

SWOT Analysis in Optimizing Human Capital in Fastco Recycle Household Waste Management in Genteng District

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ABSTRACT

This study aims to analyze the optimization *human capital* in household waste management through a SWOT analysis approach at Fastco Recycle Genteng, Banyuwangi Regency. The focus of the research is to identify the strengths, weaknesses, opportunities, and threats that affect the sustainability of the community-based waste management system. The approach used is descriptive qualitative with data collection through in-depth interviews, direct observation, and documentation studies of Fastco Recycle members, participating communities, and local stakeholders. The research instruments include interview guidelines, observation sheets, and a SWOT matrix (IFAS and EFAS) to analyze internal and external factors of the organization. The results show that Fastco Recycle Genteng has strong human capital with transformational leadership characteristics, a strong environmental commitment, and active collaboration with the community and academics. However, limitations in funding, formal training, and digital marketing skills remain obstacles. The SWOT analysis places Fastco Recycle in Quadrant I (Aggressive Strategy) with dominant internal strengths ($X=+2.4$) and significant external opportunities ($Y=+1.3$). These findings indicate that strengthening human capital through capacity building, innovation, and cross-sector collaboration are key to supporting a circular economy and realizing the vision of society *zero waste* in Genteng District.

Keywords: *SWOT analysis, human capital, waste management, community empowerment, circular economy*

1. INTRODUCTION

The waste problem is one of the most pressing environmental challenges in Indonesia. Population growth and urbanization have led to a continuous increase in the volume of household waste each year. According to data from the Ministry of Environment and Forestry (KLHK), national waste generation reaches approximately 69.9 million tons per year, with an effective management rate of only around 66.28%. Most of this waste still ends up in landfills (landfills). *TPA* without going through an adequate recycling process, resulting in soil, water, and air pollution. This condition indicates that the national waste management system still faces structural and

behavioral obstacles in society that do not fully understand the principles *reduce, reuse, recycle* (3R).

At the regional level, Banyuwangi Regency also faces similar challenges. According to a report from the Banyuwangi Environmental Agency, household waste generation in this region reaches more than 300 tons per day, while the management capacity of the Waste Management Facility (TPS3R) and waste banks only covers around 40% of the total volume. This situation emphasizes that waste management issues are not only related to technical aspects, but also human aspects, namely the quality of human resources (*human capital*) that drives the system.

In response to these challenges, environmental community initiatives emerged. *Fastco Recycle* in Genteng District, founded by Muhammad Nasir, a young educator with a strong concern for the environmental crisis. This movement prioritizes a community-based waste management system through sorting, recycling, and environmental education, using a circular economy approach. *Fastco Recycle*'s success depends not only on its technical infrastructure but also on its strong community. *Human capital* which includes the leadership, skills, values, and social commitment of its members.

Draft *human capital*, as introduced by Schultz (1961) and developed by Becker (1993), emphasizes the importance of investing in individual knowledge, skills, and values to improve organizational performance. In the context of community-based waste management, *human capital* became a key element in building ecological awareness, social innovation, and environmental economic sustainability. However, most previous research in Indonesia still focuses on the technical aspects of waste management such as recycling technology and waste bank systems, while strategic studies on strengthening *human capital* still limited.

Previous studies have generally focused on the technical aspects of waste management, such as recycling technology or waste bank systems (Dianastiti et al. 2022). Several other studies have highlighted the role of communities in changing behavior (Syawalidan 2024), but few have examined in-depth the optimization of human capital in community-based waste management systems.

The research gap that emerged was the lack of studies that integrated the SWOT analysis approach as a strategic tool in human resource development, and the concept of human capital in the context of community-based household waste management.

The novelty of this research lies in combining SWOT analysis with human capital theory to understand the dynamics of human resource management in the waste management community, which also presents a local case study (*Fastco Recycle* Genteng) that has not been widely explored in academic literature and provides practical contributions in the form of strategies for strengthening human capacity as the key to the sustainability of zero waste programs at the community level.

