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Article

Exploration of the plastic packaging product industry towards green manufacturing, efforts to consolidate environmental impact versus productivity issues

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Abstract: Plastic products, including plastic packaging, were products whose increasing demand continued because the community still needed plastic as packaging. On the other hand, plastic waste, which was increasingly high and difficult to decompose, was a problem that needed to be solved together. This study aims to understand how plastic company packaging implements TQM, its environmental impact, and how plastic packaging companies are taking steps towards green manufacturing. This research used a qualitative phenomenological method to understand the problem based on the actor's perspective. The data collection method was in-depth interviews with informants from 3 plastic companies in East Java, Indonesia, followed by observation and FGD. We carried out Triangulation, member checking, and professional involvement to determine the data's validity, reliability, and trustworthiness. The results of this study indicated a management system that promotes quality as a business strategy and is oriented towards customer satisfaction by involving all members of the organization. TQM emphasized continuous improvement, customer satisfaction, and employee involvement. By implementing aspects of TQM, plastic packaging companies could improve their production processes and reduce waste, increasing efficiency and profitability. In addition, TQM could also contribute to the company's green performance by promoting environmentally friendly practices, including using electric machines to replace hydraulic machines, thereby reducing the use of electrical energy and CO_2 emissions. The use of solar panels was a step towards green manufacturing. Companies that adopt TQM principles are more likely to implement environmentally friendly initiatives such as reducing energy consumption and using recyclable materials and can demonstrate a commitment to corporate social responsibility. The company's membership in EcoVadis and SMETA further strengthens the company's direction towards Green Manufacturing and competitive advantage.

Keywords: total quality management; corporate social responsibility; green manufacturing; plastic packaging industry; qualitative

1. Introduction

The plastic industry in Indonesia has increased in recent years. The Indonesian people produce Plastic products to meet the needs of various fields, such as the food and beverage industry, automotive, pharmaceuticals, and household needs. The plastic industry also contributes to the Indonesian economy by creating jobs for around 500,000 people. (Lestari, 2022). **Figure 1**. The following is the development of plastic production for packaging from 2010 to 2020.

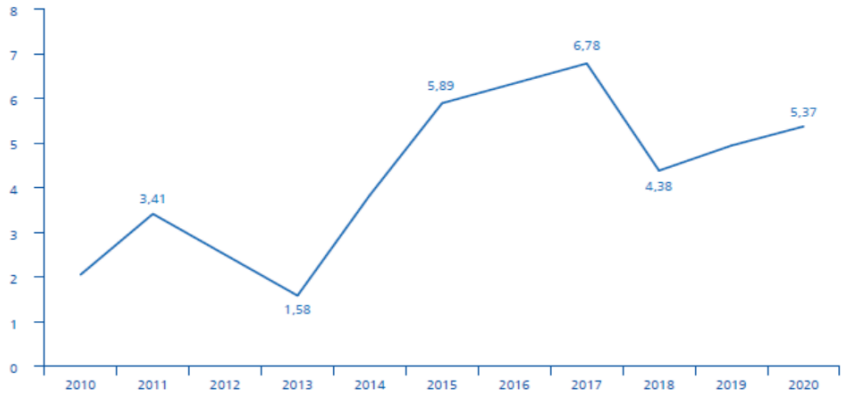

Figure 1. Plastic Production for Packaging (Billion USD).

Based on these data, there is an increase in plastic production for packaging with an annual growth of 4.65%, which can create new economic opportunities, create jobs, and have an effect on the national GDP. Therefore, the Indonesian government needs to manage the growth of plastic production wisely through policies that support innovation and the use of environmentally friendly technology. However, the negative side of increasing plastic production is its environmental impact, especially on the oceans and other ecosystems. Plastic waste pollution has impacted the health of ecosystems and the environment, tourism, fisheries, and human health. Based on data, around 60% of waste dumped into the sea is plastic waste, estimated to reach 0.29 million tons/year (Baheramsyah, 2022).

The increasing demands to meet waste reduction targets will lead to adaptations in the production processes of goods and the provision of services that create less waste, reduce energy consumption, conserve resources, and reduce damage to the environment and human life which is called Green manufacturing (Agyabeng-Mensah et al., 2020; Indrasari et al., 2020). More companies are adopting Green manufacturing practices to meet the requirements of government legislation and the demands of investors, employees, media, unions, and non-governmental organizations. (Abbott and Snidal, 2021). Some companies have applied Green manufacturing practices within the company. However, some experts argue that expanding Green manufacturing practices outside the company will increase environmental improvements more broadly (Agyabeng-Mensah et al., 2020; Riyadi and Munizu, 2022).

Based on the legislative framework, several issues demand attention: environmental regulation, health and safety standards, and environmental taxes and incentives. Regarding environmental laws, businesses must follow rules on waste management and emissions, restrictions on the use of single-use plastics, and regulations on recycling. Regarding health and safety standards, producers must pay attention to product quality standards, especially for food, health, and employee safety. Regarding environmental taxes and incentives, some countries are implementing green taxes on companies with high carbon footprints, including plastic companies. Incentives can be given for sustainable practices, such as using recycled raw materials or renewable energy

One method to achieve this goal is to implement the concept of Total Quality Management (TQM). TQM is a management system that promotes quality as a business strategy and is oriented toward customer satisfaction by involving all organization members. This concept requires a commitment to conduct continuous quality testing, which management must continuously monitor so that implementation continues consistently, which focuses on improving Operational Performance and Corporate Green Performance. Corporate Green Performance (CGP) is a company's environmental performance that includes sustainability, greenhouse gas emission reduction, waste reduction, and efficient use of resources. Some practitioners predict that in the future corporate green performance trend will be increasingly crucial in increasing the company's competitive advantage (Riyadi and Munizu, 2022).

Total Quality Management (TQM) significantly impacts the operational performance of companies, including in the plastic packaging industry (Purwanto et al., 2020). In addition, TQM can also contribute to the company's green performance by promoting Green manufacturing practices. Total Quality Management (TQM) can have quite a good effect on Operational Performance (OP) and Corporate Green Performance (CGP) (Abbas, 2020; Hassan and Jaaron, 2021; Khalil and Muneenam, 2021; Pambreni et al., 2019; Soesilo et al., 2024; Soesilo et al., 2023). In the plastic packaging industry in Indonesia, implementing TQM can improve Operational Performance (OP) and Corporate Green Performance (CGP). But on the other hand, Suhendah and Brigita (2021), Wassan et al. (2022) and Ahmed et al. (2022) show that TQM has no significant effect on Organizational Performance.

