

Journal of

Entrepreneurship and Project Management

(JEPM)

The Effect of Recycling Initiatives on Youth Empowerment in Kisumu City,
Kenya



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The Effect of Recycling Initiatives on Youth Empowerment in Kisumu City, Kenya

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Accepted: 27th June, 2025, Received in Revised Form: 14th July, 2025, Published: 30th July, 2025



Abstract

Purpose: The Study purpose is to assess how participation in recycling initiatives influences youth empowerment, particularly in enhancing leadership, entrepreneurship, and teamwork skills. Guided by the Self-Determination Theory which highlights autonomy, competence, and relatedness as key motivators for personal development.

Methodology: A descriptive survey design was used, targeting 300 urban youth waste collectors in Kisumu. From this population, 175 respondents were selected through purposive sampling. Structured questionnaires were administered and the data were analyzed using SPSS employing descriptive statistics, Pearson's correlation, and linear regression. A pilot test in Nakuru confirmed the tool's reliability (Cronbach's alpha = 0.943).

Findings: The findings showed that over 89% of respondents strongly agreed that recycling initiatives had improved their teamwork, leadership, and entrepreneurial abilities. A significant positive relationship was found between recycling initiatives and youth empowerment ($r = 0.361$, $p < 0.001$), with regression results indicating that recycling activities accounted for 13% of the variance in empowerment outcomes ($R^2 = 0.130$, $\beta = 0.783$, $p < 0.001$). Notably, many youths earned between KES 4,000 and 6,000 over six months (monthly), underscoring the economic potential of recycling. Despite the positive outcomes, barriers such as limited infrastructure, financial constraints, and low awareness of business opportunities were noted.

Unique Contributions to Theory, Practice and Policy: The Study recommends strategic support through training, funding, and partnerships to enhance the sustainability of youth participation. It also reinforces the applicability of Self-determination theory in environmental contexts by empirically linking autonomy and competence to real-world recycling activities. Therefore, these findings provide critical insights for policymakers and development actors aiming to transform recycling into a tool for youth-led environmental and economic growth.

Keywords: *Youth Empowerment, Recycling Initiatives, Solid Waste Management, Leadership Development, Entrepreneurial Skills, Teamwork*

1.0 Background of the Study

The resource recovery and recycling of solid waste are the key streams of most solid waste management initiatives. These activities include recycling of plastic, paper, glass, and metals so that they can be used to produce new products, thus lowering the consumption of raw materials (Khan et al., 2021). Also, the waste-to-energy technique can be utilized so that energy can be produced out of waste products (Silva de Souza Lima Cano et al., 2022). To give an example, another strategy practiced by such projects is composting that involves the decomposition of organic wastes like food leftovers and grass trimmings. The final products of the amendments in the form of nutrient-rich soils are used in landscaping and agricultural sectors (Wang et al., 2020). It is worth noting that provision of safe and environmentally friendly waste treatment and disposal methods of hazardous waste and other non-recyclable wastes constitutes another aspect central to such projects (Hemidat et al., 2022). It may entail, say the use of manufactured landfills that are engineered to have minimum environmental impacts.

Academic literature exposes the social and local aspects of youth involvement in waste management initiatives (Mukherjee, Basu, & Punjabi, 2020). As an example, the researchers underline that the participation of young people in community clean-up activities, recycling events, waste consciousness campaigns creates a feeling of belonging and a sense of community among participants (Tsai et al., 2021). The youth-led initiatives affect behavioral shifts, and communities learn to dispose of waste responsibly and prompt others to change their environmentally acceptable behaviors (Banerjee & Sarkhel, 2019). The youth as participants will play the role of the change agents by lending their voices and portraying their leadership potential by lobbying sustainable waste management practices and shaping the general attitude of society toward waste. Such leadership capacities and speaker positions serve to strengthen youth empowerment further where young people take control of the environmental issues in their neighborhoods.

