

## SUSTAINABLE MARKETING STRATEGY IN THE REMANUFACTURING INDUSTRY: A SOFT SYSTEMS METHODOLOGY APPROACH

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### ABSTRACT

**Background:** PT. X is one of Indonesia's heavy equipment component companies with a remanufacturing division that aims to achieve sustainability goals by implementing sustainable marketing. Even though the manufacturing industry has enormous potential, implementing sustainable marketing in this sector still faces many challenges.

**Purpose:** This study aims to analyze the critical challenges and propose a conceptual model for sustainable marketing implementation in the remanufacturing industry.

**Design/methodology/approach:** The SSM framework analyzes complex systems, emphasizing human and organizational factors, to guide the application of sustainable marketing in remanufacturing. Before developing the conceptual model, a sustainable marketing mix analysis was conducted to identify challenges that hinder successful implementation.

**Findings/results:** Several important variables were identified to increase the successful implementation of sustainable marketing for remanufactured products. Prices, product quality, and green public awareness need to be improved. The complex implementation of the sustainable marketing mix at PT X can be seen through the rich picture system. Apart from that, based on the root definition, it can show that many stakeholders are involved in supporting the success of this system, and it must also be supported by government policy. Several essential activities are identified in the conceptual model, such as the role of the remanufacturing division in PT X.

**Conclusion:** This research shows that the success of implementing sustainable marketing on remanufactured products is highly dependent on increasing prices, product quality, and public awareness, as well as involving various stakeholders and support from government policies.

**Originality/value (State of the art):** This research contributes to a holistic approach that combines systems analysis with sustainable marketing elements and focuses on the remanufacturing industry.

**Keywords:** sustainable marketing, remanufacturing industry, marketing mix, soft system methodology, conceptual model

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## INTRODUCTION

Sustainable marketing is an effort to implement sustainability value in product marketing practices. Three aspects of sustainability must be considered: economic, social, and environmental (green) (Jones et al. 2008; Baumgartner and Ebner, 2010). So far, the company has been used to the strategy of cost economy goals but has not yet considered other sustainable values. Marketing strategy is the only way to achieve the company's economic goals. Through Sustainable Marketing, the company is no longer only oriented to economic profits but also green and social value (Martin and Schouten, 2014). Besides that, it also contributes to ethics and technology (Lim, 2016). Sustainable marketing must deliver the value of sustainability to the customer and educate all stakeholders about socio-ecological responsibility and the implications of their consumption (Sheth and Parvatiyar, 2021).

The industry has widely applied sustainable marketing to achieve Sustainable Development Goals (SDGs). The industry applies sustainable marketing with two fundamentals (Martin and Schouten, 2014): first, designing an environmentally friendly corporate culture and marketing process with a social impact. The second fundamental goal is to support sustainable consumption in society with environmental friendliness and social justice. Marketing is essential in helping link sustainability, culture, environment, consumers, and industry sustainable development (Tian and Kamran, 2023). Several sustainable marketing approaches have been carried out, for example, the use in the fast fashion industry, which shows that customers cannot easily see the environmental effects of the industry, so the company must build strong brand images (Sun et al. 2014). Stoyanov (2015) reviewed the sustainable marketing mix model in the vending industry. The result shows that the company can rebuild a lousy brand image through sustainable marketing by selling junk food to the healthier concept.

The research focuses on sustainable marketing trends and is more focused on green marketing. Moravcikova et al. (2017) examine the green marketing strategy in the automotive industry to achieve a sustainable competitive position for the company. The results indicated that green marketing could be a survival tool in market competition. The green marketing model is used in the architectural design services industry (Parkman and Krause, 2018). Return to sustainable marketing is starting to be

applied by SMEs, not only large enterprises. Rudawska (2019) provides an overview of the implementation of sustainable marketing in Europe's SMEs-scale food and drink industry. The results show that the tool that best supports the delivery of sustainable value to customers is the visible one. Some visible items, such as packaging, product ingredients, or certificates, are the most visible to customers.