Previous research was conducted with a positivist paradigm and quantitative methods to find the effect of TQM on OP and CGP but has not been able to see in-depth to describe what TQM means, why it is essential to do as a corporate strategy, and how companies do it. This research seeks to offer new paradigms and methods in understanding this phenomenon by using a post-positivist paradigm and qualitative methods that explain the phenomenon of Total Quality Management and Green Manufacturing from the emic perceptions of business actors in the plastic packaging industry as the novelty of this research.

Based on this background, the objective of this research are as follows: 1) To explore the implementation of TQM for plastic packaging companies in connection with Operational Performance (OP) and Corporate Green Performance (CGP), and its relationship to productivity? 2) To construction the Sustainability Model for Plastic Packaging Companies

2. Literature review

Operational management is the total and optimal arrangement and management of labor, machines, equipment, raw materials, or other product factors to produce products of goods and services for trade (Ivanov et al., 2021). In other words, operational management is the management of resources related to products and services thus that operational activities run efficiently. Operational management generally consists of five objectives: (1) Efficiency, namely making operational activities more efficient. (2) Productivity, namely striving for productivity in the company to increase (3) Economy, namely minimizing costs or expenses related to

company activities so that the company is more economical (4) Quality is to improve quality, both related to products and services continuously. (5) Reducing Process Time, namely reducing time in the production process so that with reduced production time, the higher the product that can be produced. (Reid and Sanders, 2019).

2.1. Total Quality Management

Total Quality Management is an approach to running a business that maximizes an organization's competitiveness by continuously improving its products, services, workforce, processes, and environment. (Ross, 2017). Other definitions (Pattanayak et al., 2017) state that TQM is a management system that promotes quality as a business strategy and is oriented toward customer satisfaction by involving all organization members. This concept requires a commitment to conduct continuous quality testing, which management must continuously monitor thus that implementation continues consistently.

In general, there are eight main elements in the TQM Management System (Khalil and Muneenam, 2021), namely: 1) Customer Focus, 2) Overall Employee Involvement, 3) Process approach, 4) Cohesive system, 5) Continuous improvement, 6) Strategic and Systematic Approach, 7) Fact-based Decisions, 8) Communication.

Studies on the relationship between TQM and OP show that TQM: customer focus, continuous improvement, strategy-based, and total employee involvement have a positive and significant effect on Operational Performance (OP) (Pambreni et al., 2019). Likewise, (Hassan and Jaaron, 2021) showed that the implementation of Total Quality Management (TQM) positively affects green manufacturing practices and Operational Performance (OP). Another study showing the relationship between TQM and OP was conducted by (Bazrkar et al., 2022) showing that the application of TQM dimensions positively affects organisational innovation capabilities and Operational Performance (OP). Other studies also argue that positive TQM is considered to show a significant impact on business continuity, sustainability and Operational Performance (OP) (Soesilo et al., 2023; Soesilo et al., 2024).

2.2. Corporate Green Performance (CGP)

Corporate Green Performance (CGP) is a term used to describe a company's environmental performance in terms of managing and reducing the environmental impacts generated by operational activities. According to (Rashid et al., 2019), Corporate Green Performance (CGP) is a company's environmental performance that includes sustainability, greenhouse gas emission reduction, waste reduction, and efficient use of resources. Some practitioners predict that in the future corporate green performance trend will be increasingly crucial in increasing the company's competitive advantage. Moreover, competitive advantage is essential for the development of the company (Riyadi and Munizu, 2022; Munizu et al., 2024; Munizu and Riyadi, 2021; Slamet Riyadi et al., 2021). The concept of CGP measures the extent to which a company has succeeded in reducing its negative impact on the environment and the extent to which it can maintain sustainable performance in the long term. CGP involves measuring and reporting various environmental aspects, including energy and

water use, greenhouse gas emissions, waste and pollution, and socially responsible business practices.

Research linking TQM and CGP has been widely conducted. Abbas (2020) shows that TQM has a significant and positive influence on CGP, while Hamdan and Alheet (2021) shows that TQM implementation is positively associated with Corporate Green Performance (CGP) in the manufacturing sector. On the other hand Khalil and Muneenam (2021) in their research in pharmaceutical companies found a positive but insignificant impact of TQM on CGP.

2.3. Green Manufacturing (GM)

"Green" is an adjective that means caring about or supporting the environment and maintaining environmental quality (such as recyclable, biodegradable, or non-polluting) (Pattanayak et al., 2017). Green Manufacturing is the creation of manufactured products using materials and processes that minimize negative environmental impacts, conserve energy and natural resources, are safe for employees, communities, and consumers, and are economically sound. (Hussain and Khan, 2020). Green Manufacturing includes reducing the volume of hazardous waste produced, reducing the use of coolants during machining, and even changing energy to include more renewable energy sources. The main drivers of implementing Green manufacturing in a critical industry are (Fatoki, 2019): 1) Improve the company's image, 2) Increase the company's competitiveness, and 3) Improve product quality.

In the context of Green Manufacturing, TQM can be used to improve product quality and business processes that are more environmentally friendly, such as by applying cleaner and more environmentally friendly technologies and materials. It will enhance the company's image on consumers and stakeholders and can improve its financial performance. (Hamdan and Alheet, 2021) Conducted a study stated that there is a positive relationship between TQM and GM, which is also in line with (Hassan and Jaaron, 2021), but other studies have also found that implementing a Green Manufacturing approach is one of the main barriers to adopting Green Manufacturing is the fact that significant investments in equipment are required (Abualfaraa et al., 2022), so not all plastic companies may have the financial ability to implement green manufacturing.

3. Methodology

The approach used is the post-positivist paradigm with qualitative methods. The purpose of the study is to explore the implementation of TQM in the plastic packaging product industry and its impact on Operational Performance (OP) and Corporate Green Performance (CGP) and its relationship to productivity towards Green Manufacturing in plastic companies by obtaining emic information from business actors through interviews and focus group discussions. The unit analysis of this research is the company. The location of the research is a plastic packaging company, namely PT Rapid Plast 1, PT Rapid Plast Site 1, and PT Mahkota Perkasa.

The method used in this study in the 1st stage is a qualitative paradigm. The phenomenological method explores the problems in the plastic packaging industry through an inductive thinking process in the actual context, namely plastic packaging

industry business actors. The main characteristics of the qualitative approach in this study are more concerned with meaning, context, and emic perspective. (Kuswarno, 2009).

Data was collected by conducting an in-depth interview with the head of the company, which was the research location. The interview lasted 3 hours, followed by a site visit and observation. Interviews were conducted three times to generate consistency in the answers.

In the 2nd stage, the method used focus group discussion. At this stage, in-depth interviews with predetermined informants provide open questions about exploring the implementation of TQM in the plastic packaging product industry and its impact on Operational Performance (OP) and Corporate Green Performance (CGP). Its relationship to productivity in the context of Towards Green Manufacturing on Plastic companies in general and the steps taken by the company primarily towards Green Manufacturing to clarify and obtain conclusions on solving a problem from various perspectives.