Based on the research gap, this study uses SWOT analysis (*Strengths, Weaknesses, Opportunities, Threats*) to evaluate internal and external factors that influence development of *human capital* at *Fastco Recycle* Genteng. This approach aims to determine the organization's strategic position and formulate a strategy for optimizing human resources to improve the sustainability of household waste management. The novelty value (*novelty*) this research lies in the integration of theory *human capital* with SWOT analysis in a local community-based context, thus producing theoretical and practical contributions in strengthening social, economic and environmental capacity towards the community *zero waste*.

2. LITERATURE REVIEW

2.1. Community-Based Waste Management Concept

Modern waste management emphasizes the paradigm *from waste to resource*, where waste is no longer seen as waste, but as a resource that can be reprocessed to create economic and social value (Kristianto et al., 2025, p. 34). This paradigm is part of the concept of a circular

economy which is oriented towards waste reduction and efficient use of resources in a sustainable manner.

According to Law Number 18 of 2008 concerning Waste Management, waste management includes activities to reduce and handle waste systematically, comprehensively, and sustainably (Ambina, 2019, p. 172). This aligns with Achmad's opinion (2024, p. 214), which emphasizes that the implementation of waste management policies *zero waste* in Indonesia requires active community participation so that the management system can run effectively. Therefore, community-based waste management (*community-based waste management*) is a strategic approach because it fosters a sense of ownership, responsibility, and ecological awareness.

Fastco Recycle in Genteng is a concrete example of community-based waste management practices, where residents play a key role in sorting, collecting, and recycling activities. Research by Syawalidan (2024, p. 88) shows that direct local community involvement in waste management activities can significantly drive changes in social behavior, particularly in environmental awareness.

2.2. Theory *Human Capital* in Environmental Management

Draft *human capital* first introduced by Schultz (1961) and developed by Becker (1965, p. 45), who explained that investment in people through education, training, and work experience can increase the productivity and economic value of individuals and organizations. According to Becker (1993, p. 17), *human capital* includes not only technical skills, but also the values, commitments, and motivations that drive individual behavior within the organization.

In the context of environmental management, *human capital* plays an important role in building ecological awareness, social innovation, and community participation. Nuryanto (2018, p. 12) emphasizes that human capacity is the main pillar in forming a sustainability-oriented organization (*sustainability*). In line with that, Ulrich (1998, p. 5) states that *intellectual capital* and a high commitment to the organization's vision is an ideal combination to increase the competitiveness and effectiveness of environmental organizations.

Recent research by Febriani et al. (2025, p. 51) also revealed that the role of *human capital* is crucial for enhancing organizational competitiveness in the era of digital transformation, including in the socio-environmental sector. In the context of waste management, this means every individual must possess technical knowledge, collaborative skills, and values of ecological responsibility to ensure the system operates sustainably.

2.3. SWOT Analysis as a Strategic Strengthening Tool *Human Capital*

SWOT Analysis (*Strengths, Weaknesses, Opportunities, Threats*) is a strategic analysis method used to identify the internal and external conditions of an organization, as well as formulate appropriate development strategies (Santiani et al., 2025, p. 22). In the context of human resource management, the SWOT approach helps organizations understand the potential internal strengths and weaknesses, while simultaneously exploiting opportunities and facing threats from the external environment.

According to Ruslina, Rahman, and Purnaweni (2025, p. 156), the use of SWOT analysis in community development allows for the formulation of more realistic and sustainable local capacity-based strategies. In a similar study, Wahib and Susanto (2024, p. 333) emphasized that transformational leadership (*transformational leadership*) in the socio-environmental community is able to strengthen *human capital* through social innovation, motivation, and inter-sectoral collaboration.

Thus, the integration between the theories *human capital* A SWOT analysis provides a strong conceptual framework for understanding human resource optimization strategies in community-based waste management. This model not only analyzes the internal and external

conditions of an organization but also provides practical guidance in designing training, leadership, and collaboration programs for community-based waste management.*zero waste*.

3. RESEARCH METHOD

3.1. Research Design

This research uses a descriptive qualitative design with a case study approach in the community.*Fastco Recycling* Genteng District, Banyuwangi Regency. This design was chosen because it is able to depict social phenomena in depth, particularly optimization strategies.*human capital* in community-based household waste management (Miles & Huberman, 2014, p. 34). This approach allows researchers to understand the natural context, social behavior, and organizational dynamics from the perspective of participants.