1.2 Statement of the Problem

Young people form a significant community in Kenya, comprising approximately 35.4 percent of the country's total population (Kenya National Bureau of Statistics [KNBS], 2020). In Kisumu County alone, approximately 452,864 individuals, representing 39.2% of the population, fall within the 15 to 35-year age bracket (Commission on Revenue Allocation [CRA], 2021). Despite this, a significant number of these young people face limited access to economic opportunities, with youth unemployment in the country estimated at 38%, far above the national average of 22% (Ochola, 2024). Fundamentally, Kisumu generates over 500 tons of solid waste daily, with only 30–40% effectively collected and managed (Kisumu County Government, 2020), highlighting a growing need for sustainable, community-based waste management solutions. Recycling initiatives present a unique opportunity to address environmental challenges and empower youth simultaneously. Such programs can not only instill leadership, entrepreneurship, and teamwork qualities in youth but also generate revenue and enhance engagement (Garcia et al., 2019; Nguyen

et al., 2020). Nonetheless, the nature of how youth involvement in waste recycling programs can be translated into practical outcomes of empowerment has not been tested in Kisumu City. Much of the research available so far on solid waste management in Kenya has focused on the role of environmental and infrastructural challenges. Relatively little has been written about the social and developmental consequences of positive activities among youth participating in solid waste management (Aduda, 2011; Njeru, 2016). Hence, this Study will attempt to fill that gap by assessing the impact of recycling programs on youth empowerment in Kisumu, creating a body of knowledge that can inform inclusive policy development, long-term planning in sustainable development, and the planning of youth-specific programs.

1.3 Objectives of the Study

The objective of the Study is to examine the effect of recycling initiatives on youth empowerment in Kisumu City, Kenya.

1.3.1 Specific Objectives

1. To assess the effect of recycling initiatives on the development of teamwork skills among urban youth.
2. To examine how participation in recycling activities influences the entrepreneurial capacity of youth.
3. To evaluate the impact of recycling involvement on youth leadership development.

1.4 Hypothesis of the Study

The following hypothesis guided the Study:

H0: Recycling initiatives have no significant effect on youth empowerment in Kisumu City, Kenya.

H1: Recycling initiatives have a significant effect on youth empowerment in Kisumu City, Kenya.

1.5 Significance of the Study

This Study is significant as it bridges the gap between environmental sustainability and youth empowerment by examining how recycling initiatives contribute to skill development, income generation, and civic engagement among young people in Kisumu City. In a context where nearly 40% of the population comprises youth facing disproportionately high unemployment and limited socioeconomic opportunities, understanding the empowering potential of recycling programs is crucial for effective policy formulation and community development. The findings will provide policymakers, local governments, NGOs, and development practitioners with evidence-based insights to design inclusive, youth-driven waste management strategies that not only enhance urban cleanliness and environmental conservation but also serve as platforms for equipping young people with entrepreneurial, leadership, and teamwork skills. Ultimately, this Study aims to

support the creation of sustainable, community-based solutions that transform young people into active agents of change within their urban environment.

2.0 LITERATURE REVIEW

2.1 THEORETICAL FRAMEWORK

2.1.1 Self-Determination Theory

The Self-Determination Theory (SDT) was created by psychologists Edward L. Deci and Richard M. Ryan in the 1980s. The theory posits that all human beings have inherent psychological needs for autonomy, competence, and relatedness, and are driven to engage in actions and activities that fulfill these needs (Lange et al., 2011). SDT makes a distinction between intrinsic motivation, which is the motivation people undertake because it brings a certain satisfaction, and extrinsic motivation, which is the motivation people participate in to receive external rewards or to avoid punishment.

Within the framework of youth empowerment, Self-Determination Theory suggests that recycling programs and solid waste management intervention programs in Kisumu City can serve as a means to empower youth through intrinsic motivation and the fulfillment of their psychological needs for autonomy, competence, and relatedness (Ryan & Vansteenkiste, 2023). Autonomy is also imposed, whereby youths are allowed to make their decisions on whether to engage in the process of waste management. Competence is attained when the youths acquire skills on how to conserve the environment and relatedness is nurtured by working with youths against poverty within a local community. Empowerment of the youth has been achieved by the waste management activity, the youth empowerment activity, the development of the leadership character, the build up of self-efficacy, and the establishment of self ownership towards the activity of environmental protection. Thus, the idea is that, through such initiatives, long-term goals of increased satisfaction, well-being, as well as empowerment can be achieved (Deci et al., 2017).