The 3rd stage is the elaboration of the results obtained from stages 1 and 2. Data analysis is carried out by phenomenological analysis: 1) Identifying meaning units and grouping themes. This stage is the phenomenological reduction stage. At this stage, it is done as follows: (a) transcribing, namely by listening back to the interview recording and making a transcript of the interview results; (b) identifying meaning units and determining themes; 2) Individual textural-structural description. The stage of textural description begins with internal validity, namely triangulation. 3) Identify emerging themes across all participants (cross-participant), or cross-site analysis, 4). Identify the essence of experience. It is the result of the composite textural-structural description or cross-site analysis. This stage integrates intuition, tacit mentions, self-searching, and reflection from textural and structural descriptions (Creswell, 2007), resulting in a sustainability model for the plastic industry in Indonesia. Data analysis was conducted interactively.

For the internal validity of data, triangulation is carried out: Times triangulation is used to see the consistency of informants' answers, informant triangulation to see the textural and structural similarity of information, methods triangulation by comparing the results of data collection using in-depth interviews and observation and documentation, and theoretical triangulation, to comparing with existing theories.

External validity was achieved by consulting with peers who are experts in this field and using theories of triangulation. For reliability/trustworthiness, member checking was conducted, where the informants read back the results of the research findings for approval and feedback. To minimize the researcher's subjectivity, an epoche was carried out, minimizing the researcher's initial perception and bracketing with tables to make it easier to interpret the informants' perceptions.

Semi-structured interviews were conducted with three leaders of each company to gain an in-depth understanding of the context of the study. The data from these interviews was then analyzed, leading to the emergence of themes that encapsulated the key insights and perspectives shared by the interviewees.

Table 1 shows the key informants in this research. Three key informants, representatives of each company, were interviewed for each company.

Table 1. Key informan.

No.	Company	position in the company	Informan Code	Age
1	PT. Rapid Plast 1	Head of Division	A1	50
2	PT. Rapid Plast 1	Head of Production	A2	45
3	PT. Rapid Plast 1	Head of HRD	A3	40
4	PT. Rapid Plast 3	Factory Head	B1	54
5	PT. Rapid Plast 3	Head of Division	B2	45
6	PT. Rapid Plast 3	Head of Division	B3	41
7	PT. Mahkota Perkasa Makmur	Factory Head	C1	45
8	PT. Mahkota Perkasa Makmur	Head of Division	C2	40
9	PT. Mahkota Perkasa Makmur	Head of Production	C3	38

Source: data processed, (2024).

4. Result

The semi-structured interviews with key informants were then analyzed interactively to generate themes. The themes that emerged based on the results of interviews with key informants are shown in **Table 2** below.

Table 2. Summary of emerging themes based on interview results.

No	Theme
1	Plastic Packaging Production, Between Demand and Environmental Damage
2	TQM Implementation as a Milestone for Sustainability
3	Corporate Efforts Towards Green Manufacturing
4	EcoVadis as a Standard for Green Manufacturing
5	Corporate Social Responsibility for Plastic Companies
6	Model Sustainability for Plastic Packaging Companies

Source: data processed, 2024.

Based on the themes in **Table 2**, we can describe the topics collected based on the interviews with each informant. The themes in **Table 2** are a compilation of the issues based on each informant's perception. **Table 3** is the topics of theme 1 in **Table 1**.

Table 3. Theme 1. Plastic packaging production, between demand and environmental damage.

Informan	Topic
A1	Companies must provide innovative, efficient and economical goods and services that consumers need while caring for the environment.
A2	The increase in plastic production for packaging every year must be accompanied by quality
A3	The need for policies that support innovation and the use of environmentally friendly technologies in the plastics industry.
B1	Quality associated with continuous improvement drives market growth and wins competition.

Table 3. (*Continued*).

Informan	Topic
B2	Improving quality in the face of competitive challenges is a continuous improvement of customer-facing business operations that spans the entire organization and emphasizes flexibility and quality.
B3	Enactment of regulations and policies that support plastic recycling is also useful in reducing the adverse impact of plastic waste on the environment..
C1	Only companies that are committed to providing good quality will succeed in penetrating global market competition.
C2	efforts to reduce plastic waste cannot be done by the government alone. It needs collaboration between businesses, academic associations, and innovators as well as the wider community.
C3	The growth of this industry can create new economic and employment opportunities, and have an effect on national GDP.

Source: data processed, (2024).

Table 4 shows the topics that emerged in theme 2 based on the results of interviews with informants.

Table 4. TQM implementation as a milestone for sustainability.

Informan	Topik
A1	Green manufacturing practices outside the company will enhance environmental improvement
A2	It is important for the plastics industry in Indonesia to develop sustainable business practices that take into account environmental and social aspects.
A3	By implementing aspects of TQM, companies can improve production processes and reduce waste, leading to increased efficiency and profitability.
B1	Companies need to adopt Green manufacturing practices to meet the requirements of government laws, demands of investors, employees, media, trade unions, and non-governmental organisations.
B2	One method to achieve sustainable business is by applying the concept of Total Quality Management (TQM) which focuses on improving Operational Performance and Corporate Green Performance..
B3	In the plastic packaging industry, where environmental concerns are paramount, adopting TQM can help companies achieve both financial success and environmental sustainability.
C1	TQM emphasises continuous improvement, customer satisfaction, and employee involvement.
C2	TQM practices while implementing environmentally friendly initiatives, it can demonstrate a commitment to corporate social responsibility.
C3	The use of resicle plastic is also a step towards Green Manufacturing and TQM implementation.

Source: data processed, (2024).

Table 5 shows the topics that emerged in theme 3 based on the results of interviews with informants.

Table 5. Corporate efforts towards green manufacturing.

Informan	Topik
A1	Creating Zero Waste
A2	Domestic waste treatment by Industry managers

Table 5. (*Continued*).

Informan	Topik
A3	Use of resicle plastic
B1	Change of hydraulic machine to electric machine
B2	installation of solar panels to replace electrical energy
B3	Domestic waste treatment
C1	Fulfil workers' rights
C2	Gender Equality
C3	Worker protection

Source: data processed, (2024).

Table 6 shows the topics that emerged in theme 4 based on the results of interviews with informants.

Table 6. EcoVadis as a standard for green manufacturing.

