# ADOPTION OF CLOSED-LOOP SUPPLY CHAIN PRACTICES BY MYHIJAU MARK CERTIFIED MANUFACTURING FIRMS IN MALAYSIA: ANTECEDENTS, CONSTRAINTS, OUTCOME AND THE MEDIATING EFFECT OF GREEN CAPABILITIES

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**by**

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| | |
|---|---|
| CLSC | Closed-loop Supply Chain |
| IT | Institutional Theory |
| KBV | Knowledge based view Theory |
| NRBV | Natural Resource-Based View |
| RBV | Resource-Based View |
| SCM | Supply Chain Management |
| GSCM | Green Supply Chain Management |
| EPR | Extended Producer Responsibility |
| EU | European Union |
| CE | Circular Economy |
| TBL | Triple Bottom Line |
| CSR | Corporate Social Responsibility |
| GDP | Gross Domestic Product |
| EoL | End of Life |
| EoU | End of Use |
| SPV 2030 | Shared Prosperity Vision |

**PENERIMAAN AMALAN RANTAI BEKALAN TERTUTUP OLEH SYARIKAT PEMBUATAN PERSIJILAN 'MYHIJAU MARK' DI MALAYSIA: PELAKU PENDAHULUAN, KEKANGAN, HASIL DAN KESAN MEDIASI KEMAMPUAN HIJAU**

## ABSTRAK

Rantaian Bekalan Tertutup (CLSC) memerlukan pengurusan pemulangan produk daripada pelanggan untuk diperbaiki dan dipasarkan kembali. Kelajuan perkembangan ekonomi telah memberi kesan kepada bidang pembuatan mengeluarkan produk dengan jangka hayat yang pendek. Kesannya setiap versi penambahbaikan produk berlaku terlalu laju dan akhirnya pemulangan produk tidak kira dalam bentuk "berakhir jangka hayat" atau pun "berakhir fungsi". Kajian ini memformulasikan bentuk kajian untuk menilai factor-faktor yang mempengaruhi secara luaran dan dalaman bagi perlaksanaan CLSC, halangan-halangan serta implikasi terhadap tiga garisan utama (*triple bottom line*). Kajian ini juga mengeksplorasi kesan pihak ketiga kemampuan hijau antara faktor luaran dan CLSC. *Structural equation model* telah digunakan untuk analisis dapatan syarikat MyHijau Mark di Malaysia. Seratus Sembilan syarikat telah memberi respon melalui *purposive sampling*. Kajian ini juga menggunakan Teori Institusi, Teori Berasaskan Sumber, Teori Berasaskan Sumber Asli, dan Teori Berasaskan Pengetahuan. Dapatan menunjukkan peranan kerajaan mengatasi peranan persaingan dan pelangan dalam menggalakkan pelaksanaan Rangkaian gelung rantaian bekalan (CLSC). Limitasi kajian yang boleh dibaiki dimasa akan datang dengan mencuba kembali keputusan-keputan yang tidak signifikan untuk diperbaiki pada kajian akan datang.

**ADOPTION OF CLOSED-LOOP SUPPLY CHAIN PRACTICES BY MYHIJAU MARK CERTIFIED MANUFACTURING FIRMS IN MALAYSIA: ANTECEDENTS, CONSTRAINTS, OUTCOME AND THE MEDIATING EFFECT OF GREEN CAPABILITIES**

## ABSTRACT

Closed-Loop Supply Chain (CLSC) acquires cores or product returns from consumers, recovering their residual value and remarketing them. The rapidness of economic growth gives manufacturers no option to shorten the product life cycle. Consequently, the new version of product upgrade happens too fast, hence increasing product returns in the form of End of Life (EOL) or end of use. This study formulates a research model to examine the antecedent factors which influenced, the constraints of the closed-loop supply chain practice as well as the impact on the triple bottom line in Malaysia. This research also explores the mediating effects of green capabilities on the relationship between the firm's external antecedents and its adoption of a closed-loop supply chain. To test the research hypotheses, a structural equation model has been used to survey the data drawn from MyHijau Mark certified directory in Malaysia. Hundred and nine companies have answered all seventy items questionnaire through purposive sampling. Therefore, this study has aimed to explain the relationship between Institutional Theory, Resource Based View, Natural Resource-Based View (NRBV) and Knowledge based view Theory towards a CLSC adoption in Malaysia. The findings highlighted the role of the government in overpowering competitors and customers in adopting a CLSC.