Criticism against Self-Determination Theory is that it downplays the cultural and situational influences behind motivation and action. Also, the fact that the aspect of the psychological needs and separative concerns of people is central to the theory may overlook the fact that the interest of the youths in projects involving waste management is influenced by the social and environmental factors. The Self-Determination Theory however, has great applicability to the study of the impact of recycling program on a sense of youth empowerment in Kisumu, Kenya. In this way, this theory can assist us to comprehend how the engagement of young people in the process of recycling can result in their empowerment outcomes, containable in terms of environmental awareness, as still as leadership ability, community engagement, and personal development, by acknowledging the significance of intrinsic motivation in waste management projects and satisfying psychological needs.

2.2 Conceptual Framework

The conceptual framework was used in this Study to describe the relationship between recycling initiatives and youth empowerment in Kisumu City, Kenya.

Dependent Variable

Recycling Initiatives

- Teamwork skills
- Entrepreneurial skills
- Leadership development

Independent Variable

Youth Empowerment:

- Skill development and Personal growth

Recycling Initiatives on Youth Empowerment

A longitudinal study conducted by Smith and Jones (2017) revealed in their article titled, The Effect of Recycling Initiatives on Youth Empowerment: Evidence from a Longitudinal Study in Urban Areas of the United States that took place in several urban centers in the United States, showed that the recycling program results into empowerment of the youth, in terms of having more environmental understanding, have improved teamwork abilities, and the participants had more engagement with the civic community. The Study has addressed the beneficial consequences of recycling programs on the youth empowerment outcomes. It further noted that consistency is the major tofulness in the attainment of these advantages especially in the development of leadership and advocacy skills amongst the youths.

In one of the research articles done by Garcia et al. (2019) titled as Assessing the Effectiveness of Recycling Initiatives on Youth Empowerment: A Case Study in Rural Communities of Brazil, being the case that the research was carried out in the rural communities of Brazil, researchers stressed the idea that the recycling initiative promoted the youth empowerment, entrepreneurship, and environmental stewardship leadership. The Study brought out the matter of youth empowerment so far as to matters of the native environments, the economic opportunities created by it and to the sustainable development. It also highlighted the importance of recycling programmes in lending them feasible skills and making them feel in control.

The findings of Nguyen et al. (2020) Study in rural and metropolitan regions of Vietnam, compiled under the heading of Youth Participation in Recycling Programs: A Comparative Analysis of Urban and Rural Contexts of Vietnam, demonstrated that the civic involvement of the youth in the recycling processes evoked the sense of environmental responsibility, sense of community, and social belonging. The Study was a proponent of the necessity and practicality of adaptation of recycling programs to the local levels and engagement of the younger generations in decision-making processes, which made programs successful and sustainable in long-term, increasing levels of youth empowerment with the help of participatory action.

In one of their studies, Patel et al. (2018) carried out a study with the title Exploring the Relationship Between Recycling Initiatives and Youth Empowerment Outcomes: Insights of a Cross-sectional Study in India, and he could see the results that indicated that the youths included in the recycling initiatives formed their employability skills, environmental literacy, and social capital. The Study indicated the potential of harnessing recycling programs in empowering the youths holistically, equipping the youngsters with life skills, raising them to be people of the crowd, and ensuring that they are relevant in terms of environmental concerns in different cultures. The overall conclusion of these scientific articles is that the recycling programs impact positively on youth empowerment, which is why the engagement of the young generation in environmental protection measures is important. Recycling takes the form of winning empowerment tool that will enable the young people to own initiatives to transform their communities and improve their leadership, entrepreneurship, group activities, and responsibility towards the environment.

2.3 Empirical Review

Johnson et al. (2019) analyzed the role of recycling programs in the empowerment of the youth in the United States urban regions. An impact of engagement of youth in a recycling program in terms of development of environmental awareness, pro-environmental behaviours and social responsibility was conducted by them. The mixed-methods approach of the Study involved a mixed-methods technique where 250 participants of the youth (age 13-18) were surveyed, interviewed, and observed as participants. A structured questionnaire was used to see the perceptions, attitudes, and practices of the participants on recycling use and environmental conservation. Data were presented in descriptive and inferential analysis using quantitative data: that is, descriptive and inferential statistics. Thematic data were analyzed on the basis of questionnaires (interviews) and participant observation. The response was encouraging in that it indicated that the more the young people were exposed to recycling programs the more environmentally conscious they became, the more they undertook environmentally friendly activities and the more they became social responsible persons. The weaknesses of the Study are that it had a possible selection and response bias since it used self-report information. Engagement of young people into recycling programs was also suggested to be expanded by carrying out campaigns on the value of recycling, public cooperation, establishment of policies that favored the cause, and establishment of space that will allow youth to be an active voice in recycling programs.

