



***ADOPTION OF CIRCULAR ECONOMY
APPROACH IN DEVELOPING PRELIMINARY
POLICY FRAMEWORK FOR PLASTIC WASTE
IN MALAYSIA***

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DEVELOPING PRELIMINARY POLICY FRAMEWORK FOR
PLASTIC WASTE IN MALAYSIA**

**MASTER PROJECT
MASTER OF SUSTAINABLE SYSTEM
MALAYSIA-JAPAN INTERNATIONAL INSTITUTE OF TECHNOLOGY, UNIVERSITI
TEKNOLOGI MALAYSIA
(2018-2020)**

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PLASTIC PRODUCTS ARE MOSTLY SINGLE-USE

discarded in the short period of time, but take over 400 years to degrade

PLASTIC'S LARGEST MARKET IS PACKAGING (40%)

due to lifestyle changes of people in 60 years

RESOURCES USED

about 8% of the world's oil production is used for plastic manufacturing

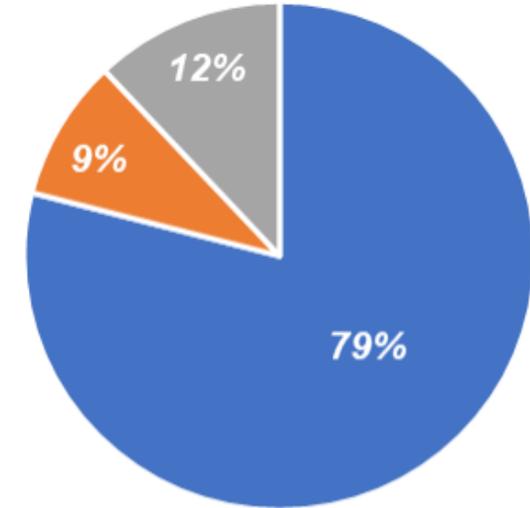
ENVIRONMENTAL IMPACTS

blockages, pollutions, contaminations, damages

ECONOMICAL IMPACTS

damage to the marine ecosystem cost at least USD 13 billion every year after-use externalities and GHG emissions from its production - estimated to cost USD 40 billion annually

GLOBAL PLASTIC WASTE SINCE 1950



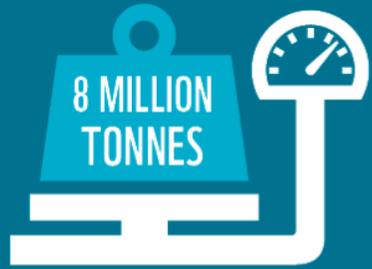
■ Dumped ■ Recycled ■ Incinerated

(Geyer et al., 2017)

TRANSITION TO CIRCULAR ECONOMY

A key to develop a sustainable, low carbon, resource efficient and competitive economy





8 MILLION TONNES

OF PLASTIC ENTERS THE OCEAN EVERY YEAR (2015 ESTIMATE)



<60%

OF GLOBAL MARINE PLASTIC ENTERS THE OCEAN FROM CHINA, INDONESIA, MALAYSIA, THE PHILIPPINES, THAILAND AND VIETNAM

860 MILLION TONNES

CO₂ EMISSIONS FROM PLASTICS IN 2019 (ABOUT 2.3% OF TOTAL GLOBAL EMISSIONS)