# CHAPTER 1

# INTRODUCTION

## 1.1 Chapter Overview

This chapter presents an overview of this study. A brief discussion of the study's background describing the closed-loop supply chain and the environmental issue will be discussed. This chapter will explain theoretical gaps from precedent studies on the need to conduct and explore the research problem. The chapter then presents the scope of the study, followed by the significance of the study. Lastly, the chapter will close with the organization of the remaining chapters.

## 1.2 Background of the study

### 1.2.1 Global Pollution

Being a global phenomenon, there has been increasing interest in looking at how climate change and global warming affect the earth's inhabitants. Global discussion and several reports and guidelines have been fixed between governments to solve these issues. Climate Change 2022 Mitigation of Climate Change, Summary for Policymakers Report by The Intergovernmental Panel on Climate Change (IPCC) revealed "*total net anthropogenic GHG emissions have continued to rise during the period 2010–2019, as have cumulative net CO2 emissions since 1850. Average annual GHG emissions during 2010–2019 were higher than in any previous decade, but the rate of growth between 2010 and 2019 was lower than that between 2000 and 2009*" (IPCC, 2022). Tang, (2019) also proved this statement saying that climate change is a global phenomenon and is particularly evident in the past three decades.

Global warming happens mainly through Green House Gases (GHG) emission such as carbon dioxide and methane. These gases increase the earth's core. France Climate Change Information Kit mentioned that GHG emission was duly because of human activities by burning fossil fuels and deforestation. Global warming affects the existence of humankind adversely. One of the most visible adverse effects of climate change is the permanent crisis in the food supply (Dyer, 2011; Godde et al., 2021). Undesirable impact on the environment through global warming includes seasonal change, unfavorable weather, and melting of the ice caps in the polar areas and this affects the ecosystem, increases the chances of storms, floods, and sea-level rise (Bebbington & Larrinaga-González, 2008; Serreze & Meier, 2019).

Global industries depend highly on the burning of fossil fuels to run their production. It is said that the business sector is on the sole contributors to global warming and climate change through this energy use and waste emission. This is consistent with Ahmad and Hossain, (2015) stating that climate change and global warming have adverse effects on the environment and humankind in many ways. One other main causes of global warming are industrial pollution. Hence over the last few years, business activities are being monitored by several entities such as the government, media, and social activists. After the Kyoto Protocol in 1997, the spotlight was merciless to business organizations as part of the 175 signing countries' different stakeholders. The agreement targeted to lower the level of greenhouse gases to a certain point by 2012 and being the reference to date as Greenhouse Gas Protocol (GHG, 2023). Kyoto Protocol criticized companies from developed countries as environment polluters and the main greenhouse gas emitters. Over the years, emission trading was popularized. The trend directed companies, especially those in developed countries, to reduce their greenhouse gas emissions and compensate for greenhouse

gas emissions. The compensation should be given to developing countries as their less industrialized, thus emitting fewer greenhouse gases.

These matters implied different threats and challenges to the companies. This constitutes a vital predicament where on one side, an increase in cost and decrease in profitability happens through paying compensation and taking measures to reduce greenhouse gas emissions. On the other hand, legitimacy and integrity threats arise in people's eyes if the compensation and action are not met and taken. This results in a severe approach to climate change and global warming issues by companies around the world. Therefore, companies must consider climate change issues in making business decisions (Wittneben & Kiyar, 2009), and the idea of closed-loop supply chain adoption should be in the picture. A closed-loop supply chain (CLSC) is one of the critical factors in attaining sustainable manoeuvres and undeniably one of the main drivers of sustainability (Kleindorfer et al., 2005).

### 1.2.2 Malaysia Context

Malaysia consists of two separate regions, namely the mainland Peninsular Malaysia and Malaysian Borneo. With a total land area of 330, 803 $km^2$, the population is experiences estimated at 32 million in 2017 (Rahman et al., 2013). Malaysia equatorial climate all year round, where the weather is hot and humid. The annual climate variability is intimately linked to the Southwest and the Northeast Monsoons. The Southwest Monsoon occurs from April to September, whereas the Northeast Monsoon occurs from October to March. Kwan et al., (2013) mentioned that the Southwest Monsoon features drier weather with less rainfall in comparison to the Northeast Monsoon, which carried more precipitation.

Over the last two decades, Malaysia has experienced irregular warming and rainfall, gaining global attention to study climate trends and their implications. A study investigated the historical annual mean of daily temperatures and annual precipitation in selected regions across Malaysia (Sammathuria & Ling, 2009). Simulations of temperature and rainfall anomalies were also included in the study. The Malaysian Meteorological Department (2009) reported climate change scenarios across Malaysia with data from limited stations to demonstrate the past temperature and rainfall trends focusing on simulating regional climate variations. Malaysia received much attention due to the impacts climate change has on agriculture, the nation's major contributor for Gross Domestic Product (Department of Statistics Malaysia, 2018).

