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E-Waste Disposal Strategies and Competitive Advantage: The Moderating Role of Stakeholder Engagement among Utility Firms in Kenya

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Abstract

Uncontrolled e-waste disposal practices can adversely affect firms' competitive advantage through reputational damage, increased regulatory and legal exposure, inefficient resource utilization, restricted market access, reduced customer loyalty, and broader negative environmental and climate impacts. Despite the growing importance of e-waste management, empirical research examining the relationship between e-waste disposal strategies and competitive advantage remains limited in the Kenyan context, particularly within the utility sector. The study investigated the influence of e-waste disposal strategies on the competitive advantage of utility firms in Kenya. The utility companies deal with electricity, telecommunications, water and sanitation operating across all forty-seven counties and were among the largest generators of e-waste in the country. The specific objectives were to assess the effect of dumping of e-waste, and enforcement of organizational e-waste policy on competitive advantage, with stakeholder engagement explored as a moderating variable. The study was anchored on the resource-based view theory, competition theory, game theory, and waste management theory. A survey research design was adopted, targeting officers drawn from utility firms using a random sample of 235 respondents. Primary data were collected using structured questionnaires. Data analysis involved descriptive and inferential statistics, with multiple regression analysis conducted using SPSS version 25. The results revealed that the disposal strategies had a positive and statistically significant relationship with competitive advantage of utility firms in Kenya. The regression model yielded an R^2 value of 0.279 (27.9%) without the moderating variable in Model 1. When the moderating variable was introduced in Model 2, the R^2 value rose to 0.484 (48.4%). In Model 3, the R^2 was 0.504 (50.4%) with the moderator variable as both intercept and slope shifter, indicating that the independent variables jointly explained 50.4% of the variation in competitive advantage, while 49.6% was attributable to factors not captured in the study. Dumping variable had the highest beta at +0.365, which was significant before the introduction of the moderator variable. Its effect on competitive advantage was reversed and became insignificant upon the introduction of the moderator. Stakeholder engagement variable attained the highest beta of +0.692 and had the highest influence in model

3. The study concluded that unsustainable non-compliant e-waste disposal practices were short lived. The perceived cost-efficiency benefits were not sustainable under the scrutiny of stakeholders and should be avoided. While dumping produced short-term financial gains, its advantage diminished in high stakeholder engagement contexts. The study also revealed that policy became strategically effective only when moderated by stakeholder engagement. The findings contribute to theory, policy, and practice by demonstrating that unsustainable e-waste management practices are not only an environmental imperative but also non-strategic drivers of competitive advantage for utility firms in Kenya.
Keywords: *E-Waste, Utility Firms, Dumping, Policy, Stakeholder Engagement, Competitive Advantage*

INTRODUCTION

Management of electronic waste (e-waste) presents both environmental risks and strategic opportunities for firms in infrastructure-intensive sectors such as utilities. While sustainability research often assumes that environmentally responsible practices enhance firm performance, empirical evidence from emerging economies remains limited and context sensitive. Environmental sustainability has increasingly become a strategic concern for firms operating in resource-constrained and institutionally evolving environments.

Barney (1991) developed the traditional format of the Resource-Based View (RBV) theory and Hart (1995) extended the model to Natural (RBV) or NRBV. The theory argues that environmental capabilities such as pollution prevention and product stewardship can generate a competitive advantage by improving efficiency and reducing long-term risk. Simultaneously, stakeholder theory suggests that firms derive performance benefits when they align their environmental practices with stakeholder expectations (Freeman, 1984; Mitchell, Agle & Wood, 1997). However, the extent to which unsustainable e-waste strategies translate into competitive advantage may depend on the institutional and stakeholder environment within which firms operate. In emerging economies such as Kenya, regulatory enforcement is evolving and stakeholder environmental awareness varies significantly across sectors. Utility firms, due to their public-facing nature and infrastructural footprint, are particularly exposed to stakeholder scrutiny. Yet, little empirical research has examined how specific e-waste management strategies contribute to competitive advantage within this context.

This study focuses on unsustainable e-waste strategies: dumping of e-waste (e.g., open site, burying and burning) and E-waste company policy enforcement. These strategies differ in visibility and operational intensity. Dumping of e-waste focuses on unsustainable cost efficiency within utility firms, while policy enforcement is applied as a compliance requirement.

Importantly, this study introduces stakeholder engagement as a moderating variable. The study argues that the competitive value of unsustainable strategies is not universal but contingent upon stakeholder salience. In low awareness environments, poor practices may generate short-term competitive advantages which are not sustainable.