Sustainability values have become more urgent to apply after the COVID-19 pandemic. Industry and customers realize the importance of sustainable consumption to survive a pandemic (Leal Filho et al. 2022). All types of industries were affected, but the tourism and hospitality industries were the most severely affected (UNWTO, 2020). Both industries must make intensive marketing efforts and sustainable strategies to bounce back. The sustainable tourism marketing model is one of the tourism industry's efforts to rise through social media (Hysa et al. 2021). Ho et al. (2021) also, it will explore the critical variables in green marketing to make the hotel industry sustainable after the COVID-19 pandemic. The results show that market orientation is the most important. Furthermore, all industries do their best to survive the pandemic with a sustainable strategy.

Today, sustainability strategy is also a competitive advantage for manufacturing/remanufacturing systems. A more environmentally friendly production process promoting recycling, reusing, and reducing resources is a way to prioritize environmental sustainability in the Green Marketing Strategy (Sugandini et al. 2020). Remanufacturing also reduces carbon emissions by reducing materials and energy needs, and it can give a lower price than new products (Ndhaief et al. 2020). Remanufacturing has long been considered the right step for the industry to achieve sustainable goals. Remanufacturing is also a marketing strategy (Atasu et al. 2008). The results of this study indicate that when the level of competition is fierce, and the market is growing, companies with remanufacturing can build a better brand image than others. Remanufactured products will be well received if the customer's sustainable awareness is also good (Khor and Hazen, 2017).

Sustainable marketing has become an increasingly important global trend in the business world. Companies across sectors are realizing that sustainability is not only a social responsibility but also a business opportunity that can improve brand reputation, customer loyalty, and financial performance. As part of a sustainability

strategy, remanufacturing offers excellent potential to reduce waste, save resources, and extend product life. PT X is one of the heavy equipment component companies in Indonesia. PT X has a remanufacturing division that is working to achieve its sustainability goals. In the remanufacturing division, customers' components are called cores. The core is the raw material that will be processed through remanufacturing. In its implementation, parts of the core that have been damaged will be replaced with new parts. PT X will reuse parts that can still be used, claiming that it established a sustainability policy in its management process and promises to support a sustainable society. The remanufacturing division is one of PT X's sustainable marketing strategies.

Implementing sustainable marketing at PT X is complex because it involves many stakeholders. PT X is engaged in manufacturing and producing heavy equipment. The remanufacturing division is only a tiny part of the business process. The soft system methodology (SSM) framework is suitable for describing the sustainable marketing strategy at PT X. SSM was introduced by Checkland in 1972 to address complex problems. In addition, SSM can handle unstructured and unclear issues at all levels of managers (Checkland, 2000). SSM has previously been used to describe the various objectives of all stakeholders in the sugar and sugarcane industry (Proches and Bodhanya, 2015; Asrol et al. 2018). SSM can also help build conceptual models that help strengthen business actors' innovation through developing their potential (Hasanah et al. 2021).

This study aims to propose a conceptual model for sustainable marketing implementation at PT X using the Soft System Methodology (SSM) framework. The implementation of sustainable marketing in the remanufacturing division of PT X will produce significant positive impacts. Sustainable marketing strategies can increase public awareness of the importance of remanufacturing, increase demand for remanufactured products, and improve the company's image as a responsible business actor.

This research introduces a new conceptual model that positions remanufacturing as a strategic marketing tool in the heavy equipment industry. By exploring the intersection of sustainability and marketing, this model provides a new way of looking at the product life cycle and proposes remanufacturing to increase product value while minimizing environmental impact. This approach

offers a perspective on sustainable consumption and the circular economy in the context of heavy equipment, thereby contributing to a more environmentally responsible and economically viable industry. Identifying critical variables of the sustainable marketing mix will help the industry develop a better strategy for the future. Implementing sustainable marketing in the remanufacturing division of PT X is expected to result in increased public awareness of reducing waste and protecting the environment. PT X will be recognized as a company committed to sustainability and environmental responsibility. Implementing sustainable marketing can increase sales of remanufactured products, reduce production costs, and improve operational efficiency.

## METHODS

The data used in this research is qualitative data, which describes all aspects of the various conditions of how the remanufacturing division plays a role in implementing sustainable marketing at PT X. Data related to the production process and multiple stakeholders involved are also collected. Apart from that, researchers also collected contextual data from experts' opinions and results from previous research.