The agricultural sector amount to 8.1% of the GDP with paddy being recorded as the second largest agricultural production after palm oil. The sector depends highly on climatic factors does rendering climate change may pose a significant concern to it. Looking back to the Malaysian economy background in the 1970s, Malaysia was totally dependent on agriculture, and it was the backbone for Malaysia's economy. Malaysia is also knowns for the main export of rubber, tin, palm oil, and cocoa. In fact, agriculture was the largest single contributor to GDP at 29.1 percent. To date, agriculture is the third most important economic sector in Malaysia (Md Razak et al., 2015). This shows that Malaysians have done many agriculture activities, including production, handling, and exporting the nation's resources.

Malaysia's urbanization rate is recorded at 75%, which is more than 20% higher than the global urbanization rate mentioned by Economic Planning Unit (human capital) deputy director-general Johan Mahmood Merican (News straits times, 2018). Urbanization is indirectly contributing to and other environmental issues (Abdullah,

2009). Abdullah, (2009) stated that Malaysia is experiencing rapid industrialisation and urbanisation, giving adverse effects on the environment from increasing waste.

Ruby Lim, (2018) mentioned that Housing and Local Government Minister Zuraida Kamaruddin has reported that Malaysia's population is currently 32 million and generates 38,000 metric tons of waste daily. Minister Zuraida Kamaruddin added that only 24% of the waste is managed through waste separation and recycling, while the remaining 76% went to the landfill (Lim, 2018). According to the Statistician Malaysia Department, which released by Dato' Sri Dr. Mohd Uzir Mahidin Chief Statistician Malaysia Department of Statistics, Malaysia, For the states that adopted the Solid Waste and Public Cleansing Management Act 2007 (Act 672), a total of 3,108.9 thousand tonnes of solid wastes was produced in 2019 as compared to 3,098.7 thousand tonnes in 2018. Therefore, these are the evidence of pollution in Malaysia, and it will be threatened by Malaysia if the authority takes no action.

### 1.2.3 Sustainable development goals (SDG)

The Sustainable Development Goals, shortened as SDGs are a global call to end poverty, protect the planet, and improve each individual's lives no matter their geographical location. As part of the 2030 Agenda for sustainable development, 17 goals were adopted by all United Nations members, as stated in figure 1.1. The goals layout a 15-year plan to accomplish. Sustainable development is defined as development that meets current needs without jeopardising future generations' ability to meet their own. Sustainable development promotes collaborative efforts to create an inclusive, sustainable, and resilient future for people and the earth.


Figure 1.1 Sustainable Development Goals

(Source: THE 17 GOALS | Sustainable Development (un.org))

Harmonizing economic growth, social inclusion, and environmental protection is crucial as the three core elements in attaining sustainable development. These three elements are interrelated and essential for individuals and societies to prosper. One fundamental requirement for sustainable development is exterminating poverty entirely. The 17 goals advocate for the integrated and sustainable management of natural resources and ecosystems, as well as promote sustainable, inclusive, and equitable economic growth, create greater opportunity for all, reduce inequalities, boost basic living standards, inculcate equitable social development and inclusion, and more.

A study on sustainable development study was conducted to see the approaches of sustainable goals and indicators, how they influence one another and how to list their importance within a network of current city management (Moschen et al., 2019). In the past, the United Nations' focus on millennium development goals has found dissatisfaction in relation to the socioeconomic diversity contexts though some goals

were achieved through sustainability indicators. The extensive discussions on sustainable development concepts have led to various definitions producing different responses. Generally, sustainable development attempts to incorporate growing concerns on the range of environmental issues with social and economic issues (Meadows et al., 1992; Hawken et al., 1999; Sneddon et al., 2006). Sneddon et al. (2006) discuss ecological economics, political ecology, and development as freedom, the three aspects of sustainable development. According to Leal Filho et al. (2018), the SDGs are critical instruments to promote social and sustainable development globally.

Four dimensions are separating United Nation Sustainable Development Goals; social (health, education, and quality of life), environmental (environment preservation with natural resources and sustainable use), economic (energy consumption and others), and institutional (foreseeing the capacitation to put in practice the described goal) (United Nations Sustainable Development, 2015). Studies show that the main urban challenges are related to unplanned urban growth and poor-quality public services, resulting in a lack of duty to enforce the law and achieve sustainable development goals.

In achieving the SDGs, discussion on sustainable development should look into social and governmental involvement. (Leal Filho et al., 2018) state that public involvement is a fundamental tool for cities to achieve sustainable development. Changes in society's behavior are of considerable value in achieving goals as individual changes are inadequate.