Using survey data from utility firms in Kenya and hierarchical regression analysis, this study investigates: (1) whether dumping of e-waste and policy enforcement strategies enhance competitive advantage, and (2) whether stakeholder engagement conditions these effects. This study contributes to strategic management and sustainability literature in three ways. First, it provides empirical evidence from an underexplored emerging economy context. Second, it extends the NRBV by demonstrating that environmental capabilities are stakeholder contingent. Third, it clarifies the role of stakeholder engagement as a structural mechanism shaping competitive outcomes at utility firms in Kenya.

Research Objectives

General Objective

To examine the influence of e-waste disposal strategies on the competitive advantage of utility firms in Kenya.

Specific Objectives

(i) To analyze the influence of dumping of e-waste on the competitive advantage of utility firms in Kenya.

(ii) To investigate the influence of company e-waste policy enforcement on the competitive advantage of utility firms in Kenya.

(iii) To investigate the moderating effect of stakeholder engagement on the relationship between e-waste disposal strategies and the competitive advantage of utility firms in Kenya.

Research Hypotheses

i. $H_{o1:}$ Dumping of e-waste has no statistically significant influence on competitive advantage of utility firms in Kenya.

ii. H_{o2}: E-waste policy enforcement has no statistically significant influence on competitive advantage of utility firms in Kenya.

iii. H_{o3}: Stakeholder engagement has no statistically significant moderating effect on the relationship between e-waste disposal strategies and the competitive advantage of utility firms in Kenya.

Limitations of the Study

The survey design applied in this study used cross sectional data that captured one point in time. This made it difficult to infer long-term causal relationships. Organizational behaviour may evolve as institutional pressures change. Self-Reported measures mean that responses may have contained bias (Bryman, 2016), especially regarding sensitive topics such as illegal dumping. The sector specific context focusing on utility companies in Kenya only implied that results may have differed in manufacturing, ICT retail, or other sectors. Finally, the moderation effect limited to stakeholder engagement only meant that other potential institutional moderators have been assumed constant such as regulatory capacity, industry competition, or technological readiness. Lack of their assessment may have affected generalization.

LITERATURE REVIEW

Theoretical Framework

The study applied four theories, namely the Resource-Based View (RBV) theory, which has evolved over time from the traditional RBV to the Natural (NRBV), Competition theory, Game theory and Waste Management Theory (WMT). NRBV as applied in this study assumes that dumping does not enhance efficiency and innovation. Though not expounded exclusively in this study, Stakeholder Theory assumes that unsuitable practices limit legitimacy and reputation.

Resource-Based View

Firms achieve competitive advantage by leveraging valuable, rare, and inimitable resources (Barney, 1991). Although dumping of e-waste has cost efficiency, in the long run it leads to reputational damage. RBV did not originally account for ecological constraints or the natural environment as a strategic consideration. This gap was addressed by Hart (1995), who introduced the NRBV and argued that the natural environment represents a fundamental strategic context that shapes firms' resource development and competitive positioning.

Competition Theory

Short-term unsustainable practices may influence the competitive positioning of firms. In the long run firms adopting visible and effective e-waste strategies may gain market differentiation, signaling environmental responsibility to stakeholders and customers (Porter & Kramer, 2011).

Game Theory

Firms' strategic choices in e-waste management can be seen as a non-cooperative game, where the payoff depends on the actions of competitors. For example, adopting proper dumping strategies may enhance reputation if competitors fail to do so, while mimicking competitors may erode differentiation. Rajendra and Arvind (2013) applied game theory to examine optimal e-waste management strategies in India, demonstrating that cooperative approaches among stakeholders yield higher collective payoffs than non-cooperative strategies.

Waste Management Theory

Emphasize systematic handling of waste to reduce environmental impact while maximizing economic and social value (Fiksel, 2006). Proper dumping and policy enforcement strategies operationalize these principles within firm strategy. Waste Management Theory has evolved from early sanitation and disposal models to a comprehensive, system-based, and strategic framework. It provides conceptual and analytical tools, including industrial ecology, Material Flow Analysis, and system-level management for optimizing the environmental, social, and economic outcomes of waste handling (Brunner & Rechberger, 2004). When applied to electronic waste disposal, WMT offers utility firms in Kenya a mechanism to convert waste challenges into strategic opportunities, enhancing cost efficiency, regulatory compliance, and long-term competitive advantage.

Variables Used (Constructs)

Dumping of E-waste

Empirical studies (Sarkis, 2003; Hoffman, 2007) indicate that informal disposal reduces costs, creating competitive advantage in weakly regulated contexts. Waste Management Theory emphasizes the environmental risks and inefficiencies of dumping, providing a counterpoint to cost-based advantage. The variable was measured using Likert-scale items and open questions assessing open site disposal, burying and burning. In this study, it is applied as an independent variable and operationalized as X_1.