Informan	Topic
A1	The company's concern for the environment
A2	Assessing business sustainability and global supply chains
A3	EcoVadis developed a scoring model that measures sustainability indicators.
B1	External Audit on Sustainability
B2	Important to increase competitive advantage
B3	Assessment based on environment, labour and human rights, ethics, and sustainable sourcing.
C1	Globalisation leads to production chains spread across the globe.
C2	Sustainability assessments are interrelated, making it difficult to achieve one without addressing the others.
C3	Reflects the quality of the company's CSR performance at the time of the assessment.

Source: data processed, (2024).

Table 7 shows the topics that emerged in theme 5 based on the results of interviews with informants.

Table 7. Corporate social responsibility for plastic companies.

Informan	Topic
A1	CSR will bring the company closer to the community
A2	CSR is a form of corporate responsibility to the surrounding environment
A3	the company's commitment to build a better quality of life together with stakeholders
B1	Improve Company image, need external audit such as SMETA
B2	Indirect company promotion
B3	Creation of sustainable business activities
C1	Customer demands
C2	Creating a socio-political climate that is conducive to the sustainability of the company's business
C3	Long-term benefits

Source: data processed, (2024).

5. Discussion

This research conducts three plastic companies in East Java, namely PT. Rapid Plast Indonesia 1, PT. Rapid Plast Indonesia 3, dan PT. Mahkota Perkasa Makmur. The research team collected data through in-depth interviews with the leaders of the three plastic companies to gain a deep understanding from the perspective of the plastic industry players in Indonesia, especially in East Java. The interviews were conducted for 3 hours in each interview session and continued with a review of the factory location. The researcher conducted a focus group discussion to gain an aggregate and simultaneous understanding of the problems in the company and their solutions for plastic companies, the research locations, and plastic companies in general, which are related to the research topic.

5.1. Plastic packaging production, between demand and environmental damage

The companies that are the location of the research are three large plastic packaging companies in East Java, Indonesia. PT. Rapid plast 3 located in Pandaan, PT. Rapid Plast 1, located in Sidoarjo and PT. Mahkota perkasa Makmur located in Gresik. PT. Rapid Plast is a subsidiary of Dynapack Asia. Dynapack Asia is a holding company with around 35 companies headquartered in Karawaci. Banten Province, Indonesia. Of the 35 companies, 26 are in Indonesia, and the rest are abroad, namely in Vietnam, China, Singapore, Thailand, and Malaysia. It is a collaboration between 2 families, Mr. Hambali from Indonesia and Raphael Geminder from Australia, so that the two families are the owners and, simultaneously, the forerunners of the development of the Dynapack Asia company.

Plant 1 & Plant 2 are located in Sidoarjo 61256 East Java, Indonesia, producing bottles for cooking, eucalyptus, and cosmetics, and Plant 3 is located at Jl. Raya Surabaya—Malang KM. 54, Ds. Lemahbang, Pasuruan, East Java, Indonesia. The items produced at Plant III are Aqua gallon caps, cosmetic caps, Cap Lang eucalyptus oil caps, and so on, with a 50 M/month turnover. Each company has product specialization, so there will be no competition.

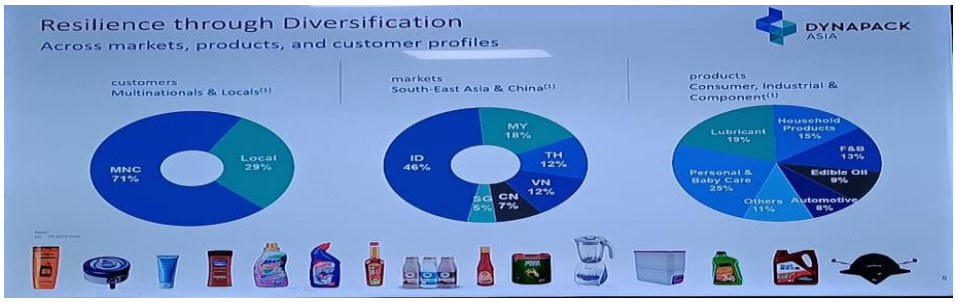

Figure 2. Customers of dynapack company.

Figure 2 Shows the customers of the Dynapack company. Customers of this company 71% are Multinational companies, such as Unilever, Johnson and Johnson, Philips, CocaCola, Loreal, Paragon and so on, and 29% local companies, such as Indomilk, Aqua, Wardah, Viva, Indofood etc. Dynapack Asia has become the number 1 largest plastic company in Indonesia, which is a holding company. His market share

is 46% in Indonesia, 18% in Malaysia, 12% in Thailand, 12% in Vietnam, 7% in China, and 5% in Singapore, and it has a target in 2030 to become the most prominent plastic packaging company in Southeast Asia. Dynapack's product range is 25% Personal and Baby Care, 19% Lubricant, 15% Household Products, 13% Face and Body, 9% Edible Oil, 8% Automotive, and 11% Miscellaneous.

Multinational companies such as Unilever have been customers of Dynapack for 40 years, Johnson and Johnson, P&G, and AHM have been customers of Dynapack for 30 years, and companies such as Aqua, Philips, L'OREAL, CocaCola, Indomilk, and so on have been a regular customer of Dynapack for 20 years, very long cooperation creates an attachment for these companies that is mutually beneficial.

Figure 3. History of long-term relationships with customers.

There are 140 plastic packaging factories in Indonesia, but plastic companies outside packaging are other factories such as toy factories, spare parts, and others. Packaging factories include bottle packaging, cosmetic packaging, and food and beverage packaging. Seeing the large amount of demand and waste produced, mainly by end consumers of plastic packaging companies, it is essential for companies and the government through related agencies to think together and take a role in creating a clean environment through concern for plastic waste management.

The three companies in this study need to provide innovative, efficient, and economical goods and services that consumers need while considering the environment. Therefore, creative design and always being a pioneer in their field is a motto that they always work professionally, especially for the company PT. Rapid Plast, which has been working with customer companies for more than 20 years, has tested consumer confidence by the length of cooperation that has been carried out.

The increasing demand for plastic packaging products is inevitable because almost all products use plastic packaging. The plastic industry also contributes significantly to the Indonesian economy by creating jobs. The growth of this industry can create new economic and employment opportunities and affect the national GDP.

For all informan, the annual increase in plastic packaging production must be accompanied by quality. Only companies that are committed to providing good quality will succeed in penetrating the global market competition. For a company like PT Rapid Plast, quality is linked to continuous improvement, which drives market growth and wins the competition. Because the current global issue consistently links the company's development with the environment, it becomes necessary for the company; if he wants to win international competition, the company must care about the

environment. Informant B1 gave an example of how a consumer abroad feels proud to buy a drink in a recycled plastic bottle to show his concern for the environment, thus encouraging bottled beverage producers to compete in demanding plastic packaging companies to use recycled products to increase their prestige.