BY 2050, THERE MAY BE

MORE PLASTIC THAN FISH

IN THE SEA BY WEIGHT



+300%

PLASTIC WASTE IS PROJECTED TO QUADRUPE BETWEEN 2010 AND 2050



800 SPECIES

ARE DIRECTLY THREATENED BY MARINE PLASTIC DEBRIS



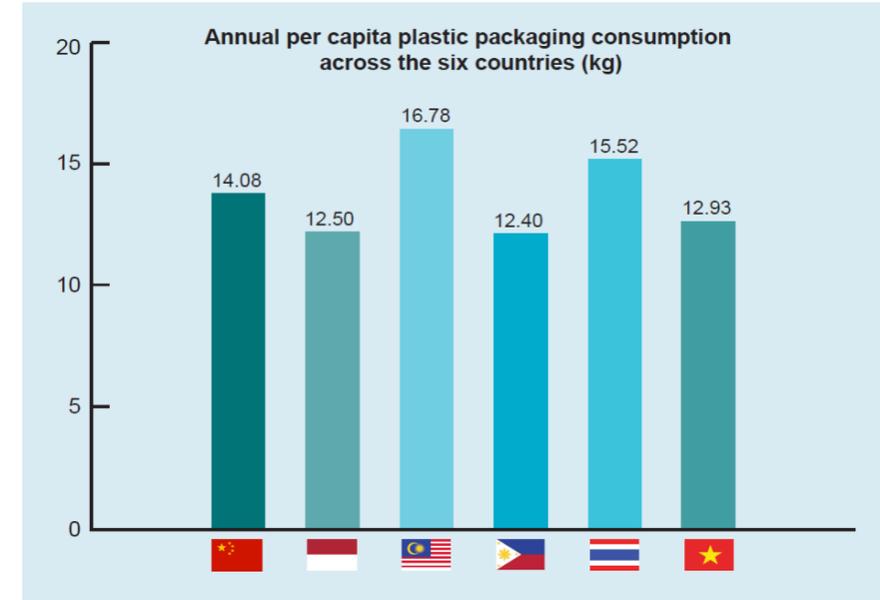
PROBLEM STATEMENT

Top 10 Countries Ranked by Mass of Mismatched Plastic Waste (2010)

| Rank | Country | Waste Generation Rate [kg/ppd] | % of Waste that Is Plastic | % Mismatched Waste | Plastic Waste [MMT/yr] | % Mismatched Plastic Waste | Marine Debris [MMT/yr] |
|------|-------------|-----------------------------------|----------------------------|--------------------|---------------------------|----------------------------|---------------------------|
| 1 | China | 1.10 | 11 | 76 | 8.82 | 27.7 | 1.32-3.53 |
| 2 | Indonesia | 0.52 | 11 | 83 | 3.22 | 10.1 | 0.48-1.29 |
| 3 | Philippines | 0.5 | 15 | 83 | 1.88 | 5.9 | 0.28-0.75 |
| 4 | Vietnam | 0.79 | 13 | 88 | 1.83 | 5.8 | 0.28-0.73 |
| 5 | Sri Lanka | 5.1 | 7 | 84 | 1.59 | 5.0 | 0.24-0.64 |
| 6 | Thailand | 1.2 | 12 | 75 | 1.03 | 3.2 | 0.15-0.41 |
| 7 | Egypt | 1.37 | 13 | 69 | 0.97 | 3.0 | 0.15-0.39 |
| 8 | Malaysia | 1.52 | 13 | 57 | 0.94 | 2.9 | 0.14-0.37 |
| 9 | Nigeria | 0.79 | 13 | 83 | 0.85 | 2.7 | 0.13-0.34 |
| 10 | Bangladesh | 0.43 | 8 | 89 | 0.79 | 2.5 | 0.12-0.31 |

(Jambeck et al., 2015)

Malaysia ranked highest among 6 countries in terms of annual per capita plastic packaging consumption.



(WWF, 2020)



37,000 tonnes of solid waste per day

(2015)

RM476 million recyclable materials disposed

(2015)

RM163 million recyclable plastics disposed

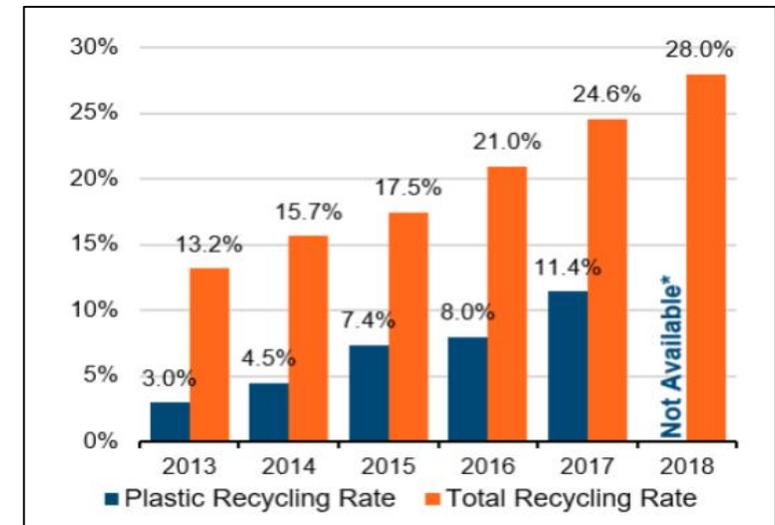
(2015)