Data was collected through in-depth interviews with PT X stakeholders, such as production and marketing employees from the remanufacturing division. An in-depth analysis was done by direct observation or assistance from supporting documents owned by PT X in 2022. Data on implementing sustainable marketing was also collected through literature studies. The data collection process in this research is flexible and combines various methods ranging from observation to interviews and literature studies. Iterations in data collection are also carried out to complete a complete picture of the soft system.

This research used the Soft System Methodology (SSM) framework (Checkland, 2000; Wilson, 2001; Wang et al. 2015). The SSM methodology in this research is a flexible qualitative approach to help clarify complex systems in the remanufacturing industry. The first step, namely the results of the literature study, carried out a critical challenge analysis of how to apply sustainable marketing to various kinds of products, especially remanufactured products. Descriptive data related to the problem of implementing sustainable marketing is depicted through rich pictures. This rich

picture helps visually depict various issues and critical elements in implementing sustainable marketing in the remanufacturing industry. Next, CATWOE (Customer, Actor, Transformation, Owner, and Environment) analysis is carried out to define the system as more structured. Apart from this, it also aims for a more focused study of root definition. Based on the root definition and input from various interests, a conceptual model related to how the system for implementing sustainable marketing in the remanufacturing industry works is described. The framework of thought of this research can be seen in Figure 1.

The detailed stages of this research are described in Table 1. First, the Complex Situation Inspection stage involves deeply understanding the situation. Then, the problem is described thoroughly at the Expressing Messy System stage. Next, Root Definitions help determine the primary purpose of the system being analyzed. Finally, Conceptual Models are built to describe how the system would ideally operate to achieve those goals. This research only focuses on creating a conceptual model of sustainable marketing implementation at PT X (Step 4).

## RESULTS

### Complex situation inspection

This step identified and reviewed the unstructured problems related to the research objective. A literature review has been conducted to identify remanufactured products' most critical marketing variables. Identifying the key elements of marketing strategy will help increase the willingness to pay off customers for the remanufactured products (Govindan, 2024). Due to limited research analyzing sustainable marketing in the heavy equipment industry, critical sustainable challenges are collected from various industries worldwide. The results of the literature survey can be seen in Table 2.

The results show that the most critical variable in the remanufactured products marketing strategy is

Price (Atasu et al. 2008; Jiménez-Parra et al. 2014; Vafadarnikjoo et al. 2018; Wang et al. 2018a; Govindan et al. 2019; Singhal et al. 2019; Pisitsankkhakarn and Vassanadumrongdee, 2020; Wang et al. 2020; Esmailian et al. 2021; Kabel et al. 2021; Chun et al. 2022). The lower prices of remanufactured products guide customers to buy them rather than new products. Prices of remanufactured products are usually lower but do not rule out the possibility of higher prices in the future (Atasu et al. 2008).

Furthermore, another important variable is green customer awareness of remanufactured products (Atasu et al. 2008; Wang et al. 2013; Jiménez-Parra et al. 2014; Abbey et al. 2015b; Khor and Hazen 2017; Wang et al. 2018a; Singhal et al. 2019, 2020; Shao et al. 2020). The success of remanufactured products in the market is primarily determined by the company's ability to educate the public about green awareness. The company must also introduce the value of sustainable consumption, especially the green aspect, in the promotional steps taken. Green value in a product is essential not only for the company's benefit but also for society. PT X must ensure that its products' sustainable value is conveyed to customers correctly.

Product quality is also still a critical variable in the marketing of remanufactured products (Wang et al. 2013; Abbey et al. 2015b; Yilmaz and Belbag, 2016; Vafadarnikjoo et al. 2018; Wang et al. 2018a; Singhal et al. 2019; Pisitsankkhakarn and Vassanadumrongdee, 2020; Shao et al. 2020; Kabel et al. 2021). Remanufactured products are identical to old ones, which are repaired by replacing components or repairs, so the perceived quality must be the same as new ones. Companies must be able to convince customers and provide a guarantee (Yilmaz and Belbag, 2016; Vafadarnikjoo et al. 2018; Shao et al. 2020; Chun et al. 2022) that the quality of the product will be the same as the new. Other critical marketing variables still need to be analyzed, along with preparing a sustainable marketing strategy for PT X.