Furthermore, this study incorporates a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis to map the organization's internal and external conditions. This combination of methods is used to strengthen the validity of the research results through data triangulation and strategic analysis (Santiani et al., 2025, p. 23).

3.2. Location, Population, and Research Sample

The research was conducted at Fastco Recycle Genteng, a community focused on circular economy-based household waste management. The study population included all active community members, volunteers, and community members participating in the waste bank program. The sampling technique used purposive sampling, which involves selecting informants deemed to have relevant experience and knowledge regarding the research topic (Sugiyono, 2017, p. 85). The primary sample includes:

1. Founder and main driver (*founder*) Fastco Recycle,
2. Administrators and active members of the community,
3. Representatives of the community who use waste bank services, and
4. External partners such as educational institutions and environmental organizations.

3.3. Data Collection Techniques

Data was collected through three main methods:

1. In-Depth Interviews with founders and community members to explore perceptions, experiences, and development strategies for *human capital*.
2. Field Observations were conducted on waste collection, sorting and processing activities to understand community behavior and participation.
3. Documentation, including activity notes, field photos, financial reports, and collaboration documents with external institutions.

According to Creswell (2018, p. 92), the combination of these three techniques enables researchers to obtain comprehensive data through the source triangulation process.

3.4. Data Analysis Techniques

Qualitative data analysis follows the Miles and Huberman (2014) model which consists of three main stages:

1. Data Reduction: Filtering and grouping important information that is relevant to the research focus.
2. Data Display: Displays grouping results in the form of tables, charts, and SWOT matrices.
3. Conclusion Drawing and Verification: Drawing conclusions from validation from various data sources.

4. RESULTS AND ANALYSIS

This section presents the research results obtained through field observations, in-depth interviews, and SWOT analysis of human resource management (*human capital*) in the Fastco Recycle Genteng community. The discussion was conducted comprehensively to interpret the research results based on theory and previous research, thus providing a more comprehensive scientific understanding.

4.1. Human Capital Conditions at Fastco Recycle Genteng

Based on observations and interviews, the human resources (HR) at Fastco Recycle consist of young volunteers with high social motivation but limited technical and managerial skills. *human capital*— knowledge, skills, values, and innovation — have developed gradually along with the community's experience in managing waste banks and environmental activities.

According to Febriani et al. (2025, p. 52), the increase *human capital* not only depends on formal education but also on *learning by doing*. This finding aligns with the situation at Fastco Recycle, where members acquire technical and leadership skills through hands-on field practice and collaboration with KKN students.

Social values such as mutual cooperation, environmental responsibility, and participatory leadership are also major factors that strengthen organizational sustainability (Rezeki et al., 2024, p. 12).

4.2. Internal and External Factor Analysis (SWOT Analysis)

SWOT analysis is conducted to identify strengths (*strengths*), weakness (*weaknesses*), opportunity (*opportunities*), and threats (*threats*) in household waste management by Fastco Recycle. The results of this analysis were then processed using the IFAS matrix (*Internal Factors Analysis Summary*) and EFAS (*External Factors Analysis Summary*) to assess the strategic position of the organization.

a. Internal Factor Analysis Matrix (IFAS)

Table 1. Strength

| Internal Factors | | | | | Weight | Rating | Score |
|--|---|-----------|------------|-----|--------|--------|-------|
| Strength (<i>Strenght</i>) | | | | | | | |
| 1. | Muhammad Nasir's | visionary | leadership | 0.3 | 4 | 1.2 | |
| style <i>transformational leadership</i> | | | | | | | |
| 2. | High social values and environmental responsibility among members | | | 0.2 | 4 | 0.8 | |
| 3. | There are two active community waste bank units | | | 0.2 | 4 | 0.8 | |
| 4. | Innovation in waste collection services that can be saved | | | 0.3 | 3 | 0.9 | |
| 5. | Active collaboration with KKN students and youth organizations | | | 0.2 | 4 | 0.8 | |
| Total Strength(<i>Strenght</i>) | | | | 1 | | 4.5 | |