WASTE MANAGEMENT

(SWCorp & JPSPN, 2016)

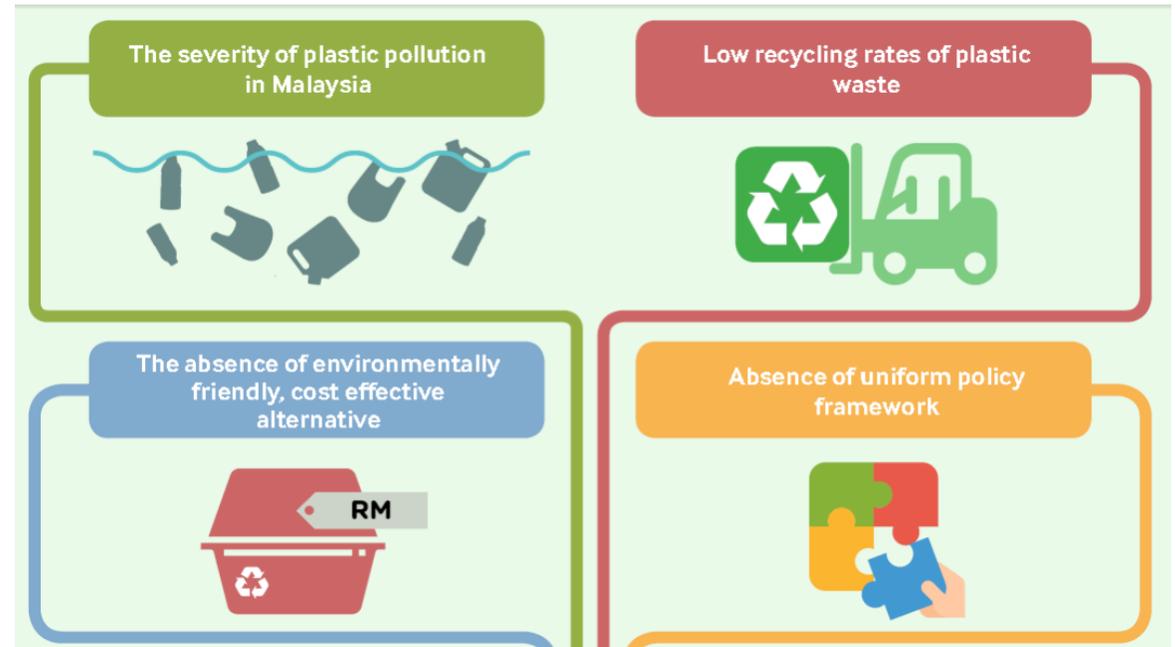
Recycling rate in Malaysia (2013-2018)

(SWCorp, 2018)



PROBLEM STATEMENT

- The plastic problem is a growing global concern, and as a developing country Malaysia is also facing the bad consequences of the accumulation of plastic waste in its environment.
- The high percentage of mismanaged plastic in Malaysia, shows that there are weaknesses and shortcomings in the current waste management system. The issue was getting worse in 2018, when there was a spike of illegal foreign plastic waste into Malaysia.
- Therefore, it is in dire need that an overarching and effective policy instruments based on circular economy to be introduced and implemented by the government to overcome the plastic problem mainly from the single use products.
- At present, there is no uniform approach in Malaysia to address single-use plastics.
- Therefore, the government has introduced the Malaysia's Roadmap towards Zero Single Use Plastics 2018-2030, which stated that a Circular Economy Roadmap (CER) for plastics will be launched soon and to be implemented in Phase II starting from year 2022.



RESEARCH QUESTIONS:

What is the best policy framework of circular economy approach to tackle the plastic problem in Malaysia?

How the government's policy framework could drive transition towards circular economy for plastics in Malaysia?