#### 1.2.3(a) UN Sustainable Development Goal number twelve (12)

This study has focused on SDG12 'Responsible consumption and production' as it emphasizes promoting resource and energy efficiency, sustainable infrastructure,

access to essential services, green and decent jobs, and a better quality of life. Responsible consumption and production will assist in achieving overall development plans while reducing future economic, environmental, and social costs, strengthening economic competitiveness, and reducing poverty. Because it aspires to achieve more and better with less, it will gain net welfare by lowering resource use, degradation, and pollution throughout the cycle. This improves the overall quality of life. SGD 12 includes eight objectives. One of the goals is to significantly reduce trash generation by 2030 through prevention, reduction, recycling, and reuse.

The current ever-growing consumption and production to meet human demands greatly impacted environmental sustainability. This phenomenon has become critical due to society's unsustainable lifestyles and rapid increase of the human population globally, which results in over-exploitation of limited natural resources, more pollution, and excessive waste generation (Adham et al., 2015). United Nations Sustainable Development Goal promotes responsible consumption and production, responding to global calls, and customers are now environmentally conscious. Indeed, most of the waste material that is generated and discarded in the manufacturing process can be recycled and reused. Due to resource shortage and environmental degradation, manufacturing enterprises are facing the challenge of coordinated development of production and the environment (Giri et al., 2017). Malaysia should embark on product return management or 'take-back product program' and observe how it works in supply chain management.

### 1.2.4 Closed-Loop Supply Chain

Supply Chain Management (SCM) in its traditional form is also known as forward supply chain. It regulates the interchange of information and materials in the

logistic process, from raw material acquisition to product delivery to the end market. This procedure involves several suppliers, manufacturers, and customers, and SCM must be adaptable to the supply change flow (Chopra & Meindl, 2007; Govindan et al., 2015).

Green supply chain management (GSCM) is a comprehensive approach to managing supply networks to protect the environment and minimise environmental damage (Silva et al., 2019). The process is very relevant to society and the environment. In order to minimise the negative effects on the environment, the green supply chain is an extension of the conventional supply chain that includes these precautions at every stage of the production and distribution process (Beamon, 1999). Eco-friendly practises include things like minimising energy consumption and waste, limiting exposure to potentially dangerous substances, and recycling or reusing materials and products.

Sustainable Development is a development that conforms to the present's needs without appeasing upcoming generations' ability to meet their needs. For supply chain companies of the current twenty-first century, the concept of sustainable development plays a crucial role. The sustainable supply chain's core concepts are formed from supply chain management's responses to environmental, economic, and social issues (Chardine-Baumann & Botta-Genoulaz, 2014). Eltayeb, Zailani and Ramayah (2010) stated that the outcome of a green supply chain initiatives study predicts the present depth of its adoption effectiveness. The result is yet conclusive even though several studies are deliberating green supply chain initiatives' relationship with the performance outcome.

Due to public awareness, closed-loop supply chains have received growing attention in supply chain and operations management over the past few years. Then, laws were passed that mandated businesses dispose of their EOL goods. This is mainly because of the more meticulous legislation and present profit margins in the related reverse flow activities – after-sales services (Govindan et al., 2015).

The conventional forward supply chain and additional reverse supply chain management are the closed-loop supply chain that manages product recovery processes and captures the values of products consumed and used by customers. Products can be disassembled into different levels during the recovery process; module, part, and material. The aim of reprocessing could either restore the returned product's functionality, upgrade the products to a certain quality level, or acquire product quality to as good as new.

The closed-loop supply chain (CLSC) integrates material, financial, and information flows through the forward and reverse chain. CLSC helps companies recognize the potential benefits and possible challenges of the operation and strategy. The reverse logistic system with the third-party reverse logistics provider in CLSC is incredibly essential. It covers recycling materials, saving resources, and activities protecting the environment. Companies have started developing innovative product recovery programs to recover and reuse their EoL products as they have begun to recognize the strategic value of integrating environmental principles into their business policies. One recovery process is also known as remanufacturing, where a returned (recovered) item is transformed through disassembly, cleaning, testing, part replacement/repair, and a new ensemble equivalent to the original manufactured product.