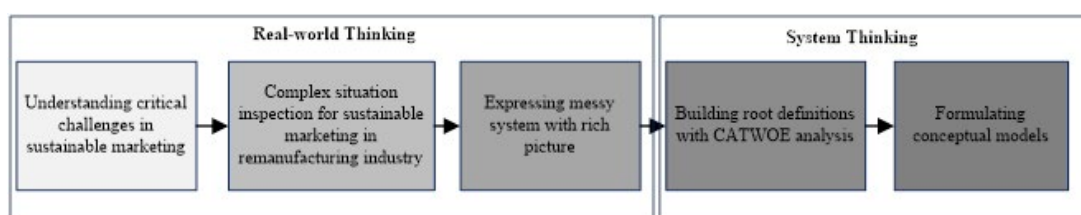


Figure 1. Framework of thought

Table 1. Research frameworks

| SSM Steps                                                            | Step Description                                                                                                          | Research Activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Complex situation inspection                                         | Identifying and reviewing the unstructured problems related to the research objective                                     | Extracting information and literature reviews to make a problems list related to sustainable marketing in the PT X remanufacturing division                                                                                                                                                                                                                                                                                                                                           |
| Expressing messy system                                              | Expressing the situation in PT X                                                                                          | Collecting related data and information by literature review, observations, interviews, and discussion<br>Making a rich picture that represents the problematic situation in Step 1                                                                                                                                                                                                                                                                                                   |
| Building Root definitions of the relevant purposeful activity system | The root definition of relevant activity systems, by choosing a point of view looking or concept at the situation of PT X | Producing root definition of the PT X problems using CATWOE analysis<br>C = Customers (who benefit from the activity objectives)<br>A = Actors (who carry out the activities)<br>T = Transformation (what must change for input to be output)<br>W = Worldview (understanding of various parties about the deep meaning of the problem situation)<br>O = Owner (who can stop the activities)<br>E = Environment Constraint (Barriers in an unavoidable system environment, parameter) |
| Formulating conceptual models                                        | Conceptual models of systems are named in the root definitions. Has possible iteration to Step 3                          | Construct conceptual models of sustainable marketing concepts at PT X<br>Describing the activity model<br>Determining and measuring the model's performance effectively                                                                                                                                                                                                                                                                                                               |