1. To evaluate Malaysia's current policy on single use plastic reduction and conduct comparative analysis of the policy with other countries' policy (EU & Japan);

1. To acquire and analyse inputs for circular economy policy framework by conducting qualitative analysis on the information from related stakeholders and literatures; and

1. To develop a formulation for preliminary policy framework for circular economy of plastic to enhance effectiveness in curbing its problem in Malaysia.

Circular Economy Model

Participants in a Circular Economy strive to:

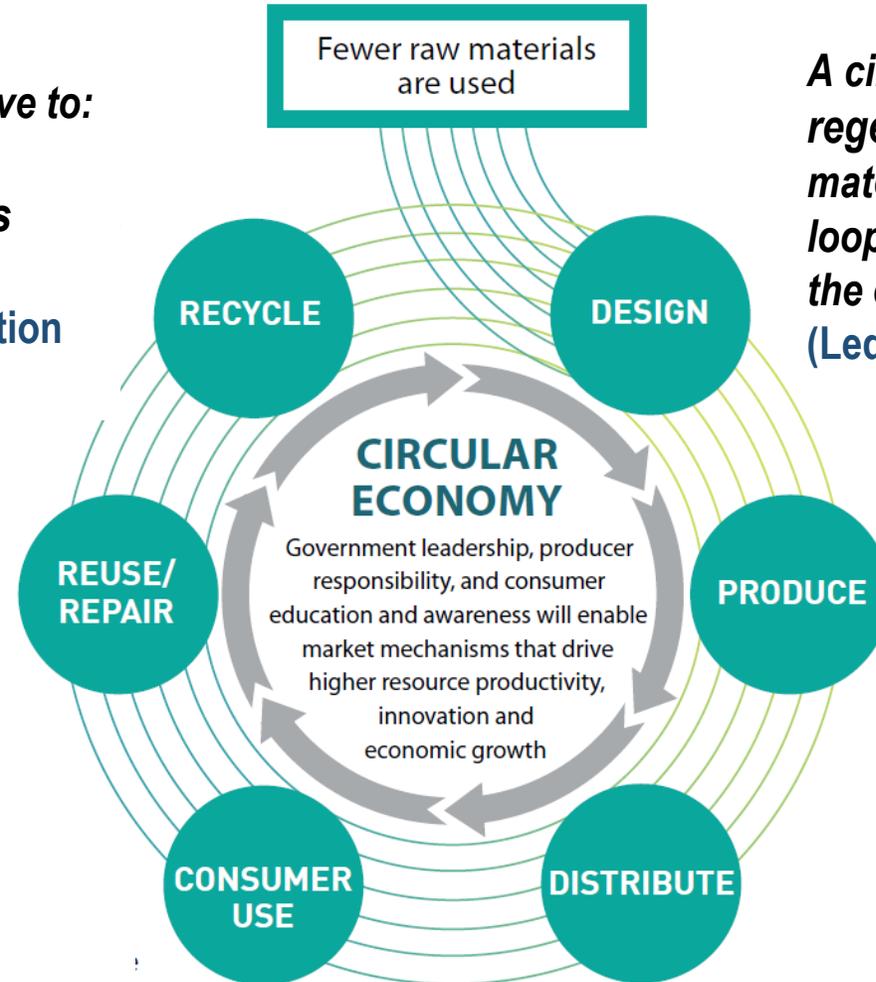
- *minimize the use of raw materials;*
- *maximize the useful life of materials*
- *minimize waste generated*

(Ministry of the Environment, Conservation and Parks. Ontario, 2017)

A circular economy entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system. It is based on three principles:

- *Design out waste and pollution*
- *Keep products and materials in use*
- *Regenerate natural systems*

(Ellen MacArthur Foundation, 2015)



A circular economy is restorative and regenerative by design, that allows materials constantly flow around a 'closed loop' system, keeping the value of plastics in the economy.

(Ledsham, 2018)

The circular economy which foresees the whole production and consumption system where materials are circulated, re-used, recycled and recovered, has been increasingly recognised and promoted by many governments in various levels and international organizations.