On the other hand, it is also essential to have policies that support innovation and the use of environmentally friendly technology in the plastic industry, for example, in the use of materials that are safe for health, hygienic and safe production processes that do not cause high pollution, and perhaps even the enactment of regulations and policies that support plastic recycling is also helpful in reducing the adverse effects of plastic waste on the environment as mentioned by Informant B3. Efforts to reduce plastic waste must be made with the government. It requires collaboration between business actors, academic associations, innovators, and the wider community to jointly carry out various ways to reduce plastic waste through environmental cleaning, sorting, a culture of disposing of waste in its place, etc.

5.2. TQM Implementation as a Milestone for Sustainability

Total Quality Management is an approach to running a business that maximizes an organization's competitiveness by continuously improving its products, services, workforce, processes, and environment. (Ross, 2017). Other definitions (Pattanayak et al., 2017) state that TQM is a management system that promotes quality as a business strategy and is oriented toward customer satisfaction by involving all organization members. This concept requires a commitment to conduct continuous quality testing, which management must continuously monitor so that implementation continues consistently.

In general, there are eight main elements in the TQM Management System (Hussain and Khan, 2020), namely: 1) Customer Focus, 2) Overall Employee Involvement, 3) Process approach, 4) Cohesive system, 5) Continuous improvement, 6) Strategic and Systematic Approach, 7) Fact-based Decisions, 8) Communication.

The three companies that are the research locations prioritize the interests of customers. The customers of these companies are large multinational and national companies, so they also have a massive commitment to the quality of their products and are very strict in quality control, starting from input, process, and output produced. With the implementation of strict SOPs, this company is very professional, avoiding fraudulent practices in terms of raw material suppliers, bribery, corruption, collusion, and nepotism, which will be fatal to the company's continuity.

In terms of employee engagement, all three companies always involve employees in decision-making because they know the conditions in the field, so the company considers it essential to get input from employees. Productivity, processes, and even sales can only be improved with the dedication of all employees. It will increase the sense of pride and responsibility for work and, therefore, increase employee retention and a strong sense of belonging.

The company that is the location of this research always focuses on improving the process, which is the basis of the TQM system. Processes are a series of activities that start from receiving from suppliers (internal and external) and transforming them into outputs that will be delivered to customers (internal and external). Processes

ensure that suitable activities are taken at the right time to provide continuity and speed up production. The advantages of the process approach are higher consistency and predictability of results and an emphasis on continuous improvement.

Total Quality Management (TQM) significantly impacts companies' operational performance, including in the plastic packaging industry (Purwanto et al., 2020). According to informants' comments, TQM emphasizes continuous improvement, customer satisfaction, and employee engagement. By implementing aspects of TQM, companies can improve their production processes and reduce wastage, increasing efficiency and profitability. In addition, TQM can also contribute to a company's green performance by promoting environmentally friendly practices. Companies that adopt TQM principles are more likely to implement green initiatives such as reducing energy consumption and using recyclable materials. In the plastic packaging industry, where concern for the environment is paramount, adopting TQM can help companies achieve both financial success and environmental sustainability. By improving operational efficiency through TQM practices while implementing green initiatives, these companies can demonstrate a commitment to corporate social responsibility. It is consistent with the research results (Soesilo et al., 2024).

The application of TQM for informant A3 can help plastic packaging companies improve Operational Performance by reducing production costs, increasing productivity, improving product quality, reducing production processing time, increasing product delivery time, and improving service to customers; this is in accordance with the results of research (Hassan and Jaaron, 2021). TQM encourages companies to adopt management principles focusing on measurement, analysis, and continuous improvement in every aspect of company operations. In addition, applying TQM can help plastic packaging companies improve environmental performance by reducing waste and emissions, improving energy efficiency, increasing the use of sustainable raw materials, improving proper waste management, and increasing environmental awareness (Li et al., 2022). TQM encourages companies to consider the environmental impact of every decision made and to endeavor to reduce negative impacts on the environment. By implementing TQM, plastic packaging companies in Indonesia can achieve better Operational Performance and environment, improve customer satisfaction, and achieve business sustainability.

5.3. Corporate efforts towards green manufacturing

The definition of Green Manufacturing (GM) is a practice and approach that aims to reduce the environmental impact of manufacturing processes and industrial activities as a whole. Green Manufacturing in the packaging industry includes implementing environmentally friendly strategies and technologies in packaging design, production, distribution, and recycling. (Fatoki, 2019). The definition of corporate social responsibility (CSR) is a method in which a company integrates concerns for social, environmental, and economic aspects into business operations and strategies. It includes the company's responsibility for the impacts of activities on various stakeholders, including society, the environment, employees, consumers, and the wider community. (Tamvada, 2020).

The increasing demands to meet waste reduction targets will lead to adaptations in the production processes of goods and the provision of services by creating less waste, reducing energy consumption, conserving resources, and reducing damage to the environment and human life (Agyabeng-Mensah et al., 2020). More and more companies are adopting Green manufacturing practices to meet the requirements of government legislation and the demands of investors, employees, media, unions, and non-governmental organizations (Abbott and Snidal, 2021). Some companies have applied environmentally friendly practices within the company. However, some experts argue that expanding Green manufacturing practices outside the company will increase environmental improvements (Agyabeng-Mensah et al., 2020).

In terms of the Sustainability Policy to move towards Green Manufacturing, PT Rapid Plast has done several things, such as

1) The change from hydraulic to electric machines has been carried out since 2022 so the company can reduce CO_2. It is produced and saves electrical energy. So for sustainability, towards the go green company strategy, the company plans that in 2025 it can reduce CO_2 production by 13%. Moreover, it will save 170 thousand tons of CO_2. PT Rapid Plast cooperates with the Japanese government to procure these machines. The form of cooperation is that Rapid Plast must make a monthly report on how much CO_2 is successfully saved from each machine given by Japan, as seen in **Figure 3** below.

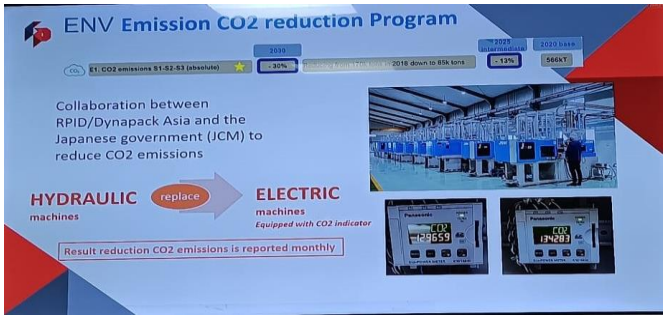

Figure 4. Replacing hydraulic engines with electric engines.