Table 2. Remanufactured product marketing challenges

| Industry (Source)                                        | Critical Marketing Variables |   |   |   |   |            |   |                |   |   |   |            |   |   |   |             |   |   |   |   |              |   |
|----------------------------------------------------------|------------------------------|---|---|---|---|------------|---|----------------|---|---|---|------------|---|---|---|-------------|---|---|---|---|--------------|---|
|                                                          | Product (Pd)                 |   |   |   |   | Price (Pc) |   | Promotion (Pm) |   |   |   | Place (Pl) |   |   |   | People (Pp) |   |   |   |   | Process (Ps) |   |
|                                                          | 1                            | 2 | 3 | 4 | 5 | 1          | 2 | 1              | 2 | 3 | 4 | 1          | 2 | 3 | 4 | 1           | 2 | 3 | 4 | 5 | 1            | 2 |
| Mixed (Atasu et al. 2008)                                |                              |   |   | √ |   | √          |   |                |   |   | √ |            |   |   | √ |             |   |   |   |   |              |   |
| Mixed (Wang et al. 2013)                                 | √                            |   |   |   |   |            |   |                |   |   | √ |            |   |   | √ |             |   |   |   |   |              | √ |
| Laptop (Jiménez-Parra et al. 2014)                       |                              |   | √ |   |   | √          |   |                |   | √ | √ |            |   |   |   |             |   |   |   | √ |              |   |
| Mixed (Abbey et al. 2015a)                               | √                            |   |   |   |   |            |   |                |   | √ | √ |            |   |   |   |             |   |   |   |   |              |   |
| Mixed (Yilmaz and Belbag, 2016)                          | √                            |   | √ |   |   |            |   |                |   | √ |   |            |   |   |   |             |   |   |   |   |              |   |
| Mixed (Khor and Hazen, 2017)                             |                              |   |   |   |   |            |   |                |   |   | √ |            |   |   |   |             |   |   |   |   |              |   |
| Fashion (Choi, 2017)                                     |                              |   |   |   |   |            | √ |                |   |   |   |            |   |   | √ |             |   |   |   |   |              |   |
| Bike (Vafadarnikjoo et al. 2018)                         | √                            |   | √ |   |   | √          |   |                |   | √ |   |            |   | √ |   |             |   |   |   |   |              | √ |
| Automobile (Wang et al. 2018b)                           | √                            |   |   |   |   | √          |   |                |   |   | √ |            |   |   |   |             |   |   |   |   |              |   |
| Mixed (Govindan et al. 2019)                             |                              |   |   |   |   |            | √ |                |   |   | √ |            |   |   |   |             |   |   |   |   |              |   |
| Electrical Electronics, Automotive (Singhal et al. 2019) | √                            |   |   |   |   | √          |   |                |   | √ | √ |            |   |   |   |             |   |   |   |   |              |   |
| Mixed (Singhal et al. 2020)                              |                              |   |   |   |   |            |   |                |   | √ | √ |            |   | √ |   |             |   |   |   | √ |              | √ |
| Automotive (Pisitsankhakarn and Vassanadumrongdee, 2020) | √                            |   |   |   |   | √          |   |                |   |   |   |            |   |   |   |             |   |   |   |   |              |   |
| Automobile (Shao et al. 2020)                            | √                            |   | √ |   |   |            |   |                |   | √ | √ |            |   | √ |   |             |   |   |   |   |              |   |
| Mixed (Wang et al. 2020)                                 |                              |   | √ |   |   |            | √ |                |   |   |   |            |   |   |   |             |   |   |   |   |              |   |
| Smartphones (Esmailian et al. 2021)                      |                              |   |   | √ |   |            | √ |                |   |   |   |            |   |   |   |             |   |   |   |   |              |   |
| Robotic Lawn Mowers (Kabel et al. 2021)                  | √                            |   |   |   |   |            | √ |                |   |   |   |            |   |   |   |             |   |   |   |   |              |   |
| Mixed (Confente et al. 2021)                             |                              |   |   |   |   |            |   |                |   | √ |   |            |   |   |   |             |   |   |   | √ |              |   |
| Diesel engines and components (Qiao et al. 2022)         |                              |   |   |   |   |            |   |                |   |   |   |            |   | √ | √ |             |   |   |   |   |              |   |
| Smartphone (Chun et al. 2022)                            |                              |   | √ |   |   |            | √ |                |   |   | √ |            |   |   |   |             |   |   |   |   |              |   |
| Mixed (Belbağ and Belbağ, 2023)                          | √                            |   | √ |   | √ |            |   |                |   |   |   |            |   |   |   |             |   |   |   |   |              |   |
| Mixed (Alam et al. 2024)                                 |                              |   |   |   | √ |            |   |                |   |   |   |            |   |   |   |             |   |   |   | √ | √            | √ |

Note : Quality (Pd1); Design Innovation (Pd2); Warranty (Pd3); Product Age (Pd4); Technology (Pd5); Price (Pc1); Return policy (Pm1) Company's Website (Pm2); Brand Reputation (Pm3); Green Awareness (Pm4); Retailing platform (Pl1); Government Support (Pl2); Competition (Pl3); Return channel structure (Pl4); Skilled Employee (Pp1); Social and Green Awareness (Pp2); Ecological consciousness (Pp3); Environmental concern (Pp4); Theory of Planned Behavior (Pp5); Technology (Ps1); Value-added Service (Ps2)

### Expressing messy system

In the second SSM step, expressing the situation, the unstructured problems delivered about sustainable marketing of remanufactured products are described in a structured, rich picture depicted in Figure 2. All stakeholders involved in PT X's business processes are shown in a rich picture. This is useful for identifying the implementation of PT X's sustainable values. Government programs supporting Sustainable Development Goals (SDGs) have recently made more industrial stakeholders. The gap between industry, education, and society is narrowed, and the benefits are increasingly being felt. Identifying all stakeholders can support problem-solving (Wang et al. 2015).