(Mroewic, 2019)

Current International Circular Economy Policy Framework for Plastic

| Author | Policy & Implementer | Target | Policy's Strategic Thrusts |
|-----------------------------------|---|---|--|
| Ellen MacArthur Foundation (2015) | The New Plastic Economy Global Commitment 2018 - Signatories of governments, businesses and institutions | All plastic packaging are reusable, recyclable, or compostable by 2025 (varies on each signatories). | <ul style="list-style-type: none"> i) Elimination of problematic or unnecessary plastic packaging through redesign, innovation, and new delivery models is a priority; ii) Reuse models are applied where relevant, reducing the need for single-use packaging; iii) All plastic packaging is 100 percent reusable, recyclable, or compostable; iv) All plastic packaging is reused, recycled, or composted in practice; v) The use of plastic is fully decoupled from the consumption of finite resources; and vi) All plastic packaging is free of hazardous chemicals, and the health, safety, and rights of all people involved are respected. |
| Wahlen (2018) | Ocean Plastic Charter 2018 - G7 countries | 100% reusable, recyclable, or, where viable alternatives do not exist, recoverable, plastic by 2030. 50% recycling rate by 2030. | <ul style="list-style-type: none"> i) Sustainable design, production and after-use markets; ii) Collection, management and other systems and infrastructure; iii) Sustainable lifestyles and education; iv) Research, innovation and new technologies; and v) Coastal and shoreline action. |

Current International Circular Economy Policy Framework for Plastic

| Author | Policy & Implementer | Target | Policy's Strategic Thrusts |
|----------------------------|---|---|--|
| Wahlen (2019) | G20 Implementation Framework for Actions on Marine Plastic Litter 2017 - G20 Countries | Reduce plastic waste inflow to the ocean to zero by 2050. | <ul style="list-style-type: none"> i) Introduce formal waste collection and disposal systems in a way that is sensitive to the economic realities of informal sector workers Increase resource productivity; ii) Consider the use of fiscal transfers from central governments to help fund municipal waste collection and disposal; iii) Support the market for recycled plastic; iv) Address uncertainty about the availability and quality of recycled plastic; and v) Reduce the cost of recycled plastic production. |
| European Commission (2018) | A European Strategy For Plastic In a Circular Economy 2018 - EU Countries | All plastic packaging placed on the EU market is either reusable or can be recycled in a cost-effective manner by 2030. | Better Regulation principles: <ul style="list-style-type: none"> i) Improving the economics and quality of plastic recycling; ii) Curbing plastic waste and littering; iii) Driving innovation and investment towards circular solutions; and iv) Harnessing global action. |

Research Design

Problem Statement

Research Objectives

Data Collection

Primary Data
Interview

Secondary Data
Literature Review

Qualitative Analysis
Thematic Analysis

Qualitative Analysis
Comparative Analysis

Results and Findings

Conclusion and Recommendation

Policy makers, industries and other relevant parties

- Government agencies
- Industry Associations
- NGOs

Policies, academic papers, books, and organizational reports

The goal of a thematic analysis is to identify important or interesting themes, and use these themes to address the research issues

The comparative analysis is conducted to identify the gaps and weaknesses in the current Malaysia's policy

EU

GENERAL POLICIES

Waste Framework Directive

Landfill Directive

Packaging and Packaging Waste Directive

TARGETED POLICIES

Circular Economy Package

Plastic Bag Directive

Single Use Plastic Directive

Japan

GENERAL POLICIES

Basic Environment Act

Fundamental Plan for a Sound Material Society

TARGETED POLICIES

Waste Management and Public Cleansing Law

Containers and Packaging Recycling Act

Acts on promoting Green Procurement

The Act on the Promotion of Effective Utilization of Resources

Malaysia

GENERAL POLICIES

Environmental Quality Act 1974

Solid Waste and Public Cleansing Management Act 2007

National Solid Waste Management Policy 2016

TARGETED POLICIES

Malaysia's Roadmap Towards Zero Single-Use Plastics 2018-2030

National Cleanliness Policy 2019

FINDINGS – COMPARATIVE STUDY

| | EU | JAPAN | MALAYSIA |
|---|---|--|---|
| Comprehensive policy package for plastics | EU Circular Economy Package 2015 European Strategy for Plastics in a Circular Economy 2018 | Fundamental Plan for Establishing a Sound Material-Cycle Society (3 phases since 2003) | Malaysia's Roadmap Towards Zero Single-Use Plastics 2018-2030 * |
| MSW legislation | Waste Framework Directive | Basic Environment Act, Basic Act for Establishing a Sound Material Society | Solid Waste and Public Cleansing Management Act 2007 (Act 672) |
| Marine litter legislation | Marine Strategy Framework Directive | The Third Basic Plan on Ocean Policy | N/A |
| Packaging /Recycling regulation | Packaging and Packaging Waste Directive | Containers and Packaging Recycling Act | N/A |
| Source separation | Waste Framework Directive | Basic Policy for Comprehensive and Systematic Promotion of Measures on Waste Reduction and Other Proper Waste Management | Solid Waste and Public Cleansing Management Act 2007 (Act 672) |