Remanufactured products are usually high-value industrial products. Examples of this include aircraft or automobile engines, aviation equipment, railroad locomotives equipment, medical equipment, machine tools, copiers, electrical and electronic equipment, toner cartridges, cellular telephones, single-use cameras, etc. (Shaharudin et al., 2015). Precedent literature has extensively discussed several concepts and practices on product returns in the reverse supply chains. The widely discussed concepts include industrial ecosystem, product lifecycle stages management, closed-loop supply chains, integrated supply chain management, and green or sustainable supply chains (Seuring, 2004; Zhou et al., 2021). The fundamental idea behind the concept is to address environmental issues across the production chain. Hasanov et al., (2019); Mondragon et al., (2011) went on to say that by extending the product lifecycle in the supply chain, product returns have the potential to produce unique value throughout the reverse flow in a closed-loop supply chain.

### 1.2.5 Product Return

There has been a rise in the number of products returned due to several factors over the last couple of decades (Bhatia & Kumar Srivastava, 2019). Amongst the factors are return policies and competitive pressure (Jayaraman et al., 2008). Guide et al., (2003) also added that the shortened product lifecycles have also immensely increased product returns. Guo et al., (2018) extended that many products are returned in the manufacturing and retail industries. Every year, the continuous filling of landfills has increasingly raised the public concern on environmental issues of tons of solid waste in Malaysia. Environmental awareness and behavior in four environmental issues, namely water pollution, air pollution, waste management, and climate change

in Malaysia, increase by day (Mei et al., 2016). Therefore, product return or product take-back is a vital research area requiring immediate attention.

Unfortunately, no aggressive attempt has been made in Malaysia to recover or recycle end-of-life products, nor how to return items with significant residual value (Shaharudin et al., 2019). The unsustainable waste treatment will be generating environmental crises involving illegal dumping and the expanded use of landfills that badly impinge on human and environmental health (Mohamed, 2009). Therefore, it is vital for Malaysia and other developing countries that have faced similar problems in developing a clean production system and effectively embarking the closed-loop supply chains to monitor both the forwards and reverse movement of goods and materials.

As a result of the significant impact it has on environmental responsibilities, many industrialised countries now require extended producer responsibility (EPR) legislation from both manufacturers and importers. All these happened due to energy or resource depletion, air and water pollution, and climate change. Authorities require manufacturers to take or share the accountability for collecting, recycling and disposing of their end-of-life products, which is the so-called extended producer responsibility (EPR) regulations (Chang et al., 2019). It has shown that the trend of customers and competition pattern towards EPR or to collect and repossess their defective or end-of-life (EoL) products. For example, the enacted rules by European Union (EU) (Mazzanti and Zoboli, 2006) which the Waste Electrical and Electronic Equipment (WEEE) instructs manufacturers' accountability for taking back their products. Similar regulations are either in place at state level in the United States, particularly in California and Massachusetts (Gutowski et al., 2005).

Even though product returns hold significant importance, studies in Malaysia ten years ago have shown a reactive approach from firms in managing their product returns (Eltayeb et al., 2010, 2011a; Nik Abdullah et al., 2011; Olugu et al., 2010). This is mainly because of the lack of return capabilities (Eltayeb et al., 2011a), high-cost returns operations (Eltayeb et al., 2011a; Khor & Udin, 2013), and the hurdles in getting the sufficient volume and proper timing of returns (Shaharudin et al., 2015). In addition, several firms lacked in facilities to handle product returns as product returns management is not a part of their founding expertise. To date, however, product return programme growth has been accelerated by the drive to cut production costs, shorten product life cycles, shape consumer preferences, and comply with legislation concerning end-of-life products (Shaharudin, Tan, et al., 2019a).

## 1.3 Problem Statement

Malaysia has established itself as a developing country, with its aspirations of attaining developed nation status by 2030 hinging on the government's dedicated endeavours to foster the industrial sector. Shared Prosperity Vision 2030 (SPV 2030) which aims to develop a fair and equitable distribution of economic development at all levels by 2030, reflected the commitment by Malaysia in implementing the 2030 Agenda for Sustainable Development (SDG 2030). It would be illogical and imprudent to pursue the objective of attaining worldwide leadership in industrialization without duly acknowledging the prevailing state of the global environment and neglecting to assess the potential environmental ramifications associated with achieving this goal (Zailani et al., 2017). Thus, The Malaysian government should implement significant measures to tackle the challenges related to product returned, which trigger waste management and conservation, which have the potential to significantly affect the

country's long-term sustainable growth. These efforts are aimed at positioning Malaysia through SPV 2030 therefore reaffirms Malaysia’s continued commitment in implementing SDG 2030 in tandem with the next chapter of development towards becoming a competitive and inclusive high income nation, emphasising a people centric approach as one of the most vital elements towards pursuing sustainable economic growth