Using the qualitative Study, Garcia et al. (2020) investigated the promotive frame of the effects of the recycling activity on the empowerment of young people in rural communities in Spain. Their Study had focused on the relationship that existed between the attitudes towards the environment, environmental behavior and community participation to the involvement of the youth in the recycling program. The Study involved 30 individuals who were youths and had 16-20 years of age and lived in certain rural areas dispersed within Spanish regions. The focus group discussions and semi-structured interviews were used to obtain the opinions of the participants and their sentiments towards the recycling programs and the issue of environmental stewardship. Thematic

analysis tool was utilized to determine the recurrent themes and trends in the answers given by the participants. Their findings showed that the participation of the young people in the recycling programmes was associated with the high level of awareness to the environment, the greater responsibility in caring about the waste and the more active involvement in community. Nevertheless, critics also mentioned the small sample and local area of the Study that may affect the generalizability of findings. Suggestions were made as to emphasize on community-based recycling programmes applying to the situation of youth in the rural areas so as to see the recycling programme sustainability. Also, resources and support was to be offered so as the youth can carry out the recycling program through a long period hence empowering the youths in environmental sustainability.

Patel et al. (2018) conducted a quantitative research study to determine how recycling programs empower Indian urban slums youths. They did a research to determine the effects of participation in recycling programs by the young people on their environmental knowledge, attitudes, and behavior. The Study was founded on the responses of 200 respondents who were representatives of the youth between the ages of 15 and 24 years in India in the urban slums. The perceptions, attitudes and behavioral variables of the participants were measured by using a questionnaire on how they recycle and how they have been able to protect the environment. Descriptive statistics and inferential analysis tools were used to make sense of the quantitative data and examine the links between various recycling actives and the consequences of youth empowerment. The findings also indicated that there was a positive relationship between the involvement of the youth into recycling programs and the clearance of the degree of environmental knowledge, awareness as well as wanting to save the environment. It was however observed that there might have been some form of bias in the data response in the section of the self-reported results as well as that the Study was cross-sectional. These guidelines were focused at influencing the youths to join in the recycling programs by carrying out simple educational activities, inducing community involvement, and championing the need of endorsing policies besides being more active and participative in decision making process in the protection of the environment and acquiring a greater empowerment and potential of the role of a leader.

Nguyen et al. (2021) combined methods in their Study to determine the influences of recycling programs in promoting the empowerment of youth within suburban communities in Vietnam. The Study was on how youth participation in recycling activities influenced the environment attitude, behavior, and social capital. The Study involved 150 youths of Suburbs of Vietnam of ages 14-25 as a sample size. The structured questionnaire was to study the perceptions, attitudes, and behaviors of the participants towards the recycling programs and environmental conservation. To interpret the quantitative data, descriptive statistics and correlational analysis has been used to explore the relations between the results of the recycling activities and the youth empowerment. As a qualitative data collection technique, thematic analysis of focus groups was conducted in order to determine the key avenues and trends in the perceptions of the participants. The findings

indicated that the greater the participation of the youths in recycling programs the larger are the likelihoods of evolving into environmental consciousness, sustainable conduct, and tending to the assembly of societal capital. However, its critics said that the findings can be viewed as a source of prejudice against self-reported data, the fact that the Study covered only suburban localities and applying it to other scenarios is a difficult venture. The recommendations were aimed at promoting recycling offered to youths by conducting education campaigns, forging partnerships within the communities, embracing a favorable environment among other relevant policies. These studies show how the empowering recycling programs go on the youthful individuals in diverse socio-cultural contexts. They emphasize the fact that engaging adolescents into the recycling process helps them to build leadership qualities, emerge as environmentally-conscious beings and achieve social capital. With greater availability of recycling projects, open participation of the youth in the decision-making process and provision of potential activities to participate in recycling immaturely, recycling schemes can be developed as youth empowerment tools that will ultimately allow youth to become active force agents in environmental protection and community maintenance.

