costs. Logistics outsourcing activities traditionally reduce transaction costs such as centralized order processing, competent asset use, and overhead amalgamation by a 3P. (Hwang, Chen, and Lin (2016). These transaction

costs are reduced as a result of progression standardization and improved coordination obtained from a 3PL provider (Hwang, et al., 2020; Zacharia, et al., 2011).

Similarly, TCT based on two fundamental behavioral assumptions about actors: bounded rationality and opportunism (SkjoettLarsen, 2000). TCT clarifies the circumstances in which 3P pacts become preferable to the traditional choice within the market and hierarchy, which are divided into three major categories (Williamson, 1985).

- Information costs, i.e. the costs of gathering information about a potentialpartner.
- Bargaining costs, i.e. the costs of negotiating and drafting contracts that take into account all possible scenarios in future transactions.
- Costs associated with enforcing performance, resolving conflicts, and renegotiating contracts are referred to as enforcement costs.

According to the resource-based point of view, an organization's capacity to invest in evolving core competencies, resources, and capabilities, as well as maintaining a higher performance position relative to competitors, influences outsourcing choice (McIvor, 2008). Examine previous research TCT, RBV, and NT are combined in an outsourcing framework by Bolumole et al., 2007. Meanwhile, Mclover (2008) established an outsourcing framework that incorporates both TCT and RBV, and Espino-Rodrguez & Rodrguez-Daz (2008) unified internal and interpersonal perspectives from a single appraisal strategy model. However, once the frequency of service transactions becomes low, it is difficult to recover the investment in the 3P

relationship (Large, 2008). Van Hoek (2000) demonstrated that the existence of detailed contracts is linked to the availability of customer-specific 3PL services such as display building and warehousing. As a result, 3LPs are not appropriate for infrequent transactions.

2.6.2 Agency Theory

Agency Theory (AT) is a concept that was developed in the 1960s and 1970s to explain and resolve issues in the relationship between business principals and their agents (Eisenhardt, 1989). The network perception highlights and clarifies how successful and long-term TPL relationships can be established and progress. AT demonstrates howdifficult it is to find a win-win relationship in TPL manufacturing. Similarly, AT has been widely used in logistics, particularly in the buyer-supplier relationship (Stock, 1997). According to the agent, there are risks associated with making the precise investment required for the principal's operations that cannot be transferred to other clients of the agent (LaLonde & Cooper, 1989). Meanwhile, while the interests of the principal (buyers) and the agent (3PL provider) may differ, the AT allows us to understand the challenges associated with 3PL. This is not to say that the logistics substructure influenced by 3PL providers completely supports the purchasing firms' goals in terms of customer costs (Sahay, Halldórsson, & SkjttLarsen, 2006).

Similarly, four characteristics of agency problems are recognized within the 3PL buyer- supplier relationship (Logan, 2000). According to Mulama (2012)'s research, the use of AT provides defense for the formation of unions between organizations and their outsourced service providers. This is extremely important in terms of

establishing a long- term relationship. According to Shapiro (2005), agency relationships necessitate costs for both the principals and agents from a sociological and economic standpoint. Halldorsson and Skjott-Larsen (2006) provide an example of a newly formed TPL relationship. Many agency theory-related problems, opportunities, and other related issues became apparent while studying this relationship. A network, on the other hand, does not exist between a 3PL provider and a 3PL buyer in which their associates also have other associates. As a result, positivism AT is useful in explaining the agent's irrational behavior.

2.6.3 Network Theory

The dynamics of 3P cooperation are illuminated by network theory (NT). The firm's NT emphasizes the creation of external relationships, organizational erections, and coalitions that are required to support the firm's integration into its network. Outsourcing should be a collaborative act that benefits the entire network, of which the firm is an importantcomponent. Outsourcing, according to NT, enables a company to manage its supply chain as a single entity by leveraging relationship building and network coordination (Hakansson & Snehota 1995; Ford 1997; Ellram, 1990). Furthermore, NT discusses theexpansion of 3PL services and their multiline relationships, which can aid in supply chain extension. Organizations seek the overall network's effectiveness through reciprocating and swaying connections to other organizations within which they operate, according to NT (Hwang, et al., 2016).

2.6.4 Resources-Based View Theory

The Resources-Based View (RBV) theory has been widely applied by business and management researchers. “RBV is based on the idea that organisations can gain and keep a competitive advantage by evolving and deploying valuable skills and resources” (Wernerfelt, 1984). According to RBV, core competencies are generally recognised from organisational resources. Resources are the theory's major structures in RBV (Barney, 1991). Furthermore, RBV focuses on how firms can generate income by utilising their scarce, valuable, and expensive resources (Ayesh, Mahmood, Baroto, & Mubarak, 2021; bin Mohamad Makmor, et al., 2019). According to Johnson, Scholes, and Whittington (2008), an organization's resources are divided into four categories: physical resources such as building blocks and various types of machinery, financial resources such as cash, and human resources (capital, debtors and creditors, shareholders and bankers.3) (employee skills, expertise, and knowledge,) Intellectual assets such as patents, brands, business systems, and customer databases (Bin Mohamad Makmor (2019); Kraja and Osmani (2013); Husso and Nybakk, 2019) .

Tan, Ng, Fong, Chong, and Sukumaran (2016) used RBV theories to conduct research on factors that affect SME performance, which included government support, social media, business planning, and innovation practises. Furthermore, RBV contends that the uniqueness of the resources used by logistics organisations determines the level of competitive advantage in a particular market (Keok, 2017). RBV is a popular choice in the logistics literature in terms of theory. According to RBV, understanding the concept of logistics performance entails reviewing various types of competencies and resources (Karia & Wong, 2013; Olavarrieta & Ellinger, 1997; Skjoett-Larsen,

1999). Services capability is a critical capability required by logistics service providers Chu, (2015); according to Panayides and So (2005b), customers seek the efficacy of logistics service providers by achieving their goals on logistic services, which include quick delivery services, timely response to requests, the ability to solve problems, accurate storage, and information delivery, as well as assistance to customers in achieving their goals. Meanwhile, Muthuveloo (2012) discovered that organisations with the ability to turn their valuable resource into a competitive advantage have four characteristics that a resource possesses: valuable, rare, non-tradable, and non-imitable. Figure 2.5 show the RBVtheory.

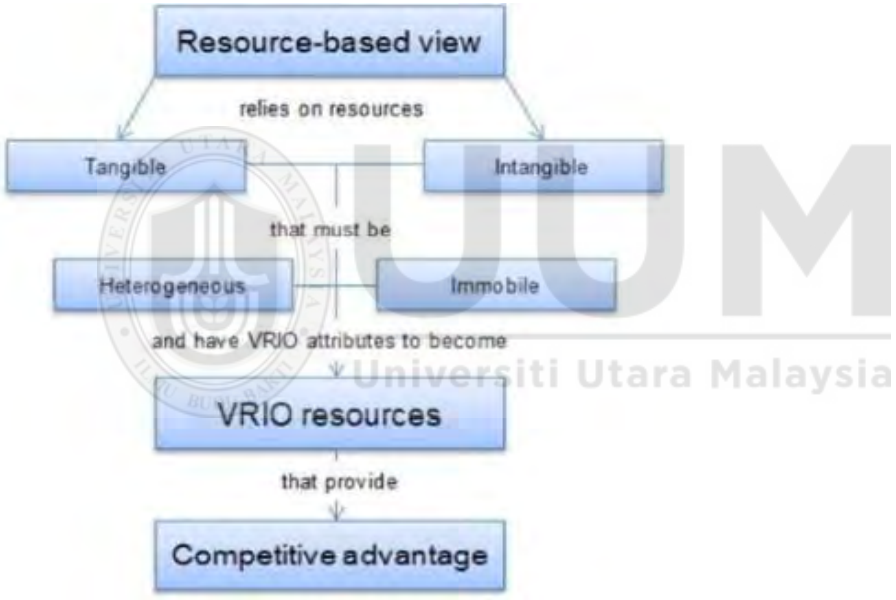

Figure 2.5: Resources-Based View (Tan, Ng, Fong, Chong, & Sukumaran, 2016)

2.6.5 Neo-Institutional Theory

"Culture, social environment, regulation, tradition, economic incentives, and history are some of the influences that promote the survival and legitimacy of organizational practices that NIT provides a theoretical lens through which to recognize and examine" (Baumol, Litan, & Schramm, 2007; Hirsch, 1975). DiMaggio and Powell's (1988) study proposes three distinct institutional pillars:

cultural cognitive, regulative, and normative. The regulatory pillar consists of regulatory frameworks, government agencies, laws and courts, professions, interest groups, and mobilized public opinion. "The morals, standards, and directions of trade and professional links are included in the normative pillar, whereas the cultural pillar is a cognitive perception of the institution that emphasizes the critical role of socially interceded construction of a shared framework of meaning" (Scott, 2001, p. 58). Historically, 3PL service providers have operated in a business environment where they are constantly subjected to regulatory pressures (Rahman, et al., 2019). Finally, the research found support for 3PL funding from the perspectives of TCE, AT, NT, RBV, and NI. Every theory provides its own viewpoint on the factors influencing the 3PL's current position in the supply chain. Similarly, all of the theories complement one another and provide complete support for 3PLs. The combination viewpoint exemplifies a more comprehensive view of organizational motivation by utilizing 3PLs such as cost reduction, access to assets, and correlation mistreatment. All theories have played an important role in enabling 3PL's modest growth.

All the theories are based on one fundamentals or the other. There is peculiarity of each theory to the condition under review and each can be applied as suitable to meet the objectives of researches that has to do with human resources, characters, logistics and supply chain.

2.6.6 Justification for Using Resources-Based View (RBV)

The study chooses RBV as a guide for the proposed research model since it enlightens on business managerial used in determining strategic resources. RBV turn

out to be the dominant approach in strategic management after its initial introduction in the 1980s. Based on RBV, it is meaningfully easier to exploit new prospects using resources and proficiencies that are already accessible, rather than having to attain new skills, personalities, or roles for each diverse opportunity. These resources are the focus of the RBV theory, with its cliques arguing that these should be prioritized within organizational approach advancement. Besides, RBV helps information technology in safeguarding customers against lack of performance and offers an appropriate idea for understanding customers' 3LPs towards their satisfaction. All related theories for this study TCT, AT, NT, RBV and NIT focus on business principles. While TCT and RBV offer a framework for studying strategic capabilities and cost making, the RBV appears tobe more appropriate for this study.

Similarly, RBV addresses the issue of an organization's identity, focusing on the origin and nature of strategic competencies. The resource-based perception is intra-organizational in nature, contending that performance is determined by the firm's unique resources and abilities (Barney, 1991; Wernerfelt, 1984). RBV recognizes the importanceof tactical assets that will likely increase the firm's market competitiveness and then employs these resources to allow them to exploit their values. Identifying and acquiring strategic resources is insufficient to produce exceptional firm accomplishment over the competition. However, in a competitive business environment, resources are efficiently managed in light of changing external situations. As a result, RBV recommends that the firm's performance results are important for firm-specific resources and firm capabilities. This demonstrates that components of the RBV model are useful for modelling 3PL key performance in Malaysia’s. manufacturing sectors. The following sections present the chapter's

conceptual model.

In all the review of literatures in this study, RBV theory was find suitable because of its peculiarity to the objectives of this study and because it enlightens on managerial perspective of business as it can be utilized for strategic resources as needed in logistics and supply chain sector.

2.7 Conceptual Model

Considering the discussion on the theoretical background of RBV presented in this chapter proposes the antecedent factors as shown in Figure 2.6. As explained in these sections, the proposed theoretical model is based on the original RBV theory by (Penrose, 1959; Barney, 1991) to explain the key performance measurement of 3PLs towards manufacturing sectors. The study's overarching goal is to investigate the relationship between the performance measurement of 3PL service providers and green logistics, as well as the mediating effect of innovation in Malaysia's manufacturing sectors. Additionally, considering the importance of service performance, operational performance among the manufacturing sectors, this study considers the mediating role of innovation in green logistics. Wieland and Wallenburg, (2013) argued that service performance includes suitable delivery, customer satisfaction, and the worth for organization solving the problem to the individual customer . Thus, customer satisfaction has been found a significant predictor for most manufacturing organizations (Leninkumar, (2017).

Previous research on third-party logistics (3PLs) has shown that they can be used as a planned tool for producers to gain an ambitious advantage in a worldwide supply

chain complex. Moreover, financial performance fascinated by IT has espoused the notion of manufacturing sectors. However, concerning 3PLs in information technology, customers are concerned with service performance since they are much reluctant to offer subtle information because they are anxious about misappropriation (Mohezar, Nor, & Daud, 2013). Hence, manufacturing sectors need to work on their devices by making trustworthiness a vital element to customers and doing this will always retain existing customers' performance as well as attract growth in the financial performance. Based on the above findings, this study proposes the theoretical model presented in Figure 2.6 showing research model for this study. The following sections present the hypotheses development for this study.

2.7.1 Services Performance for both Service and Appropriateness

Service Performance (SP), also known as customer value, measures how the outcome of the company's current service can be compared to the industry average (Wieland and Wallenburg, 2012). Customer satisfaction, and the effectiveness of customer problem solving in supply chain management and on time delivery are all refer to as services performance (Wieland & Wallenburg, 2013). According to Huo et al. (2008), the manufacturing industry values SP as well as all performance indicators related to customer services such as delivery quality, customer satisfaction, and service flexibility. Performance metrics are frequently appropriate for one type of service business but not another. Professional services, service shops, and mass services are the three types of services (Fitzgerald et al., 1991; Brignall, Fitzgerald, Johnston & Silvestro, 1992). The sorting procedure is depicted in Figure 1, and it is primarily based on customer volume, contact time, and degree of customization and discretion. Professional services, for l..l example, have a small customer base but offer a high

level of contact time, customization, and discretion, whereas mass services have a large customer base but offera low level of contact time, customization, and discretion.

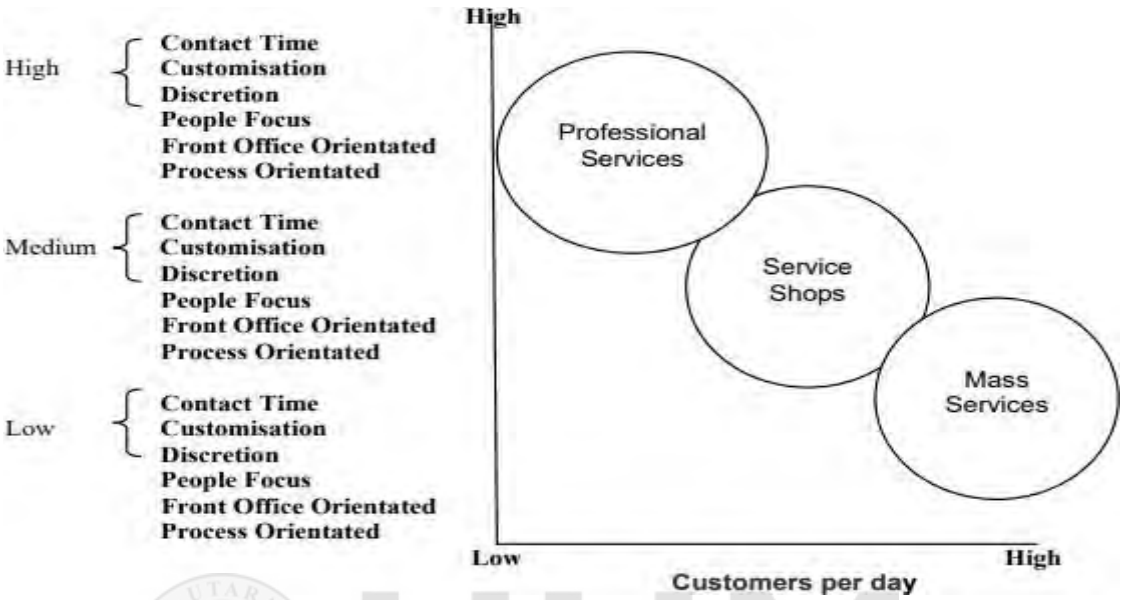

Figure 2.7: Service Classification

There is already a wealth of information on business service performance in the literature on business and administrative performance. Over the last two decades, the Services environment has become increasingly deregulated, as have changes in ownership, competition, management, and technologies (Kaplan & Norton, 1996; Kennerley, Neely, & Adams, 2003). Fitzgerald et al. (1991) identified other distinct service sector environments as intangibility, heterogeneity, simultaneity, and perishability. Among the services provided are a variety of intangible variables such as atmosphere, perception quality, timing delivery, appearances, and other hazy phenomena (Fitzgerald et al., 1991; Merchant, 1998; Anthony and Govindarajan, 2001). Fitzgerald et al. (1991); Brignall et al. (1992) emphasize that service outputs are rarely the same (heterogeneity), that production and consumption are real-time, and that an inventory cannot be built because services are unpreserved. Meanwhile,

the lack of inventory in the service sector necessitates the urgent development of indicators that match unused capacity with demand (Anthony & Govindrajan, 2001). Finally, a high level of labor intensity necessitates the development of novel measures to demonstrate labor competence by the services sector performance measurement system (Anthony & Govindrajan, 2001).

2.7.2 Operational Perform for both Shipment and Tracking & Tracing Goods

Operational Performance is a notion of how well a production unit makes use of itsresources when translating them into outputs of goods and services. Besides, resources consumed to generate outputs of goods and services are known as inputs. OP is the actual result that measures through indicators of quality improvement, effectiveness, cost reduction, quality, delivery, and flexibility (Lyer, 2011; Ahmad & Schroeder, 2003). In general, if the material is not completed properly, the cost of construction projects will be affected (Lenin, Krishmaraj, Prasad & Kumar, 2016). Firm resources are referred to as the firm's strength, whereas resources are defined in terms of their relationship to performance and are referred to as assets, information, organizational processes, knowledge, technologies and firm attributes (Barney, 2000; Amundson, 1998).

The theory of RBV has been useful in a few studies from the manufacturing sector. By applying the RBV, Zahra and Das (1993) propose a framework that examines how manufacturing technologies and lean practices organized as organizational resources are imitated in competitive performance.

2.7.3 Financial Performance for Infrastructure

The extent to which a company achieves relative sales value, sales growth, and gross

revenue is referred to as financial performance (FP) (Kitapci, Aydin, & Celik, 2011; Li, 2000). According to a study conducted by William and Michael (1995), one of the most important growth variables influencing FP in the real industries studied is sales growth. The success of any organization's FP is measured from the standpoint of its operations by deliberating the profit generated by its resources. Laisasikorn and Rompho (2014) “discussed the following financial measures: return on assets, return on equity, andearnings per share”:

- **Return on Assets (ROA):** Over the course of a year, the ratio of net profit to the average value of an organization's assets. This metric demonstrates an organization's efficiency in managing its revenue cohort assets and has an indirectimpact on a firm's value .
- **Return on Equity (ROE):** The net profit to average common stock value ratio for the entire year. It demonstrates the viability of the organization in the eyes of the owners .
- **Earnings per Share (EPS):** The ratio of net profit to the number of common shares for a given year that shows the return to shareholders created by profits pershare .

When a company is unable to precisely measure how its existing cost of value-added has been built up along the input or output chain, it is reasonable to expect that capital investment to reduce costs will be misdirected. As a result of "poor financial performance measurement" and "poor investment appraisal," poor reformation and little overall cost reduction can occur. Furthermore, when looking for reasons for poor investment performance, the disparities between cost accounting, cost drivers, and customer value become apparent. Machine setups, stock, and non-value-added activity, for example, all increase costs, but many of these drawbacks are overlooked.

"Similarly, prevalent investment appraisal approaches, which generally revolve around payback on new investment in a domain of expertise, have little link or relevance in lowering unit product costs and illuminating customer service" (Barker, 1995). Table 2.6 shows the existing and proposed methodsTable 2.5

Shows the existing and proposed methods as follows:

Items	**Existing Methods**	**Proposed Methods**
Financial performance measurement and cost accounting	"Costs are measured in an amorphous manner: some cost drivers, such as queue time, machine setup, and stock throughput time, are not identified. Without stock buffers, value adding capability and response to customer demand are not measured separately from market margin". As a result, businesses can easily become complacent until international competition arrives.	"In addition to market margin measures, use a time-based framework to assess input/output value adding capability". Identify negative costs and non-value adding activity globally, per product family, across the total value adding chain. Begin reengineering by focusing on the highest negative costs first, in descending order of importance.
Investment appraisal	"Investments are made in discrete areas of the business without a comprehensive view of the total value- adding chain (i.e. supply chain, component production, or assembly stages)". Investment is made in a machine or effectiveness island with a payback based on volume or localized reduced costs that never affect the total value chain or reduce unit product costs.	For each product family, the entire value-adding chain is identified and made visible (supply chain, component, and assembly stages). "Investment is made in total cost reduction, with a structured priority approach to cost drivers and constraints". Negative costs are gradually eliminated, and post-development audits are carried out.

2.8 Development of the Hypotheses

A hypothesis test is a type of statistical conclusion that uses data from a sample to draw conclusions about the probability distribution or a population parameter of a population (Abdulraheem, 2018). According to Sekaran (2003), a hypothesis is a testable statementof the logical relationship between one or more variables. The study tested fourteen hypotheses. These hypotheses are classified into two types: primary (direct relationships) and secondary (mediating relationships). Transportation, warehousing, packaging, and inventory management are all grouped together as Logistics Service. While (mediatingrelationship) is Innovation in Green Logistics, which includes environmental sustainability, strategic management, green transportation operations, and green transportation procurement.

2.8.1 Transportation and Logistics performance

Studies revealed that inventory management as well as transportation have productive interdependence logistically (Williams, & Tokar, 2008; Pan, Tang, & Fung, 2009). Supply chain management encompasses competitiveness in attaining satisfaction of customers. In order for an organization to reform its services to meet the needs of its customers, it must regularly improve its service level while reducing costs. As a result, in-house inventory management should be coordinated with transportation decisions. Asa result, we relied on customer specifications and requisitions, as well as accuracy in identifying items at the right place and right time (De Koster, Le-Duc, & Roodbergen, 2007).

