Impact of Electronic Cargo Tracking Systems on Cargo Security: A Case of the Inland Container Depot at Embakasi, Nairobi, Kenya

Roy Ochieng' Otieno[1]
Elijah Onyango Standslause Odhiambo[2]

[1]royochieng71@gmail.com
[2]eodhiambo@buc.ac.ke

[1]Mount Kenya University, [2]Bomet University College, Kenya

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ABSTRACT

Kenya has implemented numerous reforms to enhance cargo security, with a strong focus on technological innovations. One such initiative is the Regional Electronic Cargo Tracking System (RECTS), introduced by the Kenya Revenue Authority (KRA) at the Inland Container Depot (ICD) in Embakasi, Nairobi. RECTS was designed to address persistent challenges such as cargo theft, tax evasion, and the illegal diversion of goods. However, the effectiveness of this system in securing cargo remains under-explored in the Kenyan context. Despite the technological advancements, KRA still faces obstacles, including technical failures, limited staff capacity, and inadequate infrastructure, which inhibit the full potential of RECTS. Grounded in Technology Acceptance Model, this study investigated the impact of RECTS on cargo security at the Embakasi ICD, employing a cross-sectional design. A total of 110 customs and technical staff from KRA were targeted and 101 participated in the study, with participants selected through stratified random sampling. Data was collected using structured questionnaires. Data analysis was conducted using SPSS, regression analysis was used to assess the relationship between RECTS and cargo security. The findings revealed that RECTS significantly enhances cargo security by improving the detection of concealed items, monitoring goods in transit, and reducing cargo theft. The study concludes that technology is integral to cargo security at the ICD. To optimize RECTS's effectiveness, it recommends continuous staff training, infrastructure upgrades, and increased collaboration among stakeholders to facilitate trade and maintain system efficiency.

Keywords: Africa, Cargo Security, Cargo Safety, Kenya, RECTS, Technology

I. INTRODUCTION

In the 21st century, technology has revolutionized industries across the globe, including the logistics and supply chain sectors (Christopher, 2016). Technology plays a critical role in securing goods during transit, a concern that has grown with the rise of global trade (World Trade Organization [WTO], 2019). The application of technology in cargo security aims to address challenges such as theft, damage, and unauthorized access to goods, ensuring that they arrive at their destinations safely and efficiently (Eliakunda *et al.*, 2018; World Trade Organization, 2019). As nations increasingly rely on international trade, the need for secure cargo handling systems has never been more critical (Eliakunda *et al*., 2018; Miller, 2024; Federal Bureau of Investigation, 2010).

The World Customs Organization (WCO), recognizing the importance of securing international trade, adopted the Framework of Standards to Secure and Facilitate Global Trade (SAFE Framework) in 2005. This framework aimed to enhance the security of global trade by promoting the use of advanced technological solutions, including electronic data interchange and tracking systems (World Customs Organization, 2005). Subsequent amendments in 2021 further reinforced the importance of cooperation between customs administrations and the use of risk management systems to combat international terrorism, smuggling, and cargo theft (World Customs Organization, 2021). These global efforts underscore the critical role of technology in securing supply chains and enhancing trade facilitation.

Kenya, like many other countries, has adopted technological innovations to improve cargo security (Lihanda & Kilonzi, 2022). The Kenya Revenue Authority, responsible for customs management, has implemented various systems such as the Integrated Customs Management System (ICMS), Regional Electronic Cargo Tracking System (RECTS), and Integrated Scanning Solutions (ISS) at key ports, including the Inland Container Depot in Embakasi, Nairobi (Lihanda & Kilonzi, 2022; Murugi, 2020). These technologies have been introduced to mitigate risks such as cargo theft, tax evasion, and illegal diversion of goods, which have historically plagued Kenya's customs processes (Murugi, 2020).

Despite these advancements, the efficiency and effectiveness of these technologies in securing cargo remain under-explored, particularly in the Kenyan context. Studies in other settings have shown that while technology can

significantly enhance cargo security, challenges such as technical failures, limited staff capacity, and inadequate infrastructure can hinder its full potential (Eliakunda *et al.*, 2018; Murugi, 2020; Sarkar & Shankar, 2021). The gap between the theoretical benefits of technology and its practical application in cargo security, especially in developing countries like Kenya, presents an opportunity for further research.