E-waste Policy Enforcement

Formal policy frameworks do not automatically yield competitive gains. Institutional Theory (Meyer & Rowan, 1977) and Waste Management Theory both stress that policies require effective implementation and awareness creation to influence outcomes. The variable was measured using Likert-scale items and open questions assessing availability of guidelines, bans and restrictions, and enforcement. In this study, it is applied as an independent variable and operationalized as X_2.

Stakeholder Engagement as Moderator

Stakeholder scrutiny shapes competitive payoffs in the "e-waste game." High awareness reduces the attractiveness of dumping and amplifies the value of compliant strategies. This is consistent with Stakeholder Theory and Game Theory predictions regarding strategy and payoff interdependence on e-waste (Rajendra & Arvind, 2013). Measured using Likert-scale items and open questions assessing perceived levels of environmental awareness among employees of utility companies in Kenya. In this study, it is applied as a moderating variable and operationalized as M.

Competitive Advantage

Measured using Likert-scale items and open questions as a composite index that included: Revenue generation, ESG compliance and CSR performance. In this study, it is applied as the dependent variable and operationalized as Y.

CONCEPTUAL FRAMEWORK

Conceptual Model Structure

Independent Variables: Dumping of e-waste (X_1) and Policy enforcement (X_2)
Moderating Variable: Stakeholder Engagement (M)
Dependent Variable: Competitive Advantage (Revenue + ESG + CSR composite)
Model Logic: $X_1 \rightarrow Y$, $X_2 \rightarrow Y$, $M \rightarrow Y$, $X_1 \times M \rightarrow Y$, $X_2 \times M \rightarrow Y$

Theoretical Logic

The RBV theoretical approach as applied in this study, assumes that sustainable resources work against cost-saving shortcuts (dumping) which is a temporary (relative) advantage from cost strategies that relates with competition theory. Game theory in this study assumes payoffs that discourage dumping, depending on the cooperation between competitors and stakeholder response, while waste management theory provides for normative benchmark for responsible disposal. Stakeholder theory encourages responsible behavior and stakeholder engagement inherently discourages unsustainable practices.
Figure 1 illustrates the conceptual framework in a diagram form.

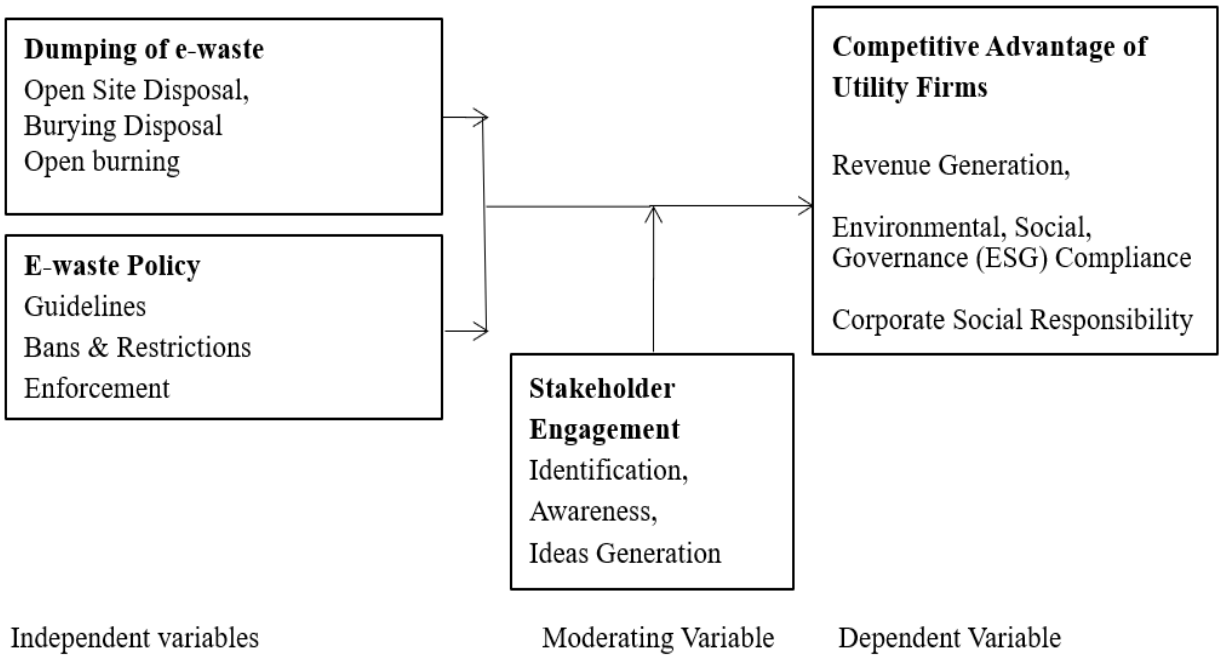


Figure 1: Conceptual Framework

METHODOLOGY

Research Design

This study employed a survey research design using quantitative survey methods. The philosophy employed was positivism. This emphasizes the use of existing theories to develop hypotheses that can be empirically tested using observable and quantifiable data (Saunders, Lewis, Thornhill, 2009). The methodology aimed at testing the direct and moderating effects of unsustainable e-waste strategies on competitive advantage.