This accomplishment is made possible by frequent traceability and deliveries that rely

on dependable and timely transportation (Tseng, Yue, & Taylor, 2005). The study's renewal theory (Bookbinder & Higginson, 2002) and shipment consolidation strategy (Rim & Yoo, 2002) both provide useful insights into inventory-dependent transport systems that improve service levels while lowering transport costs . Maximum outbound logistics procedure and operation optimization through collaboration and consolidation with third- party logistics service providers has the potential to increase an organization's profitability by lowering the cost of warehousing and transportation (Kwateng, Manso, &Osei-Mensah, 2014).

It is possible to resolve some issues of increased customer service by using efficient transport, handling, and storage (Mason, Ribera, Farris, & Kirk, 2003.). All rely on material movement via transportation systems to warehouses and customers. It is claimed that efficient transportation is used to drive demand from customers to production centers and warehouses, or to forecast demand from internal organizations to customers.

In another hand inventory management is expressed as a significant function in warehousing performance determination (Baker, 2007). At every stage in the system of inventory, the operation managers require to manage the daily activities of running the inventory system. There will be receipt of orders from both internal and external customers, these will be attended to by dispatch and gradually the demand will be depleted in the inventory. There will be needs to place and received order to replenish the stocks while deliveries are to arrive and necessitate storing. Despite these tasks, the models have been proposed to tackle challenges in inventory control. Basically, inventory management examines the decision of how much order to make

and when it is to be done. In this modern day, the most viable approach with is more economical is the needto establish the optimum quantity and good price to be paid for placing an order under demand of uncertainties and some constraints. Specifically, the best inventory management system is to attempts and find appropriate balance between the disadvantages and advantages of holding stock and paying the appropriate price relative to discount enjoyed from buying in bulk. Based on this, it can be deduced that;

H1 Transportation of 3PLS has positive significant relationship with logistics performance .

H_{1a} *Transportation of 3PLS has positive significant relationship with operational performance.*

H_{1b} *Transportation of 3PLS has positive significant relationship with financial performance.*

H_{1c} *Transportation of 3PLS has positive significant relationship with service performance.*

In term of innovation on green logistics on the relationship between transportation andlogistics performance, the following hypothesis are deduced.

Innovation on Green Logistics Moderate Relationship between Transportation to Logistics Performance

H_{1d} Innovation on Green Logistics Moderate Relationship between Transportation tooperational Performance.

H_{1e} Innovation on Green Logistics Moderate Relationship between Transportation tofinancial Performance

H_f Innovation on Green Logistics Moderate Relationship between

Transportation toservice Performance

2.8.2 Warehousing and Logistics performance

Warehouses have traditionally served as storage facilities, and the majority of inventory practices take place within them (Van den Berg, & Zijm, 1999). Inventory management has been a major determinant of warehouse efficiency and, as a result, logistics performance (Macro, & Salmi,2002). According to research, warehousing involves complex operations, so items can either go untraced or get misplaced (Gallmann, & Belvedere, 2011). As a result, inventory management is the primary depiction of item identification in the process of improving internal efficiency. Gallmann, & Belvedere (2011) is of the opinion that inventory cost component, that is, holding cost are directly connected with cost component, hence, holding so many of inventory is with morestorage cost and space. In improving performance of warehousing, hence, logistics performance, the main focus is to maximize warehousing capacity (Gu, Goetschalckx, & McGinnis, 2010) which can be attained, for instance, by palletizing, efficient shelvingand block storing. This facilitates in-house picking and identification of order. Also, the working capital management theory (WCM) offers beneficial insights on why inventory robustness results toan increase in warehousing efficiency, viz a viz logistics performance. Items disposing rapidly results to quick turn over to breach potential liabilities that relates to warehousing. Studies have defined working capital relative to variations in liabilities and assets (Eljelly,2004), risks and turn overs (Filbeck, & Krueger,2005). The efficient management of working capital has been proposed to influence an organization's profitability and liquidity. This contributes to lower overall warehousing costs as a result of stock obsolescence and, as a result, improved

logistics performance. This is hereby hypothesized that;

H_2 Warehousing of 3PLS has positive significant relationship with logistics performance.

H_{2a} *Warehousing of 3PLS has positive significant relationship with operational performance.*

H_{2b} *Warehousing of 3PLS has positive significant relationship with financial performance.*

H_{2c} *Warehousing of 3PLS has positive significant relationship with service performance.*

Likewise, relative to the moderating effect on innovation on the relationship between warehousing and logistics performance, the following hypothesis was deduced; Innovation on Green Logistics Moderate Relationship between Warehousing to logisticsPerformance

H_{2d} Innovation on Green Logistics Moderate Relationship between Warehousing tooperational Performance

H_{2e} Innovation on Green Logistics Moderate Relationship between Warehousing tofinancial Performance

H_{2f} Innovation on Green Logistics Moderate Relationship between Warehousing toservice Performance.

2.8.3 Packaging and Logistics performance

Organizations throughout supply chain management have several requirements, priorities and perspectives as regards to packaging. These requirements, priorities and perspective in regard to packaging. They are, however, not uniformly distributed across different packaging levels, necessitating an integrated view of products, supply

chain, and packaging. This is defined as the process of designing, controlling, and implementing an integrated packaging, product, and supply chain approach to prepare goods for safe, efficient, secure, and effective handling, transport, retailing, storage, distribution, consumption, disposal, reuse, and associated information in order to maximize consumer and social value . From the standpoint of sustainability, sales and profit are increased, and thus logistics performance is improved. Adoption of sustainable packaging may contribute to increased supply chain competitiveness by deploying sustainability. Hence, the following hypothesis development;

H_3 Packaging of 3PLS has positive significant relationship with logistics performance.

H_{3a} Packaging of 3PLS has positive significant relationship with operational performance.

H_{3b} Packaging of 3PLS has positive significant relationship with financial performance.

H_{3c} Packaging of 3PLS has positive significant relationship with service performance.

Also, in term of the moderating effect of innovation on green logistics relationship between packaging and logistics performance, here are the hypothesis formulated; Innovation on Green Logistics Moderate Relationship between packaging to logistics Performance.

H_{3d} Innovation on Green Logistics Moderate Relationship between packaging to operational Performance

H_{3e} Innovation on Green Logistics Moderate Relationship between packaging to financial Performance

H_{3f} Innovation on Green Logistics Moderate Relationship between packaging to service Performance

2.8.4 Green Innovation and relationship with logistics practices and performance

Following the Brundtland Commission Report, environmental management became a tactical concern for companies (Sharma & Vredenburg, 1998). Strategy formulation necessitates long-term planning and management. Incorporating environmental concernsinto corporate and business strategies is thus one method of defining and managing the environment-business interface (Bourgeois, 1980). A recent poll found that 77% of respondents believe that environmental issues are critical to the firm's overall strategy (Eye for Transport, 2009). On the one hand, sustainability strategies include adhering to industry standards and regulations, while on the other, voluntary environmentalpreservation actions are taken (Buysse & Verbeke, 2003; Sharma, 2000; Arago n-Correa, 1998; Sharma & Vredenburg, 1998). No distinction has been made in this study because both types of sustainability strategies have an impact on the firm's supply chain design and control.

However, top-management support is essential in any change process (Kotter, 1995), and several greening logistics measures are dependent on decisions made higher up the hierarchy (Aronsson & Huge Brodin, 2006; McKinnon, 2003). Because the economic benefits of greening logistics proposals are frequently uncertain (Ludvigsen, 1999; Evers et al., 1996), the following hypotheses are proposed:

H4a. The extent to which sustainability is incorporated into the strategies of 3PLs and manufacturing organizations has a positive impact on the amount of work done in greening transportation operations.

H4b. The degree to which sustainability is integrated into the strategies of 3PLs and

manufacturing organizations has a positive influence on the total of work performed in greening transportation procurement.

2.8.5 Innovation Greening Transport Operations

Transportation, according to Wu and Dunn (1995), is the "single largest source of environmental hazard in the logistics system." They argue that in order to achieve a more environmentally friendly logistics system, logistics decisions that reduce transportation emissions should be made. According to McKinnon (2003), logistics activities canreduce transportation emissions by changing the mode of transportation, transportation demand, or vehicle utilization. It has been demonstrated, for example, that shippers' general perception is that a shift to less polluting modes of transportation would result ina general decrease in logistics performance (Ludvigsen, 1999; Evers et al., 1996).

The prospect of reduced transportation demand is surrounded by a similar set of arguments. Finally, improved vehicle utilization is widely regarded as a good way to align financial and ecological achievement as resources are used more efficiently. In other words, improving environmental performance in this manner is likely to result in increased efficiency. From this discussion, we hypothesize the following:

H5a. Greening transportation operations has an impact on the logistics services providedby 3PLs.

H5b. Greening the transport operation does not affect logistics services of 3PLs serviceproviders.

2.8.6 Innovation of Greening Transport Procurement

Green procurement, also known as green purchasing, has been approached from a variety of disciplines and points of view. Green transportation procurement has received less attention, but many of the arguments for green purchasing in general can be applied to transportation service purchases (Bjorklund, 2005). Green procurement, according to Mulder (1998), is the practice of taking supplier environmental products and process capability into account when purchasing products and services (Mulder, 1998, p. 123). The Euro-class of a vehicle is an example of the former, while whether or not drivers have received Eco-driving training is an example of the latter (Kohn & Brodin, 2008). Adherence to sustainability regulations is one of the most important and influential performance indicators (Min & Galle, 1997). Greening transportation procurement, on the other hand, entails more than simply imposing requirements on the service provider.

Green purchasing strategies, in my opinion, revolve around two key components: evaluating suppliers' environmental performance and mentoring suppliers to help them improve this performance (Rao and Holt 2005, p. 901). By not only demanding change, but also collaborating on environmental issues with a supplier, a company can more easily meet and exceed customer expectations while also lowering costs (Walton et al., 1998). Greening the purchasing function is frequently promoted as a viable method of improving environmental performance and efficiency (BCG, 2009; Rao & Holt, 2005; Sroufe, 2003; Walton et al., 1998; Porter & van der Linde, 1995). According to the study, transportation procurement can be applied and the following hypothesis is proposed:

H6a. Greening transport procurement affects 3PLs service provider's logistics

performance positively.

H6b. Greening transport procurement does not affect 3PLs service provider's logistics performance positively.

2.8.7 Hypotheses for Moderating Variables (MoV)

One hypothesis for moderating variables was tested in this study, which consists of Innovation in Green Logistic (IGL), the hypothesis for mediating variables is formulated on the suggestions of previous studies. Therefore, the present study projected the hypothesis as follows and summarized in Table 2.7

H_7: Innovation in green logistics mediates the relationship between logistic services and 3PLS Key Performance.

Table 2.6
Research Hypotheses for Moderating Variable

Codes	Description of Hypothesis	MOD	Endogenous
H7	Innovation in green logistic moderating the relationship between logistic services and 3PLS Key Performance	IGL	LS & 3PLs KP

2.9 Summary

This chapter offered a thorough discussion of previous studies on manufacturing sectors and the roles played. Besides, the chapter provided a review on the comprehension of manufacturing sectors organization which shelter the state of 3PLs and issues that were discussed in the chapter. Likewise, the chapter gives the details of all reviews of literature that are relevant to all dimensions and variables of the research study. The reviews focused on concepts of key performance in logistics, measurement of logistics performance, the history of outsourcing 3LPs, the logistics performance measurement of 3PL service providers, and green logistics were

reviewed. The evolution of Malaysian manufacturing industries and the manufacturing sector of Malaysia were all reviewed. The conceptual model was established based on these assessments and measurement of the study was expressed to attain the objectives of the research. Lastly, the chapter discusses related theories as they have been widely used for key performance measurement of 3PLs. this leads the researcher by coming up with a justification using the RBV theory useful in shaping factors influencing customers' performance. The next chapter dwells on the research methodology adopted in response to the research questions.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

The research methodology adopted in this research study is presented in this chapter so that the outlined research objectives can be attained. Basically, this research attempt to show the moderating impact of new innovation of green logistics on the relationship between logistics services and 3PLs service provider in the manufacturing sector in Malaysia. Thus, the research method, design and analysis units are well details. The population and the sampling techniques cum data collection method and procedure are discussed. In a like manner, the instrumentation and the questionnaire development, validity and reliability of the research are highlighted.

3.2 Research Design

The main importance of research design is to guarantee the evidence acquired so as to allow a researcher to efficiently tackle the stated research problem explicitly. It is the key pilot plan that highlight the method of collection and analysis of the research data (Zikmund, 2000), it is as well a blueprint that offers an explanation of the research, sampling, measurement, requirements for data collection and as well as the analysis ofthe gathered data. According to Biswas and Muthukkumarasamy (2017). Quantitative research is expressed as the scientific approach that follows a certain series of procedures like models formulation, theories and hypotheses identification, methods of measurement and instrumentations development, manipulations of variables and experimental control, empirical data collection, modeling, analysis and

evaluation of findings. In summary, this research method aligns with experimental modes of inquiry which is aligning with a standard form, such as materials, participants, procedures and measures. Based on this fundamental truth, this study chooses quantitative method of research.

The research study distributed 522 questionnaires to different organizations and retrieved 222 numbers

3.3 Quantitative Method

Quantitative research frequently incorporates empirical and systematic investigation of phenomena using mathematics and statistics, as well as numerical data processing. In quantitative research, the procedure of number estimation serves as the fundamental link between empirical observation and the mathematical expression of quantitative relationships. In most cases, data is selected and numerically analyzed (Goertz & Mahoney, 2012).

Statistics or mathematical expression are commonly utilized in quantitative research when, for instance, a need arise to analyze and process large numbers of quantitative data either to verify hypothesis or test a theory and in some instances, both conditions. Or when there are uncertain matters connected to theories under investigation, or, maybe when research that is to be conducted might be efficiently done with the use of questionnaire whereby simple questions with short answers are sufficient. It may also be when the data gathered from survey can be compared and quantified. Certainly, in quantitative research, data processing is usually undergone with the utilization of unique statistical software (Martin & Bridgmon, 2012; Singh, 2006). There are many highlighted benefits of quantitative research method as shown in the literature, they

are among others;

1. The findings are numerical; hence there is high probability that the result is never influenced by individual feelings or opinions in evaluating and representing research facts.
2. In quantitative method of research, large number of data is simplified by processing.
3. There is easier data comparison.
4. The method permits the development of quantitative valuation indicators (Martin et al., 2001).

Basic features of quantitative research as links to some particular research objectives includes; connection of research with experiments, the use of advanced statistics tools, a certain phenomenon investigation, use of questionnaire and commonly closed type of question, quantitative data gathering, procession and presentation and the quantification of features and relations (Goertz & Mahoney, 2012; Singh, 2006).

The reason for chosen quantitative research is because it is the most suited research method for this study relative to all the objectives of the study and for easy answering of all the research questions.

Research question 1, 2 and 3, is answered by descriptive analysis and correlation and regression analysis from PLS software.

3.4 Population and Sampling

A "research population" is a group of people or things that are known to have similar characteristics. In addition, Cresswell and Clark (2017) defined population as a group of people who share similar characteristics and other characteristics that researchers

can identify and study. As stated by, it is defined as the collection of the subject of interestto be studied (Sekaran and Bougie, 2016). Castillo (2009), on the other hand, classified the population as either accessible or target. The target population, also known as the theoretical population, is the entire group of people or objects that researchers wish to generalize their findings to. In contrast, the study population is the population to which the researchers' findings can be applied. The accessible population is also a subset of the target population from which samples are drawn by researchers.

Based on the foregoing, this study considered managers and senior staff in Malaysia's selected manufacturing and logistics industries as the target population. The study's accessible population is all managers and senior staff in the selected manufacturing and logistics in Penang, Malaysia. In order to assess the key performance measurement of 3PLs service providers in the green logistics of manufacturing sectors of Malaysia, the overall number of certified organization with MS ISO 14001 in Malaysia as at now is 522organizations.

The main objective is to evaluate the key performance of 3PL service provider in the green logistics of manufacturing sector of Malaysia, hence, only organizations with ISO 14001 certificates have been selected for this study. The reason for this decision is because they are set of organization with the mandate to adopt green initiatives in their operations (Eltayeb & Zailani, 2009). Since this research advocates for information's on green logistics practices among the manufacturing organizations in Malaysia using 3PL service providers with vast knowledge and information on green logistics operations, then the appointed Environmental Management Representatives

(EMR) as listed by Standards Industrial Research Institute of Malaysia (SIRIM), who has the sole responsibility of issuing certificate of ISO 14001 to organization, (Eltayeb & Zailani, 2009). Likewise, allthe managers of appointed and certified 3PL service providers that serve manufacturing sector of Malaysia; particularly Penang was targeted for data collection.

3.5 Sample Size of the Study

Sample size refers to the selection of the representatives from the entire population of which statistical inference is made about the aggregate (Sridhar, 2009). The inability of researchers to directly observe every element of the population under study, which necessitates the selection of a sample (Herek et al., 2010). For instance, Krejcie and Morgan (1970) present an easier method of achieving a good sample size using a given formula and a comprehensive table concerning a defined population figure to reduce sampling errors. As a result, researchers are relieved of the burden of calculation. Nonetheless, the researcher attempted to use the formula to calculate the sample size. Thus:

$$S = \frac{X^2 NP (1 - P)}{d^2 (N - 1) + X^2 P (1 - P)}$$

Where:

P – The proportion of the population which is assumed to the (P = 0.50) X – The freedom of the desired confidence level of which is (X= 3.841). N – The population size this equaled (N=522).

d – The degree of accuracy which in this study is based on 5% level (d=0.05).

In this regards, the sample size was calculated in the following order:

$$S = \frac{(3.841)\,(522)\,(0.50)\,(1-0.50)}{(0.05)2\,(522-1)+(3.841)\,(0.50)\,(1-0.50)} = 222$$

522 respondents is from all the logistics companies and the total populations of the respondents which are top managers and middle managers of 3PLs service provider.

Going by the results obtained Krejcie and Morgan (1970) calculation, sample size for present study is 222. To be able to achieve an appreciable level of response rate and makeprovision for non-return questionnaires, previous studies suggested that the size of the population be added at least 50% of the required sample as recommended by Bartlett et al(2001) and Salkind (2008) and Hair et al. (2010). Based on the argument of the scholars, the study 50% (50% of 222 = 111) of the sample size added, which amounted to 333. Hence, 333 copies of questionnaires will be collected from managers and senior staffs by applying systematic random sampling.

Alrech and Settle (1995) recommended a smallest amount of sample size of 100 respondents for small population and the highest size for a sample with respects to 1000 respondents. For instance, Dennis, Hackert, Tokle &Vokurka, (2011) used a sample of 325 firms. Opara, (2010) used 230 firm's manager. Muthuri and Gilbert, (2011) used 70 companies, and Dincer, (2011) used 169 firms. Therefore, this study uses thus scenario asbasis in determining its sample size (333).

In this study the respondent are majorly the stakeholders from 3PL service providers registered for business within Penang in Malaysia. They are branch managers, logistics directors, managers, Directors and others. They were randomly selected from each 3PL service providers.

3.6 Sampling Techniques

Probability sampling techniques vary and selected based on the nature of the research andpopulation. For example, when using simple random sampling, each component has an equal chance of being chosen. Cluster sampling, on the other hand, prefers to group components based on specific criteria. Furthermore, some researchers used multiple sampling techniques at the same time (Robert et al., 2009). Thus, multistage samplingoccurs when sampling procedures are carried out in stages, with scholars further dividing the sample into smaller sampling components for each phase. For this study, systematicsampling techniques and other scientific and professional sampling techniques are used.

In contrast, this study employs systematic sampling, which entails randomly selecting an initial starting point on a list and selecting every nth element in the sampling frame (Hair et al, 2018). Systematic sampling is a type of probability sampling techniques where researchers make a selection of members of the population at regular interval. The reason for choosen systematic sampling is that it enables selection of members of the respondents to this study to be done at intervals because of the operations and activities of 3PL service providers.

According to Zikmund et al. (2010), systematic sampling is a procedure inwhich a starting point is chosen at random and then every nth number on the list is chosen. The sampling interval is defined as the number of population elements chosen from the entire sample between each unit. For this study, the sampling interval is used asthe total population/sample size (522/333 = 2). At a starting point, the researcher chosen a number between 1 and 2. Then, the sample would be the

sampling elements numbered 2, 4, 6, 8, 10, 12 and so on to the last sample to be selected, which means the sampled element number of 333.

This type of sampling technique has several advantages, including its simplicity, which allows the study to incorporate a systematic factor into a random sample of subjects. As aresult, the researcher can be confident that the population will be fairly sampled. It also eliminates the possibility of human bias in the selection of cases for sample inclusion. As previously stated, it allows the study to draw statistical conclusions based on the sample size (Sekaran & Bougie, 2016; Zikmund et al., 2010). This study follows in the footsteps of previous scholars based on the philosophical assumptions of the study (Alibaygi et al., 2013; Sour et al., 2013; Vafee et al., 2011; Zabidi et al., 2007; Zakeri et al., 2013; Kheng et al., 2013; Shehu & Mahmood, 2014a).

3.7 Unit of Analysis

This represents the subject matter of a particular research project. As suggested by Creswell and Clark (2017); Kumar et al., social science research has the following unit of analysis methods: individual, company, and group (2013). As a result, the research focus aids in the selection of the unit of analysis for this research study that is required (Sekeran, 2003). Individual managers and senior staff from the selected manufacturing and logistics companies served as the unit of analysis for this research study, and data were collected from them. The individual managers and senior staffs were seen as the most appropriate respondents for this study due to the fact that they are the key tools execution and are in consistence with the prior studies uses (Taddei & Delecolle, 2012).

3.8 Statistics Model

In structural equation modelling, both formative and reflective measurement scales are used. The distinction is critical because different types of measurement scales can affect the relationships and outcomes of a study (Loehlin, 2004). Variation in the construct causes variation in the item measures in reflective measurement models, changes in observed variables or indicators of the latent constructs reflect changes in the latent constructs, and the error item in items can be identified. In contrast, variation in item measures causes variation in the construct in formative measurement models, latent constructs are determined as a combination of their indicators, and the error term cannot be identified if the formative measurement model is estimated alone (Churchill, 1979; Coltman et al., 2008). The reflective scale will be used to evaluate logistics performance in this study.