### Building Root definitions of the relevant purposeful activity system

Based on the sustainable marketing challenges and the rich picture above, a root definition is defined for the problem-solving model. The root definition in this study is how sustainable marketing can be applied at PT X, which involves many stakeholders ranging from suppliers, remanufacturing divisions, distributors, customers, and communities to the government.

Implementing sustainable marketing is expected to help deliver sustainable values to all levels of society and support sustainable development (Syrytczyk, 2023). The root definition was produced by applying CATWOE (Customers, Actors, Transformation, Worldview, Owner, Environment) analysis (Ebrahimi, 2022). The result of the CATWOE analysis can be seen in Figure 3.

The customer element illustrates that a sustainable marketing system will benefit many stakeholders, not only PT X but also suppliers, distributors, government, society, industrial customers, and the customers themselves. Sustainable marketing applications will help to form better brand loyalty (Khandai et al. 2023). All stakeholders are also involved as actors, plus vocational schools whose role is to support sustainable behavior education (Dragolea et al. 2023). The next most important thing is that implementing sustainable marketing and increasing sustainable value in the industry will not be successful without being supported by the environment, namely government policy, which has been proven to strongly influence human resource factors, financial factors, and social responsibility (Hung, 2021).

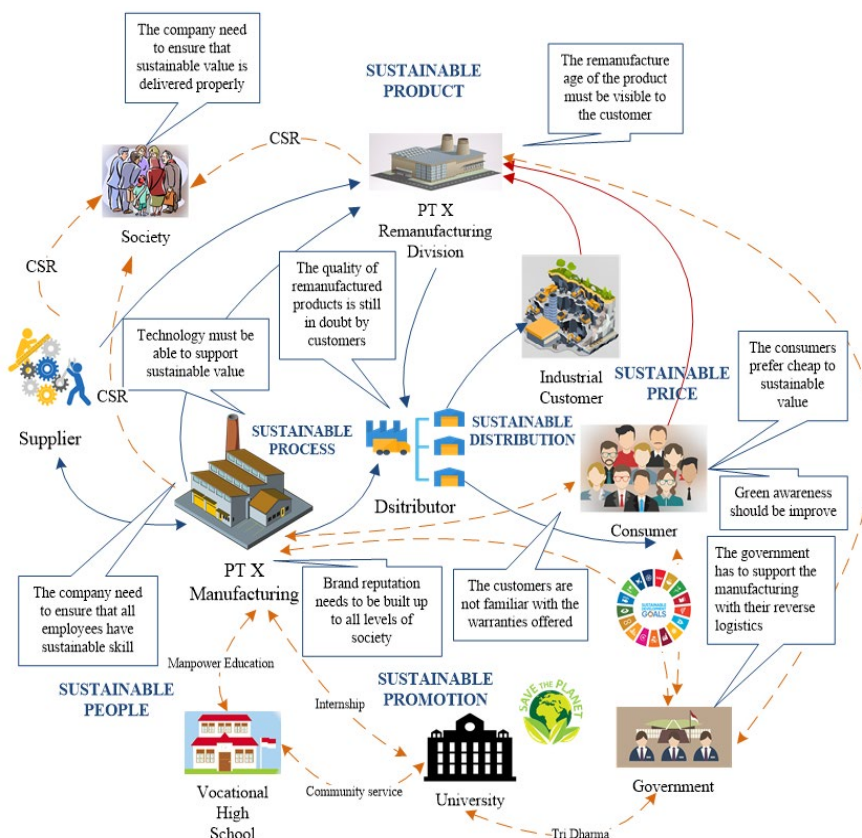


Figure 2. Rich picture

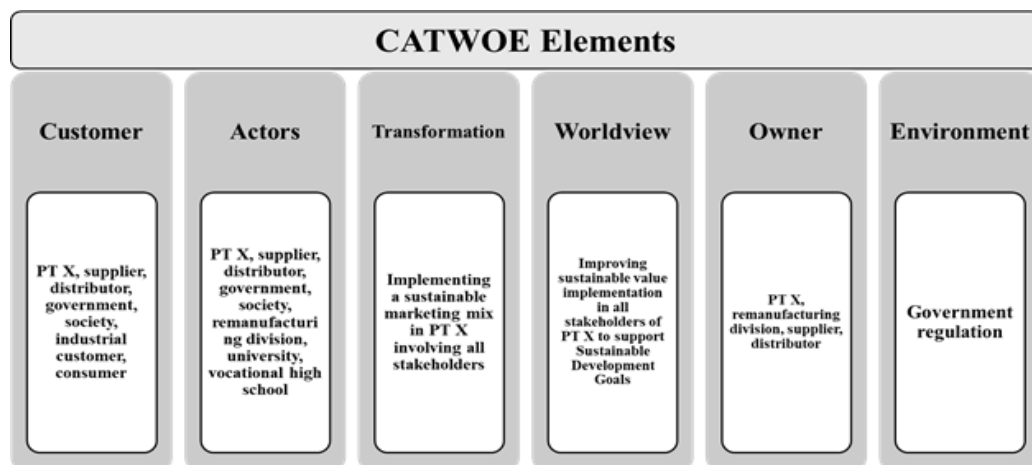


Figure 3. CATWOE Elements

### Formulating Conceptual Models

Formulating a conceptual model is the fourth step in SSM. The development of this Conceptual model builds on the root definition. The conceptual model is a collection of activities logically structured in a system of ideas, and the definition of roots is limited (Checkland, 2000). The conceptual model was created to describe the problem of sustainable marketing implementation in the heavy equipment industry. The conceptual model was developed to understand the activities required to achieve a change (Ebrahimi, 2022). The expected change is that PT X can implement sustainable marketing successfully.

PT X has a remanufacturing division that is one of the primary keys to implementing sustainable marketing. PT X needs to create a conceptual model to identify, understand, and master the critical challenges of implementing sustainable marketing. The sustainable marketing mix approach helps the industry to see the obstacles in every essential point that needs attention (Olson, 2022). Previously, sustainable marketing mix tools 5P (sustainable product, price, distribution, promotion, people) were considered very important according to SME managers in Sri Lanka to provide long-term benefits in the social, economic, and environmental dimensions (Kowalska, 2020).