Sample and Data Collection

The study population targeted utility firms operating in Kenya in the Electricity, Telecommunications, Water and Sanitation sectors. Target population respondents were company personnel involved in handling of e-waste in utility companies in Kenya. Data was collected using structured questionnaires. The sample size was 235 respondents, which was obtained using (Krejcie & Morgan, 1970) formula from a population of 601 respondents within the utility companies. The response was received from 190 respondents, which was therefore a response rate (190/235) of 80.9%.

Pilot Study

A pilot study was conducted using 24 respondents, which was a 10 percent proportion of the sample size. This was carried out to ascertain the feasibility of the study. Reliability test results using the Cronbach model were obtained as shown in Table 1. Reliability refers to how well the findings can be repeated with results being similar if carried out by different researchers at different times. It determines internal consistency and reliability. In the Cronbach formula, when all the scale items are independent from one another, then the coefficient (α) is zero. If the items are highly related meaning they have high covariance, then α will approach 1. According to Goforth (2015), a reliability coefficient of 0.65 to 0.8 or higher is considered acceptable in most social science research situations. The constructs were all above α=0.8. This showed that there was internal consistency as required.

Table 1: Reliability Statistics on the Variables

Item	Description of Variable	Number of Items	Cronbach Alpha	Comments
1	Dumping of e-waste	11	0.810	Above 0.8
2	E-waste Policy	7	0.942	Above 0.8
3	Stakeholder Engagement	10	0.883	Above 0.8
4	Competitive Advantage	6	0.841	Above 0.8

RESEARCH FINDINGS AND DISCUSSION

This chapter examined response rate and descriptive statistics derived from the respondents' views. The chapter also covered analysis of the assumptions of Ordinary Least Squares (OLS). Multiple regression analysis was applied in testing the relationship between the independent and dependent variables with and without the moderating variable in a three (3) model approach. Discussions on the findings were also included in this chapter.

Descriptive Results

The descriptive results gave the following values for dumping (X_1): Mean = 3.38, SD = 1.185, Policy enforcement (X_2): Mean = 3.16, SD = 1.267, Stakeholder engagement (M): Mean = 3.50, SD = 1.207 and Competitive Advantage (Y): Mean = 3.66, SD =1.1507

Dumping of E-waste

The mean of 3.38 indicated high adoption of e-waste dumping practices compared to the other variables. The SD of 1.185 indicated fair variability among respondents; some companies practice dumping while others do not.

Policy Enforcement

The mean of 3.16 indicated moderate adoption of policy enforcement, meaning companies neither strongly agree nor disagree that policy enforcement is carried out in the company. The SD of 1.267 is among the highest for the study variables, revealing large variability, suggesting inconsistent e-waste policy enforcement practices across utility firms.

Stakeholder Engagement

The mean of 3.50 indicated high stakeholder engagement of e-waste handling obligations and practices. SD = 1.207 shows moderate variability, meaning awareness levels differ but are generally strong. This suggested a strong influence in determining the relationship between e-waste strategies and competitive advantages of utility firms in Kenya.

Competitive Advantage Results

The mean of 3.66 suggested that utility companies perceived themselves as having a high level of competitive advantage linked to e-waste strategies. The SD of 1.15 suggested consistent responses.

Tests For Ordinary Least Squares (OLS) Assumptions

This section examined and analyzed the assumptions of Ordinary Least Squares (OLS). These tests were necessary to ensure that the data could be used for multiple regression analysis. The tests included Normality test, Linearity test, Heteroskedasticity test and Correlation tests.

Test for Normality

To test for normality of the dependent variable which in this study was the Competitive Advantage of utility firms in Kenya, the Kolmogorov-Smirnova (KS) and Shapiro-Wilk test (SW) was used. This assisted in establishing the appropriate tests to be conducted and ensured that assumptions of normal distribution are upheld. Following the Shapiro and Wilk (1965), the tests rejected the normality hypothesis if the p-value is less than or equivalent to 0.05. The findings from the test were as presented Figure 2 and 3.

The analysis from the observed data showed that KS and SW statistics were 0.054 and 0.990 respectively. The p-values were 0.200 and 0.199 for KS and SW respectively. Both are greater than 0.05 level of significance indicating that the hypothesis for normal distribution of data should fail to be rejected concluding that the data is normally distributed.