3.0 RESEARCH METHODOLOGY

This Study used a descriptive survey design to critically assess the impact of recycling-related programs on youth empowerment within the Kenyan City of Kisumu. It was chosen because this method will enable the researcher to gather information applicable in real life, while also gaining the perspective and experiences of the participants (Asenahabi, 2019). Quantitative and qualitative approaches were employed to obtain a comprehensive understanding of the phenomenon. The sample population consisted of 300 waste collectors in urban youth working in this sector, as stated in the Kisumu County Solid Waste Management Policy (2020). The effect of having a sample size that is too small would be that it would not provide adequate power, as only 175 respondents were considered using the Taro Yamane formula at a 95% level of confidence and a 5% precision.

A purposive sampling technique was employed to select respondents based on gender and age, thereby enabling a cross-sectional and representative study of youth actively engaged in recycling practices (Mugenda & Mugenda, 2003). A structured questionnaire with questions on five-point Likert scales was implemented to gather data, focusing on three main dimensions of empowerment: teamwork skills, entrepreneurial development, and leadership capacity. To validate and ensure the reliability of the instrument used, a pilot study was conducted in Nakuru City, which shares urban characteristics similar to those of Kisumu. Cronbach's alpha was used to test the reliability of the questionnaire, yielding a result of 0.943, which indicates that the questionnaire exceeds the acceptable level of 0.70 (Fraenkel & Wallen, 2000) and that the reliability is appropriate.

For data analysis, responses were coded and processed using descriptive statistics, Pearson's correlation analysis, and regression modeling. The correlation analysis examined the strength and

direction of the relationship between recycling initiatives and youth empowerment. To determine the predictive power of recycling activities on empowerment outcomes, the Study employed simple linear regression and further extended it with multiple linear regression analysis. The model used is shown below:

$$Y_n = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where: Y = Youth Empowerment

N is the number of participants

X1 = Recycling Initiatives

β_0 = Constant

β_1 -4 = Coefficients for each independent variable

ε = Error term

4.0 RESULTS

The Study's objective was to determine the effect of waste disposal practices on youth empowerment. The findings were presented using a 1-5 Likert scale. The results of the descriptive statistics calculation are shown in Table 1.

Table 1: Effect of Recycling Initiatives on Youth empowerment in Kisumu City

	Very Low		Low		Moderate		High		Very High	
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Recycling initiatives enhance teamwork skills	0	0.0%	0	0.0%	0	0.0%	18	10.3%	157	89.7%
Recycling fosters entrepreneurial skills	0	0.0%	0	0.0%	0	0.0%	20	11.4%	155	88.6%
Recycling contributes to leadership development	0	0.0%	0	0.0%	0	0.0%	19	10.9%	156	89.1%
Recycling promotes teamwork effectiveness	0	0.0%	0	0.0%	0	0.0%	22	12.6%	153	87.4%
Recycling nurtures entrepreneurial potential	0	0.0%	0	0.0%	0	0.0%	20	11.4%	155	88.6%

According to the findings in Table 1, respondents were asked to rate the extent to which recycling initiatives enhance teamwork skills among young people. The table shows that 18 respondents (10.3%) rated this aspect as "High," indicating moderate agreement. In comparison, a significant majority of 157 respondents (89.7%) rated it as "Very High," indicating a firm agreement. Notably, the responses in the categories 'Very Low', 'Low', or 'Moderate' were not provided, indicating that the majority of respondents agreed on the positive influence of recycling efforts on teamwork skills. The results are consistent with those obtained by Smith and Jones (2017), who also found a significant consensus among the parties involved in their research regarding the beneficial effects of recycling activities on the development of teamwork skills in children in an urban area.

Likewise, the respondents were requested to rank the impact of recycling campaigns on the development of business acumen among young people. It is evident from the table that 20 respondents (11.4%) scored this aspect as 'High', whereas the vast majority (88.6%) of respondents scored it as 'Very High'. Just as in the first question, responses to the second question have not been lower in terms of agreement; in most cases, respondents agreed with the power of recycling initiatives in developing entrepreneurial skills. These results are consistent with the Study done by Garcia et al. (2019), who focused on promoting entrepreneurship abilities among young people with the help of recycling programs.