FINDINGS – COMPARATIVE STUDY

| | EU | JAPAN | MALAYSIA |
|---|--|--|---|
| Separate Collection | Waste Framework Directive | Basic Policy for Comprehensive and Systematic Promotion of Measures on Waste Reduction and Other Proper Waste Management | Solid Waste and Public Cleansing Management Act 2007 |
| National targets for recycling / recovery | Waste Framework Directive, Landfill Directive, Packaging Waste Directive | Fundamental Plan for a Sound Material Society KPIs for Resource Productivity and Cyclical Use Rate | Malaysia's Roadmap Towards Zero Single-Use Plastics 2018 - 2030 |
| EPR legislative framework | Waste Framework Directive & Circular Economy Package | Containers and Packaging Recycling Act | N/A |
| EPR reporting requirements | Waste Framework Directive & Circular Economy Package | Containers and Packaging Recycling Act | N/A |
| EPR take back requirements | Waste Framework Directive & Circular Economy Package | Containers and Packaging Recycling Act | Solid Waste and Public Cleansing Management Act 2007 |
| Packaging marks and labels | Waste Framework Directive & Circular Economy Package | Containers and Packaging Recycling Act | N/A |

3 Principles Of Effective Policy

Clear prioritization of waste management initiatives

- Hierarchy in managing waste - prevention, preparation for reuse, recycling, other recovery, and disposal
- Mechanism - EPR scheme

Setting of measurable targets

- Set national goals include targets for stakeholders in the packaging and packaging waste value chain
- Mechanism - Identify targets for various aspects of packaging including, reuse, recycling and recovery, landfill restrictions and minimum recycling content.

Life cycle approach

- Comprehensive and interconnected web of policies, regulations and efforts with clear direction and objectives – lead to high circularity of plastic
- Mechanism – Implement policy instrument with holistic approach to encourage innovation, reduce resource use, shift end-of-life management to producers

Semi-structured interviews

POLICY INTERVENTION

- Policies that incorporate circular economy models are needed, to ensure resources are kept longer in the economy, minimize new resource use, reduce waste.
- Stronger policy interventions are needed to address the gaps and challenges throughout the plastic's life cycle, from material extraction until the final disposal.
- Initiatives to encourage producers to reduce the unnecessary use of plastic; increase reuse, recycling and recovery and treat post-consumer plastic as valuable materials instead of waste.
- Recycling sector need to be regulated.
- Key barriers to be resolved:
 - i. Old infrastructure & business model
 - ii. Lack of investment and incentives
 - iii. Consumer behaviour