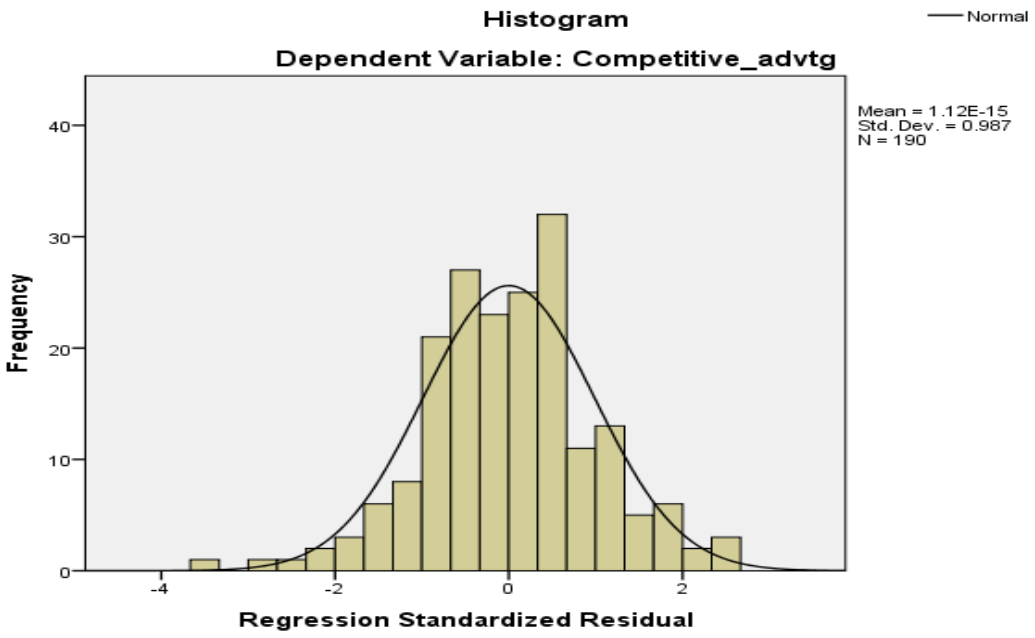
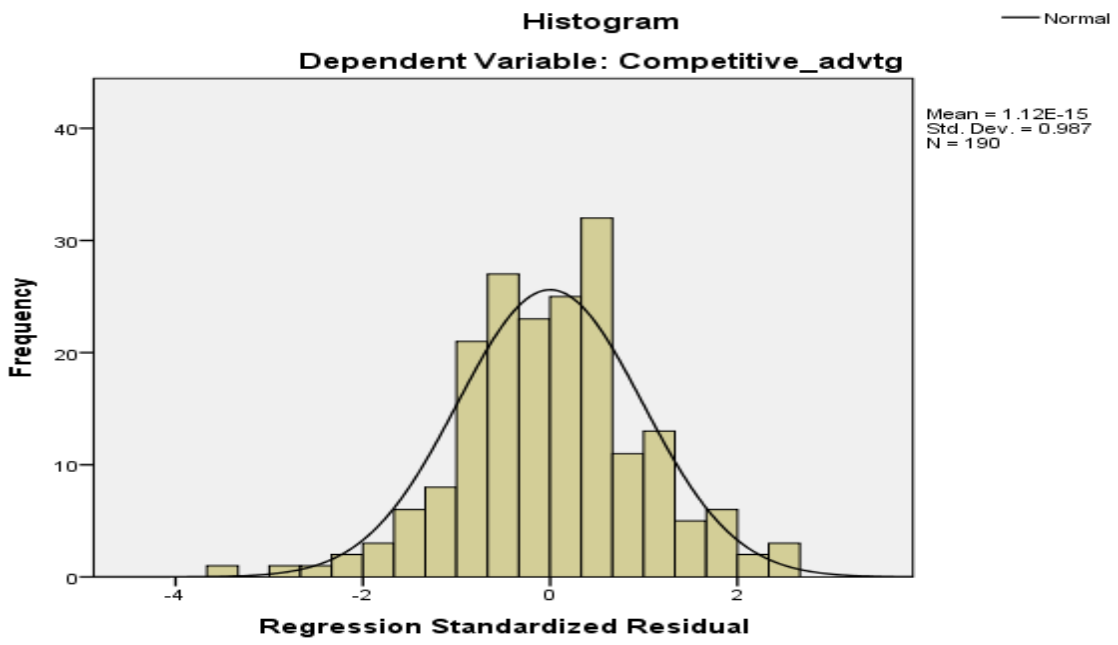