Table 2. Weaknesses

| Weaknesses(<i>Weaknesses</i>) | Weight | Rating | Score |
|---|---------------|---------------|--------------|
| 1. The waste sorting process is still manual and depends on human power. | 0.3 | 2 | 0.6 |
| 2. Limited funds for formal training and upgrading of recycling technology | 0.3 | 3 | 0.9 |
| 3. Members' managerial and digital marketing skills are still low. | 0.2 | 2 | 0.4 |
| 4. Dependence on central figures in decision making | 0.05 | 1 | 0.05 |
| 5. Lack of supporting facilities such as plastic presses and shredding machines | 0.05 | 3 | 0.15 |
| Total Weakness(<i>Weaknesses</i>) | 1 | | 2.1 |

Looking at the IFAS table below, the total score difference of $4.5 - 2.1 = 2.4$ indicates that Fastco Recycle's internal strength is quite strong, above the average for an organization. This means that human capital is a strategic asset that can be optimized to strengthen the organization's competitiveness. However, investment in this area is still needed. *capacity building*, managerial structure, and modern recycling technology.

b. External Factor Analysis Matrix (EFAS)

Table 3. Opportunities (*Opportunities*)

| External Factors | Weight | Rating | Score |
|--|---------------|---------------|--------------|
| Opportunity(<i>Opportunities</i>) | | | |
| 1. Government support for zero waste and circular economy programs | 0.3 | 4 | 1.2 |
| 2. Potential for collaboration with campuses, NGOs, and the private sector | 0.2 | 3 | 0.6 |
| 3. Increasing public awareness of environmental issues | 0.3 | 3 | 0.9 |
| 4. Market demand for recycled and compostable products is increasing | 0.2 | 2 | 0.4 |
| Total (<i>Opportunities</i>) | 1 | | 3.1 |

Table 4. Threats(*Threats*)

| Threat (<i>Threats</i>) | Weight | Rating | Score |
|---|----------|--------|------------|
| 1. Lack of strict regulations regarding household waste management | 0.3 | 2 | 0.6 |
| 2. Competition with other larger recycling business players | 0.2 | 1 | 0.2 |
| 3. Fluctuations in the price of economically valuable waste (plastic, paper, metal) | 0.2 | 2 | 0.4 |
| 4. Low awareness among some people regarding waste sorting | 0.3 | 2 | 0.6 |
| Total (<i>Threats</i>) | 1 | | 1.8 |

Source: Processed data (2025).

Looking at the EFAS table below, the difference in total scores of $3.1 - 1.8 = 1.3$ indicates weak internal conditions. This means Fastco Recycle's external factors are still weak in capitalizing on opportunities and facing external environmental threats. The organization has not been able to optimize opportunities and remains vulnerable to external threats.

SWOT Quadrant Position

Based on the IFAS and EFAS scoring results, Fastco Recycle's quadrant positioning can be seen. The next stage is the analysis stage. Internal and external analyses are conducted to refine the results of the previous evaluation and analysis. This analysis will produce an internal-external matrix that is useful for determining Fastco Recycle's competitive strategy position. The results of the internal-external matrix analysis can be seen in the quadrant position image below:

Description:

- Strength score value (S) : 4.5
- Weakness score value (IN) : 2.1
- Opportunity score value (THE) : 3.1
- Threat score value (T) : 1.8

Determination of the SWOT Analysis matrix in Optimizing Human Capital in Fastco Recycle Household Waste Management in Genteng District as follows.

- Internal Analysis Coordinates
X-axis = Strength score - Weakness score = $4.5 - 2.1 = 2.4$
- External Analysis Coordinates
Y axis = Opportunity score - threat score = $3.1 - 1.8 = 1.3$

So, it can be concluded that the coordinate point of Fastco Recycle is at position (X= +2.4 ; Y= +1.3).