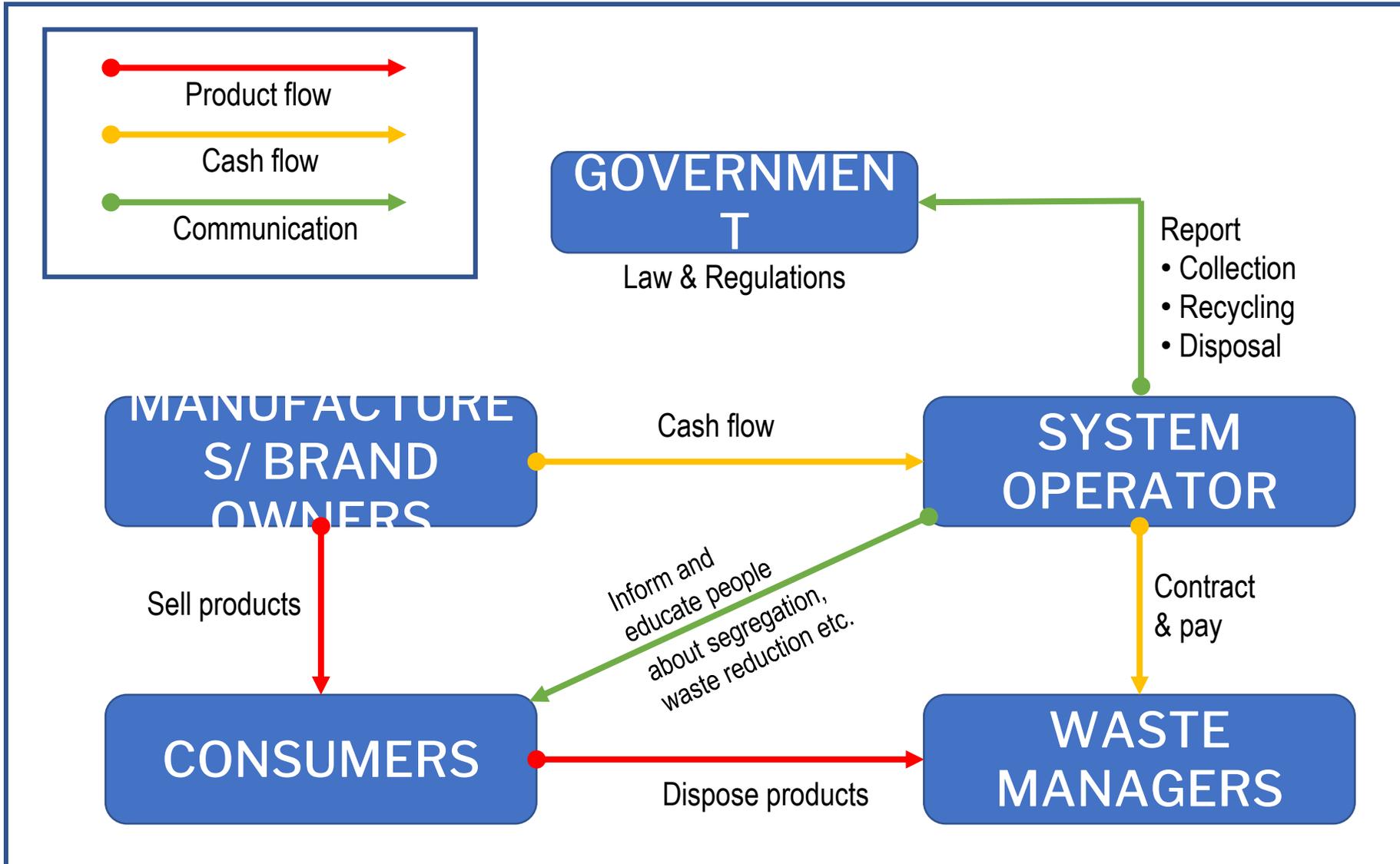
COLLABORATIVE EFFORTS

- A successful transition to the circular economy for plastic requires appropriate policies that supported by strong collaboration between and within industry, government and society.
- The formation of Malaysia Plastic Pact (MPP) in 2020 will be the right platform for this purpose.
- Companies - enhancing capabilities in eco-design to implement product reuse, and recycling, and serve as a determinant of the innovative circular economy business model.
- Policy makers - rethinking incentives and providing the right set of policies and funding access.
- NGOs and community - acting as the third force for practical action and pressure on businesses and governments to accelerate implementation.

EXTENDED PRODUCER RESPONSIBILITY (EPR)

- EPR scheme has proven to be an effective measure for circular economy transition.
- EPR scheme - shift responsibility & costs to hold manufacturers/brand owners accountable for their plastic products and packaging's end-of-life impacts.
- Advantages - increase end-of-life collection, environmentally sound treatment, reuse and recycling, and provide incentives for manufacturers to redesign products.
- Enforcement EPR schemes would fill the gap in regulating the recycling industry in Malaysia
- High-impact EPR schemes is best accompanied by, high-level strategic documents (e.g. CER), a framework law describing the pathway towards EPR, and additional laws detailing out EPR (roles, responsibilities, targets, measures).