3.9 Instrument Design

A literature review and observation were used to develop the measurement of logistics performance of 3PL service providers in the manufacturing sector in this study, and a pilot study will be used to test the questionnaire before conducting a comprehensive survey to ensure content validity. The questionnaire survey items will be well-structured and will be presented on a 5-point Likert scale. Likert-type scales are considered trustworthy and are recommended for gathering information about people's attitudes, values, and perceptions (Miller, 1970). In the 5-point Likert-type scale used in this study, 1 = “strongly disagree, and 5 = “strongly agree.”

The multiple-indicator measure of a concept is used to evaluate logistics performance. The main reason for its use is an acknowledgement that relying on a single indicator

may have issues, because one indicator may only capture a portion of the underlying concept or be too general (Bryman & Bell, 2011). Furthermore, the PLS-SEM requires a minimum number of indicators for a latent variable (Loehlin, 2004). Multiple-indicator measures have the potential to reduce measurement errors while also improving concept measure reliability and validity (Grinnell & Unrau, 2011). The logistics performance indicators have been validated by supply chain and logistics academics and practitioners in Malaysia's manufacturing industry. Table 3.1 indicates the summary of the variables with the items and sources.

Table 3.1

Summary of the Variables with its Measurement and Sources

Variables	Items	Source(s) of Adoption/Adaption
Transportation	8	Singh et al, (2012); Wang et al. (2015)
Warehousing	9	Gudehus & Kotzab (2012); Ho et al (2012)
Packaging	3	Singh et al, (2012); Wang et al. (2015)
Inventory Management	5	Gudehus & Kotzab (2012); Ho et al (2012)
Innovation in Green Logistics	23	Chae (2009); Lai & Wong (2012)
Service Performance	13	Bryman & Bell (2011); Wang et al. (2012)
Operational Performance	6	Robb et al. (2008)
Financial Performance	4	Flynn et al. (2010)

3.10 Data Collection

In the current study, data collection process was commenced two months after the proposal defense and continued for two months. Furthermore, data was collection from managers and senior staffs for the manufacturing and logistics companies in Penang Malaysia. Initially, an official letter from OYAGSB College of Business (COB) was requested to introduce the researcher and explain the purpose of the study. As a result of this letter, the researcher was able to obtain permission from selected manufacturing and logistics companies to collect data from respondents.

A questionnaire survey is an important data collection tool. In this study, 333 manufacturing companies and 25 third-party logistics service providers were identified and invited to participate. A web-based survey will be used to collect empirical data. After that, researcher collected data through self-administered questionnaires from the managers and senior staffs for the manufacturing and logistics companies in Penang Malaysia. Thus, researcher appealed the respondents to fill the questionnaires on the spot so that they can be collected immediately. The number of questionnaires completed was 256, and the return rate was approximately 77%. Data cleaning has been ensured that the data entry does not contain an error. By using an SPSS expectation-maximization algorithm, the researcher imputed the randomly missing data.

3.11 Data Analysis

This study took into account the sample size for research using the partial least squares approach for structural equation modelling (PLS-SEM) analysis. The smaller sample size is one advantage of the PLS-SEM approach over other approaches. PLS-SEM is apopular statistical technique in today's business research (Henseler, Ringle, & Sinkovics, 2009). This package is frequently used for data screening and cleaning. The study's initial reliability, validity, and purification measure were all taken into account. Because the current study is exploratory and predictive in nature, the partial least squares path modelling technique with Smart PLS was used for data analysis (Henseler, 2018; Shmueli, Ray, Velasquez Estrada, & Chatla, 2016).

The Smart- PLS procedure is divided into three steps for evaluating the conceptual

framework. The first step is to assess common method bias using Harman's (1976) single-factor test, Bagozzi's (1991) correlation threshold of.90, and indicator collinearity with the variance inflation factor (Hair et al., 2017). The second step attempts to establish convergent and discriminant validity in the measurement model by performing confirmatory factor and correlation analyses and comparing the results to recommended threshold values for factor loadings, composite reliability, average variance extracted (AVE), and heterotrait-monotrait (HTMT) (Byrne, 2010; Fornell & Larcker, 1981; Hair, et al., 2010; Henseler, et al., 2015; Sarkar, et al., 2001). Finally, the third step employs bootstrapping and blindfolding procedures to investigate the significance and effect size of the structural model's path relationships, variance explained by, and predictive relevance (Hair et al., 2017; Ringle et al., 2015).

3.12 Pilot Study

Pilot study, after the face and content validity was conducted to predetermine the validity and reliability of indicators (Creswell & Clerk, 2017). Reliability entails that how stable, consistent and dependable the instrument is (Keyton, 2015). Whereas, the validity is extent to measure what is intended to be measured by the instrument (Lynn, 1986). The questionnaire items was subjected to content validity by 4 Professors from my school and from school of management as well. Thereafter, 100 questionnaires were distributed to the managers and senior staffs in the manufacturing and logistics companies in Penang Malaysia for pilot study. This is because they share same characteristics of the population of the study (Keyton, 2015). However, 88 were retrieved from the respondents, which used for analysis of reliability and validity. Thus, the pilot study response rate was 88%. It is notable that these 88 participants of

the pilot study were not included in main study. Furthermore, researcher was able to receive feedback and comments from participants wording, structure and length of instrument.

Table 3.2

Reliability and validity of Construct (n=88)

Constructs	Items	Cronbach's Alpha	KMO
Transportation	8	0.744	0.659
Warehousing	9	0.786	0.540
Packaging	3	0.771	0.590
Inventory Management	5	0.648	0.588
Innovation in Green Management	23	0.687	0.614
Service Performance	13	0.778	0.603
Operational Performance	6	0.711	0.635
Financial Performance	4	0.803	0.555

3.12.1 Result of Reliability and Validity

To ensure the measurement model's reliability and validity, a factor analysis for the reflective construct is performed. Reliability is defined as the degree of consistency between multiple measurements of a variable (Hair et al., 2010). In this study, a reliability coefficient with Cronbach's alpha will be used to test the scale's reliability. In SPSS, Cronbach's alpha greater than 0.7 indicates reliability (Hair et al., 2010).

Validity is another important factor in determining the degree of accuracy of measurements. “Validity is the degree to which two measures of the same concept are correlated” (Hair et al., 2010). High correlations are required to ensure convergent validity. A value greater than 0.7 indicates a high level of satisfaction. The degree to which two conceptually similar concepts are distinct, on the other hand, is defined as

validity (Hair et al., 2010). In factor analysis, various reliability and validity tests, such as Cronbach's alpha and the KMO Bartlett's test, are used.

The researcher used SPSS to determine the internal consistency and reliability of the constructs in order to ensure the validity and reliability of the indicators. As a result, Hair et al. (2014) advocated for composite reliability coefficient thresholds ranging from 0.60 to 0.70. Likewise, KMO must be 0.50. (Hair et al., 2014). The results of the KMO and Cronbach Alpha coefficient analysis of the latent constructs for this study are presentedin Table 3.2. According to the analysis results (Refer to - Table: 3.2), the KMO between 0.52 and 0.65 is greater than the 0.5 threshold suggested by Hair et al (2010).

Furthermore, Cronbach Alpha is between 0.76 and 0.89, all of which are greater than the required threshold of 0.60 to 0.70. (Hair et al., 2014). As a result, the instrument is said tobe valid and reliable.

3.13 Ethical Consideration

For upholding the integrity of current study, it is imperative to consider ethical issues, which are often inherent in the process of obtaining the required data (Fisher, 2008). Therefore, permission was obtained before collecting data from dean of the school of business management (SBM). As advised by Scott (2005) and Keyton (2015), a research must protect participant's anonymity and data confidentiality. Although, despite the fact that this study will be published in academic journals, yet the identity of the participants will be secured. All information collected during the research were neither shared with other participants nor individuals outside this study. Finally,

respondents in this study are volunteers and are free to withdraw at any point of the study.

3.14 Chapter Summary

This chapter dutifully explained the methods to be used in this research study, as well as the research design and type of research used in this study. The instrument designs, sample size, and population size were all thoroughly explained. The data collection and data analysis procedures, as well as the software to be used for the analysis, were mentioned and explained. The reliability and validity test of the research study via questionnaire, as well as the factor test that will be conducted, were explained.

CHAPTER FOUR
DATA ANALYSIS AND RESEARCH FINDINGS

4.1 Introduction

This chapter presents the findings of the quantitative data analysis for the study, which were distributed and collected via a questionnaire survey. This research study investigates the relationship between logistics service (in term of transportation, warehousing, packaging and inventory management); innovation in green management and 3PLS key performance of selected manufacturing companies in Nigeria. Firstly, the analysis stated from the account of the response rate from the data collected, next to the data coding and data screening. The study also provided the demographic profile of the respondents as well as descriptive statistics for the variables. In addition to the regression analysis assumption (such as normality test, linearity test and multicollinearity test). Finally, the study presents the findings of the correlation analysis, regression analysis, and hierarchical regression analysis in order to test the moderating effect of green logistics innovation.

4.2 Survey Response Rate

A total of 333 questionnaires were dispersed to the target respondents via online web survey based on the identification of the respondents via their lists. Thereby, many of the respondents answered instantly and returned the questionnaires, whereas some required several followed up before their questionnaires were received. In addition, follow-up was made through sending of e-mail reminder and sometimes phone calls during data collection to be able to adequately retrieve all the data distributed from categories of manufacturers. Thus, the data were collected for the period of (3)

months betweenAugusts ending to the middle of November, 2020. Summarily, a total number of 256 questionnaires were completed and returned which represent 76% of the total sample. However, 27 questionnaires were removed from the data collected due to the issue of unproductive questionnaires such as univariate and multivariate outliers, and void questionnaires. Finally, 229 questionnaires were retained and usable for further analysisas indicated in Table 4.1:

Table 4.1

Survey Response Rate

Detail	Frequency	Percentages (%)
Distributed Questionnaires	333	100
Retrieved Questionnaires	256	77
Rejected Questionnaires	27	8
Retained Questionnaires	229	69

The table 4.1 above showed that a total of 229 respondents were derived as the retained questionnaires and comprised the sample for the research, indicating 69 % of response that covers Malaysian owner/managers. As a result, the retained questionnaires are deemed adequate by Sekaran (2003), who suggests that a 30 % response rate is appropriate for the analysis . Furthermore, the study response rate is sufficient, as recommended by Hair et al. (2010), that a sample size of 5 to 10 times the number of variables be used for the regression analysis. Given the study variable 8, a sample size of 80 is deemed adequate for data analysis. As a result, 229 usable responses 69% meet the sample size requirement for multiple regression analysis, and the data was entered into SPSS version 26 for further analysis.

4.3 Data Coding

According to Churchill (1999), the categorization of data coding is mainly into two basis. Firstly, the category alluded that the indicator should emerge to agree with the study constructs (that is, every variable should have its own different division that asks questions about it). The second basis has to do with assigning code number to each variables for easy identification. Thus, this study followed the argument of Churchill (1999) on the arranging the questions in agreement with the study variables. In addition, the constructs in this study were coded with the items in the Table 4.2 as follows:

Table 4.2
Coding of the Study Variables

Variables	Coding	Items
Service Reliable	TRS	4
Responsiveness	TRR	4
Transportation		**8**
Logistic Capacity	WAL	7
Cargo Safety	ECS	2
Warehousing		**9**
Relationship Building	PRB	3
Packaging		**3**
ICT Integration	ICT	5
Inventory Management		**5**
Environmental Sustainability	ES	5
Strategic Management	SM	6
Green Transport Operation	GTO	8
Green Transport Procurement	GTP	4
Innovation in Green Logistics		**23**
Services	SPS	8
Appropriation	SPA	5
Service Performance		**13**
Shipment	OPS	3
Tracing and Tracking	OPT	3
Operational Performance		**6**
Infrastructure	FPI	4
Financial Performance		**4**

4.4 Preliminary Analysis of the Study

Having confirmed the coding of the study variables, this section presents a detail discussion on the preliminary test via statistical packages for social science (SPSS version 25) before the evaluation of correlation and regression analysis. This preliminary test comprises of data cleaning (missing data and outliers), the fundamental assumption for regression analysis (such as., normality test, linearity test, multicollinearity test, and homoscedasticity test). The further details are presented in the sub-sections below:

4.4.1 Data Cleaning

As indicated by Hair et al. (2018), it is essential to screen the data in any form of data analysis for the reliability and validity of data especially in the quantitative research. It presents a solid background for the achievement of the significant result. Thus, the quality of the result and analysis are solely dependent upon the quality of the data screening (Hair et al., 2014). However, the ignoring the importance of data cleaning may eventually resulted to poor quality of results and analysis. As argued by the Tabachnick and Fidell (2007; 2013), data quality may be ensured by mere proofreading and the method could be very tasking when dealing with big data. Therefore, this study classified data cleaning into missing data and outliers which commenced with the missing data detection as explained in the sub-section below:

4.4.2 Missing Value

This has become an issue of concern virtually in every research and this is also varying from one research to another with the magnitude of its impact. After

keying the data in the SPSS dataset, descriptive statistics were run to check for the missing point. Out of the 16,660 data points of this study, only 14 data points were randomly missed which is resulted to 0.08% of the entire data points. In the meantime, there is no acceptable percentage of missing values in the dataset for making valid statistical inferences. As a result, the researchers have generally stated that missing values of less than 5% are not significant (Hair et al., 2018; Tabachnick and Fidell, 2013). Furthermore, the scholars recommended that median nearby points be used to replace missing values if the percentage of missing points is less than 5% of the total data points. As a result, missing points in this study were replaced with median nearby points, as suggested by Tabachnick and Fidell (2007). As a result, Table 4.3 shows the total missing value replaced in this study.

Table 4.3
Replaced Missing Value Result

	Result Variable	N of Replaced Missing Values	Case Number of Non-Missing Values		N of Valid Cases	Creating Function
			First	Last		
1	GTO2_1	2	1	238	238	SMEAN(GTO2)
2	GTP1_1	3	1	238	238	SMEAN(GTP1)
3	SPS2_1	1	1	238	238	SMEAN(SPS2)
4	SPS6_1	2	1	238	238	SMEAN(SPS6)
5	SPA2_1	1	1	238	238	SMEAN(SPA2)
6	OPS1_1	3	1	238	238	SMEAN(OPS1)
7	FPI3_1	2	1	238	238	SMEAN(FPI3)

Note: Total missing data points is 14 out of the 16,660 data points equal to 0.08% of the entire data points

4.4.3 Assessment of Outliers

According to Barnett and Lewis (1994), Outliers is defined as subgroups of observations that are in line with the rest of the data. The effect of outliers in the data in a regression analysis can seriously distort the estimates of the coefficient of regression, resulting in unreliable results (Verardi & Croux, 2008). The frequency table was examined using the minimum and maximum statistics to look for any value

that was outside the expected range (within SD 1 – SA 5). The data was then examined for univariate outliers using standardized values with a benchmark of ±3.29 (p.001), as suggested by (Tabachnick and Fidell, 2013). Only nine (9) univariate outliers were identified and removed from the study using the rule of thumb. Multivariate outliers were examined in order to detect items with outliers using the Mahalanobis distance (D2), following the evaluation of univariate outliers.

Mahalanobis Distance (D2) is defined by Tabachnick and Fidell (2007) as the distance between a case and the centroid of the remaining cases, where the centroid is the point formed by the intersection of the mean values of all variables. Thus, Chi-square table were assessed by using the total number of 70 items with the p- 0.001, the recommended threshold of chi-square table resulted to 112.31 (p=0.007). Any Mahalanobis distance value that above this threshold were regarded as the multivariate outliers. Hence, 18 multivariate outliers were detected and eventually deleted from the dataset. Altogether, 27 outliers (univariate 9 and multivariate 18) were detected and removed from the entire dataset and 229 final data set were used in this study for further analysis.

4.4.4 Test of Non-Response Bias

This is defined as the most common mistake that may be anticipates by the researcher to make in estimating the features of the study sample, due to the fact that some category of respondents is underrepresented as a result of non-response (Berg, 2002). Singer (2006) asserts that there is no minimum response rate below which a survey estimate is necessarily biased. In the meantime, there is no response rate above which it is never biased. On the contrary, regardless of how minor a non-response is, there is

a bias that must be investigated (Pearl & Fairly, 1985). Thus, extrapolation procedure was carried out to test non-response bias as recommended by Armstrong and Overton (1977). Invariably, respondents were categorized into two independent samples based on their response of questionnaire survey with these eight (8) major variables in the study (that is, Transportation, warehouse, packaging, inventory management, innovation in green logistics, service performance, operational performance and financial performance).

Part of the methods used to test for the non-response bias is to compare how respondents attend to the instrument (questionnaire survey) administered early before August, 2020 and others, that is, those responds to the questionnaires after August, 2020. The data collection period covered three months (that is between early August and middle of October). Nevertheless, the response of those respondents late after August, 2020 are considered late response. Hence, in line with Miller and Smith (1983), a sample of non- response to the first questionnaires distributed, and presumed to be the representative of the non-respondent group. Table 4.4 show the result of the early and late non-response bias for the questionnaires distributed.

Table 4.4

Analysis of Non-Response Bias

Constructs	Response Rate	N	Mean	Std. Deviation	Std. Error Mean	F	Sig
Inn. Green Logistics	Late Response	102	3.7937	.76826	.07607	2.934	.088
	Early Response	127	3.8911	.66819	.05929		
Transportation	Late Response	102	3.8088	.86418	.08557	.003	.957
	Early Response	127	3.8228	.84419	.07491		
Warehousing	Late Response	102	3.7418	.77489	.07673	.001	.973
	Early Response	127	3.9230	.76706	.06807		
Packaging	Late Response	102	4.0033	.90165	.08928	.269	.604
	Early Response	127	3.9633	.88514	.07854		
Inventory Management	Late Response	102	3.8843	.74058	.07333	.132	.717
	Early Response	127	3.8677	.79411	.07047		

Service Performance	Late Response	102	3.9012	.86849	.08599	.004	.953
	Early Response	127	3.9794	.89111	.07907		
Operational Perf	Late Response	102	4.1046	.78662	.07789	.476	.491
	Early Response	127	4.1522	.78568	.06972		
Financial Performance	Late Response	102	4.0833	.70740	.07004	.040	.841
	Early Response	127	4.1713	.77004	.06833		

As indicated from Table 4.4 of the independents sample t-test above, the outcome revealed that the group mean and the SD for the late and early respondents are actually not different. Also, the t-test result indicates that there is no significant difference between early and late response based on the items in the financial performance (t= 0.040; p< 0.841); operational performance (t= 0.476; p< 0.491); service performance (t= 0.004; p< 0.953); inventory management (t= 0.132; p< 0.717); packaging (t= 0.269; p< 0.604); warehousing (t= 0.001; p< 0.973); transportation (t= 0.003; p< 0.957); and innovation on green management (t= 2.934; p< 0.088) . The result of the independent sample t-test items are statistically different and not significant to have negative impact on the whole results of the study.

4.4.5 Test of Common Method Variance

Common method variance is defined by Podsakoff and Podsakoff (2019) as variance that is related to the measurement method rather than the variable of interest. Several academics have generally stated that common method variance is a major concern for self-report survey studies. This includes Spector (2006); Podsakoff et al., (2019); and Lindell and Whitney (2001). Also, Conway and Lance (2010) revealed that common method variance inflate the relationship between constructs measured by self-reports. In addition, any study carries out using self-report surveys are related with high correlations because of common method variance. As a result, the study used a

variety of procedural solutions to reduce the impact of common method variance. Examples include Podsakoff et al., (2019); Podsakoff et al., (2012); Mackenzie and Podsakoff (2012); and Viswanathan and Kayande (2012).

Meanwhile, to alleviate anxiety, respondents were informed that there were no correct or incorrect answers to the questionnaire items. They were also assured that their responses would be kept private throughout the research process. In addition, the study improved the items scale to reduce method biases in the current study. This was accomplished by avoiding vague concepts in the questionnaire and providing simple examples when such concepts were used. To improve the item scale, all of the questions were written insimple and concise language.

In addition, Harman's (1967) single factor test was used in this study to evaluate commonmethod variance as it was used by (Podsakoff et al. 2012). As a result, all constructs of interest are subjected to an exploratory factor analysis in this procedure. The unroasted factor remedy results are then analyzed to determine the number of factors required to account for the variance in the construct (Mackenzie & Podsakoff, 2012). Harman's single factor test assumes that if there is enough common method variance, whether a single factor emerges or one general factor accounts for the majority of the covariance in the exogenous and endogenous constructs (Podsakoff & Organ, 1986).

According to the current study's common method variance result, all items were subjected to a principal component analysis. The findings revealed that twelve factors explained a total of 77.05 percent of the variance, with the first factor explaining

37.65 percent of the total variance, which is more than 50% (Kumar, 2013). Furthermore, no single factor accounted for the majority of covariance in the independent and dependent variables, according to the findings (Podsakoff et al., 2019). As a result, the findings show that common method bias is not a problem, and the relationship between constructs measured in the study is not inflated. Table 4.5 shows the result of the common bias variance of this study.