Theoretical frameworks such as the Technology Acceptance Model (TAM) provide a foundation for analyzing how technological innovations are adopted and utilized in cargo security. TAM, developed by Davis (1989), posits that perceived ease of use and perceived usefulness influence the adoption of new technologies. In the context of cargo security, this theory can explain how customs officials and logistics personnel adopt and utilize system RECTS (Davis, 1989). Game Theory, on the other hand, explores the strategic decisions made by stakeholders to invest in security technologies based on the perceived value of the cargo (Nagurney *et al*., 2018). Both theories help in framing the discussion on the role of technology in enhancing cargo security.

This study, therefore, aims to explore the impact of technology on cargo security at the Inland Container Depot in Embakasi, Nairobi, Kenya. Specifically, it seeks to assess how electronic cargo tracking systems contribute to mitigating cargo theft and ensuring the safe transit of goods.

1.1 Statement of the Problem

Kenya serves as a critical gateway for goods entering and leaving the East African region, playing a pivotal role in both regional and international trade (Maurer et al., 2023). The high volume of cargo passing through the Embakasi ICD, coupled with logistical complexities over long transport distances, poses significant security risks. While electronic cargo tracking and customs management systems have been implemented, breaches in cargo security persist, raising concerns about their effectiveness (Lihanda & Kilonzi, 2022).

Studies in other regions provide mixed evidence regarding the effectiveness of cargo security technologies. Research in Ghana and Uganda suggests that electronic tracking systems improve cargo safety by minimizing transit risks and providing real-time security alerts (Mensah & Adjei, 2022; Cao & Zheng, 2024). Conversely, studies in South Africa and the European Union highlight persistent challenges, including interoperability issues, regulatory gaps, and cybersecurity threats, which can compromise the effectiveness of these systems (Expeditors, 2020; European Commission, 2021). Similarly, research in the United States indicates that while advanced tracking and scanning technologies enhance cargo security, their sustainability depends on continuous investment and technological upgrades (Smith & Johnson, 2020).

Despite the increasing adoption of electronic tracking systems in Kenya, there is limited research on their practical application and effectiveness, particularly at the ICD in Embakasi. This knowledge gap underscores the need for further investigation to assess the impact of these technologies on cargo security and trade facilitation. This study aims to address this gap by evaluating the effectiveness of integrated scanning and tracking solutions in enhancing cargo security at the Embakasi ICD

1.2 Research Objective

(i) The objective of the study was to establish the impact of electronic cargo tracking systems on cargo security at the Inland container depot at Embakasi, Nairobi.

1.3 Research Question

(i) What is the contribution of the electronic cargo tracking systems to cargo security at the Embakasi Inland container depot?

II. LITERATURE REVIEW

2.1 Theoretical Review

A theory is a set of established principles used to explain facts or phenomena allowing for the drawing of solid conclusions about natural phenomena (Bradford & Hamer, 2022). Theories however often fall short of specificity required in arriving at key decisions to be implemented. This study used Technology Acceptance model theory.

2.1.1 Technology Acceptance Model Theory (TAM)

Technology Acceptance Model Theory (TAM) was introduced by Davis (1989) to highlight on how individuals accept and use new technologies. According to the theory, two key factors influence technology adoption; perceived usefulness and perceived ease of use. These perceptions shapes user's attitudes and intentions, ultimately determining whether they will embrace or reject a specific theory.

This theory in relation to cargo security, is crucial for understanding how technologies such as the electronic cargo tracking systems can be adopted by customs, cargo handlers and other stakeholders. If the tracking systems are seen as useful in reducing risks, preventing theft and securing transportation of goods, it is most likely to be accepted and incorporated into cargo security processes. Additionally, if users find it easy to operate, the likelihood of adoption is high. Thus, this theory's relevance to cargo security lies in its ability to explain human factors that influence adoption of security innovations in technology.

2.2 Empirical Review

2.2.1 Technology and cargo security

What is technology? Technology is the application of conceptual knowledge for achieving practical goals, especially in a reproducible way (Skolnikoff, 1993). Since technology backs fiscal growth and improves human prosperity, most industries have embraced its use in ensuring increase and speed in productivity and global market capability while cutting down on huge expenses. According to TSA Team (2023), Technology has contributed a major impact in transforming cargo safety during transportation of commodities. Upcoming technologies such as Internet of Things, GPS tracking, block chain and artificial intelligence, have revolutionized the way businesses protect valuable cargo from theft and supply chain disruptions.