EPR SETUP & BENEFITS



ENVIRONMENTAL

- Reduce overall plastic use
- Improve end-of-life treatment (e.g. segregation, collection, recycling)

SOCIAL

- Reduce organizational and financial burden to governments
- Informal sector integration

ECONOMIC

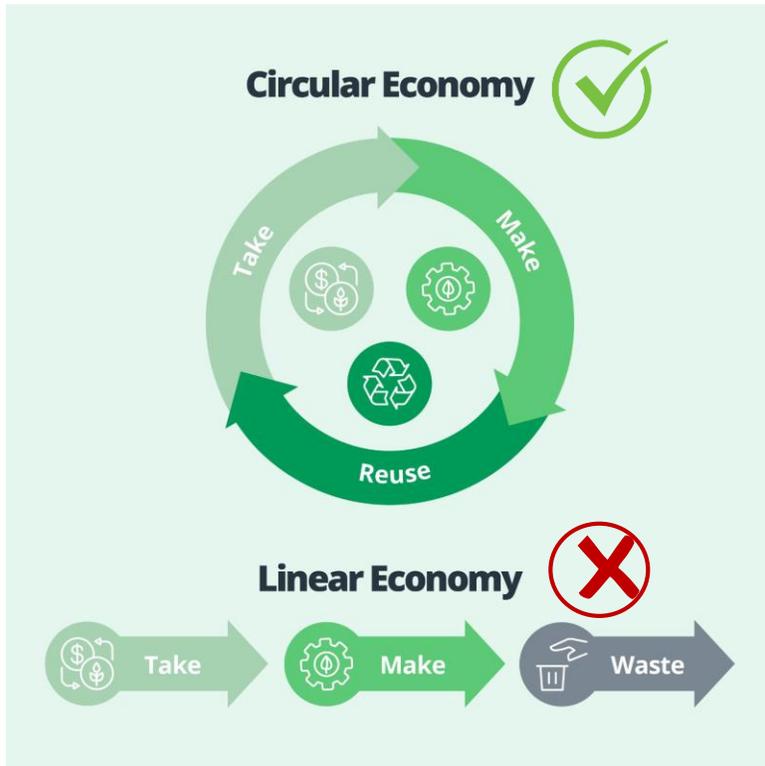
- Cost-efficient
- Relief to other sectors negatively impacts by plastic waste (e.g. fishing, tourism)

- The study is important to constitute strategic solutions in tackling the issues and shortcomings in order to strengthen the country's policy and institutional framework on single use plastics, specifically on plastic packaging.
- The study could potentially contribute to the establishment of Malaysia's first formal policy on circular economy for plastics in near future, which will be able to define the nation's way forward on reducing plastic consumption.

**MALAYSIA'S ROADMAP
TOWARDS ZERO
SINGLE-USE PLASTICS
2018-2030**
Towards a sustainable future



**CIRCULAR ECONOMY
ROADMAP (CER) FOR**



1. The circular economy concept has been proven to be an effective solution to address plastic problems in developed countries like the EU and Japan, and it is time for Malaysia to adopt and customize the idea.
2. The adoption of circular economy concept into a policy framework for plastic couple with the strong collaborative efforts and right system will contribute to a sustainable solid waste management system in Malaysia.
3. Existing policies in managing plastic waste in Malaysia are not robust enough to tackle its negative impacts.

A COMPREHENSIVE POLICY FRAMEWORK BASED ON THREE PRINCIPLES:

- i. Waste management hierarchy;**
- ii. Setting up of measurable targets;**
- iii. Life cycle approach.**

COLLABORATIVE EFFORTS

Malaysia Plastic Pact (MPP) - platform for the government, industry players and other stakeholders to work together in the effort to realize the circular economy

EXTENDED PRODUCER RESPONSIBILITY (EPR) SCHEME

- The most recommended policy tool for the transition towards a circular economy for plastic.**
- Potentially removes unnecessary plastic items, increase collection efficiency, reuse, recycling, and recovery, and ensure proper disposal.**
- Hold manufactures/brand owners accountable for their plastic's end-of-life and encourage eco-innovation in the business sector.**
- Its mechanism must be tailored to the need and the structure of Malaysian economy.**
- The legal framework should outline clear objectives, responsibilities, enforcement mechanisms and a timeline for implementation, and should involve the role of federal and state governments, local authorities, producers, business owners and public.**



THANK YOU