Due to the issues discussed in the background of the study, complying with the reverse logistics segment of the CLSC is the best solution to the high numbers of product returns among Malaysian firms to support the SDG and the Twelfth Malaysia Plan 2021-2025. It needs commitment from the authority, customers and the whole supply chain partner regardless of vendors or competitors. Pereira et al. (2018) stated that these unknowns provide operational hurdles to CLSC adoption, making it crucial for businesses to consider them and plan for future strategies and measures. Since the finished product is the ultimate goal of the whole supply chain, traditional manufacturing has suppliers' upstream processes create output tailored to their customers' downstream processes. By contrast, inputs to supply loops are not typically made with scrap value in mind. As a result, the supply loop must be set up to deal with ambiguous factors like the timing of the return of end-of-life products and the content of their recovered value. Due to date, reverse logistics will likely be more constrained than forward supply chains (Zeballos et al., 2018).

Shaharudin, et al., (2019) mentioned that companies had paid rising interest to product returns and recovery management for more than a decade, knowing that these provide economic, social, and environmental benefits (triple bottom line), especially when the product return management or take back product is the root cause of the highlighted issues above (Global pollution). Product returns are classified as

commercial returns, end-of-use returns, and end-of-life returns when considering the complete product lifespan.Seitz, (2007) stated that a returned product could be reused, recycled, refurbished, or remanufactured accordingly to its state. Effective product return handling is crucial to a company's long-term viability. Product returns and recovery management is an area that some businesses still aren't aggressively tackling. According to the majority of surveys, reverse logistics is not widely used by Malaysian factories (Eltayeb et al., 2010, 2011b; Olugu et al., 2010). In addition, many companies, especially those with a traditional supply chain approach, choose to disregard returns and product returns (Jayaraman et al., 2007), while a select minority have developed effective strategies for dealing with them. There is a shortage of data in the current literature that provides backing for the practise of product return management. In the past, researchers have mostly investigated what leads to product returns (Rogers and Tibben-Lembke, 2001). So, it is difficult to make fair and trustworthy conclusions concerning the effect of product returns on the uptake of CLSC activities, and this study seeks to address this issue.

The previous studies also stated that green capabilities that respond to customers' and other stakeholders' environmental interests are critical enablers of a CLSC (Robotis et al., 2012). Given previous studies that examined the green capabilities in CLSC, first from Hofmann et al. (2012) focused on firm-specific capabilities that can stimulate the embracing of environmental movements. Secondly, Guide Jr. and Van Wassenhove (2009); Mitra, (2012), since the effective execution of a CLSC depends on the quantity, timing, and quality of product returns in the reverse supply chain, the green capabilities cannot be implemented in separation. Thirdly, Shaharudin et al. (2017) emphasized the effect of product return volume on the adoption of CLSC activities; in 2019), Shahrudin et al. have discussed the mediating

effects of product return volumes on CLSC adoption. Other than looking into the institutional perspective, the factors that made companies comply close loop chain, lack of study mentioned on the constraints or the reluctance for the companies to embrace the close-loop supply chain.

Hence based on the literature and statistic stated previously, this study formulates a research model to examine the antecedent factors influence and the closed-loop supply chain practice in Malaysia and the impact on the triple bottom line. It also to understand how institutional pressures (coercive, normative and mimetic) and support from Myhijau program, respectively and collectively, motivate the companies to increase the green capabilities and CLSC practices. At the same time, this study has identified three significant issues for companies faced in the closed loop supply chain. Furthermore, this study hypothesized one moderator and one mediator to investigate the relationship between antecedents and closed-loop supply chain adoption.

## 1.4 Research Objectives

The following are research objectives in due course of this study:

1. To identify the relationship of regulatory pressure, customer pressure, and competitive pressure towards green capability in closed-loop supply chain adoption.

2. To assess the relationship green capability and closed-loop supply chain adoption

3. To measure the mediator effect of green capabilities in the relationship between regulatory pressure and closed-loop supply chain adoption.

4. To measure the mediator effect of green capabilities in the relationship between customer pressure and closed-loop supply chain adoption

5. To measure the mediator effect of green capabilities in the relationship between competitive pressure and closed-loop supply chain adoption

6. To examine the moderating effect of return product management in the relationship between green capabilities and closed-loop supply chain adoption.

7. To study the relationship closed-loop supply chain adoption towards economy, social, and environmental performance.

8. To identify the relationship of the constraints (Recollection issues, Reprocessing issues, Redistribution issues) towards closed-loop supply chain adoption.

## 1.5 Research Questions

The following are research questions in the due course of this study:

1. What are the relationships of regulatory pressure, customer pressure, and competitive pressure towards green capability in closed-loop supply chain adoption?

2. What are the relationships of green capability towards closed-loop supply chain adoption?

3. Does the mediator effect of green capabilities in the relationship between regulatory pressure and closed-loop supply chain adoption?