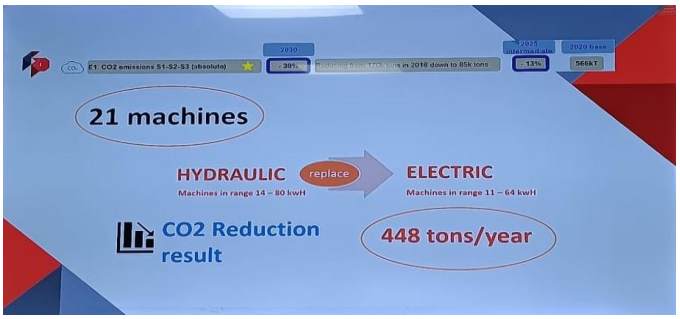

Figure 5. CO_2 Reduction per year with Electric Engine.

Figure 4 shows machines the Japanese government donated to PT Rapid Plast to reduce CO_2 emissions. The machines are free of charge given by the Japanese government as a form of concern for the environment on condition that the company must report how much CO_2 reduction each machine produces every month**.**

Using 21 electric machines donated by the Japanese government, PT Rapid Plast can reduce CO_2 emissions by 448 tons per year, which they must report to the Japanese

government every month as a form of responsibility for the environment as shows at **Figure 5**.

2) PT Rapid Plast 3 plan to install solar panels at the end of 2024. Because this factory is the most recent factory of PT Rapid Plast, the need to install solar panels has directly adjusted to the construction of the building. The target is 450 megawatts, so there will be a CO_2 reduction of 350 tons/year with solar panels installed on the roof, as can be seen in **Figure 6** as follows.

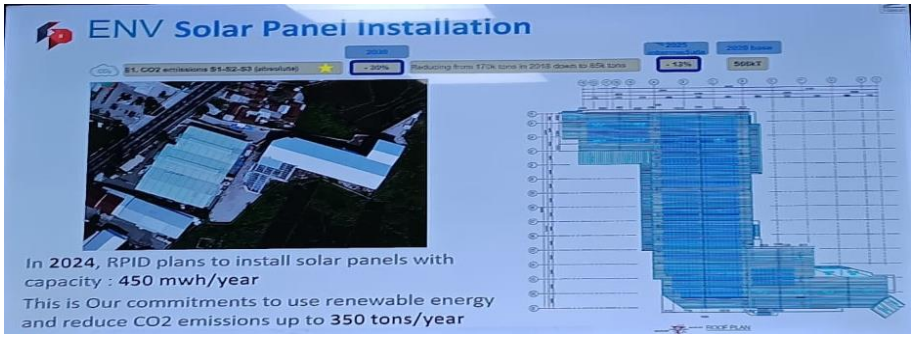

Figure 6. Solar Panel Installation Plan at PT Rapid Plast 3.

3) Equally important is recycled plastic, sold and reprocessed as raw material. Recycled plastic is slightly opaque in color; it is not perfect like the original plastic raw material, but the company has committed to customers to use recycled plastic. The recycling process goes through several stages, where the product is crushed, washed with warm water, sifted out, and processed again, and cannot be used immediately. Because it goes through a relatively long process, making plastic recycled is quite safe because it is still standard, goes green, and is only used for cosmetic packaging products. The use of plastic recycle makes the company produce zero waste and this is very supportive towards green manufacturing.

Figure 7. Recycled resin result appearance.

Figure 7 shows the color difference between virgin and recycled plastic raw materials. The color of recycled plastic is darker and more opaque, but this plastic material can still be used for products such as cosmetic packaging, disposable toothbrushes and so on.

PT Mahkota Perkasa Makmur has not used solar panels or electric machines in the production process, because the use of these two things requires large funds. However, PT Mahkota Perkasa Makmur has carried out a production process with zero

waste, the use of resicle plastic and processing household waste so that this company is also processing towards green manufacturing.

5.4. EcoVadis as a standard for green manufacturing

EcoVadis is an external assessment body for business sustainability, intelligence performance improvement tools, and cooperation for global supply chains. Their CSR assessment methodology covers 198 purchasing categories, 155 countries, and 21 CSR indicators. EcoVadis divides the concept of sustainability into four areas that can be applied to companies: environment, labor and human rights, ethics, and sustainable procurement. The overall score used by EcoVadis ranges from 0 to 100, reflecting the quality of a company's CSR performance at the time of assessment. Guy (2023) accessed 27 August 2024.

Figure 8. EcoVadis score of PT Rapid Plast Indonesia.

The EcoVadis score of PT. Rapid Plast Indonesia will be 45 in 2022, increasing to 52 in 2023 and 62 in 2024 as shown at **Figure 8**. It shows the company's outstanding commitment to sustainability and environmental concerns. For companies on a global scale, sustainability must be recognized by the world. Concern for the environment has become a central issue, so a firm commitment is needed for companies to compete globally, especially in environment, labor and human rights, ethics, and sustainable procurement.

As one of the forms of Ecovadis' assessment in terms of the environment, PT. Rapid Plast has consistently carried out waste management. There are two types of waste produced by the company; production waste and domestic waste. Production waste is reprocessed into plastic raw materials so that the waste from the company's production is almost zero, only about 0.3% of the raw materials used. That is also dirty plastic, which has fallen, is exposed to oil, and so on. This remaining raw material is then sold to external parties and the community around the company to be made into other products, such as doormats or handicrafts. At the same time, domestic waste is in the form of wastewater from employee toilets, which is then collected and processed to produce clear water before being channeled for other purposes or into clean waters as shown in **Figure 9**.

Figure 9. Domestic waste management PT. Rapid Plast 3.

Figure 9 shows the domestic waste treatment plant from the employee toilets, where the waste from the toilets will pass through a three-filtration process so that the waste produced becomes clear and ready to flow into the waters. The same applies to waste disposal. The company has neatly prepared waste disposal bins based on the type of waste, as shown in **Figure 10** below.

Figure 10. Waste disposal sites by waste type.

Figure 10 shows landfills by type of waste: non-organic waste HDPE plastic bottles, organic waste, non-organic waste (plastic, styrofoam, tissue, and so on), and non-organic PET plastic bottles. This will make it easier to classify plastic for recycling and organic waste. **Figure 11** shows one of the recycled plastic products, a toothbrush.

Figure 11. Toothbrush with recycled plastic material.

An example of the embodiment of EcoVadis in terms of labor and human rights is that the company does not employ underage labor and gender equality. It is also a concern for PT Rapid Plast customers. Customers want gender equality in leadership, so the company's target is 30 to 40 percent of the company's leaders are women. Currently, the female leader is still 29 percent and strives to continue to improve as the embodiment of Green manufacturing on labor and human rights.