The respondents were also allowed to evaluate the role recycling efforts played in youth leadership development. The values in the table indicate that 19 respondents (10.9%) reported a high level of this aspect, although a great majority of the respondents (156, 89.1%) assigned it a very high rating. Again, there were no responses with lower entries, indicating the extreme popularity of the given idea, as well as the general recognition of the significant contribution of recycling initiatives to the development of leadership competencies in young populations. The results of the research are consistent with those of Nguyen et al. (2020), who evaluated a similar number of people and found that the number of participants who agreed on the importance of recycling activities in training young people to become leaders was high.

Moreover, it will present a discussion on efficient ways to enhance recycling activities and improve teamwork qualities among young people. As shown on the table, 22 respondents (12.6%) indicated that this aspect is rated as "High," while a vast majority of 153 respondents (87.4%) responded that the aspect is rated as "Very High." Just as in the case of the above questions, no responses had levels of agreement lower than those, thus showing a strong impression of the effectiveness of recycling activities in enhancing teamwork skills. The findings can be compared with those of the Study by Patel et al. (2018), who noted a large percentage of agreement among participants regarding the efficiency of recycling initiatives as methods for developing teamwork skills among young people.

Finally, the respondents were also asked to rate the significance of recycling programs in developing business acumen in young people. As shown in the table, 20 respondents (11.4%)

indicated that this aspect is very high, whereas a vast majority of 155 respondents (88.6%) indicated that it is incredibly high. Again, there was no single reaction hinting at the lower agreement levels, indicating the general acceptance of the paramount importance of recycling programs in developing entrepreneurial skills among young people. These results are consistent with the Study by Patel et al. (2018), which also highlighted the role of recycling programs in developing business sense in young people.

Thus, the survey results serve as strong indicators of the overwhelmingly positive impact of youth engagement in recycling processes in Kisumu and youth empowerment nationwide. The fact that there was no reply to indicate that the effects were moderate, low, or very low in every category shows that all participants agreed that these projects had a relatively significant positive impact. The participation of youth in recycling programs also helps them realize that they are contributing to environmental conservation, while also enhancing their personal growth and maturity to face future challenges. This aligns with the broader goal of empowering youth to be proactive and become agents of positive change in their communities, fostering a sense of responsibility and ownership for the environment and society as a whole. Ultimately, integrating youth participation in recycling initiatives catalyzes holistic youth empowerment, creating opportunities for learning, growth, and community impact.

The data was subjected to further analysis using Pearson's Correlation to establish the effect of youth participation in recycling initiatives and youth empowerment in Kisumu City. The table provides the findings.

Pearson's Correlation Analysis between Recycling Initiatives and Youth Empowerment

Table 2: Pearson's Correlation Analysis between Recycling Initiatives and Youth Empowerment

		Youth empowerment
Recycling Initiatives	Pearson Correlation	.361
	Sig. (2-tailed)	.000
	N	175

*. Correlation is significant at the 0.05 level (2-tailed).

Table 2 results indicate a high and significant positive correlation ($r = 0.361$, $p = 0.000$) between recycling initiatives and youth empowerment in Kisumu City. This means that youth participation in recycling initiatives leads to youth empowerment.

The Study further sought to establish the effects of recycling initiatives on youth empowerment in Kisumu City, Kenya. To achieve this, the Study tested the second hypothesis, which stated that:

H₀: *There is no significant effect between recycling initiatives and youth empowerment in Kisumu City.*

This analysis was done using simple linear regression, and the results are presented in the table.

Regression Coefficient for Recycling Initiatives

Table 3: Regression Coefficient for Recycling Initiatives

R^2	β	F	t	p
.130	.783	12.893	3.616	0.000

Table 3 shows the goodness of fit for the regression between youth participation in recycling initiatives and youth empowerment in Kisumu City. An R^2 of 0.130 indicated that 13% of the variance in youth empowerment can be explained by youth participation in recycling initiatives. The standardized coefficient (β) of 0.783 suggests a moderately strong positive relationship between youth participation in recycling initiatives and youth empowerment. Additionally, the F-value of 12.893 is statistically significant ($p < 0.001$), indicating that the regression model as a whole is a good fit for the data. Furthermore, the t-value of 3.616 associated with the predictor variable signifies its significance in predicting youth empowerment. The Study concluded that youth participation in recycling initiatives substantially affects youth empowerment in Kisumu City.