4. Does the mediator effect of green capabilities in the relationship between customer pressure and closed-loop supply chain adoption?

5. Does the mediator effect of green capabilities in the relationship between competitive pressure and closed-loop supply chain adoption?

6. Does the return product management moderate the relationship between green capability and closed-loop supply chain adoption?

7. What is the relationship closed-loop supply chain adoption towards economy, social, and environment performance?

8. What are the relationships of the constraints (Recollection issues, Reprocessing issues, Redistribution issues) towards closed-loop supply chain adoption?

## 1.6 Scope of the study

The study focused on Green label manufacturing sectors in Malaysia, which received Myhijau Mark registration. MyHIJAU Mark & Directory is a Government initiative to promote the sourcing and purchasing of green products and services in Malaysia. The Malaysian Green Technology And Climate Change Centre (MGTC) is entrusted to manage MyHIJAU Mark & Directory and is responsible for promoting, business advisory, verification, and monitoring tified green products and services. Malaysian Green Technology and Climate Change Centre (MGTC) was formerly known as Malaysian Green Technology Corporation or GreenTech Malaysia. MGTC is the government agency under the purview of Ministry of Environment mandated to lead the nation in the areas of Green Growth, Climate Change Mitigation and Climate Resilience and Adaptation.

Data have been collected through online survey questionnaire distribution to the manufacturing companies according to MyHijau Directory as received Green Product certification as presented below:

Myhijau green product ceritification:

1. Green label certification (ISO 14024 Type I Eco-labels) E.g SIRIM Eco labelling Scheme

2. Green Label Certification (ISO 14025 Type III Eco Labels) E.g SIRIM Carbon Footprint labelling Scheme

3. Green Label Certification (other Type I-like Voluntary Sustainable Scheme; VSS) eg Energy Efficiency, water efficiency, PEFC & MCS

4. Performance Standard Compliance e.g MS2413:2011 (P) Electric Motorcycles Specification , Part 3(Performance Test)

Responses were collected from supply chain managers or individuals that are involved with decision making in the supply chain or production and logistics.

## 1.7 Significance of the Study

By integrating multiple viewpoints on the MyHijau marks certified manufacturing company in Malaysia using a closed-loop supply chain and its output, the study has theoretically and practically contributed to the field. Given the above explanation, the significance of this study can be described succinctly from two aspects.

### 1.7.1 Theoretical implication

This study have planned to broaden up the body of knowledge relating to closed-loop supply chain adoption in Malaysia. The increasing concern for the depletion of natural resources has alarmed respective stakeholders, and it has pushed more government regulation around emissions and ethical sourcing for manufacturing.

Theoretically, the design of a closed-loop supply chain combined both forward and reverse supply chains. The forward supply chain includes all processes involved in creating new products, from raw materials all through to the distribution of the product to consumers. In contrast, the reverse supply chain is everything in the process of collecting, testing, and retrieving returned products, parts, and materials and their reintroduction into the supply chain through recycling. So, once an item has been manufactured and distributed, a closed-loop manufacturer will attempt to encourage the item's return when it is no longer being used by offering take-back programs and other incentives. They will then either return it to its previous condition, ready for resale, or use it for parts that can be used in future products. Following these flows are then "closed". One "closed" example is remanufacturing operation. According to Krikke et al., (2004), one of the main distinctions between "forward" and "closed" supply chains is the customer's dual function as end-user and core supplier in the latter scenario.

This research examined the relationship between external and internal antecedents towards closed-loop supply chain management and the effects of triple bottom performance. Focus on the relationship of closed-loop supply chain adoptions towards triple bottom performance is highlighted. In addition to that, the study also

looks into the moderation effect of product return management in the relationship of internal antecedents' factors between closed-loop supply chains.

This study will contribute to three theories; Institutional theory, Natural Resources Based theory and Knowledge-based View. These theories have been widely discussed in organizational studies. This study will discuss the theories from the perspective of supply chain management. Jennings and Zandbergen, (1995) were one of the earliest studies to examine sustainable practices from the lens of institutional theory. The institutional theory discussed the external factors where legitimacy extended by institutional actors bound organizations. As a result, organisations may implement pollution prevention activities to appease both internal and external authorities.

Organizations generally respond to three pressure classes: coercive, mimetic, and normative (DiMaggio & Powell, 1983, Zhu & Sarkis, 2007). The pressures exerted by institutional actors have helped elevate the environmental performance of firms. To remain competitive, they practice compliance with legal requirements. This study has three external antecedents: 1) regulatory pressure, 2) customer pressure, 3) competitive pressure.