The realization of EcoVadis scores in terms of ethics is found in work ethics, socializing ethics, and relationships with the opposite sex, including clear SOPs on suppliers relationships, marketers, internal and external, which are implemented strictly and consistently to create working comfort and certainty for all employees, minimizing the emergence of the conflict in work so that it becomes more professional. EcoVadis's score in terms of sustainable procurement is achieved by external parties in the supply chain. Everything must have clear SOPs, avoiding bribery, corruption, collusion, and nepotism.

Applying robust standards, will increase professionalism in the company, but on the other hand, will cause the company to become very rigid and less flexible in dealing with problems within and around the company. There are times when companies conflict with communities over the sale of plastic waste, licensing rules, or recipients of the company's CRS, so it is also essential for companies to be flexible in dealing with community issues.

5.5. Corporate social responsibility for plastic companies

Corporate Social Responsibility is a company's commitment to building a better quality of life with related parties, especially the surrounding community and the social environment in which the company is located, which is carried out in an integrated manner with its business activities in a sustainable manner (Nurjanah and Mulazid, 2018). The purpose of implementing CSR for companies can be described as follows(Saleh and Sihite, 2020): Enhancing corporate image, usually implicitly, the assumption that corporate behavior is fundamentally sound; 2) Organizational accountability with the existence of a social contract between the organization and society, 3) An extension of traditional financial reporting and its purpose is to provide information to investors.

De Jong and Van Der Meer (2017), the research mentions several reasons for the need for corporate social responsibility: 1) The needs and expectations of society are changing, and society is increasingly critical and sensitive to the products they will buy. So that companies cannot only focus on generating profits; 2) Limited natural resources, businesses are expected to not only exploit limited natural resources but must also maintain and use resources wisely; 3) A better social environment, the social environment will support the business success for a long time, the better the social environment will automatically help improve the existing business climate. For example, with the decreasing unemployment rate; 4) Balance of responsibility and power, too much power, if not balanced and controlled with social responsibility, will cause business to become a destructive force for society; 5) Long-term benefits, with commitment and social involvement a positive image is created by the community,

because of a socio-political climate creation that is conducive to the sustainability of the company's business.

For informants, CSR will bring the company closer to the community (A1), CSR is a manifestation of the company's responsibility to the surrounding environment (A2), the company's commitment to building a better quality of life together with stakeholders (A3), Improving the company's image, the need for external audits such as SMETA (B1), Indirect promotion of the company (B2), Creating sustainable business activities (B3), Customer demands (C1), Creating a socio-political climate conducive to the company's business sustainability (C2) Long-term profits (C3). The social impact of business behavior is seen across four domains of responsibility, whether in the provision of jobs, goods, and services (economic), payment of taxes (legal), facilitation payments to bureaucrats and politicians (ethical), or social, charitable contributions (discretionary). In addition to impact, it is also essential to monitor the nature of programs selected for investment across domains and the integration of social issues in the body of the corporate policy.

In order to audit its CSR, PT. Rapid Plast uses SMETA from Sedex. The Supplier Ethical Data Exchange (Sedex) is a not-for-profit organization committed to continually improving ethical performance in the supply chain. Sedex aims to ease the audit burden on suppliers through shared reporting and drive improvements in supply chain standards. SMETA (Sedex Members' Ethical Trade Audit) is an audit method created by Sedex members to provide a defined and definitive procedure. It is an audit procedure comprising good practices in ethical audit techniques but is not a code of ethics, a new method, or a certification process. SMETA was developed for Sedex members, but non-Sedex members are encouraged to use it because SMETA is publicly available and is expected to promote transparent audit methods and share knowledge about auditor qualifications and practices that support SMETA reports. The SMETA method uses the ETI code and local laws as a measuring tool that includes four modules: Health and safety, Labor standards, Environment, and Business ethics (Guy, 2023). Sysindo Consultant, accessed 27 August 2024, As shown in **Figure 12**.

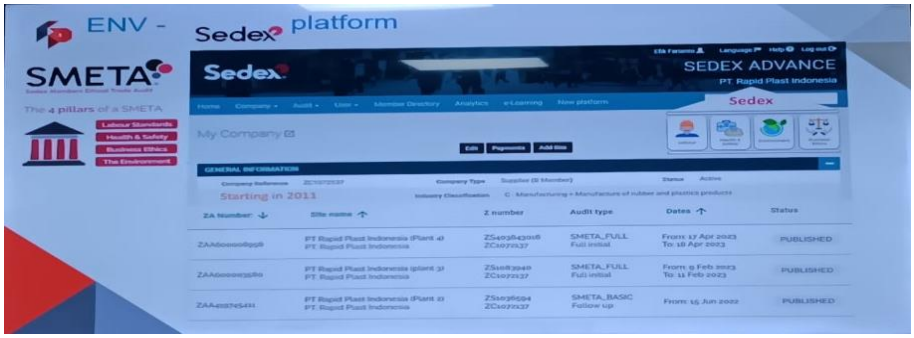

Figure 12. SMETA platform from sedex.

SMETA audits PT. Rapid Plast's CSR as shown in **Figure 12**. For example, it explains whether the company employs minors, whether employee salaries are below the minimum wage, or whether unpaid overtime exists. Using labor whose payment is unclear can be checked at SMETA. Including ethics, such as whether there is sexual harassment. In business ethics, are there transactions due to connections, collusion,

use of bribes, or unfair competition? So, all transactions must go through a process that will be audited as customers required.

Meanwhile, CSR, directly related to the community, is a program from HRD. Every year, HRD will prepare an event to carry out this obligation; for example, during the Eid al-Adha holiday (a holiday for the Muslim community), the company distributes sacrificial meat to the surrounding community. There is also cooperation with youth organizations for matters related to domestic waste or plastic recycling so that they can process it into products such as doormats or handicrafts and benefit from the presence of the company around them. There is also assistance to orphans, carried out annually, providing guidance on plastic waste processing or waste banks and Tossa units for garbage collectors. Something that is no less important is educating the community about plastic waste processing. Plastic recycling processing factories only exist in Java, so there is an excellent opportunity to establish plastic processing factories for recycling in Kalimantan, Sulawesi, Bali, etc.

Another important thing is to provide awareness to the community to carry out a culture of grouping in the disposal of plastic waste and organic waste, and the importance of waste banks to make the environment cleaner, free from plastic waste that accumulates and collects in the open sea. We must care for the environment, dispose of waste in its place, and process plastic waste to make it more functional so that it does not damage the environment.