Table 4.5: *Analysis of the Common Method Variance*

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	26.731	37.650	37.650	26.731	37.650	37.650
2	5.211	7.340	44.989	5.211	7.340	44.989
3	3.681	5.185	50.174	3.681	5.185	50.174
4	2.948	4.152	54.326	2.948	4.152	54.326
5	2.797	3.939	58.265	2.797	3.939	58.265
6	2.654	3.738	62.003	2.654	3.738	62.003
7	2.203	3.103	65.106	2.203	3.103	65.106
8	2.070	2.915	68.022	2.070	2.915	68.022
9	1.722	2.426	70.447	1.722	2.426	70.447
10	1.658	2.336	72.783	1.658	2.336	72.783
11	1.608	2.264	75.047	1.608	2.264	75.047
12	1.421	2.002	77.049	1.421	2.002	77.049
13	.911	1.282	78.331			
14	.814	1.147	79.478			
15	.779	1.098	80.576			
16	.719	1.012	81.588			
17	.656	.923	82.512			
18	.623	.878	83.390			
19	.594	.837	84.227			
20	.534	.752	84.979			
21	.501	.705	85.684			
22	.470	.661	86.346			
23	.464	.653	86.999			
24	.441	.621	87.620			
25	.424	.598	88.217			
26	.403	.567	88.785			
27	.380	.536	89.321			
28	.369	.520	89.841			
29	.345	.487	90.327			
30	.335	.472	90.799			
31	.330	.465	91.264			
32	.319	.449	91.714			
33	.307	.432	92.146			
34	.303	.427	92.573			
35	.283	.398	92.971			
36	.266	.375	93.346			
37	.263	.371	93.717			
38	.248	.349	94.066			
39	.237	.334	94.400			
40	.231	.326	94.726			
41	.227	.320	95.046			

42	.222	.313	95.359				
43	.210	.296	95.655				
44	.205	.288	95.943				
45	.193	.272	96.215				
46	.182	.257	96.472				
47	.179	.253	96.725				
48	.170	.239	96.964				
49	.159	.223	97.187				
50	.147	.208	97.395				
51	.142	.200	97.595				
52	.135	.191	97.785				
53	.129	.181	97.967				
54	.123	.173	98.139				
55	.121	.170	98.309				
56	.112	.158	98.467				
57	.109	.153	98.620				
58	.106	.149	98.770				
59	.099	.139	98.909				
60	.096	.135	99.044				
61	.089	.125	99.170				
62	.084	.119	99.289				
63	.077	.108	99.397				
64	.074	.105	99.501				
65	.070	.098	99.599				
66	.060	.085	99.684				
67	.057	.081	99.765				
68	.055	.078	99.842				
69	.044	.062	99.904				
70	.036	.050	99.954				
71	.032	.046	100.000				

Extraction Method: Principal Component Analysis.

4.5 Descriptive Statistics of the Demographical Information

According to Pallant (2013), the information about the respondent is essential to the study to indicate the profile of the data collected. As indicated in the Table 4.5, the respondents were asked to explain some of their demographical information which include education, gender, position, age, service types, ownership type, number of employees, years of operation and annual revenue. Table 4.5 shows the result of the demographical information of the respondents.

Table 4.6
Profile of the Respondents

Demographic Info.	**Details**	**Frequency**	**Percentage (%)**
Gender	Male	123	53.7
	Female	106	46.3
Age	18 – 25 years	63	27.5
	26 – 35years	92	40.2
	36 – 45 years	53	23.1
	46 – 55 years	21	9.2
Qualifications	Diploma and Below	59	25.8
	Degree	101	44.1
	Masters	46	20.1
	PhD	23	10.0
Position	Senior Manager/Manager	52	22.7
	Executives	74	32.3
	Supervisor	18	7.9
	Planners	4	1.7
	Others	81	35.4
Services Types	Freight Forwarding	7	3.1
	Transportation	40	17.5
	Warehousing and inventory	18	7.9
	Manufacturing	19	8.3
	Logistics	145	63.3
Ownership Types	Public Liability Company	56	24.5

	Private Liability Company	93	40.6
	Sole Proprietorship	26	11.4
	Partnership	51	22.3
	Limited Liability Partnership	3	1.3
Full time Employees	Below 50 employees	109	47.6
	50 – 99 employees	39	17.0
	100 – 149 employees	15	6.6
	150 – 199 employees	4	1.7
	200 employees and above	62	27.1
Years of Operation	0 – 5 years	62	27.1
	6 – 10 years	83	36.2
	11 – 15 years	4	1.7
	16 – 20 years	11	4.8
	21 years and above	69	30.1
Annual Revenue	Below USD 500k	99	43.2
	USD 500k – 1m	36	15.7
	USD 1.1m – 10m	36	15.7
	USD 10.1m – 50m	14	6.1
	USD 50m and above	44	19.2

The majority of the respondents according to table 4.6 above were male, represents 123 (53.7%) respondents, whereas, the remaining 106 (46.3%) were females as previous studies shows the similar distribution regarding the sex of the participants. Based on the age group of the respondents, 92 (40.2%) of the respondents were in the age group of 26– 35years. Next to those in the age group of 18 – 25 years with 63 (27.5%) respondents. This is also followed by the age group between 36 – 45 years with 53(23.1%) of the respondents. Finally, the smallest age group is 46 years and above which amounted to 21(9.2%) respondents.

With regards to qualification of respondents, 59(25.8%) of the respondents possessed Diploma and below. Those respondents that are having first degree amounted to 101(44.1%). Next to the respondents are those that having master degree representing 46(20.1%). The smallest part of the qualification are those that having PhD, representing 23(10%). Concerning the position of the respondents, Table 4.5 indicates that 74(32.3%) of the respondents were executive officers, followed by the Senior Manager/managers of 52(22.7%); next to the Supervisor that are amounted to 18(7.9%). Whereas, those respondents with the position of Planners are just only

4(1.7%). Finally, other position that are not mentioned in this study amounted to 81(35.4%). This indicates that the majority of the positions responded to the questionnaires are executives and senior managers/managers which make the information more effective due to their knowledge and experiences at services.

Furthermore, in term of type of services rendered by the respondents, Table 4.5 revealed that majority of them provides logistics services with the total number of 145(63.3%); next to the respondents with transportation business amounted to 40(17.5%); followed bythose doing warehousing and inventory business representing 18(7.9%) and finally, 19(8.3%) respondents are manufacturing business. Regarding the type of ownership of the business; Table 4.5 indicates that 93(40.6%) of the respondents with private liability companies. Followed by the respondents with public liability companies amounted to 56(24.5%). Next to the respondents that owned partnership business representing 51(22.3%). Those that owned sole proprietorship business are just only 26(11.4%). Finally, Table 4.6 indicates those owned limited liability partnership with total number of3(1.3%).

As indicated in Table 4.6 of this study, the majority of the respondents with fulltime employees below 50 employees amounted to 109 (47.6%) respondents. Next to the respondents that have 200 employees and above representing 62(27.1%). Followed by the respondents that have between 50-99 fulltime employees accounted for 39(17%). Also, respondents with 100 – 149 fulltime employees are 15(6.6%). Whereas the least respondents owned between 150 – 200 fulltime employees are only 4(1.7%). Based on the year of operations of the business, 83(36.2%) respondents owned the company operated between 6 – 10years. Followed by the respondents owned the company

operated for 21years and above with 69(30.1%) respondents. Next to the companies that operated with 5 years representing 62(27.1%). Also, 11 (4.8%) respondents operating their business between 11 – 15 years and finally, those respondents operating their business within 11 – 15 years are just only 4(1.7%) respondents. With regards to the annual income of the business, 99(43.2%) respondents generated below USD 500k from their business. This is followed by the 44(19.2%) respondents generated over USD50m and above. Next to the 36(15.7%) respondents who generated between USD500k – USD10m. finally, only 14(6.1%) respondents generated annual revenue between USD10.1m – USD10m. this indicated that the majority of the respondents have annual income below USD 500k which revealed that the majority of business in this study are SMEs business.

4.6 Descriptive Statistics of the Latent Variables

The descriptive statistics, according to Sekaran and Bougie (2016), measure the average value of the dataset as well as the index of variability in the dataset. Thus, the mean is the most commonly used measure of central tendency, whereas the standard deviation is ameasure of dispersion. As a result, the mean and standard deviation are primarily used for fundamental descriptive analysis of the ratio and interval scales. This study used a five (5) point Likert scale, as suggested by Nik, Jatan, and Taib (2010), and the interpretation of the level of scale was adapted . According to Nik et al. (2010), a score of less than 2.33 is considered a low level response rate, a scale of 2.33 – 3.67 is considered a moderate level response rate, and a scale of 3.67 and above is considered a high level response rate. As a result, the mean and standard deviation of the latent constructs used inthis study are shown in Table 4.6 below.

Table 4.7
Mean and Standard Deviation of the Variables

Constructs	N	Min	Max	Mean	SD
Inn. On Green Logistics	229	1	5	3.8477	.71453
Transportation	229	1	5	3.8166	.85130
Warehousing	229	1	5	3.8423	.77414
Packaging	229	1	5	3.9811	.89079
Inventory Management	229	1	5	3.8751	.76911
Service Performance	229	1	5	3.9446	.88004
Operational Performance	229	1	5	4.1310	.78473
Financial Performance	229	1	5	4.1321	.74248

The result from the Table 4.7 above present the mean and standard deviation of the latent constructs used in this study. Financial performance recorded the highest mean (M =4.13; SD = .742), whereas the Transportation recorded the lowest (M = 4.13; SD = .742). Hence, the entire constructs average means were in the range of high level.

4.6.1 Mean and Standard Deviation of Transportation

The descriptive statistics of the items TRS1 – 4 and TRR1 – 4 of service reliable and responsiveness respectively as presented in Table 4.7 revealed the degree of transportation under the logistics service thought among the respondents, these items have mean scores above 3. All the eight items were recorded high level of mean score.

Specifically, immediate response to Shippers complaints recorded highest mean score of (M= 4.13; SD = .785), while the Accuracy of estimates and calculation recorded the moderate mean score of (M= 4.13; SD = .785). The result indicates that immediate response to Shippers complaints is the major characteristics representing the transportation under logistics services as indicated in Table 4.7 below.

Table 4.8
Mean and Standard Deviation of the Transportation

Constructs	Mean	SD
Accuracy of service documents which includes billing, transit, delivery information	3.85	.714
Accuracy of estimates and calculation	3.82	.851
All services and products are up to standard and meet requirement of customer	3.84	.774
Consistency in performance and procedures	3.98	.891
Service Reliable		
Response to unforeseen circumstance while cargo is on transit	3.88	.769
Prompt response to cargo claims	3.95	.880
Immediate response to Shippers complaints	4.13	.785
Availability of cargo space	4.13	.743
Responsiveness		

4.6.2 Mean and Standard Deviation of Warehousing

The descriptive statistics of the items WAL1 – 7 and WCS1 – 2 of logistics capacity and cargo safety respectively as presented in Table 4.8 revealed the degree of transportation under the logistics service thought among the respondents, these items have mean scores above 3. All the nine items were recorded high level of mean score. Particularly, Ability to retain qualified and skilful personnel recorded highest mean score of (M= 3.98; SD = 1.110), while the Ability to tackle problems and complaints recorded the moderate mean score of (M= 3.81; SD = 1.011). In essence, the result indicates that Ability to retain qualified and skilful personnel is the major characteristics representing the warehousing under logistics services as shown in Table 4.9 below.

Table 4.9
Mean and Standard Deviation of the Warehousing

Constructs	Mean	SD
Offering operation simplicity	3.83	1.096
Offering standard operations	3.83	1.148
Ability to keep a very low rate of freight damages	3.85	1.137
Ability to maintain timely delivery for all category of customers	3.82	1.081
Ability to tackle problems and complaints	3.81	1.011

Ability to retain qualified and skilful personnel	3.90	1.110
Ability to offer routine services	3.88	1.124
Logistics Capability		
Response to unforeseen circumstance while cargo is on transit	3.82	1.104
Prompt response to cargo claims	3.83	1.051
Cargo Safety		

4.6.3 Mean and Standard Deviation of Packaging

The descriptive statistics of the items PRB1 – 3 of relationship building as presented in Table 4.9 revealed the degree of packaging under the logistics service thought among the respondents, these items have mean scores above 3. All the three items were recorded high level of mean score. Thus, Collaboration in term of services with other logistics companies recorded highest mean score of (M= 4.00; SD = .934), while the Collaboration with other downstream organizations recorded the moderate mean score of (M= 3.98; SD = 1.100). In essence, the result indicates that Collaboration in term of services with other logistics companies is the major characteristics representing the packaging under logistics services as shown in Table 4.10 below.

Table 4.10
Mean and Standard Deviation of the Packaging

Constructs	Mean	SD
Collaboration in term of services with other logistics companies	4.00	.934
Collaboration with other downstream organizations	3.96	1.008
Competences of sales personnel	3.98	1.100
Relationship Building		

4.6.4 Mean and Standard Deviation of Inventory Management

The descriptive statistics of the items ICT1–5 of information communication technology as presented in Table 4.10 revealed the degree of inventory management under the logistics service thought among the respondents, these items have mean

scores above 3. All the five items were recorded high level of mean score. Predominantly, "Links of communication between company and their drivers" recorded highest mean score of (M= 3.92; SD = 1.081), whereas, the Linkage with other associated industries' information systems recorded the moderate mean score of (M= 3.85; SD = 1.032). In essence, the result indicates that "Links of communication between company and their drivers" is the major characteristics representing the warehousing under logistics services as shown in Table 4.11 below.

Table 4.11
Mean and Standard Deviation of the Inventory Management

Constructs	Mean	SD
Integration of Global information systems	3.88	.979
Data transmission quality	3.88	.956
Information sharing with other organization	3.85	1.067
Links of communication between company and their drivers	3.92	1.081
Linkage with other associated industries' information systems	3.85	1.032
ICT Integration		

4.6.5 Mean **and Standard Deviation of Innovation in Green Logistics**

The descriptive statistics of the items ES1 – 6, SM1 – 6, GTO1 – 8, and GPT1 – 4 of environmental sustainability, strategic management, green transport operation and green transport procurement respectively as presented in Table 4.11 revealed the degree of innovation in green logistics thought among the respondents, these items have mean scores above 3. All the twenty-three (23) items were recorded high level of mean score. Specifically, "Consideration for procurement and selection of vehicle types based on cost, quality, and environmental impacts" recorded highest mean score of (M= 3.97; SD = 1.122), while the Focusing attention on strategic aspects of business recorded the moderate mean score of (M= 3.72; SD = 1.189). In essence, the result indicates that Consideration for procurement and selection of vehicle types based on cost, quality, and environmental impacts is the main feature

representing the innovation in green management as shown in Table 4.12 below.

Table 4.12
Mean and Standard Deviation of the Innovation in Green Logistics

Constructs	Mean	SD
"Level of environmental compliance"	3.77	1.160
"The purchased products are friendly to environment and environmental harmful products are avoided"	3.75	1.125
"The purchased raw material can be reused or recycled"	3.76	1.081
"The purchased raw material are produced from excess and environmental friendly"	3.76	1.148
"The computer network is used instead of papers in marketing between vendor and factory"	3.80	1.125
Environmental Sustainability		
Learning existing work practices	3.78	1.122
Strategic planning (formulation)	3.80	1.145
Strategy implementation/execution	3.80	1.207
Focusing attention on strategic aspects of business	3.72	1.189
strategic decision making	3.79	1.163
Strategic capabilities	3.97	1.059
Strategic Management		
"Managing strategic change"	3.89	1.101
"The concern on environmental management of provider"	3.91	1.082
"The concern of carbon dioxide releasing of provider"	3.89	1.090
"The distance between vendor and factory is minimized in order toreduce pollution and cost"	3.87	1.088
"The factory is concerned about the fuel consumption in distribution includes measuring the carbon dioxide emission"	3.93	1.090
"The delivering vehicles are well checked and maintenance plan areavailable".	3.94	1.091
"The full truck load system is applied to increase the effectiveness of product delivering"	3.91	1.074
"The delivering routes are determined to safe the fuel and reduce thepollution"	3.92	1.105
Green Transport Operation		
"Consideration for procurement and selection of vehicle types based oncost, quality, and environmental impacts"	3.97	1.122
"Strategic planning the preventive maintenance of all vehicles"	3.90	1.088
The pollution reducing system is paramount in transport procurement	3.86	1.173
The clean energy technologies are applied	3.83	1.175
Green Transport Procurement		

4.6.6 Mean and Standard Deviation of Services Performance

The descriptive statistics of the items SPS1 – 8 and SPA1 – 5 of services and appropriation performance respectively as presented in Table 4.12 revealed the degree of service performance thought among the respondents, these items have

mean scores above 3. All the thirteen (13) items were recorded high level of mean score. Specifically, The imports shipments are cleared and delivered as scheduled recorded highest mean score of (M= 4.10; SD = .831), while the Focusing attention on strategic aspects of business recorded the moderate mean score of (M= 3.72; SD = 1.189). In essence, the result indicates that Expedited customs clearance for traders with high compliance levels is the main feature representing the service performance as shown in Table 4.13 below.

Table 4.13
Mean and Standard Deviation of the Service Performance

Constructs	Mean	SD
The imports shipments are cleared and delivered as scheduled	3.89	1.035
Logistics organization provides adequate services	3.90	1.054
The exports shipments are cleared and delivered appropriately	3.98	1.061
Timely and adequate information received when any regulations and government policy changes	3.97	1.084
Demonstrating high levels of compliances by expedited clearance	3.92	1.085
Standard inspection of all services	3.90	1.068
Less damaged and Lost of freight	3.93	1.118
Evaluating performance	3.96	1.038
Services		
All consignment reaches the consignee at the appropriate time and promptly	3.93	1.120
All order placement as well as the receipt are within stipulated time	3.90	1.120
All clearance and delivery of exports and imports are to schedule	3.94	1.110
Adequate and timely information on regulatory changes	3.96	1.127
Expedited customs clearance for traders with high compliance levels	4.10	.831
Appropriation		

4.6.7 Mean and Standard Deviation of Operational Performance

The descriptive statistics of the items OPS1 – 3 and OPT1 – 3 of shipment and tracking and tracing of goods respectively as presented in Table 4.13 revealed the degree of operational performance thought among the respondents, these items have mean scores above 3. All the six (6) items were recorded high level of mean score. Specifically, Competitive trucking charges recorded highest mean

score of (M= 4.23; SD = .961), while the Low operating cost and maintenance cost recorded the moderate mean score of(M= 3.98; SD = .898). In essence, the result indicates that Competitive trucking charges is the main feature representing the operational performance as shown in Table 4.14below.

Table 4.14
Mean and Standard Deviation of the Operational Performance

Constructs	Mean	SD
Competitive trucking charges	4.23	.961
Competitive trans-loading facility charges	4.12	.929
Low operating cost and maintenance cost	3.98	.878
Shipment		
Consignments are easily trace and tracked	4.10	.917
Short time for customer to respond	4.16	.942
Detailed information and timing about the location of the consignment	4.20	.899
Tracking and Tracing of Goods		

4.6.8 Mean and Standard Deviation of Financial Performance

The descriptive statistics of the items FPI1 – 4 of infrastructure as presented in Table 4.15shown the degree of financial performance thought among the respondents, these items have mean scores above 3. All the four (4) items were recorded high level of mean score. Specifically, The quality of ports, rail, roads and terminal recorded highest mean score of (M= 4.17; SD = .923), while the The telecommunications quality as well as other sharing systems that are important for trade facilitation recorded the moderate mean score of (M= 4.12; SD = .800). In essence, the result indicates that The quality of ports, rail, roads and terminal is the main feature representing the financial performance as shown in Table 4.15 below.

Table 4.15
Mean and Standard Deviation of the Financial Performance

Constructs	Mean	SD
The quality of ports, rail, roads and terminal	4.17	.923
The telecommunications quality as well as other sharing systems that are important for trade facilitation	4.12	.800
Most major infrastructures are well maintained	4.12	.858

Adequate logistics services are provided and well developed	4.12	.929
Infrastructure		

4.7 Multiple Linear Regression Assumptions

The constructs were evaluated for normality, linearity, homoscedasticity, and multicollinearity to ensure that the underlying assumptions of the multiple linear regression analysis were met, as recommended by Hair et al. (2016) and Pallant, (2013).

4.7.1 Normality Test

One of the fundamental assumptions of regression analysis is the normality test, which indicates that each variable and all linear groupings of constructs are normally distributed. It is investigated through the use of graphical or statistical methods. Skewness and kurtosis, on the other hand, are fundamental statistical normality techniques. For the data distribution to be normal, the skewness and kurtosis values must be close to zero. Histogram residual plots, which are based on the graphical method of testing normality, are commonly used to evaluate it. This refers to the data distribution's shape as a single continuous construct and its resemblance to the normal distribution. As a result, the residual must be independently and normally distributed in order to meet the stated assumption (Tabachniche & Fidell, 2013). The

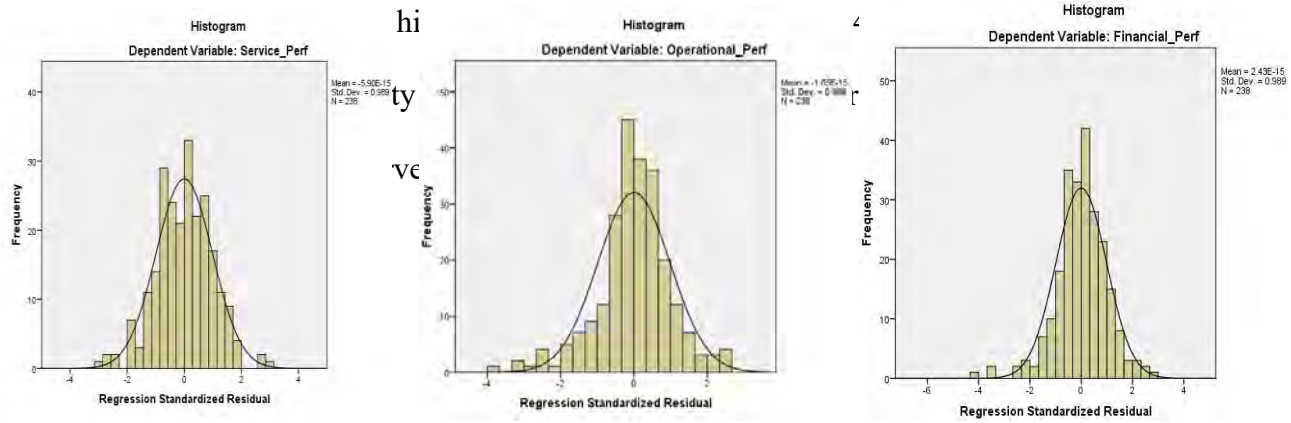

Figure 4.1
Histogram and Normal Probability Plots

The Skewness and Kurtosis Method was used to diagnose the normality test assumption by assessing the skewness and kurtosis. According to Hair et al. (2014), the data can be subjected to a normality test. As a result, highly skewed and kurtotic data can inflate bootstrapped standard error estimates, underestimating the statistical significance of the component coefficients . For the data to be normally distributed, the constructs must be within the benchmark of ±2.58 if the guideline is followed. As a result, the value of skewness and kurtosis for all constructs meets the normality assumption in this study. According to Table 4.16, the data do not have a normality problem.