The results of this research found that there are six critical variables to support the successful implementation of sustainable marketing in the remanufacturing industry. The six sustainable marketing mixes for remanufactured products were found based on literature review and observation. They are a sustainable product, sustainable price, sustainable

promotion, sustainable people, sustainable place or distribution, and sustainable process.

Based on the activities that have been identified, a conceptual model is created, which can be seen in Figure 4. The conceptual model that has been made can then be compared with the actual situation at PT X and all its stakeholders. This paper has limitations, so the SSM framework is only carried out until the conceptual model is made. The next step in the SSM framework will be further research. The paper has shown a conceptual model for implementing sustainable marketing strategies for remanufacturing companies. PT X can take advantage of this by thoughtfully identifying the challenges in marketing its remanufactured products. This step can be taken by asking for cooperation from stakeholders in each supply chain, especially the remanufacturing division.

The obstacles can then be considered when choosing a sustainable marketing model. In this step, PT X must consider the actual role of the remanufacturing division and be involved in preparing the marketing strategy. This is because the remanufacturing division has in-depth knowledge regarding the product. Furthermore, after formulating the implementation model, it is found that the central company can control the implementation of the strategy and must periodically carry out evaluations to make improvements. The conceptual model can be applied to companies with the same characteristics regarding company goals, resources, stakeholders, and the environment.

However, this conceptual model has several limitations. Most of the information sources come from PT X and the remanufacturing division. Suppliers and distributors



can be involved to explore further problems related to marketing. Furthermore, the proposed conceptual model can be validated by involving all stakeholders along the supply chain. In the future, the conceptual model can be refined by adding more literature, more constraining factors, and numerical-scale studies to determine the best sustainable marketing implementation strategy.

### Managerial Implications

This SSM approach provides a tool for analyzing complex systems and applying sustainable marketing in remanufacturing. It also provides a framework for PT X managers to understand and change their organizational systems. With SSM, managers can identify hidden problems, involve various stakeholders in decision-making, and design more effective and sustainable solutions. SSM also encourages an organizational culture that is more adaptive and responsive to change so that companies can be better prepared to face future business challenges.