Figure 2: Histogram on Normality



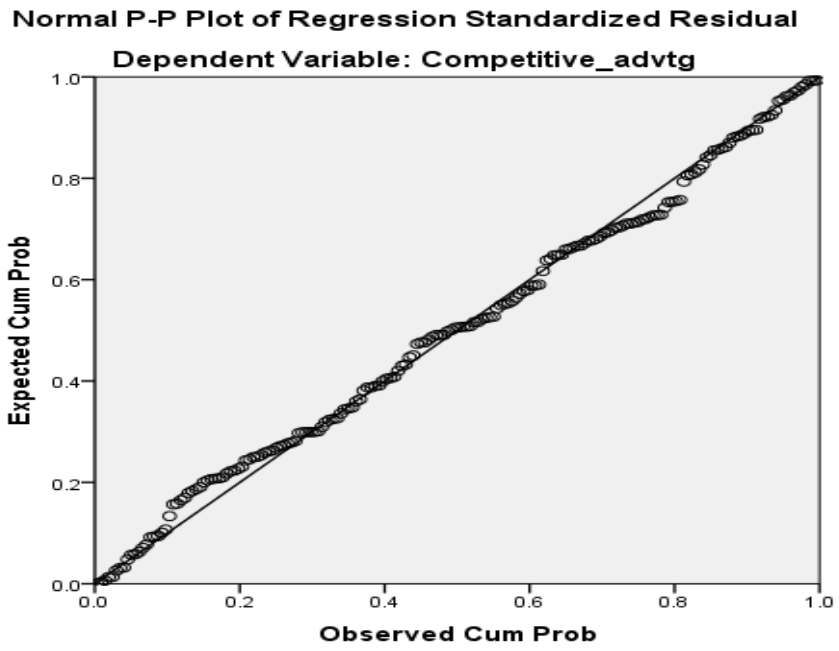


Figure 3: Normal PP plot

Multiple Regression Results Analysis

Analysis Method

Hierarchical multiple regression was employed:

Model 1: Direct effects

Model 2: Intercept moderation

Model 3: Interaction terms (slope moderation)

Model 1: Multiple Regression in the Absence of Moderating Variable

Table 2: Model 1 Summary

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	. 528[a]	. 279	.271	.85389735

a. Predictors: (Constant), Zscore(Policy), Zscore(Dumping)

Table 3: Model 1 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	52.651	2	26.325	36.105	.000[b]
	Residual	136.349	187	.729		
	Total	189.000	189			

a. Dependent Variable: Competitive_advtg.

b. Predictors: (Constant), Zscore(Policy), Zscore(Dumping)

Table 4: Model 1 Coefficients

	Unstandardized coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	sig
(Constant)	1.653E-15	.062		.000	1.000
Zscore(Dumping)	.365	.063	.365	5.784	.000
Zscore(Policy)	.323	.063	.323	5.123	.000

a. Dependent Variable: Zscore(Competitive_advtg)

$Y = 1.653E^{-15} + 0.365X_1 + 0.323X_2 + \varepsilon$ ……equation 1

- Dumping effect positive (highest) and significant ($\beta = 0.365$, $p = 0.000$)
- Policy effect is positive and significant ($\beta = 0.323$, $p = 0.000$)

Model 2: Multiple Regression in the Presence of a Moderating Variable

Table 5: Model 2 Summary

R	R Square	Adjusted R-Square	Std. Error of the Estimate
.696[a]	.484	.476	.72375120

Table 6: Model 2 ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	91.570	3	30.523	58.271	.000[b]
Residual	97.430	186	.524		
Total	189.000	189			

a. Dependent Variable: Zscore(Competitive_advtg)

b. Predictors: (Constant), Zscore(Stakeholder), Zscore(Dumping), Zscore(Policy)

Table 7: Model 2 Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	7.845E-16	.053		.000	1.000
Zscore(Dumping)	.069	.064	.069	1.083	.280
Zscore(Policy)	-.025	.067	-.025	-.380	.705
Zscore(Stakeholder)	.672	.078	.672	8.620	.000

a. Dependent Variable: Zscore(Competitive_advtg)

$Y = 7.845E^{-16} + 0.069X_1 - 0.025X_2 + 0.672M + \varepsilon$ ……equation 2

- Dumping effect becomes reduced and insignificant (Beta = 0.069, p=0.28)
- Policy effect is negative (reduced) and becomes insignificant: (Negative Beta = -0.025, insignificant p = 0.705)
- Stakeholder moderator M: Highest Beta and significant (β = 0.672, p = 0.000)

Model 3: Multiple Regression in the Presence of Moderating Variable (Slope Shifter)

Table 8: Model 3 Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.710[a]	.504	.491	.71353615

a. Predictors: (Constant), X_4M, Zscore(Policy), Zscore(Dumping), X3M, Zscore(Stakeholder)