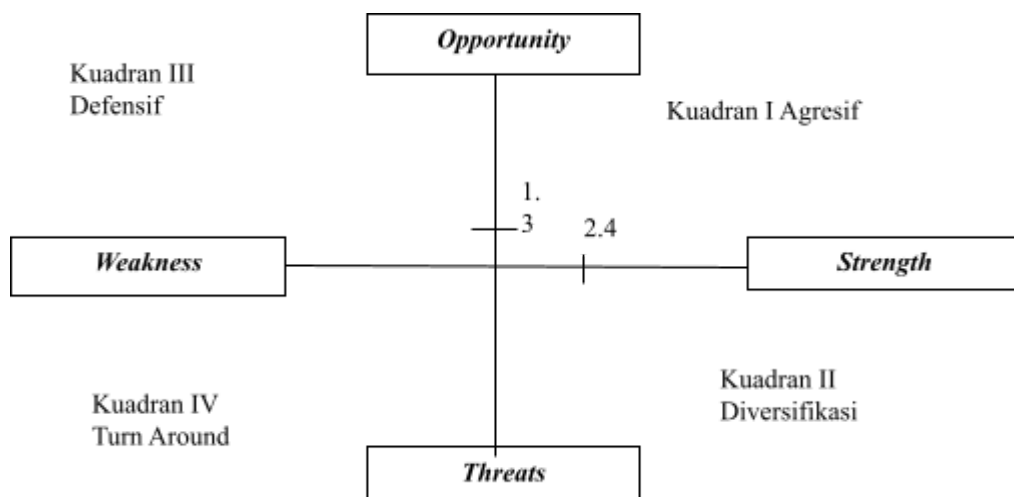


Figure 1. SWOT Quadrant Position

The results of Fastco Recycle placement are seen from the coordinate values, namely:

- $X = +2.4$ which indicates dominant internal strength
- $Y = +1.3$, which indicates that external opportunities are greater than threats.

So Fatco Recycle Genteng is in Quadrant I, namely growth strategy (Growth Strategy / Aggressive).

Overall, the SWOT analysis results show that the coordinate position (2.4: 1.3) indicates that Fastco Recycle Genteng is in Quadrant I, an area with high internal strength and significant external opportunities. This position illustrates that Fastco Recycle has strong social capital and human resources characterized by visionary leadership, values of environmental responsibility, and active collaboration with local communities and students.

In addition, the external environment also provides broad opportunities, such as increasing public awareness of waste issues, local government support for community-based waste management, and the opening of a market for recycled products with economic value.

Table 4. Recommended Strategies Based on the SWOT Matrix

| Category Strategy | Focus Strategy | Action Plan |
|---|---|--|
| ONLY (<i>Strength-Opportunity</i>) | Maximizing internal strengths to take advantage of external opportunities | <ul style="list-style-type: none"> - Developing the “Green Skill Academy” training program in collaboration with universities and the KKN community. - Increase digital promotion to expand customer and CSR partner networks. - Forming a community-based circular economy business model. |
| W-O (<i>Weakness-Opportunity</i>) | Minimize weaknesses by taking advantage of opportunities | <ul style="list-style-type: none"> - Apply for grants or CSR funds for circular economy and digital marketing training. - Utilizing academic support for improvements to operational management and bookkeeping systems. |
| S-T (<i>Strength-Threat</i>) | Using force to confront threats | <ul style="list-style-type: none"> - Improve service innovation such as a digital garbage collection scheduling system. - Strengthen social values and public relations to maintain customer loyalty. |

| | | |
|-----------------------------------|--|---|
| W-T (<i>Weakness-Threat</i>) | Reduce weaknesses so that threats do not have a major impact | - Prepare work SOPs so that the operational system does not depend on individuals. - Establish a formal organizational structure and incentive system for members. |
|-----------------------------------|--|---|

Source: Processed data (2025).

Discussion Based on Human Capital Aspects

a. Knowledge

The research findings indicate that the Fastco team's knowledge is still practical and based on field experience, not yet fully addressing the circular economy and modern operational management aspects. These findings align with research confirming that human resource knowledge capacity in waste management plays a crucial role in creating efficiency and innovation within the environmental management community (Ruslina, Rahman, and Purnaweni 2025). Therefore, capacity building through technical and managerial training is a strategic step for Fastco to strengthen its competitiveness.

b. Skills

Technical skills in compost processing, making creative recycled products, and managing waste banks have become Fastco's main strengths.