Table 4.16

Normality Test (Skewness and Kurtosis of the Variables)

Constructs	N	Mean	SD
Inn. On Green Logistics	229	-1.039	.035
Transportation	229	-1.071	.407
Warehousing	229	-.960	.408
Packaging	229	-1.128	.840
Inventory Management	229	-.839	.304
Service Performance	229	-1.209	.671
Operational Performance	229	-1.927	1.312
Financial Performance	229	-1.966	1.920

4.7.2 Linearity Test

Another fundamental assumption of regression analysis is the linearity test, which indicates each variable and all linear groupings of the constructs. It is also important in regression because the relationship between dependent and independent variables

is linear. Nonetheless, correlation can be used to capture the linear relationship between variables. As a result, if non-linear relationships exist, they will be ignored in the analysis, resulting in an underestimation of the main strength of the association. In line with the study by Ringim (2012), the residual scatter plot was used and the residual value ought to scatter around o and most of the scores should focus at 0 points. Figure 4.2 presents the scatter plot between independent variables and business performance.

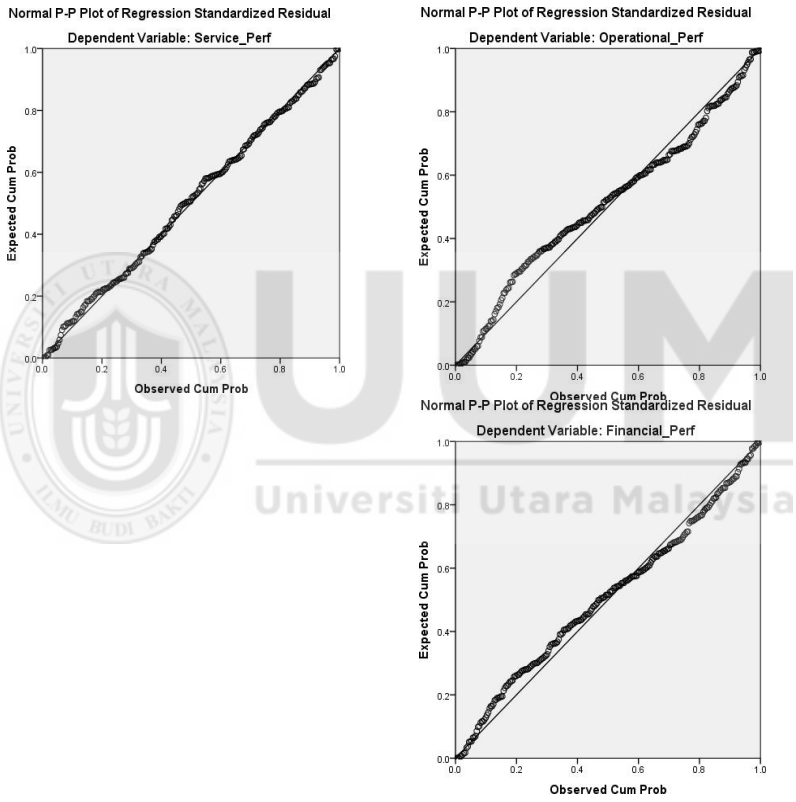

Figure 4.2
Probability Plots for the Linearity Diagnostics

The linearity assumption was not violated based on the graphical representation shown above, as the plot indicating that residual scores converged at the centre along the zero point, indicating that the linearity assumption was met.

4.7.3 Multicollinearity Test

The multicollinearity test, which indicates each variable and all linear groupings of the constructs, is another fundamental assumption of regression analysis. It also refers to a situation in which one or more independent variables are highly correlated. According to Hair et al. (2018), the presence of multicollinearity among variable constructs can significantly distort regression coefficient estimates with their significance tests Two techniques were used in this study to check or detect multicollinearity, the first of whichis correlation analysis of exogenous constructs, as indicated by (Peng and Lai, 2012). SeeAppendix A, checking the VIF and tolerance value is another way to examine the multicollinearity test. According to Hair et al. (2016), any VIF greater than 5 and tolerance value less than 0.2 indicates a multicollinearity problem. The VIF and the tolerance value of independent variables were implied in Table 4.17.

Table 4.17

Multicollinerity Test (VIF and Tolerance)

Constructs	N	VIF	Tolerance
Inn. On Green Logistics	229	2.268	.373
Transportation	229	2.295	.436
Warehousing	229	1.772	.564
Packaging	229	1.732	.577
Inventory Management	229	2.114	.473

The result for the Table 4.17 above indicates that the absence of multicollinearity among the exogenous constructs because the VIF is less than 5, whereas the tolerance values are more than 0.2. Therefore, indicating that the multicollinearity assumption was not violated.

4.8 Factor Analysis (Goodness of Measures)

Factor analysis is a data reduction tool that is used to summarize the structure of constructs in a specific set of data. Certain conditions must be met before the factor analysis can be performed. According to Tabachniche and Fidell (2013:2007), a minimum of 200 sample cases is required. In addition, the general rule of thumb for the factor to be conducted is that a minimum of 5 respondents per variable be present. "According to Comrey and Lee (1992), a sample size of 50 cases is extremely poor, 100 cases are poor, 200 cases are fair, 300 cases are good, 500 cases are very good, and 1000 cases are excellent". Furthermore, a sample size of 350 or greater necessitates a factor loading of 0.30 in order to examine statistical significance (Tabachniche & Fidell, 2014).

Meanwhile, in this study, the principal component analysis (PCA) used is that extracted factors were mainly based on eigenvalue ≥ 1. As revealed by Hair et al (2014), the factor analysis is appropriate when majority of the correlation coefficient items were ≥ 0.3. Bartlett's test of the sphericity required to be sig. at ($p<0.05$). Whereas, the Kaiser Meyer Olkin (KMO) result and overall measure of sampling adequacy (MSA) must be ≥ 0.6 for the goodness of factor analysis test., however, if the value is < 0.6, this shows that there is require for collecting additional data or probably additional construct to be introduce assuggested by Field (2009). In addition to the justifications above, Hutcheson and Sofroniou (2009) suggested that the classification of KMO result value between 0.5 and 0.7 considered as average; between 0.7 – 0.8 considered as good; between 0.8 – 0.9 considered as very good and the result of KMO above 0.9 is considered as excellent.

Furthermore, Hair et al. (2014) indicated that the result of MSA should greater than

0.5 for the overall test result and individual constructs, item load lower than 0.5 is consideredto be removed. Though, the loading of 0.3 is used as minimum implies by the Tabachnichand Fiddel (2014). By assessing the number of factors to extract, there is need for considering other vital result (Such as KMO, and Total Variance Explained). The identity of the component is solely on item with higher loadings. Thereby, the cross loading and item loading of ≥ 0.5 on one factor is considered due to its practical and statistical significance (Tabachnich & Fiddel, 2014; Hair et al., 2016). Hence, the rule of thumb highlighted above were employed as a basis for carried out PCA. The factor analysis for the independent variables, dependent variables as well as moderating variable results were explained in details as follows:

4.8.1 Factor Analysis for Dependent Variables (3 PLS Key Performance)

The dependent variables of 3 PLS key performance were measured with three sub-construct (service, operational and financial performance) with 23 items. This was subjected to the PCA using SPSS version 25. Thus, the result of the factor loading of the study items ranges from 0.536 – 0.945. The checking of the correlation matrix indicates that all the correlation coefficient has value greater than 0.3.

Before examining the factor analysis in Table 4.18 below, the KMO measure of samplingadequacy was performed and showing the result of 0.712 – 0.896 Germany, which is above the rule of thumb of 0.6, this revealed that the sample size is adequate of assessing of the factor analysis. In addition, Bartlett's test of sphericity is statistically significant which support the factorability of the correlation as the p-value is less than 1percent ($p<0.000$).

Table 4.18
Result of the Factor Analysis for 3PLS Key Performance

Code	Details	1	2	3	4	5
Service Performance (with 13 items)						
SPS1	The imports shipments are cleared and delivered as scheduled	.785				
SPS2	Logistics organization provides adequate services	.763				
SPS3	The exports shipments are cleared and delivered appropriately	.945				
SPS4	Timely and adequate information received when any regulations and government policy changes	.934				
SPS5	Demonstrating high levels of compliances by expedited clearance	.915				
SPS6	Standard inspection of all services	.920				
SPS7	Less damaged and Lost of freight	.931				
SPS8	Evaluating performance	.740				
SPA1	All consignment reaches the consignee at the appropriate time and promptly		.913			
SPA2	All order placement as well as the receipt are within stipulated time		.904			
SPA3	All clearance and delivery of exports and imports are to schedule		.929			
SPA4	Adequate and timely information on regulatory changes		.919			
SPA5	Expedited customs clearance for traders with high compliance levels			.536		
Operational Performance (with 6 items)						
OPS1	Competitive trucking charges				.840	
OPS2	Competitive trans-loading facility charges				.821	
OPS3	Low operating cost and maintenance cost				.734	
OPT1	Consignments are easily trace and tracked					.832
OPT2	Short time for customer to respond					.889
OPT3	Detailed information and timing about the location of the consignment					.882
Financial Performance (with 4 items)						
FPI1	The quality of ports, rail, roads and terminal					.714
FPI2	The telecommunications quality and other sharing systems that are important for trade facilitation.					.721
FPI3	Most major infrastructures are well maintained					.674
FPI4	Adequate logistics services are provided and well developed					.753
	Eigenvalue		5.484	3.952	2.396	2.261	2.862
	Percentage of Variance		85.445	79.033	79.86	75.367	71.547
	KMO		.896	.889	.721	.712	.760
	Bartlett's Test of Sphericity		2027.2	1381.2	361.33	275.22	475.13
	Significance		.000	.000	.000	.000	.000

4.8.2 Factor Analysis for Independent Variables (Logistics Services)

The independent variables of logistics operations were measured using three sub-constructs (transportation, warehousing, packaging, and inventory management) and a total of 25 items. Specifically, the transportation has 8 items, warehousing has 9

items, packaging has 3 items and inventory management has 5 items respectively, which all are measured as uni-dimensional. Prior to the conducting of factor analysis, the KMO for measuring sampling adequacy was performed with the following result between 0.563 – 0.865, which is above the minimum value of 0.6 for good factor analysis. Thus, the Bartlett's test of sphericity is significant at p < 000, indicating that the correlation matrixis factorable. The table 4.19 below shows the results of the factor analysis of independent variables

Table 4.19
Result of the Factor Analysis for Logistics Services

Code	Details	1	2	3	4	5	6
Transportation (with 8 items)							
TRS1	Accuracy of service documents which includes billing, transit, delivery information	.848					
TRS2	Accuracy of estimates and calculation	.865					
TRS3	All services and products are up to standard and meet requirement of customer	.759					
TRS4	Consistency in performance and procedures	.763					
TRR1	Response to unforeseen circumstance while cargo is on transit		.882				
TRR2	Prompt response to cargo claims		.764				
TRR3	Immediate response to Shippers complaints		.832				
TTR4	Availability of cargo space		.563				
Warehousing (with 9 items)							
WAL1	Offering operation simplicity			.769			
WAL2	Offering standard operations			.812			
WAL3	Ability to keep a very low rate of freight damages			.811			
WAL4	Ability to maintain timely delivery for all category of customers			.854			
WAL5	Ability to tackle problems and complaints			.835			
WAL6	Ability to retain qualified and skilful personnel			.826			
WAL7	Ability to offer routine services			.808			
WCS1	Response to unforeseen circumstance while cargo is on transit				.773		
WSC2	Prompt response to cargo claims				.773		
Packaging (with 3 items)							
PRB1	Collaboration in term of services with other logistics companies					.833	
PRB2	Collaboration with other downstream organizations					.830	
PRB3	Competences of sales personnel					.666	
Inventory Management (with 5 items)							

ICT1	Integration of Global information systems						.861
ICT2	Data transmission quality						.840
ICT3	Information sharing with other organization						.824
ICT4	Links of communication between company and their drivers						.855
ICT5	Linkage with other associated industries' information systems						.844
	Eigenvalue	2.626	2.269	3.761	1.545	2.330	2.851
	Percentage of Variance	65.642	56.723	81.658	77.273	77.652	84.496
	KMO	.710	.687	.830	.500	.693	.710
	Bartlett's Test of Sphericity	393.11	254.18	1101.6	79.987	341.26	616.23
	Significance	.000	.000	.000	.000	.000	.000

The result of Table 4.19 above indicates the outcome of the factor analysis for the independent variables (transportation, warehousing, packaging and inventory management). Checking of the correlation matrix was carried out and it revealed that most item coefficients were ≥ 0.3 as shown in the table above. The PCA extracted one component of each with eigenvalue exceeding one. Therefore, the percentage of the variance was 84.496 (84.5%) and the factor loading result was ranged between 0.563 – 0.865, which adequate with the rule of thumb of 0.5 and above as suggested by the previous studies (Tabachnich & Fiddel, 2014).

4.8.3 Factor Analysis for Moderating Variables (Innovation in Green Logistics)

The moderating variable of innovation in green logistics were measured with three sub- construct (environmental sustainability, strategic management, green transport operation, and green transport procurement) with 23 items. Particularly, the environmental sustainability has 5 items, strategic management has 6 items, green transport operation has 8 items and green transport procurement has 4 items respectively, which all are measured as uni-dimensional. Prior to the conducting of factor analysis, the KMO formeasuring sampling adequacy was performed with the following result between 0.563 –0.865, which is above the minimum value of

0.6 for good factor analysis. Thus, the bartlett's test of sphericity is significant at p<.000 which supported the factorability of the correlation matrix in this study. The results of the factor analysis of the study's independent variables are shown in Table 4.20.

Table 4.20
Result of the Factor Analysis for Innovation in Green Logistics

Code	Details	1	2	3	4
Environmental Sustainability (with 5 items)					
ES1	Level of environmental compliance	.895			
ES2	"The purchased products are friendly to environment and environmental harmful products are avoided"	.911			
ES3	"The purchased raw material can be reused or recycled"	.673			
ES4	"The purchased raw material are produced from excess and environmental friendly"	.735			
ES5	"The computer network is used instead of papers in marketing between vendor and factory"	.758			
Strategic Management (with 6 items)					
SM1	Learning existing work practices		.905		
SM2	"Strategic planning (formulation)"		.914		
SM3	Strategy implementation/execution		.867		
SM4	Focusing attention on strategic aspects of business		.683		
SM5	strategic decision making		.637		
SM6	Strategic Capabilities		.434		
Green Transport Operation (with 8 items)					
GTO1	"Managing strategic change"			.845	
GTO2	"The concern on environmental management of provider"			.848	
GTO3	"The concern of carbon dioxide releasing of provider"			.863	
GTO4	"The distance between vendor and factory is minimized in order to reduce pollution and cost"			.833	
GTO5	"The factory is concerned about the fuel consumption in distribution includes measuring the carbon dioxide emission"			.870	
GTO6	"The delivering vehicles are well checked and maintenance plan are available".			.861	
GTO7	"The full truck load system is applied to increase the effectiveness of product delivering"			.838	
GTO8	"The delivering routes are determined to safe the fuel and reduce the pollution"			.768	
Green Transport Procurement (with 4 items)					
GTP1	"Consideration for procurement and selection of vehicle types based on cost, quality, and environmental impacts"				.390
GTP2	"Strategic planning the preventive maintenance of all vehicles"				.912
GTP3	The pollution reducing system is paramount in transport procurement				.924
GTP4	The clean energy technologies are applied				.922
	Eigenvalue	3.199	3.466	4.669	2.688
	Percentage of Variance	63.970	57.769	84.064	67.191
	KMO	.820	.835	.880	.770
	Bartlett's Test of Sphericity	577.85	746.66	1621.40	518.43
	Significance	.000	.000	.000	.000

The result of Table 4.20 above showing the outcome of the factor analysis for the moderating variables (environmental sustainability, strategic management, green transport operation, and green transport procurement). Checking of the correlation matrix was carried out and it shown that most item coefficients were ≥ 0.3 as shown in the table above. The PCA extracted one component of each with eigenvalue exceeding one. Therefore, the percentage of the variance was 67.191 (67.2%) and the factor loading result was ranged between 0.390 – 0.924, which adequate with the rule of thumb of 0.5 and above as suggested by the prior studies (Tabachnich & Fiddel, 2014; Pallant, 2011).

4.9 Correlation Analysis

Correlation analysis is used to determine the magnitude and direction of a linear relationship between or among variables. "One of the multicollinearity test's fundamental assumptions is that each variable and all linear groupings of the constructs are indicated". Hair et al. (2018:2010) state that coefficients of correlation of 0.9 or higher indicate a problem with multicollinearity between independent variables. The table below indicate the interrelations among business performance, logistics services in term of transportation, warehousing, packaging, inventory management, as well as innovation in green logistics.

A "correlation of 0 indicates no relationship, a correlation of 1 indicates a positive correlation, and a correlation of -1 indicates a perfect negative correlation, according to" (Pallant, 2011). As a result, Table 4.21 displays the correlation analysis of all of the study's independent variables.

Table 4.21
Correlation Analysis of the Exogenous Constructs

Constructs	IGL	Trans	Wareh	Pack	Inv.Mgt	S.Perf	O.Perf	PFP
Inn. Green Logistics (IGL)	1							
Transportation (Trans)	.744**	1						
Warehousing (Wareh)	.595**	.558**	1					
Packaging (Pack)	.508**	.441**	.443**	1				
Inventory Management (Inv.Mgt)	.597**	.513**	.519**	.632**	1			
Service Performance (S.Perf)	.797**	.703**	.668**	.587**	.704**	1		
Operational Performance (O.Perf)	.500**	.347**	.441**	.441**	.503**	.515**	1	
Financial Performance (PFP)	.520**	.333**	.477**	.461**	.542**	.546**	.880**	1

The result for Table 4.21 above indicates that the correlation coefficient between independent variables was sufficiently lower than the recommended benchmark value of 0.9 or more, indicating that the independent variables were self-determining and nothighly correlated.

4.10 Regression Analysis and Testing of Hypotheses

Multiple regression analysis provides a neutral way to assess the degree and nature of the relationship between independent variables and the dependent variable (Sekaran & Bougie, 2016; Field, 2009). The regression coefficient is used to show how important each logistics service is in predicting 3PLS key performance. "When logistics services are jointly regressed against 3PLS key performance to explain its variance, the size of each (individual) regression coefficient shows how much an increase in one unit in the individual variable affects 3PLS key performance, taking into account all other individual variables and 3PLS key performance cave in to multiple correlation covariance" (Sekaran & Bougie, 2016). Regression analysis was used to examine the hypothesis in this study; it is intended to investigate the relationship between logistics services and key performance of 3PLs.

1 Regression Analysis and Hypotheses Test between Logistics Services and Service Performance

Multiple regression analysis was conducted in determining the relationship between logisticsservice and service performance

Table 4.22: **Model Summary[b]**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.841[a]	.708	.702	.48008	2.164

a. Predictors: (Constant), Inventory Management, Transportation, Warehousing, Packaging

b. Dependent Variable: Service Performance

The model summary, as shown in table 4.22 above, shows that R Square is 0.71; this means that the constant variables (logistics service) explained 71 % of the variation in the dependent variable (service performance), while the remaining 29 % is due to other variables not included in the model. This means that the regression (model) can be usedto make predictions.

Table 4.23: **ANOVA[a]**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	124.955	4	31.239	135.542	.000[b]
	Residual	51.626	224	.230		
	Total	176.581	228			

a. Dependent Variable: Service Performance

b. Predictors: (Constant), Inventory Management, Transportation, Warehousing, Packaging

The results of an analysis of variation in service performance with a large value of regression sum of squares (124.955) in comparison to the residual sum of squares (51.626) were summarized in table 4.23 above. This value indicated that the model adequately explained a large portion of the variation in service performance. However, the estimated F-value (135.542) in the table above with a significance value of 0.000 is less than the p-value of 0.05 (p0.05), indicating that the logistics performance elements asa whole can influence change in service performance.

Table 4.24: **Coefficients**[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.418	.192		-2.177	.031
	Transportation	.354	.048	.342	7.404	.000
	Warehousing	.294	.053	.259	5.583	.000
	Packaging	.119	.047	.121	2.534	.012
	Inventory Mgt.	.363	.058	.317	6.242	.000

a. Dependent Variable: Service Performance

As shown in table 4.23, the dependent variable explains how logistics service affects service performance. This served as a yardstick for evaluating the impact of the four variables. Regarding the influence of transportation service on firms' performance, result indicated that transportation service had significant relationship with service performance($\beta = .354$, $t = 7.404$, $p < .000$). Hence, Hypothesis H_{1a} was buttressed.

Hypothesis H_{1b} foreseen that warehousing service is positively correlated to service performance. Result indicated that warehousing service had a significant positively relationship with deviant service performance ($\beta = 0.294$, $t = 5.583$, $p < .000$), supporting Hypothesis H_{1b}. Similarly, in examining the influence of packaging services on service performance, result indicated that packaging services had a significant positively relationship with service performance ($\beta = .119$, $t = 2.534$, $p < .012$), support Hypothesis H_{1c}.

Hypothesis H_{1d} predicted that inventory management is positively related to service performance. As shown a significant positively relationship between inventory management and service performance ($\beta = .363$, $t = 6.242$, $p < .000$) was found indicating support for Hypothesis H_{1d}. The overall summary of this regression result in relation to the inventory management coefficient has a significant influence on the service performance of Malaysia's manufacturing sector. This means that the null

hypothesis will be rejected, whereas (i.e., logistics have significant influence on service performance of manufacturing sector in Malaysia). As a result, hypotheses H1a, H1b, H1c, and H1d were supported.

4.10.2 Regression Analysis and Hypotheses Test between Logistics Services andOperational Performance

The relationship between logistics service and operational performance was determinedusing multiple regression analysis.