Table 9: Model 3 ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	95.319	5	19.064	37.444	.000[b]
Residual	93.681	184	.509		
Total	189.000	189			

a. Dependent Variable: Zscore(Competitive_advtg). b. Predictors: (Constant), X4M, Zscore(Policy), Zscore(Dumping), X3M, Zscore(Stakeholder)

Table 10: Model 3 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	-.046	.062		-.740	.460
	Zscore (Dumping)	.055	.064	.055	.856	.393
	Zscore (Policy)	-.034	.067	-.034	-.503	.615
	Zscore (Stakeholder)	.692	.082	.692	8.396	.000
	X_1M	-.052	.043	-.074	-1.213	.227
	X_2M	.124	.048	.141	2.568	.011

a. Dependent Variable: Zscore(Competitive_advtg)

$Y = -0.046 + 0.055X_1 - 0.034X_2 + 0.692M - 0.052X_1M + 0.124X_2M$ ……...Equation 3

- Interaction X_1*M: Negative, insignificant (β = -0.052, p = 0.227)
- Interaction X_2*M: Positive, significant (β = 0.124, p = 0.011)
- Stakeholder moderator M: Highest beta positive, significant (β = 0.692, p = 0.000)
- Variance Inflation Factor (VIF) < 5for all variables, indicating no multicollinearity.

Discussion of Multiple Regression Findings

Direct Effect of Dumping

The study results revealed that dumping creates a competitive advantage in weak institutional environments. Model 1 shows that dumping has a strong and positive effect on competitive advantage (β = 0.365, p < 0.001), while weak or inadequate policy frameworks also enhance competitive advantage (β = 0.323, p < 0.001). This aligns with competition theory, which argues that firms facing minimal oversight tend to adopt cost-cutting strategies to outperform rivals (Porter, 1991). Dumping reduces compliance costs, thereby freeing resources for customer acquisition, pricing flexibility, or network expansion.

The disappearing advantage is explained by the fact that dumping can only persist when information asymmetry exists, which happens when stakeholders lack awareness of a firm's environmental impact. Once stakeholders become informed and actively participate, the

asymmetry reduces, leading to increased regulatory inspections, customer preference shifts toward responsible firms, pressure from environmental groups, internal organizational resistance, and potential financial penalties. Studies show that transparency, reporting, and stakeholder involvement undermine the viability of unsustainable practices by increasing institutional pressure and monitoring (Delmas & Toffel, 2008; Bansal & Clelland, 2004).

From an RBV perspective, these short-term savings may appear to enhance a firm's competitive position. However, the NRBV suggests that such practices lack long-term strategic value because they expose firms to future regulatory, reputational, and environmental risks (Hart, 1995). The results thus reveal a gap between short-term advantages and long-term capability development.

These findings echo waste management theory. The theory argues that where policy enforcement is weak, firms often revert to end-of-pipe disposal solutions instead of circular approaches (Gharfalkar et al., 2015). This explains why dumping appears beneficial only under low regulatory pressure.

This partially aligns with findings from Sarkis (2003) study on green supply chain cost considerations that often dominate environmental concerns in developing economies. The Hoffman (1999) study revealed that firms respond to environmental issues only when institutional pressure intensifies. Several empirical studies in Sub-Saharan Africa and South Asia have shown that weak enforcement environments allow firms to benefit from non-compliance without immediate penalties. The results and findings from this research empirically demonstrate that dumping's advantage disappears once stakeholder engagement is considered. This confirms that unsustainable practices create competitive advantage only in low awareness. This fits the environment institutional contingency argument.

Moderation: Stakeholder Engagement Neutralizes the Advantage of Dumping

Model 2 introduces stakeholder engagement and reveals a drastic change: dumping becomes insignificant ($\beta = 0.069$, $p = 0.280$) and policy also loses its effect. Meanwhile, stakeholder engagement becomes the dominant predictor of competitive advantage ($\beta = 0.672$, $p < 0.001$). This demonstrates that when stakeholders are vigilant, dumping no longer provides competitive benefits.

Institutional theory argues that firms operate under coercive, normative, and mimetic pressures (DiMaggio & Powell, 1983). Active stakeholders such as regulators, consumers, media, and communities exert oversight that increases the economic and reputational costs of illegal dumping. The findings support institutional contingency theory, whereby the profitability of unsustainable practices depends on contextual pressures.

Game theory further explains this shift: in low-monitoring environments, the payoff for "defection" (dumping) is high; but when stakeholders monitor behavior, the payoff structure changes, making compliance more beneficial. Thus, stakeholder engagement transforms the environmental "game" from free riding to cooperation.