Most global freight companies are now implementing use of technology in tracking of their shipments by use of Internet of Things in relaying real time data of locations and environmental monitoring (Inbound Logistics, 2023). It assists in interconnectivity of devices and sensors enabling companies to secure and monitor cargo effectively. This in the long run ensures optimal conditions for sensitive items and detect any abnormalities (Ifeanyi & Spencer, 2024) Artificial Intelligence is transforming cargo security by enabling threat detection and prevention. AI systems analyze huge volumes of data from various items such as sensors, security cameras to identify anomalies and risks (Inbound Logistics, 2023). Through technology, KRA has been able to transform cargo security by improving transparency and trust in supply chain operations (Kenya Revenue Authority, 2023).

Major shifts in the world of shipping has revolutionized transportation of goods globally. Containers have undergone massive refurbishments over the years, as notable technological advancements have been suggested to improve on cargo security and handling (Krishnan et al., 2024). Block chain based tracking has been in used in monitoring and tracking in order to reduce risk of fraud and improve on the chain of supply of cargo. It has created a paperless ledger system of container transit from ports to their destination, streamlining handling (Mvubu & Naude, 2024). Technology will aim at the introduction of autonomous containers, which will be able to move around terminals without human intervention. This is aimed at cutting down labor costs and ensure safer handling.

Vohra (2023) states that technology through both data analytics and advanced quantum computing will assist in boosting processing power and solve issues in optimization. This will aid in data processing and quick decision making. Advanced analytics has enabled cargo service companies obtain more details and knowledge into their operations, thus assisting them in estimating and determining shipping costs. This is proactive and aids in cost saving, efficiency and decision making.

2.2.2 Electronic Cargo Tracking Systems and cargo security

Mugambi (2017) conducted a study on the effects of cargo tracking systems on cross-border trade between Kenya and Uganda. The study adopted an exploratory design with purposive sampling to determine the extent of automation and the effects of cargo tracking systems. Findings indicated that the system reduced cargo diversion, decreased monitoring costs, and increased revenue collection. The study recommended synchronizing RECTS with other systems, such as RFID, for improved efficiency (Mugambi, 2017).

Nyongesa (2018) investigated the influence of RECTS on the management of transit goods, using a descriptive research design. The study targeted agents, truck drivers, and truck owners, employing stratified and simple random sampling. Results indicated that RECTS positively influenced goods management, reduced transit time, and decreased dumping. However, the study identified gaps, such as insufficient manpower in the Transit Management Unit (TMU) and a shortage of deployed seals. Additionally, the study noted long alert response times due to the large coverage area for Rapid Response Units (Nyongesa, 2018). This study provides a comprehensive view of RECTS's operational impact but highlights significant gaps in resource deployment and response efficiency.

Dongo *et al*. (2020) assessed the impact of RECTS on key stakeholders along the Northern Corridor in East Africa. The study found a 50% reduction in transit time and that Rapid Units responded to 2,468 high alert cases, protecting USD 37,271,476 in revenue Dongo et al. (2020). The study concluded that RECTS significantly improved cargo transportation efficiency but recommended increasing the number of transporters using RECTS. While the study provides useful data on transit time and revenue protection, it does not delve into the system's integration challenges or specific regional disparities.

III. METHODOLOGY

3.1 Study Design

The study utilized a cross-sectional design using survey to collect data. The survey was conducted over a two-month period, specifically from July to August 2024, to gather comprehensive data on the effectiveness and implications of RECTS on cargo security

3.2 Study Setting

The study was conducted at the Inland Container Depot located in Embakasi East Sub County, Nairobi County, Kenya. It borders Lang'ata to the south, Machakos County to the east, Roysambu Sub County to the north and Embakasi Central to the north. This facility serves as a pivotal hub in Kenya's logistics and cargo handling network. Positioned strategically within Nairobi, the ICD plays a crucial role in facilitating both domestic and international trade by managing substantial volumes of cargo. Its central role in the import and export processes underscores its significance in the broader context of Kenya's economic activities. The Inland Container Depot is renowned for its advanced infrastructure, which includes cutting-edge technologies such as integrated scanning solutions and electronic cargo tracking systems. These systems are integral to the depot's operations and central to the focus of this research

3.3 Study Population, Sampling and Sampling Technique

The target population for this study consisted of employees working at the Embakasi Inland Container Depot. This diverse group included customs officers, technical staff, and managerial personnel, all of whom are directly involved in cargo handling and security operations. These individuals were selected as the target population because of their integral roles in the implementation and oversight of the security technologies being evaluated in the study. To ensure that the study captured a broad and representative range of perspectives, a stratified random sampling method was employed. This approach was chosen to ensure that all relevant subgroups within the population were adequately represented in the sample. The process involved dividing the population into distinct strata based on specific job functions. These strata included customs officers and RECTS operators, each of whom plays a unique role in the depot's operations.