Table 4.25: **Model Summary**[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.559[a]	.313	.301	.65628	1.640

a. Predictors: (Constant), Inventory Management, Transportation, Warehousing, Packaging
b. Dependent Variable: Operational Performance

The model summary, as shown in table 4.25 above, shows that R Square is 0.313, implying that the constant variables (logistics service) explained 31% of the variation in the dependent variable (operational performance), while the remaining 69 % is due to other variables not included in the model. This means that the regression (model) can be used to make predictions.

Table 4.26: **ANOVA**[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43.927	4	10.982	25.498	.000[b]
	Residual	96.476	224	.431		
	Total	140.403	228			

a. Dependent Variable: Operational Performance
b. Predictors: (Constant), Inventory Management, Transportation, Warehousing, Packaging

Table 4.26 above summarizes the results of an analysis of variation in the s operational performance, with a large value of regression sum of squares 43.927 in comparison to theresidual sum of squares 96.476. This value indicated that the model explained a significant portion of the variation in operational performance. However, in the table above, the estimated F-value (25.498) with a significance value of 0.000 is less than the p-value of 0.05 ($p < 0.05$), indicating that the logistics performance elements as a whole can influence change in operational performance.

Table 4.27: **Coefficients**[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.565	.263		5.958	.000
	Transportation	.008	.065	.009	.124	.901
	Warehousing	.220	.072	.217	3.049	.003
	Packaging	.142	.064	.162	2.212	.028
	Inventry_Mgt	.290	.080	.284	3.646	.000

a. Dependent Variable: Operational Performance

The dependent variable, as shown in table 4.27, elucidates the impact of logistics service on operational performance. This was used as a yardstick to assess the impact of the four variables. According to Hypothesis H2b, warehousing service is positively related to operational performance. Result indicated that warehousing service had a significant positively relationship with deviant service performance ($\beta = 0.220$, $t = 3.049$, $p < .003$), supporting Hypothesis H_{2b}. Similarly, in examining the influence of packaging services on operational performance, result indicated that packaging services had a significant positively relationship with operational performance ($\beta = .142$, $t = 2.212$, $p < .028$), support Hypothesis H_{2c}.

Hypothesis H_{2d} predicted that inventory management is positively related to operational performance. As shown a significant positively relationship between inventory management and operational performance ($\beta = .290$, $t = 3.646$, $p < .000$) was found, indicating support for Hypothesis H_{2d}. However, regarding the influence of transportation service on firms' performance, result indicated that transportation service had insignificant relationship with operational performance ($\beta = .008$, $t = .124$, $p < .901$). Hence, Hypothesis H_{2a} was not supported. The overall summary of this regression result in relation to the inventory management coefficient has a significant influence on the operational performance of Malaysia's manufacturing sector. This means that the null hypothesis will be rejected, whereas (i.e., logistics service has significant influence on operational performance of manufacturing sector in Malaysia except on transport services). As a result, hypotheses H2b, H2c, and H2d were supported, while hypothesis H2a was rejected.

4.10.3 Regression Analysis and Hypotheses Test between Logistics Services and Financial Performance

The relationship between logistics service and financial achievement was determined using multiple regression analysis.

Table 4.28: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.601[a]	.361	.350	.59869	1.702

a. Predictors: (Constant), Inventory Management, Transportation, Warehousing, Packaging
b. Dependent Variable: Financial Performance

The model summary, as shown in table 4.28 above, shows that R Square is 0.36; this means that the constant variables (logistics service) explained 71 percent of the variation in the dependent variable (financial performance), while the remaining 64

percent is due to other variables not included in the model. This means that the regression (model) can be used to make predictions.

Table 4.29: **ANOVA**[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	45.403	4	11.351	31.668	.000[b]
	Residual	80.289	224	.358		
	Total	125.692	228			

a. Dependent Variable: Financial Performance
b. Predictors: (Constant), Inventory Management, Transportation, Warehousing, Packaging

The results of an analysis of variation in financial performance with a large value of regression sum of squares (124.955) in comparison to the residual sum of squares (51.626) were summarized in table 4.29 above. This value indicated that the model adequately explained a large portion of the variation in financial performance. However, the estimated F-value (135.542) in the table above with a significance value of 0.000 is less than the p-value of 0.05 ($p < 0.05$), indicating that the logistics performance elementsas a whole can influence change in financial performance.

Table 4.30: **Coefficients**[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.571	.240		6.553	.000
	Transportation	-.049	.060	-.056	-.827	.409
	Warehousing	.255	.066	.265	3.873	.000
	Packaging	.132	.059	.158	2.247	.026
	Inventory Mgt.	.321	.073	.333	4.431	.000

a. Dependent Variable: Financial Performance

As shown in table 4.29, the dependent variable explains how logistics service affects financial performance. This served as a yardstick for evaluating the impact of the found variables. Regarding the influence of transportation service on firms' performance, Hypothesis H_{3b} predicted that warehousing service is positively related to financial performance. Result indicated that warehousing service had a significant positively relationship with deviant financial performance ($\beta = 0.255$, $t = 3.873$, p

< .000), supporting Hypothesis H_{3b}. Similarly, in examining the influence of packaging services on financial performance, result indicated that packaging services had a significant positively relationship with financial performance (β = .132, t = 2.247, p < .026), support Hypothesis H_{3c}.

Hypothesis H_{3d} predicted that inventory management is positively related to financial performance. As shown a significant positively connection between inventory administration and financial accomplishment zf (β = .321, t = 4.431, p < .000) was found, indicating support for Hypothesis H_{3d}. However, regarding the influence of transportation service on firms' performance, result indicated that transportation service had significant relationship with financial performance (β = -.049, t = -.827, p < .409). Hence, Hypothesis H_{3a} was not supported. The overall summary of this regression result in relation to the inventory management coefficient has a significant influence on Malaysia'smanufacturing sector's financial performance. This means that the null hypothesis will be rejected, whereas the alternative hypothesis will be accepted (i.e., logistics have significant influence on financial performance of manufacturing sector in Malaysia). As aresult, hypotheses H3b, H3c, and H3d were embraced, but not H3a.

4.10.4 Moderating Effect of Innovation on Green Logistics

To determine whether green logistics innovation modifies the relationship between logistics services in the areas of transportation, warehousing, packaging, and inventory management. According to Baron and Kelly (1986), three steps of hierarchical regression were performed in investigating the variance proportion of a study variable as described by other constructs in these constructs are entered into the

test of regression analysis in anorderly manner.

Based on the first step, the direct influence of exogenous constructs was recorded, and in the step 2, the moderating constructs were entered as examine whether the moderator (Innovation on green management) have significant effect on the endogenous constructs (3PLS key performance). Meanwhile, the analysis in the third step indicate that the interaction terms (i.e., the product of the exogenous constructs and the moderator constructs) were used to check any additional variance explained.

4.10.4.1 Innovation on Green Logistics as a Moderating Effect on Logistics Services and Services Performance

Table 4.30 revealed the result of the hierarchical regression between logistics services and services performance. The exogenous constructs were first entered in the step one (1) which explained substantial percentage of variance. Thus, examining of the interaction oftransportation services with innovation of green logistics revealed (t = -1.700; p = .091). This demonstrated that green logistics innovation does not moderate the relationship between transportation services and service performance. Thus, the hypotheses H_{4a} is not supported. Based on the interaction terms of warehousing services x innovation of green logistics, the result of the hypotheses showing (t = 2.588; p = .010).

This indicated that innovation of green logistics moderate the relationship between warehousing services and services performance. Thus, the hypotheses H_{4b} was supported. In addition, examining of the interaction of inventory management with innovation of green logistics revealed (t = 2.416; p = .016). The result indicated that innovation of green logistics moderate the relationship between inventory

management and services performance. Thus, the hypotheses H_{4d} was supported. However, examining of the interaction of packaging services with innovation of green logistics revealed (t = -1.183; p = .238). This proved that green logistics innovation does not mediates the effect between packaging services and service performance. Thus, the hypotheses H_{4c} is not supported. The raw results of the interaction between logistics services and innovation of green logistics can be seen in the Appendix B. hence, Table 4.31 show the results of the interacting effect of innovation of green logistics and service performance of the manufacturing sector in Malaysia.

Table 4.31
Innovation on Green Logistics as a Moderating Effect on Logistics Services and Services Performance

Indirect Hypotheses	**B**	**t**	**Sig.**	**Decision**
Interaction Transportation -> Inn -> Service Performance	-.094	-1.700	.091	Not Moderated
Interaction Warehousing -> Inn -> Service Performance	.134	2.588	.010	Moderated
Interaction Packaging -> Inn -> Service Performance	-.056	-1.183	.238	Not Moderated
Interaction Inventory Management -> Inn -> Service Performance	.124	2.416	.016	Moderated

4.10.4.2 Innovation on Green Logistics as a Moderating Effect on Logistics Services and Operational Performance

Table 4.31 shown the result of the hierarchical regression between logistics services and operational performance. The exogenous constructs were first entered in the step one (1) which explained medium percentage of variance. Thus, examining of the interaction of transportation services with innovation of green logistics revealed (t = .203; p = .839). This demonstrated that green logistics innovation does not moderate the connection between transportation services and operational efficiency. Thus, the hypotheses H_{5a} is not supported. Likewise, examining of the interaction of

warehousing services withinnovation of green logistics revealed (t = -1.094; p = .275). This revealed that green logistics innovation does not moderate the association between warehousing services and operational performance. Thus, the hypotheses H_{5b} was not supported.

Based on the interaction terms of packaging services with innovation of green logistics, the result of the hypotheses showing (t = 3.391; p = .001). This indicated that innovation of green logistics moderates the relationship between packaging services and operational performance. Thus, the hypotheses H_{5c} was supported. In addition, examining of the interaction of inventory management with innovation of green logistics revealed (t = 5.188; p = .000). The result indicated that innovation of green logistics moderates the relationship between inventory management and operational performance. Hence, the hypotheses H_{5d} was supported. The raw results of the interaction between logistics services and innovation of green logistics can be seen in the Appendix B. Therefore, Table 4.32 revealed the results of the interacting effect of innovation of green logistics and operational performance of the manufacturing sector in Malaysia.

Table 4.32
Innovation on Green Logistics as a Moderating Effect on Logistics Services and Operational Performance

Indirect Hypotheses	**B**	**t**	**Sig.**	**Decision**
Interaction Transportation -> Inn -> Operational Performance	.015	.203	.839	Not Moderated
Interaction Warehousing -> Inn -> Operational Performance	-.023	-1.094	.275	Not Moderated
Interaction Packaging -> Inn -> Operational Performance	.208	3.391	.001	Moderated
Interaction Inventory Management -> Inn -> Operational Performance	-.352	-5.188	.000	Moderated

4.10.4.3 Innovation on Green Logistics as a Moderating Effect on Logistics Services and Financial Performance

Table 4.32 revealed the result of the hierarchical regression between logistics services and financial performance. The independent variables were first entered in the step one

(1) which explained significant percentage of variance. Thus, investigative the interactionof transportation services with innovation of green logistics revealed (t = -1.158; p =

.248). This shown that innovation of green logistics does not moderate the relationship between transportation services and financial performance. Thus, the hypotheses H_{6a} is not supported.

Based on the interaction terms of warehousing services with innovation of green logistics, the results of the hypotheses showing (t = -1.973; p = .050). This indicated that innovation of green logistics moderate the relationship between warehousing services and financial performance. Thus, the hypotheses H_{4b} was negatively supported. Also, examining of the interaction of packaging services with innovation of green logistics revealed (t = 2.965; p = .003). This indicated that innovation of green logistics moderate the relationship between packaging services and financial performance. Thus, the hypotheses H_{6c} was supported. Similarly, assessing the interaction of inventory management with innovation of green logistics revealed (t = 2.416; p = .016). The result indicated that innovation of green logistics moderate the relationship between inventory management and financial performance. Thus, the hypotheses H_{6d} was supported. The raw results of the interaction between logistics

services and innovation of green logistics can be seen in the Appendix B. hence, Table 4.33 show the results of the interacting effect of innovation of green logistics and financial performance of the manufacturing sector in Malaysia.

Table 4.33
Innovation on Green Logistics as a Moderating Effect on Logistics Services and Financial Performance

Indirect Hypotheses	**B**	**t**	**Sig.**	**Decision**
Interaction Transportation -> Inn ->Financial Performance	.080	1.158	.248	Not Moderated
Interaction Warehousing -> Inn -> Financial Performance	-.129	-1.973	.050	Moderated
Interaction Packaging -> Inn -> Financial Performance	.170	2.965	.003	Moderated
Interaction Inventory Management -> Inn -> Financial Performance	.244	3.822	.000	Moderated

4.11 Chapter Summary

This chapter presents the findings and interpretations of the empirical findings from the study. The chapter commenced with the data collection process and responses, next to the assessment of non-response bias issue, which the result show that There were no significant differences in response times between early and late respondents by adopting method of independent t-test. In addition, data screening also carried out to check for the missing data and outliers (Univariate and multivariate outliers). The descriptive statistics were reported in order to provide a profile of the respondents who work in the manufacturing industry in Malaysia. The basic assumption of the multiple regression analysis was found which none of the assumptions were violated. This give a go ahead in carry out the regression analysis.

Factor analysis was carried out on all the variables, principal component analyses were statistically revealed to be adequate for further analysis. The Pearson correlation

test was used, and the results show that all of the variables are significantly correlated. Multiple regression analysis of the variables was conducted. Out of the twenty-four (24) hypotheses tested in this study seventeen hypotheses were supported, whereas only seven

(7) hypotheses were not supported. Thus, the implications and recommendation of this results were presented in the next chapter. Therefore, the hypotheses tested were highlighted in the Table 4.34 below.

Table 4.34
Summary of the Hypotheses (Direct and Indirect Hypotheses)

Hypotheses	**Details**	**t**	**Sig.**	**Decision**
H1a	"The transportation service provision offered by 3PL providers is positively related to their service performance".	7.404	.000	Significant
H1b	"The warehousing service provision offered by 3PL providers is positively related to their service performance".	5.583	.000	Significant
H1c	"The packaging service provision offered by 3PL providers is positively related to their service performance".	2.534	.012	Significant
H1d	"The inventory management provision offered by 3PL providers is positively related to their service performance".	6.242	.000	Significant
H2a	"The transportation service provision offered by 3PLproviders is positively related to their operational performance".	.124	.901	Not Significant
H2b	"The warehousing service provision offered by 3PLproviders is positively related to their operational performance".	3.049	.003	Significant

H2c	"The packaging service provision offered by 3PL providersis positively related to their operational performance".	2.212	.028	Significant
H2d	"The inventory management provision offered by 3PL providers is positively related to their operational performance".	3.646	.000	Significant
H3a	"The transportation service provision offered by 3PL providers is positively related to their financial performance".	-.827	.409	Not Significant
H3b	"The warehousing service provision offered by 3PLproviders is positively related to their financial performance".	3.873	.000	Significant
H3c	"The packaging service provision offered by 3PL providersis positively related to their financial performance".	2.247	.026	Significant
H3d	"The inventory management provision offered by 3PL providers is positively related to their financial performance".	4.431	.000	Significant
H4a	"Innovation on green logistics moderates the relationship between transportation services and service performance".	-1.700	.091	Not Moderated
H4b	"Innovation on green logistics moderates the relationship between warehousing services and service performance".	2.588	.010	Moderated
H4c	"Innovation on green logistics moderates the relationship between packaging service and service performance".	-1.183	.238	Not Moderated
H4d	"Innovation on green logistics moderates the relationship between Inventory management and service performance".	2.416	.016	Moderated
H5a	"Innovation on green logistics moderates the relationship between transportation services and service performance".	.203	.839	Not Moderated
H5b	"Innovation on green logistics moderates the relationship between warehousing services and service performance".	-1.094	.275	Not Moderated
H5c	"Innovation on green logistics moderates the relationship between packaging service and service performance".	3.391	.001	Moderated
H5d	"Innovation on green logistics moderates the relationship between Inventory management and service performance".	-5.188	.000	Moderated
H6a	"Innovation on green logistics moderates the relationship between transportation services and financial performance".	1.158	.248	Not Moderated
H6b	"Innovation on green logistics moderates the relationship between warehousing services and financial performance".	-1.973	.050	Moderated
H6c	"Innovation on green logistics moderates the relationship between packaging service and financial performance".	2.965	.003	Moderated
H6d	"Innovation on green logistics moderates the relationship between Inventory management and financial performance".	3.822	.000	Moderated

4.12 Summary of Findings

This research study was conducted to investigate the performance measurement of 3PL service providers in Malaysia's manufacturing sector in relation to green logistics. As a result, this study looks into the relationship between logistics service (in terms of transportation, warehousing, packaging, and inventory administration) and the operation

of Malaysian manufacturing firms. In addition, the study investigates whether green logistics innovation moderates the relationship between logistics services and the performance of Malaysian manufacturing companies. As a result, quantitative methods were employed to collect data from the target respondents, which amounted to the use of structured questionnaires adapted and modified from prior literature. Self-administered questionnaires were used, allowing the researcher to make face-to-face contact withrespondents. Meanwhile, 333 sets of questionnaires were distributed to the owners and managers of manufacturing companies with a population of 455. After a few months of administering the questionnaires, 256 copies of the questionnaires were completed and returned. The data were entered into SPSS version 26 and the analysis began by looking for missing values and outliers. As a result of incomplete data, univariate and multivariate outlier cases, and other factors, 27 questionnaires were deemed unsuitable and inadequate. Finally, 229 copies of the questionnaires were deemed usable and saved for future analysis.

Furthermore, principal component analysis was performed to ensure that the factor validity of the instruments was assessed, followed by the assessment of reliability test for the purpose of assessing the internal consistency of the measures using Cronbach's alpha. The direct relationship hypotheses were tested using multiple linear regression analysis, while the indirect relationship (Moderation) hypotheses were tested using hierarchical regression analysis. The factor analysis of performance as dependent variables revealed that each construct is measured with three components. Transportation, warehousing, packaging, and inventory management were all multidimensionally measured, and their

reliability coefficients were all greater than 0.6, which is the minimum rule of thumb. In terms of testing hypotheses for both direct and indirect relationships using regression analysis, the results show that some hypotheses were accepted while others were rejected. The sub-section that followed reported the results of the stated hypotheses based on the study's objectives.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter gives details of the results got in the last chapter in respect of all the stated objectives of this research. The research investigated a structural model on the relationship between performance measurement of 3PLs service provider and green logistics with the moderating impact of innovation in manufacturing sectors of Malaysia. The sources of information were the senior manager, Executives, Supervisor, Planners, and others. The data is for testing the various hypotheses and model of the study, so that the objectives of the study can be attained. The findings of this investigation are discussed based on the study's highlighted objectives which were hypothesis according tothe research questions that were formulated through the problem statement. As acknowledged, the previous data did not some measurement model based on some indicators which are not measuring their individual variables because of very low factor loadings. But when the items were deleted because they were all below the standard factor loadings. The other data with good loading factor became fit for the model and reasonable.

5.2 Summary and Discussion of Findings

This study was conducted to examine the impact of key performance measurement of third party logistics towards manufacturing sector in Malaysia. The study also went further to examine the moderating impact of new innovation practices in the logistics operation of 3PLs service. With the view of the above, the objectives were

highlighted. To achieve the stated objectives, three research questions were highlighted and answered:

i. What is the current operation performance measurement of 3PL service providersin the manufacturing sector of Malaysia relative to green logistics?
ii. To what degree is the sustainability engagement of 3PLs and manufacturing organization's strategy relatively to greening the transport operations?
iii. What is the moderating effect of new innovation practices in the logistics operationof 3PLs service provider in the manufacturing sector of Malaysia?

Furthermore, the theoretical framework was presented in the chapter two where it was clarified that it is based on resource-based view theory of the organization, and being the underpinning theory. This is due to the resource-based view explained the relationship between the exogenous constructs and third party logistics performance. Thus, this enhances the sustainability is part of 3PLs and manufacturing firm's strategy relative to green transport operation and the four relevant constructs employed were supported by several studies as the primary 3PLs sources (transportation, warehousing, packaging, new innovation practices).

This research study distributed a cross-sectional survey to managers and senior's staffs of 3PL logistics companies in Malaysia. Also, the primary data for the study were collected from managers and senior's staffs of randomly selected 3PL logistics companies in Malaysia by using structured questionnaires survey. The questionnaires were designed to measure items of interest to this study. Thus, the items (instruments) were adapted from many prior literatures. Quantitative method of research using well-structured questionnaire was administered to 333 managers and senior's staffs of

randomly selected 3PL logistics companies virtually. Thus, SPSS used to analyze the data collected from and senior's staffs of 3PL logistics companies in Malaysia.

The result shows that innovative green logistics moderate the relationship between packaging services and operational performance. Likewise, the interaction of warehousing services with innovation of green logistics moderates the relationship between warehousing services and financial performance. This study's findings in the perspective of making innovation in green logistics as a moderating factor in the relationship between 3PLs service provider's key performance factors and green logistics in the Manufacturing industry of Malaysia is significant. This is consistence with the previous studies as well as the resource-based view theory. Precisely, this study analyzed each relationship in the subsection below:

5.2.1 Relationship between logistics service and Service performance

The first relationship investigated in this study is whether there is a significant influence between logistics service and manufacturing service performance. As a result, the hypothesis was tested using multiple regression analysis. The hypothesis that predicts the relationship between logistics services and Service performance was assessed with the help of regression in line with SPSS output. The result revealed that the four predicting variables (transportation, warehousing, packaging and inventory management) were able to explain 71% of the model (R^2 = .708; F-Change = 135.542; P< .001). Specifically, the multiple regressions results indicate that all the four independent variables were found predicting the service performance of the manufacturing companies in Malaysia. It was established through the result that the logistic performance as a whole can jointly cause changes in the service performance.

The dependent variable explained the influence of logistics services on service performance.

In respect of the impact of transportation service on the organization performance, it was established through the result that transport service showed significant relationship with the service performance. This explain hypothesis H1a and it can be proved that it was supported. Meanwhile, hypothesis 1b predicted that warehousing service is positively connected to service performance. It was predicted that warehousing service had a positive significant relationship with service performance, hence, hypothesis H1b is supported.