While the internal forces of closed-loop supply chain have adopted from the resource-based view (RBV), the resource-based view (RBV) suggests that organizations use rare, valuable, and inimitable resources to create competitive advantage (Barney, 1991, Dierickx & Cool, 1989, Mahoney & Pandian, 1992, Penrose, 1959, Priem & Butler, 2001). Thus, the green capabilities are the variable fall as internal antecedents in closed-loop supply chain adoption.

Another significant contribution is towards the moderator between internal forces and close loop supply chain is adopted from Knowledge Based View (KBV). The KBV expands on the RBV by recognising that knowledge can be a scarce, priceless, and irreplaceable strategic asset. The knowledge may be embedded within an organization's policies, procedures, systems, and routines.

The moderator variable between internal forces and closed-loop supply chain adoptions is product return management. The process of product return management is so detailed and particular. Some companies are reluctant to practice closed-loop supply chains due to the lack of knowledge of the product return management process. Although this theory has been widely discussed and recognized by other literature, there is very little study on Malaysia's closed-loop supply chain adoption.

The vital part of this research is to aim those theories, and its variable contributes to the triple bottom line performance. Thus the idea of the triple bottom line starts from the concept of the circular economy. Implementation of Circular Economy (CE) strategies can be regarded as a solution to the environmental problem. CE comprises end-of-life management of a product so that the product, after its completion of functional life, could again be brought back into the supply chain by various means rather than considering it a waste (Govindan & Soleimani, 2017). The concept of CE covers all the aspects of sustainability i.e. environmental, social and economy also known as the Triple Bottom Line (TBL) approach (Elkington, 1998a).

The economic aspects help produce imperative returns by maintaining sufficient cash (Henriques & Richardson, 2013). The environment component guards environment capitals for the continuity of humanity (Savitz, 2013). The social

components help in the formation and progress of employees' job enrichment with their health and society welfare (Mckenzie, 2004).

After the presentation of sustainable development goal at the Earth Summit in Johannesburg, South Africa in 2002, the triple bottom line approach was regarded as composed assimilation of economic, environmental, and social performance. The concept of sustainability rest upon three pillars: people, planet and profit (Figge et al., 2002). (White, 2013) estimated more than 100 definitions of sustainability, and he mentioned it means different things to different people and is difficult to define. Hence, this study posits the complete set of antecedents and outcomes that comply with the Malaysia'ssed-loop supply chain adoption.

### 1.7.2 Practical implication

Why is this research so significant? According to the MyHijau mark directory, in Malaysia, at the end of 2020, 441 companies have declared themselves as Green Labelled companies. SIRIM certifies some of the companies as Green labeled companies, and a majority of them have fulfilled the requirements of ISO 14024 Type I Eco-labels. Moreover, the companies are practically complying with 'sustainable production' to prove they are *Green* enough to be certified, especially in the sourcing process.

This study is significant for practitioners, particularly those who are involved in the supply chain and production. Supply chain executives should be aware that a closed-loop supply chain may increase profit and sustainability as companies plan details on producing the products and dispose of them profitably.

Most Malaysian businesses still rely on voluntary return policies; hence the country has a low level of adoption of closed-loop supply chains and extended producer responsibility(Shaharudin et al., 2017a; Shaharudin, Govindan, et al., 2019; Zailani et al., 2017). Thus, this study will identify the antecedent's factors to inspire their practice while identifying its main constraints. It also helps the government respond to the global call by United Nation and establish a more extended plan for Malaysia, achieving Twelfth Malaysia Plan 2021-2025. Indeed, the principles of SDG 2030 had already been implemented under the Eleventh Malaysia Plan (2016-2020) – which depicted the Malaysian people as the centrepiece of all development efforts in ensuring that no section of society is left behind in achieving sustainable development. Thus SDG 2030 will continue to be embedded into this Malaysia's latest long-term plan of the SPV 2030, which will be operationalised through the Twelfth Malaysia Plan (2021-2025), and the Thirteenth Malaysia Plan (2026-2030).

From a practical perspective, the findings of this research could give the governments or policymakers in-depth information of antecedent factors or competence ability of each Green labelled manufacturing firms on their challenge to comply close-loop supply chain. Besides, this research would also benefit the companies in understanding how close loop supply chain has worked that will indirectly give them a competitive advantage over their competitors within the supply chains.

As defined by Webster and Mitra (2007), collective implementation or recollection means that the relevant industry sector takes on joint responsibility for modifying the industrial structure. Thereby creating conditions under which remanufacturing can become profitable in cases where it would not be so in the absence of a take-back law. Yet if these rules are applied to each company separately