Average Income Earned from Recycling Activities

The respondents were asked about the average income they earned from recycling activities in the past six months in KES. The results are shown in Figure 1.

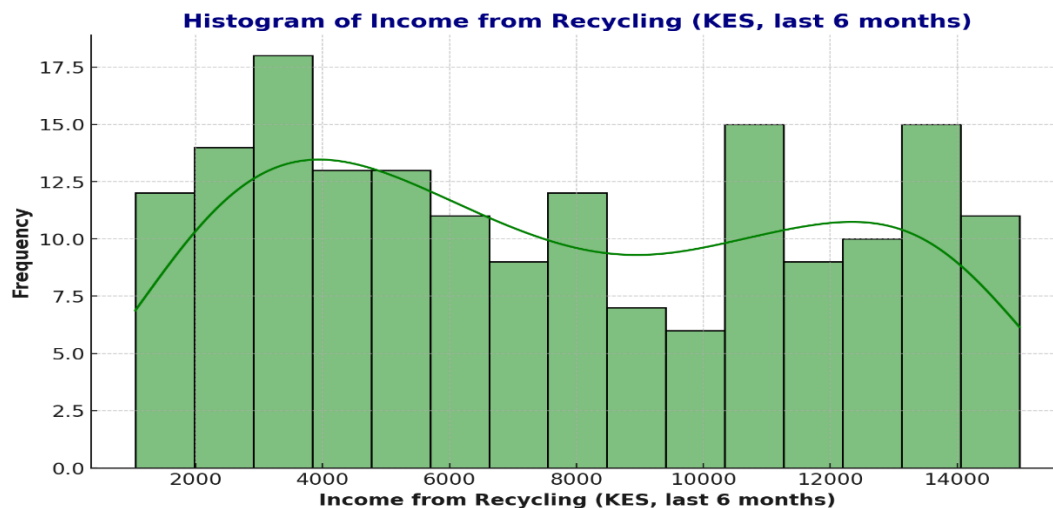


Figure 1: Average Income from Recycling (KES, last 6 months)

The histogram illustrates the distribution of income from recycling over the last six months among respondents. Some participants reported earning as little as KES 1,049, while others earned more than KES 18,000 from recycling activities. A significant number of respondents earned around KES 4,641, indicating a standard earning range among participants. However, earnings varied

widely, with some individuals generating significantly higher income, likely influenced by engagement levels, types of recyclables collected, and market demand. This diversity in income underscores the economic potential of recycling, as well as the need for enhanced market access, improved recycling process efficiency, and financial literacy training to maximize earnings and promote sustainability in waste management.

Recycling Frequency

The respondents were asked how many recycling activities they participated in over the last year. Their responses are shown in Figure 5.