Likewise, the examination of the impact of packaging services showed that it has a significant positive relationship with the service performance, this proved and supported hypothesis H1c. In a like manner, hypothesis H1d predicted inventory management and the result showed that it is significantly positive on service performance of manufacturing sector in Malaysia, this is an indication that all the hypothesis, H1a, H1b, H1c, H1d were all supported and proven significant positively. This is consistent with previous research, which stated that various environmental and practices such as transportation, warehousing, inventories, and packaging have a significant impact on the green service performance of 3PLs. Singh et al. (2012); Singh, 2011; Sheu et al., 2005; Ebinger et al. (2006).

5.2.2 The relationship between Logistics services and operational performance

The second relationship of this study is to examine whether there is a significant

effect between logistics service and operating performance of manufacturing. Thereby, hypothesis was tested by using multiple regression analysis. The hypothesis that predicts the relationship between logistics services and operating performance was assessed using multiple regression in line with SPSS output. The result shown that the four predicting variables (transportation, warehousing, packaging and inventory management) were able to explain 31% of the model (R^2 = .313; F-Change = 25.498; P< .001). The multiple regressions results indicate that three out of the four independent variables were found predicting the operating performance of the manufacturing companies in Malaysia. It was established through the result that the logistic performance as a whole can jointly cause changes in the operating performance. The dependent variable explained the influence of logistics services on operating performance.

The result of the analysis showed that logistics performance as a whole jointly impact positive changes in the operational performance. This is utilized to prove Hypothesis H2b which predicted that warehousing service has a significant relationship with service performance. In a like manner, the influence of packaging services on operational performance which was tested using hypothesis 2c showed that packaging services had a significant and positive relationship with operational performance, hence hypothesis 2c was proved. Hypothesis H2d predicted that inventory management is positively significant to operational performance and it was supported by the result of the analysis. But hypothesis H2a which predicted the influence of transportation service on organization performance indicated that transportation service had no significant influence with operational performance, it was not supported. Generally, the coefficientof inventory management has significant impact

on operational performance of manufacturing sector in Malaysia. Therefore, it can be explained through the findings of this research that logistics service has significant influence on operational performance ofmanufacturing sector in Malaysia except on transport services. Hence, hypothesis H2a was rejected while hypothesis H2b, H2c and H2d were all supported.

These findings are consistent with previous research findings in which, within the domain of green logistics, green packaging was considered to be another important issue that was prioritized. Authors like Zhang and Zhao (2012) emphasized the government's role in the development of new and innovative green packaging materials. They also advocated for the standardization of packaging materials with the active participation of the government and established institutions. Palanivelu and Dhawan (2011) discussed some efforts to reduce waste weight by reducing packaging volume, and it was discovered that packaging accounts for 23 percent of total waste weight. It has also been discovered that reduced packaging saves the environment because all packages must be transported between retailers and waste processors. Similarly, Carter and Jennings (2002) discovered that social logistics values and a green logistics manager's faith significantly influenced the performance of logistics' social duties. All of this lends credence to the study'sfindings.

5.2.3 Relationship between logistics service and financial performance

The third relationship investigated in this study is whether there is a significant relationship between logistics service and manufacturing financial performance. As a result, the hypothesis was tested using multiple regression analysis. The hypothesis that predicts the relationship between logistics services and financial performance

was assessed using multiple regression in line with SPSS output. The result shown that the four predicting variables (transportation, warehousing, packaging and inventory management) were able to explain 31% of the model (R^2 = .361; F-Change = 31.668; P< .001). The multiple regressions results indicate that three out of the four independent variables were found predicting the financial performance of the manufacturing companies in Malaysia. It was implied through the result that the logistic performance as a whole can jointly cause changes in the financial performance. The dependent variable explained the influence of logistics services on financial performance.

According to hypothesis H3b, the influence of transportation service on organisational performance predicts that warehousing service is positively related to financial performance. The findings demonstrated that warehousing service is positively related to financial performance, thereby supporting hypothesis H3b. Similarly, hypothesis H3c was supported, indicating that packaging services have a significant positive impact on financial performance; thus, hypothesis H3c was supported. Meanwhile, hypothesis H3d predicted that inventory management is related to financial performance in a positive way. A significant positive relationship was shown to exist between inventory management and financial performance which indicate support for the hypothesis. Meanwhile, the prediction in hypothesis H3a predicting the influence of transportation service on the organization performance indicated that there is no significant relationship between transportation service and financial performance, hence hypothesis H3a was not supported.

This study's findings on the relationship between logistics and performance are consistent with the findings of other researchers, such as Huang et al. (2012b), who

discovered that reverse relationships and financial performance influence reverse logistics performance. Likewise, Green supply chain management system was found to result to improve performance in economic, operational, environmental and social performance, (Geng, Mansouri & Aktas, 2017). “Green manufacturing initiatives, according to other researchers, are implemented to improve economic and environmental performance”(Rehman et al., 2016). Green practises also help with the cost-benefit analysis of economic and environmental factors. It is not uncommon to discover that lowering emissions requires only a minor cost increase (Zhanga & Zhaob, 2012; Pazirandeh & Jafari, 2013; Kim et al., 2009). Ellinger et al. (2003) used eight financial performance measures, including gross profit margin, return on sales (ROS), operating profit margin, return on assets (ROA), and return on equity (ROE), accounts receivable turnover, current ratio, and debt ratio. Other metrics used in previous research include return on investment (ROI) (Panayides, 2007), sales growth (Panayides, 2007), and sales volume (Panayides et al., 2007; Yeung et al., 2006).

5.2.4 Innovation on Green Logistics as a Moderating effect on logistics services and Services Performance

This study investigates the indirect effect of green logistics innovation as a moderate impact on the association between logistics services in the aspects of transportation, warehousing, packaging, and inventory management and Malaysian manufacturing companies' service performance. Thus, hierarchical regression was used to investigate the moderating influence of green logistics innovation on the connection between logistics service and service performance, with green logistics innovation moderating two of the four hypotheses. To be more specific, the findings revealed that the interaction of transportation services with green logistics innovation is not

moderating the association between transportation services and service performance, and thus H4a is not supported. Meanwhile, hypothesis H4b was supported, which predicts a positive moderating effectof green logistics innovation on the relationship between warehousing and service performance. It denotes that green logistics innovation moderates the relationship between warehousing services and service performance.

The investigation of the interaction of packaging services with green logistics innovation, on the other hand, revealed that green logistics invention is not moderating the relationship between packaging services and service performance, so hypothesis H4c wasnot supported. The findings are consistent with those of Shahid, Waseem, Khan, Waseem, Hasheem, and Shi (2020), who discovered that technological innovation (process innovation) had a moderating effect on the relationship between internal environment management and a firm's long-term performance. Similarly, technological innovation (process innovation) has no moderating effect on the relationship between socially responsible management and long-term performance of a firm. Likewise, researchers have juxtaposed the adoption of green practices to adoption technological innovation process (Lin & Ho, 2010; Weng, & Lin, 2011). Hence, the utilization of technological innovation theories. As a result of this, technological innovation is the centered and this study and systems environmental innovations as new procedures, products or services that result in the reduction of environmental harms, (De Marchi, 2012).

5.2.5 Innovation on Green Logistics as a Moderating effect on logistics and operational Performance

This study investigates the indirect impact of green logistics innovation as a moderating factor in the connection between logistics services in the areas of transportation, warehousing, packaging, and inventory management and Malaysian manufacturing companies' operational performance. Thus, hierarchical regression was used to investigate the moderating influence on green logistics innovation on the relationship between logistics service and operational performance, with green logistics innovation moderating two of the four hypotheses.

The findings disclosed a hierarchical correlation between logistics service and operational operation. The interaction of transportation services with green logistics innovation revealed that green logistics innovation did not moderate the relationship between transportation services and operational performance, so hypothesis H5a is not supported. Similarly, the investigation of the interaction of warehousing services with green logistics innovation did not moderate the relationship between warehousing and operational performance, so hypothesis H5b was rejected.

In terms of the interaction of packaging services with green logistics innovation, the results showed that green logistics novelty moderates the association between packaging services and operational enactment, thereby supporting hypothesis H5c. Furthermore, the interaction of inventory management with green logistics innovation revealed that green logistics innovation moderates the relationship between inventory organization and operational performance. This make hypotheses H5d to be supported.

Green logistics innovation, according to the study's findings, did not moderate the relationship between transportation services and operational performance. The link between transportation services and operational performance is unaffected by green logistics innovation. Same goes with the interaction between warehousing services and operational performances. So, innovation green logistics has no significant effect on the relationship. The same cannot be said of the relationship between packaging services and operational performance. The innovative green logistics moderate the relationship effectively.

5.2.6 Innovation on Green Logistics as a Moderating Effect on Logistics services andFinancial Performance

This study investigates the indirect impact of green logistics innovation as a moderating effect on the association between logistics services (transportation, warehousing, packaging, and inventory management) and the financial performance of Malaysian manufacturing companies. Thus, hierarchical regression was used to investigate the moderating effect of green logistics innovation on the relationship between logistics service and financial performance. As a result, the innovation in green logistics moderated two of the four hypotheses.

The interaction of transportation services with innovation of green logistics revealed that innovation of green logistics was not moderating the connection between transportation services and financial performance, then hypotheses H6a is therefore supported. Also, the interaction terms of warehousing services with innovation of green logistics, the result indicate that innovation of green logistics moderate the relationship between warehousing services and financial performance. Therefore, hypothesis, H4b was negatively supported. Also, the interaction of packaging services with innovation of green logistics showed that innovation of green logistics moderates the relationship between packaging services and financial performance. This also support hypotheses H6c. Meanwhile, the interaction of inventory management with innovation of green logistics revealed that innovation of green logistics moderates the relationship between inventory management and financial performance. This result supported hypothesis H6d.

According to the findings of this study, green logistics innovation did not moderate the correlation between transportation services and financial performance. It does not have a significant figure in the relationship. Meanwhile, green logistics innovation modifies the relationship between warehousing services and financial performance. Likewise, Green logistics innovation moderates the relationship between packaging services and financial performance. That is, it is very important in moderating the relationship. Green logistics innovation moderated the association between inventory management and financial performance.

5.3 Contributions of the Study

The study investigates the relationship between logistics service and the performance

of Malaysian manufacturing firms' third-party logistics. As a result, the study's findings have provided insight for stakeholders such as academics, government, financial expertise, practitioners, and investors. This insight adds to the body of knowledge in the areas of theory, practice, and methods. The study's contribution is further elaborated as follows:

5.3.1 Theoretical Contributions

This study's findings contribute to and support empirical research on the relationship between logistics service and third-party logistics service performance in Malaysia. As a result, the theoretical contribution of this research is its ability to extend knowledge of third-party logistics performance to the public sector, particularly the manufacturing and logistics sectors. This is due to the fact that the focus of several studies on 3PLs was on profit-driven organizations. As a result, the purpose of this study is to add to the reviewed literature and contribute to the study of logistics services worldwide, particularly in developing countries such as Malaysia. Furthermore, the theoretical contribution of this research study includes the expansion, conceptualization, and empirical testing of third- party logistics effect on performance, as well as the moderated by green logistics innovation. As a result, this study established a link between logistics services, green logistics innovation, and third-party logistics performance.

The findings, in particular, have contributed to the body of relevant knowledge, and thus innovation in green logistics has been established to positively and significantly influence the relationship between logistics service and third-party logistics performance. This finding is especially pertinent in Malaysia, where the Covid-19 pandemic has made the logistics industry more ethical in terms of transportation,

warehousing, and inventory management. In comparison to other previous studies on third party logistics service, this study provides a detailed discussion on the correlation between eulogistic service and performance of the third party logistics service.

This study is the first empirical study to investigate the moderating effect of green legalistic invention on the relationship between logistics service and third-party logistics performance in the Manufacturing and logistics context. As a result, the study combined several studies that included RBV theory and other theories to explain the relationship between logistics service and third-party logistics service performance. Furthermore, the current study has significantly improved understanding of the role of logistics services in improving the performance of third-party logistics services. This study will also make significant contributions to the literature on logistics service and performance by combining various measures that capture the multidimensionality of all four main constructs (transportation, warehousing, packaging, and inventory management).

5.3.2 Practical Contribution

This quantitative study employs green logistics innovation as a moderating construct in the connection between 3PL service providers' key performance factors and green logistics in Malaysia's manufacturing sector. In doing so, the study evaluates the impactof 3PL's new innovation on their key performance indicators. Furthermore, this study adds to the body of knowledge on the key performance measurement of 3PLs service providers in relation to the new green logistic innovation as a moderating factor. The study's findings can assist Malaysia's manufacturing sector in

becoming more sustainable and environmentally friendly in all of its operations. It will also help the manufacturing sector to be more proactive among the region's business gladiators, thereby raising their rating.

The academic and practitioner studies in this study are replete with discussions about the value-added benefits for service providers from providing the best customer service with the green-SCOR components. However, the SCOR-model, which was developed as a diagnostic tool for logistics and supply chains, can be used as a strategic assessment tool for the environmental performance of 3PLs in Malaysia's manufacturing sector. There is clear evidence of environmental considerations in the use of the green-SCOR model by Malaysian 3PL service providers in the manufacturing sector.

The impact and effectiveness of logistics performance through antecedents such as business analytics has become a hypothetically valuable and certain means of securing a competitive advantage and improving logistics services. The study addressed the issue of empirical study dart by assessing the moderating effect of green logistics relative to the key performance measurement of 3 PLs service providers in Malaysia's manufacturing sector. Furthermore, the physical impact of this research will benefit 3PL service providers in all sectors by emphasizing the issue of green strategy as a tool for advanced performance. It is hoped that by doing so, they will be able to improve their performance in terms of efficiency and competitive advantages.

The study's practical contribution to the logistics service of third logistics service

andtheir customers is an understanding of how logistic service performance can focus on green logistics service to perform better, which is essential to customers, and thus compete more effectively with rivals. Executives in the manufacturing and logistics industries have expressed an interest in environmental concerns in logistics service offerings. One critical opportunity for logistics service providers is to provide more environmentally friendly services to their customers. While this research has been widely studied in advanced countries (such as the United States, the United Kingdom, and China), it has received little attention in developing countries such as Malaysia. Furthermore, as part of the strategic integration of the 3PL function into the manufacturing strategic plan, Logistics and Supply Chain professionals must actively participate in the overall business strategic process. All primary alignment in business strategy information must be effectively communicated with Logistics and Supply Chain professionals. These professionals should be adequately trained and compensated, and reorganization schemes should be aimed at achieving manufacturing goals, which will result in overall business performance.

A well-developed and networked logistics industry is critical to the success and overall growth of the economic, as efficient supply chain management provides industry with a competitive advantage. In order to meet current and future business needs and challenges, this Study delves into several factors that contribute to the success of third-party logistics service provider and supply chain partner relationships, such as transportation,warehousing, packaging, and inventory management. The third party logistics industry began as a transaction-based service but has gradually evolved into a more strategic function that is integral to an organization's operational activities, and its adoption in Malaysian industries is likely to gain traction as an increasing

number of organizations embrace the concept of third party logistics for the improved operational efficiency it provides.

5.3.3 Methodological Contribution

Apart from the practical and theoretical contribution stated in this study, this study highlighted some methodological contribution. Most of the third party logistics literatures used on junior staffs or customer's data to examine the performance of logistics services in Malaysia context which reduced the effectiveness of the result. Hence, this study proceeded in using the senior management and owners' data to examine the performance of the third party logistics. Furthermore, the study also builds on prior studies in term of measurement of the moderating variable of the study. Previous studies examined innovation in green management using two or three dimensions, which their results are not significant. Therefore, this study combined the environmental sustainability, strategic management, green transportation operation and green transportation procurement) and it contributes to body of relevant knowledge by examining each of the dimensions as a first order variable.

Furthermore, despite the fact that the measurement scales were adapted and others were adopted from various literatures, this study contributed to revising the measurement items for the study variables. As a result, this study refined all of the measurement items adopted from previous studies and modified them using confirmatory factor analysis CFA, where items with loadings less than the minimum benchmark of 0.5 were removed and new measurement scales emerged. As a result, the above-mentioned implications contribute to the methodological contributions of this study.

In line with the government policy SPV2013, this study's findings in the perspective of making innovation in green logistics as a moderating factors in the relationship between 3PLs service provider's key performance factors and green logistics in the Manufacturingindustry of Malaysia. Hence, it fulfils one of the key economic growth activities or operations under strategic thrust 2 that Malaysia is to build resilient key new sectors in both renewable energy and green economy. With the innovation factor as moderating variables in this study and its impact on the relationships between 3PLs service providers key performance factors and green logistics. This goes to show that this study's findingsis in tendon with SPV2030 and it can assists the government to achieve the aim of SPV2030. This goes to show that innovation that is green in nature can influence the key performance of 3PLs service providers and green logistics if adopted.

In like manner, the findings about the effectiveness of green-SCOR model components which was established as diagnostic tool for environmental performance gauge of 3PLs service providers is a good output for the government policies that is relevant to the intention of governments to attain increase for the indices, particularly, the indices of environmental and climate change index. The adopted tools as showed in this study can assists the government to achieve the desired goals. This can brings about effective and impactful logistics performance by means of antecedent such as business analytic. This has become hypothetically valuable and better system of gaining competitive advantage and improve logistics services.

Besides this, the outcome of this study will be advantageous to the 3PL service

providerin each sector of the economy to be emphatical on green technology issue as tool for economic advancement. By this, its belief that they will be empowered to enhance their performance relative to competitive advantages and efficiency. This also meet the demands and requirement of the SPV2030, under proposed 15 key economic growth activities, especially, KEGA 8, 11 and 12 that highlight transportation & sustainable mobility, as well as renewable energy and green economy respectively.

Furthermore, in the shared prosperity vision 2030 enablers, under sustainability section, national development that is eco-friendly with focus on conserving and preserving naturalresources was part of the findings of this study whereby it showed that innovation by means of green logistics in transport and logistics section is key factor for performance measurement of third-party logistics providers.

Sustainable Developments Goals (SDGs) is also known as global goals, it was adopted in 2015 by United Nations as a global call to action or steps taking to end poverty, protect the whole planet and ensure that by 2030, all people all over the world enjoy prosperity and peace. In line with Sustainable Development Goals, this research output in innovativegreen logistics which moderate the relationship between packaging services and operational performance. This goes to show that the result is beneficial in the area of fulfilling one of the cardinal points of sustainable development goal, goal number 8 to be precise. Where it was stated that SDGs promote economic growth that is sustainable with higher level of technological innovation and productivity. The goal is to attain productiveand full employment with decent work for all men and women by 2030.

The findings of the study where it was established that the interaction of warehousing services with innovation of green logistics moderate the relationship between warehousing services and financial performance. As well as the interaction of packaging services with innovation of green logistics which showed that innovation of green logistics moderates the relationship between packaging services and financial performance. All these findings are in tandem with the SDGs goal number 9, where it was established that technological progress is germane to finding durable solutions to both environmental and economic challenges, such as offering new jobs as well as efficiency in energy utilization. It also promotes industries that are sustainable like manufacturing sector of Malaysia. It was emphasized that investing in innovation and scientific research are all significant means to ease sustainable development.

These indicate that all these findings can be impactful in the process of implementing andachieving the SDGs goals in particular, goal number 8 and 9 as highlighted in the SDGs. This will also assist the Manufacturing sector of Malaysia to measure up to the international standard by complying with all the goals in their business transactions. Furthermore, the conceptualization, empirical testing as well as expansion of third party logistic services impact on the key performance which also moderate the expansion, conceptualization and empirically testing of third party logistics effect on theperformance and also moderate by innovation of the green logistics form part of the theoretical contribution of this research study.

Hence, this study established the linkage between logistics services, innovation on green logistics and the performance of the third-party logistics as it moderates the

relationship between inventory management and financial performance comply with goal number 11 of SDGs. The goal number 11 focus on making cities more sustainable, which is an indication of creating opportunities for business and career, affordable and secured housing, building resilient economies and societies. It also includes public transport investment establishing green public spaces, as well as enhancing urban planning and management in all-inclusive ways. All these corroborates the findings in this study which make it to be more significant in fulfilling all these goals and more relevant if strictly adopted and followed by manufacturing sector in Malaysia as well as third party logistics service providers in Malaysia.

5.4 Limitation of the Study

Despite the huge amount of contribution from the rigorous empirical evidence on the relationship between logistics service and performance of the third party logistics in Malaysia, which provides implications to academicians, practitioners, administrators, researchers, as well as government relevance authorities. However, few limitations do exist that can create research options for the further studies. Firstly, this research study considered only manufacturing firms in Penang and suburb without consider other region like Kuala Lumpur, Pahang, Sarawak, Shaba, Perlis, and Kedah as well as other industries like Aviation, Banking, Oil and Gas, Insurance. Also, even though, there are so many variables that can measure performance of third party logistics service, this study islimited to only transportation, warehousing, packaging, inventory management as well as innovation in green logistics.

In addition, this research study only considered one country (Malaysia), and

specifically undertaken from manufacturing firms in one region. Even though, the population of the study (managers and senior staffs of the Manufacturing) is homogeneous all over Malaysia, the level of region development in terms of water way transportation and other demographic variables may hinder the generalization of the study. Furthermore, this study considered the cross-sectional methods, where data only collected once from the target respondents. This can be considered as short period due to limited resources and time and may eventually result to inability to prove the cause and effect relationship among the variables. More also, this study framework only provides a relationship between the variables not present a deep understanding of the cause and effect of the said relationship. Finally, because the study excluded other stakeholders in Malaysia's manufacturing industry, particularly government relevant authorities, the views of respondents from only one angle (Manufacturing) were considered, which may have provided some balance if those views from the government had been included.

5.5 Recommendation for Further Studies

To address the limitations stated in the previous subsection above, the study suggests that further research should be conducted other variables such as green procurement, strategic orientation, knowledge management, dynamic competence among others to performance of the third party logistics service relationship in Malaysia, medium R^2 on the direct relationship suggest that other variables may have a strong positive relationship with the criterion variables. In addition, there is need for further empirical studies on third party logistics service to performance relationship with will cover the entire six (6) states in Malaysia for the sake of generalization of study.