The sample size of 101 participants was calculated using Yamane's formula, which ensures a representative sample from the total population of 135 employees at the depot. The formula is as follows:

n= N/1+N (e) 2

Where

n = sample size

N =targeted population (135)

e = level of significance [i.e. 5% for 95% Confidence Interval]

Thus:

n=135/1+135(0.05)2

n =101

3.4 Data Collection and Instruments

Primary data was gathered through structured questionnaires. The questionnaire was designed to capture information about the participants' Socio demographic data, experiences with the security technologies in place, their perceived effectiveness, and any challenges encountered. The questionnaire included both closed-ended and open-ended questions to allow for quantitative analysis.

3.5 Data Analysis

Data analysis from survey was done using the Statistical Package for Social Sciences (SPSS), version 27. First, descriptive analysis (frequencies and percentages) was done to analyze socio-demographic characteristics of the respondent. Second analysis conducted was Pearson correlation. To analyze the relationship between the independent variables (RECTS) and the dependent variable (Cargo Security), Pearson's correlation analysis was conducted using SPSS software. The process began by entering the survey data into SPSS, ensuring that each variable was correctly coded. Prior to running the correlation analysis, the normality of the data was checked using descriptive statistics and the Shapiro-Wilk test, as Pearson's correlation assumes normal distribution. Once normality was confirmed, the analysis proceeded by selecting the relevant variables and running a bivariate correlation to compute Pearson's correlation coefficients.

3.6 Ethical Consideration

The study received ethical approval from the Mount Kenya University Ethics Review Committee (Ref. No. MKU/ISERC/3739) and the National Commission for Science, Technology, and Innovation (Ref. No. 173965). Additionally, institutional authorization was granted by Nairobi County and the KRA (Ref. No. KRANKU139824072024), further ensuring that the study adhered to both local and institutional guidelines. Before the commencement of the data collection, informed consent was obtained from each participant, ensuring their full awareness and voluntary participation. Participants were provided with detailed information outlining the study's objectives, and the potential benefits of their participation. They were also made aware of any potential risks, however minimal, that could be associated with participating in the survey. This information was communicated in a clear and understandable manner, allowing participants to make an informed decision about their involvement. Participation in the study was entirely voluntary, and participants were explicitly informed that they could withdraw from the study at any stage without any negative consequences.

IV. FINDINGS & DISCUSSION

4.1 Response Rate

The survey targeted 101 respondents across various roles at the ICD, including senior officers, ISS operators, RECTS operators, and ICMS officers. A total of 101 questionnaires were completed and returned, resulting in a 100 percent response rate, which is considered an exceptional level of participation. According to Kothari (2007), a response rate above 80 percent is generally regarded as highly reliable and sufficient for ensuring the validity of the research findings. Table 1 provides a breakdown of the response rate by the different categories of respondents

Table 1

Response Rate of the Respondent

Respondent	Target number of questionnaires	Number of questionnaire answered	Response rate
Senior Officers	13	13	100%
I-Scan officers	27	27	100%
RECTS Officers	14	14	100%
Junior Officers	29	29	100%
ICMS Officers	18	18	100%
Total	**101**	**101**	**100%**

4.1.1 Socio Demographic Characteristics of Participants

As illustrated in Table 1, the participants' ages ranged from 18 to over 55 years, the respondent age distribution showed that majority (36.6%) were between 25-35 years old. Most participants (39.6%) held a Bachelor's degree, while (32.7%) had a diploma and (27.7%) had a Master's degree. The gender distribution comprised 60.39% male and 39.61% female, reflecting a slightly higher participation rate among men. The marital status of the participants indicated that the majority were married (64.35%), while the religious affiliation was predominantly Christian (82.2%).