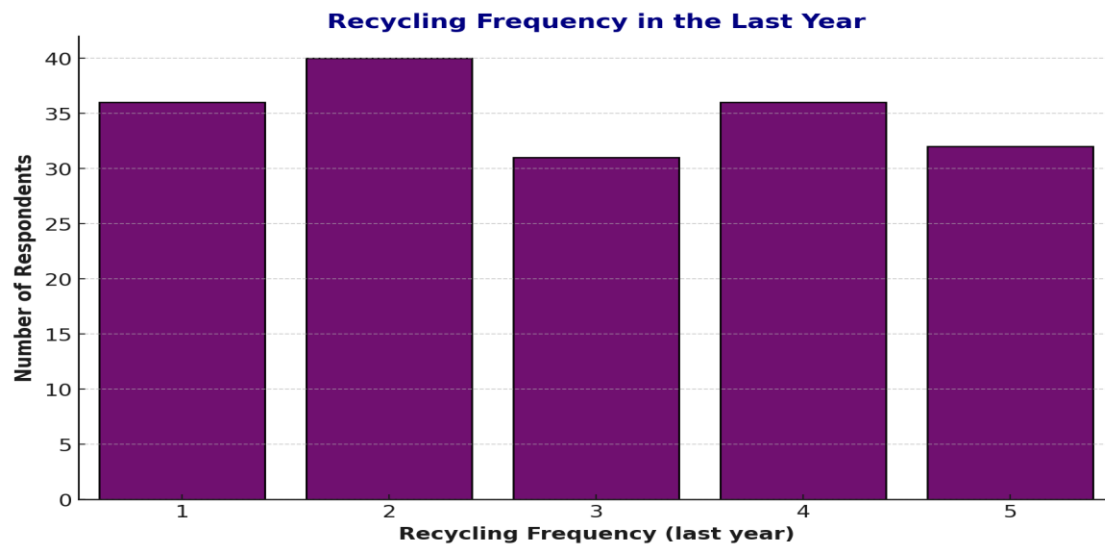


Figure 2: Recycling Frequency in the Last Year

The bar graph illustrates the distribution of recycling frequency among respondents over the past year. Some individuals reported recycling only once last year, while others engaged in recycling as frequently as five times a year. The majority of participants fall within a moderate range, indicating varying levels of commitment to recycling activities. Factors such as access to recycling facilities, awareness programs, and economic incentives likely influence the frequency with which individuals engage in recycling. Encouraging consistent recycling practices through educational campaigns, infrastructure improvements, and incentive-based programs could enhance overall participation and contribute to sustainable waste management efforts.

5.0 CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Conclusion

This Study explored the effect of recycling initiatives on youth empowerment in Kisumu City, Kenya, with a focus on how participation in waste management activities enhances leadership, entrepreneurship, and teamwork skills. Grounded in Self-Determination Theory, the research emphasized autonomy, competence, and relatedness as pathways to empowerment. Using a

descriptive survey design, data were collected from 175 purposively selected urban youth waste collectors through structured Likert-scale questionnaires. Statistical analysis revealed that the majority of respondents strongly agreed that recycling initiatives had a positive influence on their personal and professional development. Pearson's correlation analysis showed a significant positive relationship ($r = 0.361$, $p < 0.001$), while regression analysis indicated that recycling activities explained 13% of the variance in youth empowerment outcomes ($R^2 = 0.130$, $\beta = 0.783$, $p < 0.001$).

5.2 Policy Implications/Recommendations

The results confirm that recycling programs not only help sustain the environment but are also an important avenue for building skills and earning incomes for young people. The economic potential of such programs is further demonstrated, as many respondents mentioned that in half a year, they could earn KES 4,000 to 6,000 through recycling. Nevertheless, issues were also pointed out, such as the lack of infrastructure for recycling activities, financial aid, and a lack of awareness about the opportunities to act as an entrepreneur in the recycling value chain. The total significance of the recycling programmes on youth empowerment was reported, despite these limitations, as highly positive, especially about the more purposeful involvement of youth in community-based environmental programmes.

It is based on these findings that the Study proposes the development of a structured support scheme to maintain and grow youth involvement in recycling programs. This will entail the provision of specific capacity-building programs, financial support in the form of start-up loans, and an increase in public-private partnerships with local governments, NGOs, and the private sector. Some of the impacts that would be expanded include a better accessibility of recycling products in the market, establishing awareness programs, and incorporating the youth involvement into formal plans of reach in waste. Future studies could examine whether empowerment in question is gender-specific and what kind of risks arise when allowing youths to handle the waste because it would allow creating more inclusive, fair, and sustainable interventions.

5.3 Areas of Further Research

Researchers need to conduct further research to see how recycling programs impact youth power in Kisumu City. In specific, a study targeted at the gendered forms of empowerment needs to be conducted to discover the variations in impact of empowering young men and women, and develop more inclusive methodology. It is needed to take longitudinal studies to consider the long effects the recycling activities have caused over time on the youth and their maturity both in career and civic development. Also, possible psychological, health, and social risks of informal waste work such as the stigmatization, safety risks, and psychological concerns should be explored. Socioeconomic attributes beyond the narrow scope found in education, family support, and income levels must be analyzed to know how they affect the results of participation and empowerment. The interactions between local governments and partnerships on how to support youth-led

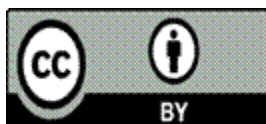
recycling programs also ought to be looked at institutionally in terms of policy structures that can be used. Also the expansion of the Study to the other cities and villages can contribute to the evaluation regarding the flexibility and reachability of the Kisumu model. Finally, the new methods of involving the young generation in recycling, with the help of digital tools, innovation, and technology and the possibility of turning informal recycling jobs into sustainable business and long-term economic empowerment should also be discussed.

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