The data were collected through cross-sectional methods, hence, further research should be consider collecting of data for longer period of time, (i.e., longitudinal research method) to have ample of time for data collection. Also, the further studies study examines extensively the nature of the relationship, considering the cause and effect relationship of the third party performance. More also, the present study used manager and senior staffs as respondents of third party logistics service. Thus, future studies should consider other employees of third party logistics. As explained in the limitation of study, this study adopted quantitative research design to examine the relationship between variables, hence, further studies should adopt a triangulation/Mixed method. That is, qualitative interview to be conducted with participant should give a better understanding of the relationship between the construct under study.

In addition, the present study suggests comparative research between Malaysia and other developing economy that may give insight and enable the comparative countries toexamine areas of strength and weaknesses. A more extensive case study is required to investigate the validity of the proposed model, and the working model is currently being validated with a field expert. Thus, a first visit to a logistics service performance should take into account the definition of the practical case study within organizations for fine- grained evaluation. Finally, the study recommends using the Structural Equation Modelling (SEM) Method with Smart PLS for data analysis in future research studies. This study would like to suggest that a similar study should be conducted in other sectors of the economy such as ministries, government institutions, and the private sector. This is due to the fact that Malaysia's third-party logistics system is still in its early stages, providing a rich research field with ongoing

activities.

5.6 Conclusion

The goal of this research is to look into the correlation between 3PL service provider performance and green logistics, as well as the moderating effect of new green logistics innovation in Malaysia's manufacturing sectors. The first goal is to explore the connection between logistics service transportation and third-party logistics service performance. The results of the multiple regression analysis showed that the relationship between transportation and third-party logistics service performance is supported. As a result, owners and managers must put more effort into strategies while also emphasizing transportation logistics in order to gain a competitive advantage. The second goal of this research is to look into the relationship between logistics service transportation and third- party logistics service performance. The results show that the relationship between warehousing and third-party logistics service performance was supported. This suggests that warehousing is a good predictor of third-party logistics performance. As a result, third-party logistics owners and managers should place a greater emphasis on the issue ofwarehousing.

The third goal is to explore the relationship between logistics service packaging and third-party logistics service performance. The results of the multiple regression analysis showed that the relationship between packaging and third-party logistics service performance is supported. As a result, owners and managers must put more effort into strategies while also emphasizing transportation logistics in order to gain a competitive advantage. The results show that the relationship between inventory management and third-party logistics service performance was supported. This

suggests that inventory management is a good predictor of third-party logistics performance. As a result, third- party logistics owners and managers should place a greater emphasis on inventory management.

As a result, the influence of the four independent variables (transportation, warehousing, packaging, and inventory management) is critical in creating a positive impact on third- party logistics service performance, which includes service, operational, and financial performance. In an increasingly competitive business environment, the role of green logistics innovation as a moderating effect is critical in creating alignment between those independent variables and third-party logistics service performance in order to ensure the logistic and supply chain procurement function remains in sync with purchasers and objectives. There is a link between several relationship logistics service dimensions and the level of performance. The findings can be used to support the importance of relationship marketing in the third-party logistics industry. This study also revealed that green logistics innovation in the areas of environmental sustainability and strategic management play a role in 3PL performance in Malaysia.

The framework of this study was derived from the existing literature reviews, so constructs such as transportation, warehousing, packaging, and inventory management, aswell as green management innovation, were included. It is possible to conclude that all of the research objectives were met. As a result, the theoretical framework agrees with the underlying theories (Resource Based View) that were used to explain the study framework.

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APPENDICES

Moderating Effects

Transportation * Innovation in Green Logistics -> Services Performance

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.703[a]	.494	.492	.62733	
2	.814[b]	.662	.659	.51379	
3	.816[c]	.666	.662	.51166	1.976

a. Predictors: (Constant), Transportation
b. Predictors: (Constant), Transportation, Inn. Green Logistics
c. Predictors: (Constant), Transportation, Inn Green Logistics, Inter Transport
d. Dependent Variable: Service Performance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.171	.191		6.138	.000
	Transportation	.727	.049	.703	14.889	.000
2	(Constant)	.065	.188		.345	.731
	Transportation	.255	.060	.246	4.257	.000
	Inn. Green Logistics	.756	.071	.614	10.602	.000
3	(Constant)	-.992	.649		-1.528	.128
	Transportation	.593	.208	.573	2.855	.005
	Inn. Green Logistics	1.066	.196	.866	5.439	.000
	Inter_Transport	-.094	.055	-.545	-1.700	.091

a. Dependent Variable: Service Performance

Warehousing * Innovation in Green Logistics -> Services Performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.668[a]	.446	.444	.65626
2	.833[b]	.693	.691	.48941
3	.838[c]	.702	.698	.48335

a. Predictors: (Constant), Warehousing
b. Predictors: (Constant), Warehousing, Inn Green Logistics
c. Predictors: (Constant), Warehousing, Inn Green Logistics, Inter_warehouse

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.026	.220		4.665	.000
	Warehousing	.759	.056	.668	13.528	.000
2	(Constant)	-.298	.191		-1.558	.121
	Warehousing	.342	.052	.301	6.562	.000
	Inn. Green Logistics	.761	.056	.618	13.497	.000
3	(Constant)	-1.864	.634		-2.940	.004
	Warehousing	.827	.195	.728	4.252	.000
	Inn. Green Logistics	1.209	.182	.981	6.657	.000
	Inter_warehouse	-.134	.052	-.713	-2.588	.010

a. Dependent Variable: Service Performance

Packaging * Innovation in Green Logistics -> Services Performance
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.587[a]	.344	.341	.71415
2	.824[b]	.680	.677	.50023
3	.826[c]	.682	.677	.49979

a. Predictors: (Constant), Packaging
b. Predictors: (Constant), Packaging, Inn Green Logistics
c. Predictors: (Constant), Packaging, Inn Green Logistics, Inter_packaging

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.637	.217		7.556	.000
	Packaging	.580	.053	.587	10.919	.000
2	(Constant)	-.206	.193		-1.068	.287
	Packaging	.242	.043	.245	5.616	.000
	Inn. Green Logistics	.828	.054	.672	15.383	.000
3	(Constant)	-.912	.627		-1.455	.147
	Packaging	.444	.175	.449	2.529	.012
	Inn. Green Logistics	1.031	.180	.837	5.729	.000

Inter_packaging	-.056	.047	-.324	-1.183	.238

a. Dependent Variable: Service Performance

Inventory Management * Innovation in Green Logistics -> Services Performance
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.704[a]	.495	.493	.62671
2	.846[b]	.716	.713	.47129
3	.850[c]	.723	.719	.46632

a. Predictors: (Constant), Inventory Mgt.
b. Predictors: (Constant), Inventory Mgt., Inn Green Logistics
c. Predictors: (Constant), Inventory Mgt. Inn Green Logistics, Inter_Inv

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.825	.213		3.868	.000
	Inventry_Mgt	.805	.054	.704	14.919	.000
2	(Constant)	-.400	.185		-2.162	.032
	Inventry_Mgt	.405	.051	.354	8.009	.000
	Inn_Green_Logistics	.721	.054	.586	13.244	.000
3	(Constant)	-1.955	.669		-2.922	.004
	Inventry_Mgt	.858	.194	.750	4.423	.000
	Inn_Green_Logistics	1.160	.189	.941	6.126	.000
	Inter_Inv	-.124	.051	-.677	-2.416	.016

a. Dependent Variable: Service Performance

Inventory Management * Innovation in Green Logistics -> Operation Performance
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.503[a]	.253	.250	.67963
2	.562[b]	.315	.309	.65219
3	.623[c]	.388	.380	.61773

a. Predictors: (Constant), Inventory Management
b. Predictors: (Constant), Inventory Management, Inn Green Logistics
c. Predictors: (Constant), Inventory Management, Inn Green Logistics, Inter_Inv

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.141	.231		9.263	.000
	Inventory Mgt.	.513	.059	.503	8.774	.000
2	(Constant)	1.562	.256		6.098	.000
	Inventory Management	.324	.070	.318	4.632	.000
	Inn. Green Logistics	.341	.075	.311	4.528	.000
3	(Constant)	-2.862	.887		-3.228	.001
	Inventory Mgt.	1.612	.257	1.580	6.274	.000
	Inn. Green Logistics	1.588	.251	1.446	6.334	.000
	Inter_Inv	-.352	.068	-2.160	-5.188	.000

a. Dependent Variable: Operational Performance

Transportation * Innovation in Green Logistics -> Operation Performance
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.441[a]	.194	.191	.70595
2	.531[b]	.282	.276	.66783
3	.535[c]	.286	.276	.66754

a. Predictors: (Constant), Warehousing
b. Predictors: (Constant), Warehousing, Inn Green Logistics
c. Predictors: (Constant), Warehousing, Inn Green Logistics, Inter_Transport

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.414	.237		10.201	.000
	Warehousing	.447	.060	.441	7.398	.000
2	(Constant)	1.710	.261		6.556	.000
	Warehousing	.225	.071	.222	3.161	.002
	Inn Green Logistics	.405	.077	.369	5.259	.000
3	(Constant)	1.469	.342		4.300	.000
	Warehousing	.237	.072	.234	3.295	.001
	Inn Green Logistics	.546	.150	.497	3.637	.000
	Inter_Transport	-.023	.021	-.149	-1.094	.275

a. Dependent Variable: Operational Performance

Warehousing * Innovation in Green Logistics -> Operation Performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.441[a]	.194	.191	.70595
2	.531[b]	.282	.276	.66783
3	.535[c]	.286	.276	.66754

a. Predictors: (Constant), Warehousing
b. Predictors: (Constant), Warehousing, Inn Green Logistics
c. Predictors: (Constant), Warehousing, Inn Green Logistics, Inter_Transport

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.414	.237		10.201	.000
	Warehousing	.447	.060	.441	7.398	.000
2	(Constant)	1.710	.261		6.556	.000
	Warehousing	.225	.071	.222	3.161	.002
	Inn Green Logistics	.405	.077	.369	5.259	.000
3	(Constant)	1.469	.342		4.300	.000
	Warehousing	.237	.072	.234	3.295	.001
	Inn Green Logistics	.546	.150	.497	3.637	.000
	Inter_Transport	-.023	.021	-.149	-1.094	.275

a. Dependent Variable: Operational Performance

Packaging * Innovation in Green Logistics -> Operation Performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.441[a]	.195	.191	.70584
2	.545[b]	.297	.291	.66066
3	.576[c]	.332	.323	.64583

a. Predictors: (Constant), Packaging
b. Predictors: (Constant), Packaging, Inn Green Logistics
c. Predictors: (Constant), Packaging, Inn Green Logistics, Inter_packaging

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.584	.214		12.073	.000
	Packaging	.389	.052	.441	7.404	.000
2	(Constant)	1.674	.255		6.556	.000
	Packaging	.222	.057	.252	3.892	.000
	Inn Green Logistics	.409	.071	.372	5.754	.000
3	(Constant)	-.939	.810		-1.159	.248
	Packaging	.967	.227	1.097	4.265	.000
	Inn Green Logistics	1.162	.233	1.058	4.994	.000
	Inter_packaging	-.208	.061	-1.344	-3.391	.001

a. Dependent Variable: Operational Performance

Transportation * Innovation in Green Logistics -> financial Performance
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.333[a]	.111	.107	.70177
2	.526[b]	.277	.271	.63415
3	.530[c]	.281	.272	.63367

a. Predictors: (Constant), Transportation
b. Predictors: (Constant), Transportation, Inn Green Logistics
c. Predictors: (Constant), Transportation, Inn Green Logistics, Inter_Transport

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.025	.213		14.172	.000
	Transportation	.290	.055	.333	5.313	.000
2	(Constant)	2.096	.232		9.038	.000
	Transportation	-.106	.074	-.122	-1.437	.152
	Inn Green Logistics	.634	.088	.610	7.210	.000
3	(Constant)	2.988	.804		3.716	.000
	Transportation	-.391	.257	-.449	-1.522	.129
	Inn. Green Logistics	.372	.243	.358	1.533	.127
	Inter_Transport	.080	.069	.545	1.158	.248

a. Dependent Variable: Financial Performance

Warehousing * Innovation in Green Logistics -> financial Performance
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.477[a]	.227	.224	.65406

2	.560[b]	.314	.308	.61775
3	.571[c]	.326	.317	.61383

a. Predictors: (Constant), Warehousing
b. Predictors: (Constant), Warehousing, Inn
c. Green Logistics
c. Predictors: (Constant), Warehousing, Inn. Green Logistics, Inter_warehouse

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.375	.219		10.829	.000
	Warehousing	.457	.056	.477	8.174	.000
2	(Constant)	1.714	.241		7.102	.000
	Warehousing	.249	.066	.259	3.786	.000
	Inn. Green Logistics	.380	.071	.366	5.336	.000
3	(Constant)	.197	.805		.245	.807
	Warehousing	.719	.247	.750	2.910	.004
	Inn. Green Logistics	.813	.231	.782	3.526	.001
	Inter_warehouse	-.129	.066	-.818	-1.973	.050

a. Dependent Variable: Financial Performance

Packaging * Innovation in Green Logistics -> financial Performance
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.461[a]	.213	.209	.66019
2	.568[b]	.323	.317	.61371
3	.590[c]	.348	.340	.60340

a. Predictors: (Constant), Packaging
b. Predictors: (Constant), Packaging, Inn Green Logistics
c. Predictors: (Constant), Packaging, Inn Green Logistics, Inter_packaging

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.601	.200		12.992	.000
	Packaging	.385	.049	.461	7.835	.000
2	(Constant)	1.711	.237		7.214	.000
	Packaging	.222	.053	.266	4.184	.000
	Inn. Green Logistics	.400	.066	.385	6.057	.000
3	(Constant)	-.424	.757		-.560	.576
	Packaging	.830	.212	.996	3.921	.000
	Inn. Green Logistics	1.015	.217	.977	4.670	.000

Inter_packaging	-.170	.057	-1.161	-2.965	.003

a. Dependent Variable: Financial Performance

Inventory management * Innovation in Green Logistics -> financial Performance
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.542[a]	.293	.290	.62549
2	.595[b]	.353	.348	.59966
3	.627[c]	.393	.385	.58238

a. Predictors: (Constant), Inventory Management
b. Predictors: (Constant), Inventory Management, Inn Green Logistics
c. Predictors: (Constant), Inventory Management, Inn Green Logistics, Inter_Inv

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.106	.213		9.897	.000
	Inventory Management	.523	.054	.542	9.709	.000
2	(Constant)	1.567	.235		6.653	.000
	Inventory Management	.347	.064	.359	5.391	.000
	Inn. Green Logistics	.317	.069	.305	4.580	.000
3	(Constant)	-1.506	.836		-1.801	.073
	Inventory Management	1.241	.242	1.286	5.125	.000
	Inn. Green Logistics	1.183	.236	1.139	5.006	.000
	Inter_Inv					

a. Dependent V
b. ariable: Financial Performance

SECTION 1: GENERAL INFORMATION OF RESPONDENTS

Direction: Please fill in the blank and tick ( ) the appropriate boxes that corresponds to your answer to each of the question below.

1. Name : _____
2. Email Address : _____
3. Contact Number : _____
4. Gender
   1) Female
   2) Male
5. Age
   1) 18 - 25
   2) 26 - 35
   3) 36 - 45
   4) 46 - 55
   5) 56 - Above
6. Qualification
   1) Diploma & Below
   2) Degree
   3) Master
   4) PhD
7. What is your position in your company (choose one)
   1) Senior Manager /Manager
   2) Executive
   3) Supervisor
   4) Planners
   5) Others

8. Types of services offered by the logistics company
   1) Freight forwarding
   2) Transportation
   3) Warehousing and Inventory
   4) Manufacturing
   5) Logistics
9. Type of Ownership
   1) Public Limited Company
   2) Private and limited company
   3) Sole proprietorship
   4) Partnership
   5) Limited Liability Partnership
10. Number of full time employees
   1) < 50
   2) 50 - 99
   3) 100 - 149
   4) 150 - 199

5) >200

11. Years of operation in Malaysia / Other Country
    1) 0 - 5
    2) 6 - 10
    3) 11 - 15
    4) 16 - 20
    5) > 20
12. Annual revenue in 2019 and 2020 in USD (USD)
    1) < 500k
    2) 500k - 1.0m
    3) 1.1m - 10.0m
    4) 10.1m - 50.0m
    5) >50.0m

Section 2. This section contains the Green logistic/3Pls features of your organization. Please indication in your response, towards which extent do you think the following statement are true. You can tick ( ) the appropriate response level based on the scale indicated. Very high-5, high-4, Neutral-3, low-2, very low-1.

	Environment & Strategy	(5)	(4)	(3)	(2)	(1)
1	Level of environmental compliance					
2	Energy Consumption					
3	Water Consumption					
4	Wastage /scrap rate					
5	Number of jobs created					
6	Contribution to local community					
7	The purchased products are friendly to environment and environmental harmful products are avoided					
8	The purchased raw material can be reused or recycled					
9	The purchased raw material are produced from excess and environmental friendly					
10	Consideration for procurement and selection of raw materials based on cost, quality, and environmental impacts					
11	The computer network is used instead of papers in marketing between vendor and factory (Paperless)					
12	The provider has received ISO 9000 and ISO 14000					
13	Corporate strategy regarding renewable energy and its importance to support in manufacturing					
14	Reducing carbon dioxide emission in manufacturing process					
15	Strategic planning the preventive maintenance of machines					
16	The pollution reducing system in producing process is operated					
17	The clean manufacturing technologies are applied.					
18	Control and emission pollution of heavy metals into water resource					
19	Reducing energy consumption cost					
20	Cooperate with employee regarding energy preservation for cost saving					
21	The waste for production can be reused or recycled					
22	The used products from customers are recycled					
23	The used packaging(s) are reused					
24	Strategic planning for optimizing waste treatment and disposal system based on legal procedure					
25	Control and decreasing the consumption of hazardous and toxic substance in raw materials					
26	The environmentally friendly products are designed					
27	Promoting and improvement of occupational health and safety in the workplace					
28	The wasted water generated from whole facilities are neutralized and reused					
29	The wastes from all manufacturing failure are well managed					
30	The thought of environment responsibility is implanted to employee					

31 Communication with customer in order to make them realize the importance of environmental friendly products

	Performance	(5)	(4)	(3)	(2)	(1)
	Infrastructure					
1	The quality of ports, rail, roads and terminal					
2	The telecommunications quality as well as other sharing systems that are important for trade facilitation					
3	Most major infrastructures are well maintained					
4	Adequate logistics services are provided and well developed					
	Services					
5	The imports shipments are cleared and delivered as scheduled					
6	Logistics organization provides adequate services					
7	The exports shipments are cleared and delivered appropriately					
8	Timely and adequate information received when any regulations and government policy changes					
9	Demonstrating high levels of compliances by expedited clearance					
10	Standard inspection of all services					
11	Less damaged and Lost of freight					
12	Evaluating performance					
	Shipment					
13	Competitive trucking charges					
14	Competitive transloading facility charges					
15	Low operating cost and maintenance cost					
	Tracing and Tracking of Goods					
16	Consignments are easily trace and tracked					
17	Short time for customer to respond					
18	Detailed information and timing about the location of the consignment					
	Appropriateness					
19	All consignment reaches the consignee at the appropriate time and promptly					
20	All order placement as well as the receipt are within stipulated time					
21	All clearance and delivery of exports and imports are to schedule					
22	Adequate and timely information on regulatory changes					
23	Expedited customs clearance for traders with high compliance levels					

	Strategic Management	(5)	(4)	(3)	(2)	(1)
1	Learning existing work practices					
2	Strategic planning (formulation)					
3	Strategy implementation/execution					
4	Focusing attention on strategic aspects of business					
5	strategic decision making					
6	Strategic capabilities					

	Green Transport Operations	(5)	(4)	(3)	(2)	(1)
1	Managing strategic change					
2	The concern on environmental management of provider					
3	The concern of carbon dioxide releasing of provider					
4	The distance between vendor and factory is minimized in order to reduce pollution and cost					
5	The factory is concerned about the fuel consumption in distribution includes measuring the carbon dioxide emission					
6	The delivering vehicles are well checked and maintenance plan are available.					
7	The full truck load system is applied to increase the effectiveness of product delivering					

8 The delivering routes are determined to safe the fuel and reduce the pollution

Green Transport Procurement (5) (4) (3) (2) (1)

1 Consideration for procurement and selection of vehicle types based on cost, quality, and environmental impacts

2 Strategic planning the preventive maintenance of all vehicles
3 The pollution reducing system is paramount in transport procurement
4 The clean energy technologies are applied

Section 3: This section deals with capacities Logistics Services. Please tick the appropriate portion that correspond with satisfaction level of capacity based on the scale where very poor=1, poor =2, neutral=3, good=4 and very good=5

Reliability of service (5)
(4)
(3)
(2)
(1)

1 Capability to provide warehousing
2 Capability to offer customs clearance service
3 Capability to provide consolidation of service
4 Capability to provide multimodal services
5 Capability to offer door-to-door services
6 Capability to price tagging, bar coding and labelling
7 Capacity to offer repairing management
8 Capacity to offer QA testing, inspection and control
9 Capacity for the company to engage reverse logistics

Service Reliability

11 Accuracy of service documents which includes billing, transit, delivery information

12 Accuracy of estimates and calculation
13 All services and products are up to standard and meet requirement of customer

14 Consistency in performance and procedures

Cargo Safety

15 Reliability of leaving time on schedule
16 Capability to trace all cargo with ease

Responsiveness

17 Response to unforeseen circumstance while cargo is on transit
18 Prompt response to cargo claims
19 Immediate response to Shippers complaints
20 Availability of cargo space

Relationship Building

21 Collaboration in term of services with other logistics companies
22 Collaboration with other downstream organizations
23 Competences of sales personnel

ICT Integration

24 Integration of Global information systems
25 Data transmission quality
26 Information sharing with other organization
27 Links of communication between company and their drivers
28 Linkage with other associated industries' information systems (hauler, forwarder, customs and carriers)

Logistic Capability

29 Offering operation simplicity
30 Offering standard operations
31 Ability to keep a very low rate of freight damages
32 Ability to maintain timely delivery for all category of customers

33 Ability too tackle problems and complaints
34 Ability to retain qualified and skilful personnel
35 Ability to offer routine services

THANK YOU