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

The remanufacturing division at PT X is essential in implementing sustainable marketing. Implementing sustainable marketing on remanufactured products is more challenging than implementing new products. The sustainable marketing mix approach is used to help identify critical variables in sustainable marketing. Several essential variables of the marketing of remanufactured products are product prices, product quality, and green community awareness that needs improvement. The sustainable marketing implementation model at PT X remanufacturing uses the Soft System Methodology framework. A conceptual model for implementing sustainable marketing at PT X can be created through a rich picture and root definition. Some essential activities are identifying the role of the remanufacturing division in PT X sustainable marketing, identifying sustainable values in all stakeholders that need to be improved, making strategies for each challenge, and formulating models.

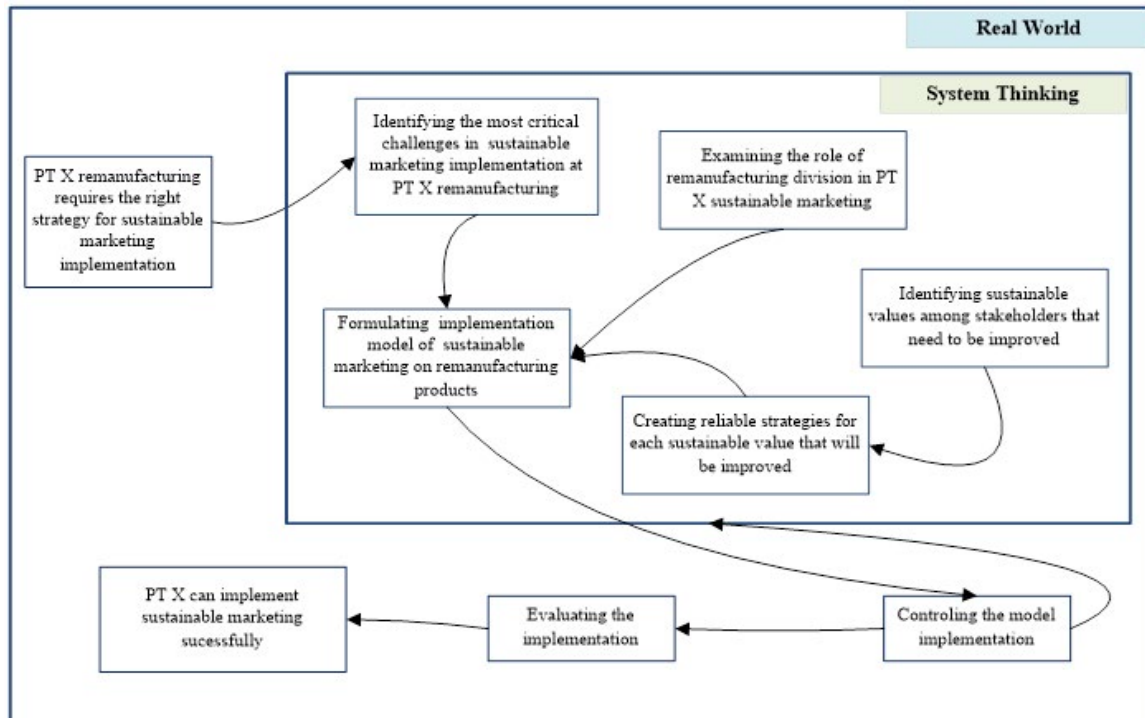


Figure 4. The conceptual model for PT X sustainable marketing



## Recommendations

This research has succeeded in identifying the critical role of the remanufacturing division in implementing sustainable marketing at PT X and highlighting several vital variables. However, this study has several limitations, such as the limited generalization of the findings to one company and the lack of quantitative analysis. For further development, it is recommended to conduct comparative studies with other companies, develop more comprehensive research instruments, and evaluate the effectiveness of long-term strategies. In addition, expanding the conceptual model by including additional variables and a more in-depth study of aspects such as sustainability performance measurement could provide a more comprehensive understanding of the implementation of sustainable marketing in the remanufacturing industry.

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