H_{01} was rejected in Model 1 ($\beta = 0.365$, $p < 0.001$) and the study concluded that in the absence of stakeholder engagement moderator variable:

> **H_{a1}**: Dumping has significant influence on competitive advantage by utility companies in Kenya,

and failed to be rejected once the moderator was introduced in Models 2 ($\beta = 0.069$, $p = 0.279$) and 3 ($\beta = 0.055$, $p = 0.393$). Stakeholder engagement eliminated the initial positive explanatory power of dumping. The study therefore failed to reject the null hypothesis and concluded that, in the presence of stakeholder engagement moderator variable:

H_{01}: Dumping has no significant influence on competitive advantage by utility companies in Kenya.

Slope Moderation: Stakeholder and Policy Synergy Enhances Advantage

The policy on e-waste disposal enforcement before moderation was positive (β = 0.323, p = 0.000) and significant in model 1 equation 4.1. It became negative and insignificant in model 2 (Beta = -0.25, p = 0.705). The interaction between policy and stakeholder engagement was significant in model 3 (Beta=0.124, p=0.011). That implied that the moderating variable affected the policy coefficient statistically and was significant.

Stakeholder engagement enhances the explanatory power of policy (Model 3 effect). The study therefore rejected the null hypotheses and concluded that, in the presence of stakeholder engagement moderator variable:

H_{a2}: Policy has significant influence on competitive advantage at utility companies in Kenya.

H_{03}: Stakeholder engagement has a statistically significant moderating effect on the relationship between e-waste disposal strategies and the competitive advantage of utility firms in Kenya.

The finding reinforces that firms cannot rely on unethical or environmentally harmful shortcuts once the institutional environment matures. Stakeholder engagement transforms sustainability from a compliance burden into a strategic capability that shapes long-term competitive advantage (Russo & Fouts, 1997). The findings fit well within the environmental institutional contingency argument, which states that organizational behavior and the performance effects of that behavior are contingent on the institutional environment, especially stakeholder pressures, regulations, and societal norms (DiMaggio & Powell, 1983). In environments with low institutional pressure (e.g., weak regulation or low public environmental consciousness), firms may temporarily benefit from non-compliant practices. But as the institutional environment becomes more engaged through stakeholders, regulation, and public awareness the same practices become costly, risky, and uncompetitive.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The study concludes that:

(i) Unsustainable practices (dumping) generate competitive advantage only in environments of weak stakeholder engagement.

(ii) Stakeholder involvement is the single strongest determinant of sustainable competitive advantage in this study.

(iii) Policy becomes strategically effective only when moderated by stakeholder engagement.

(iv) Institutional contingencies fundamentally shape whether unsustainable practices remain profitable.

The study empirically supports the argument that unsustainable strategies create temporary competitive advantage but when aligned with stakeholder expectations this advantage disappears. (Aragón-Correa & Sharma, 2003; Hoffman, 1999). Under strong stakeholders and institutional pressure, sustainability becomes a competitive necessity, not optional.

The study also concludes that the assumption that dumping enhances competitive advantage is context-dependent and collapses under institutional scrutiny. Sustainable, stakeholder-centered, NRBV-aligned strategies offer more durable pathways for competitive advantage in Kenya's utility sector. This suggests sustainability transitions from moral obligation to competitive strategy.

Recommendations

The recommendation to utility companies who were the subject of this study is to shift from cost-based to stakeholder-aligned e-waste strategies. As observed in the study; while dumping may produce short-term financial gains, its advantage diminishes in high stakeholder engagement contexts. Firms should anticipate increasing stakeholder scrutiny and invest in sustainable disposal systems. The specific recommendations are listed in the following subsections.

Strengthen Stakeholder Engagement

- Establish multi-stakeholder e-waste committees.
- Implement transparent reporting systems for e-waste flows.
- Provide employee sustainability training.

Reinforce Policy through Co-Regulation

- Link regulatory enforcement to stakeholder oversight.
- Use risk-based monitoring for firms with high e-waste volumes.
- Provide incentives (tax credits, subsidies) for take-back programs.

Develop NRBV-Based Sustainable Capabilities

- Invest in recycling partnerships, refurbishment centres, and reverse logistics.
- Adopt circular procurement (leasing, modular equipment).
- Prioritize pollution prevention systems.

De-Incentivize Dumping

- Increase fines and compliance audits.
- Digitally track e-waste disposal.
- Promote mandatory certification for e-waste handlers.

Build Institutional Capacity for Circularity

- Strengthen formal recycling infrastructure.
- Encourage public–private partnerships for e-waste innovation.
- Support community-level take-back points.

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APPENDICES

Appendix I: Discarded E-waste

Discarded E-waste : Utility Damp Site Photos.

Discarded E-waste : Utility Damp Site Photos.