5.6. Sustainability model for plastic companies

Based on the description in the previous section, building a sustainability model for plastic packaging companies requires a holistic approach that considers environmental, social, and economic aspects. There are five pillars to developing a sustainability model for plastic companies, namely:

1) The Environmental Pillar focuses on reducing the environmental impact of plastic packaging production and distribution activities. It includes (a) Emissions and Energy Reduction. Energy Efficiency: Ensuring more efficient energy use in the production process, using renewable energy whenever possible (solar, wind, or biogas). Carbon Emissions Management: Calculate and reduce the carbon footprint of company operations. Replace fossil fuels with green energy sources. (b) Sustainable Raw Materials, including Eco-friendly Materials: Using biodegradable, bio-based, or recycled plastics. Use of Recycling: Increase the proportion of recycled materials used in packaging production and minimize the use of virgin (new) plastics. (c) Waste Management. Zero Waste to Landfill: Implement a production system with zero waste to landfill. Non-recyclable waste can be reused or converted into energy. Product Life Cycle: Develop a product life cycle strategy that extends the useful life of packaging products and facilitates recycling.

2) Social Pillar: This pillar ensures that the company has a positive impact on the community, workers, and society at large, including (a) Worker Welfare and HR Development, by conducting training and capacity building for workers to improve skills, including those related to handling environmentally friendly technology. (b) Consumer Education, namely recycling campaigns by engaging communities and consumers in education on the importance of recycling and how to use plastic

packaging responsibly, and Sustainability Labelling: Including labels on products that indicate the percentage of recycled materials or information related to the product's environmental sustainability. (c) Corporate Social Responsibility (CSR), Environmental CSR Programme: Carry out environmental conservation projects, such as reforestation, beach clean-ups, or support for local recycling initiatives. Community Engagement: Building partnerships with local communities, including providing education or training on plastic waste management.

3) Economic Pillar: This aspect aims to maintain the company's financial sustainability while maintaining social and environmental responsibility. Includes: (a) Cost Efficiency: Reduction of Operational Costs: Through energy efficiency, good waste management, and reduction of virgin raw materials, the company can lower production costs. Product Innovation: Developing new plastic packaging products that are more sustainable and economical, such as lighter or reusable packaging. (b) Supply Chain Sustainability: Green Supply Chain: Using sustainable and environmentally friendly raw materials. Ensure suppliers also implement responsible business practices. Responsible Production Practices: Implementing production processes that are resource-efficient and minimize wastage. (c) Long-term Benefits: Circular Economy Business Model: Adopt a circular economy business model where packaging products are reclaimed, recycled, and reused in the production process. Product Diversification: Develop a product portfolio to enter the market for more environmentally friendly non-plastic packaging, such as recycled paper packaging or other organic materials**.**

4) Innovation and Technology Pillar: Innovation plays a vital role in achieving long-term sustainability, including (a) R&D for Alternative Materials, New Materials: Investing in research and development of more environmentally friendly and biodegradable plastic materials. Smart Packaging: Developing innovative packaging that can track product lifespan, help prevent food waste, or can be recycled more easily. (b) Automation and Digitalisation, Green Production Technologies: Implementing the latest technologies in production that reduce the use of harmful chemicals and energy consumption. Data Management for Optimisation: Using data to track emissions, energy use, and efficiency of production processes so that the company can continuously improve its sustainability performance**.**

5) Transparency and Accountability: Companies must be transparent about their sustainability targets and progress. It includes (a) Sustainability Reporting, Public Reports: Publish annual reports on sustainability practices, reporting progress on emissions reduction, energy efficiency, and recycling initiatives. External Certification: Obtain certification from external sustainability bodies such as ISO 14001 (Environmental Management) or other sustainable plastic packaging industry certifications. (b) Sustainability Audit, Third Party Audit: Conduct independent sustainability audits to assess the company's environmental, social, and economic commitments and outcomes.

This sustainability model will help plastic packaging companies reduce their negative environmental impact and increase their competitiveness in a market that is increasingly concerned about sustainability. It can also build trust with consumers and stakeholders, creating long-term economic and reputational value. **Figure 13** shows The sustainability model for plastic packaging companies as follows

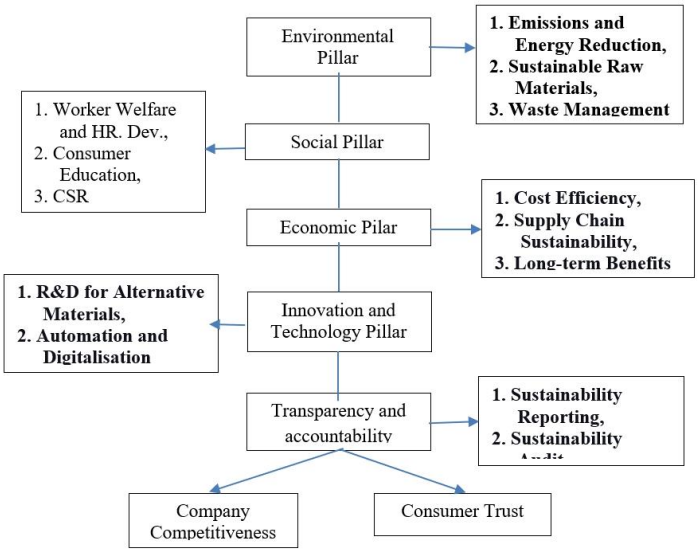

Figure 13. Sustainability model for plastic packaging companies.

6. Conclusions and future studies

Plastic products, including plastic packaging, are products whose demand continues to increase because the community still needs the use of plastic as packaging, but on the other hand, plastic waste that is increasingly high and difficult to decompose is a problem that needs to be solved together because eliminating plastic packaging products is impossible, many products such as food, drinks, cosmetics, and others use plastic as a container and until now have not been able to replace it.

Plastic companies have done various things to reduce plastic waste and care for the environment, including replacing hydraulic machines with electric machines to reduce CO_2 emissions and save electrical energy. Solar panels are used to save electrical energy, recycled plastic materials are used so that plastic waste is minimal, and domestic waste is processed into clean water before being released into the water.

To answer the global challenges regarding sustainability and customer demands, the company has routinely conducted CSR audits using EcoVadis, which will measure the company's concern in terms of environment, labor and human rights, ethics, and sustainable procurement, as well as SMETA, which will audit in this case health and safety, employment standards, environment and business ethics, making the company more professional, increasing profits, but at the same time also being responsible to the surrounding community and a form of our responsibility to the universe and the survival of future generations.

The limitation of this research is that the results of this research may be utilized by plastic companies that are already large, have considerable capital, and are no longer only profit-oriented because going green manufacturing requires enormous funds and care, such as the use of solar energy panels, electric machines, external audits and so on, so it is difficult to apply on small plastic companies.

For future research, it may be possible to involve more plastic packaging companies in more countries to look at their interconnectedness and corporate responsibility for the environment globally so as to produce policies for companies globally to support environmental sustainability for future generations.

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