However, limitations in modern technology and digital marketing remain a barrier. These results reinforce findings that technical skills not matched by digital skills hinder many waste management communities from developing economically (Yazirin, Margianto, and Melfazen 2024). Fastco has demonstrated progress through collaborations with KKN students and youth organizations (such as Karang Taruna), where social action-based activities enhance members' practical skills through the process *learning by doing*.

c. Values and Attitudes (Attitude & Values)

The values of environmental responsibility and social care are at the core of Fastco's human capital. Members and the community demonstrate consistent behavior toward cleanliness and active participation in waste sorting activities. This finding aligns with research confirming that internalizing environmental values within local organizations strengthens commitment and the sustainability of waste management programs (Rezeki, Sagala, and Muhajir 2024). Fastco's education for housewives is a concrete example *community empowerment which* strengthens collective values in maintaining environmental cleanliness.

d. Innovation and Leadership

Muhammad Nasir's leadership reflects a transformational style, where leaders inspire, motivate, and set an example for their followers. Innovations such as waste collection services for savings, simple waste banks, and education in schools demonstrate a high level of social creativity. This research is in line with findings that state that transformational leadership in environmental communities is able to encourage social innovation and strengthen participation-based human capital (Wahib and Susanto 2024).

4.3. Strategic Position of the Organization (SWOT Quadrant Position)

Based on the IFAS and EFAS calculations, Fastco Recycle is positioned in Quadrant I, which is Aggressive Strategy (Growth Strategy). This quadrant indicates a situation where both internal strengths and external opportunities are equally dominant.

The strategic position of an organization can be described mathematically as follows:

$$S_x = (S - W) = (4.5 - 2.1) = 2.4 \quad S_{and} = (O - T) = (3.1 - 1.8) = 1.3 \quad P = f(S_x, S_{and}) = f(2.4, 1.3)$$

Equation (1) shows that Fastco Recycle's strategic coordinates are at point (2.4; 1.3), which means the organization has high internal strength and large external opportunities. Positive values on both axes indicate significant growth potential.

4.4. Discussion

The research findings show that Fastco Recycle's main strength lies in transformational leadership Muhammad Nasir, the value of social responsibility, and cross-sector collaboration. This aligns with Wahib and Susanto's (2024, p. 334) opinion that transformative leadership encourages social innovation and strengthens community participation.

In addition, the concept *human capital* Becker (1993, p. 20) proposed that individual knowledge, skills, and values are forms of productive investment, proving relevant to Fastco's situation. Human resource capacity development through technical training, social learning, and community participation contributes directly to the sustainability of the circular economy.

The limitations identified, such as a lack of managerial training and technological facilities, align with the findings of Yazirin et al. (2024, p. 2478), which show that many waste management communities in Indonesia face similar challenges in digital adaptation and operational efficiency.

With an aggressive strategy (Quadrant I), Fastco Recycle has the potential to expand its social and economic impact through collaboration with the government, universities, and private partners. *human capital*, which is based on innovation and participation is expected to be able to realize the vision of "Genteng Zero Waste" and become a model for community-based sustainable waste management.

5. CONCLUSION

This study aims to analyze the optimization *human capital* in household waste management through a SWOT analysis approach in the Fastco Recycle Genteng community. The results of the study indicate that the expectations as outlined in the introduction, namely to find internal and external factors that influence strengthening *human capital*, have been achieved comprehensively.

Fastco Recycle has a prominent internal strength in the form of visionary leadership with a style *transformational leadership*, strong social values and environmental commitment, and active collaboration with the community and educational institutions. However, several weaknesses remain, such as limited funding, minimal formal training, and digital marketing capabilities that need to be improved. Based on the SWOT analysis, Fastco Recycle is in Quadrant I (Aggressive Strategy) with equally strong internal strengths and external opportunities, demonstrating strong potential for sustainable growth and development.

Thus, the optimization strategy *human capital* This can be done through increasing human resource capacity, service innovation, and strengthening cross-sectoral cooperation networks. Integration of theory of *human capital* with SWOT analysis provides a new conceptual model in developing human capacity to support sustainable community-based waste management.

This research opens up opportunities for further studies to develop quantitative evaluation models for performance *human capital*, including the application of digital technology in the community's human resource management system. This approach is expected to strengthen the sustainability of circular economy programs and accelerate the realization of Genteng's Zero Waste vision.

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