Table 2

Socio Demographic Characteristics of the Participants (N=101)

Characteristic	Frequency	Percentage	Cumulative Frequency
Age			
18-25	21	20.7	20.8
25-35	37	36.6	57.4
35-45	26	25.7	83.2
45-55	10	9.9	93.1
Above 55	7	6.9	100.0

Highest level of education			
Diploma	33	32.7	32.4
Bachelors	40	39.6	71.9
Masters	28	27.7	100.0
Gender			
Male	61	60.39	60.39
Female	40	39.61	100.0
Marital status			
Single	24	23.76	23.76
Married	65	64.35	88
Separated	8	7.9	95.9
Divorce	4	4.0	100.0
Religion			
Muslim	11	10.9	10.9
Christian	83	82.2	93.1
Hindu	0	0	93.1
Other	7	6.9	100.0

4.2 Inferential Statistics

The study employed correlation and multiple regression analysis to establish the association between the independent variables, including ISS), the RECTS, and ICMS, and the dependent variable, which is cargo security.

4.2.1 Comparative analysis of the impact of technology on the Cargo Security

A comparative analysis was conducted on the effectiveness of different electronic systems in enhancing cargo security, including ISS, RECTS, ICMS. Table 3 presents the descriptive statistics for cargo security across different technological interventions

Table 3

Comparative Statistics for Cargo Security

Variable	N	Mean	Median	Std.	Min	Max	Sum
CS.ISS	101	1.2167	1.0000	0.41545	1.00	2.00	73.00
CS.RECTS	101	1.2833	1.0000	0.45442	1.00	2.00	77.00
CS.ICMS	101	1.2500	1.0000	0.43667	1.00	2.00	75.00

Results indicate that RECTS had the highest impact on cargo security, with a mean score of 1.2833 and a standard deviation of 0.45442, followed by ICMS with a mean of 1.25 and a standard deviation of 0.43667, and ISS having the lowest mean of 1.2167 and a standard deviation of 0.41545. These findings suggest that while all systems contribute to cargo security, RECTS is perceived as the most effective.

4.2.2 Correlation Analysis

Pearson correlation analysis was used to assess the strength of the relationship between the electronic cargo tracking systems and cargo security. Pearson (r) correlation analysis was employed using SPSS. The correlation coefficients reveal a significant positive relationship between ISS ($r = 0.472$, $p < 0.05$) and RECTS ($r = 0.315$, $p < 0.05$) with cargo security, whereas ICMS had a negative correlation ($r = -0.259$, $p < 0.05$), indicating possible inefficiencies in its implementation.

Table 4

Pearson Correlation Co Efficient

Variable	SC.ISS	CS.RECTS	CS.ICMS	Cargo Security(CS)
CS.ISS	1			0.472*
CS.RECTS	-0.117	1		0.315*
CS.ICMS	-0.061	-0.278*	1	-0.259*

*p < 0.05 (significant at 95% confidence interval)

4.2.3 Regression Analysis

Having passed the above test, multiple regression analysis was conducted to assess the extent to which ISS, RECTS and ICMS predict cargo security.

Table 5
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.886[a]	.786	.770	.41389	.786	50.463	4	55	.000

Predictors: (Constant), CS. RECTS, CS.ISS, CS. ICMS)

The R Square value of 0.786 from the summary table 5 above indicates that 78.6% of the variation in cargo security can be explained by the independent variables [RECTS, ISS, ICMS]. The adjusted R square value of 0.770 suggest that even after accounting for the number of predictors in the model, about 77% of the variation in the cargo security is still explained. The standard error of the estimate is 0.41389, indicating the average distance between the observed values and the predicted values. The F Change value of 50.463 and the significance level (p = 0.000) confirm that the model is statistically significant and that the independent variables [ISS, RECTS, ICMS] have a meaningful impact on cargo security.

Table 6
Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	8.756	.352		24.844	.000	8.050	9.463
	CS.ISS	1.033	.132	.497	7.813	.000	-.768	1.297
	CS.RECTS	.989	.130	.500	7.628	.002	-.729	1.249
	CS.ICMS	-.800	.124	-.421	-6.447	.000	-1.048	-.551

Dependent Variable: Cargo Security

The regression analysis results indicate that both ISS and RECTS have a significant positive impact on cargo security, while the ICMS negatively affects it. The unstandardized coefficients reveal that a one-unit increase in ISS is associated with a 1.033-unit increase in cargo security (p = 0.000), while a similar increase in RECTS leads to a 0.989-unit increase (p = 0.002), suggesting that both technologies enhance security outcomes. Conversely, ICMS has a negative coefficient of -0.800 (p = 0.000), indicating that its current implementation reduces cargo security, possibly due to inefficiencies or challenges in integration. The standardized coefficients further reinforce the importance of RECTS (β = 0.500) and ISS (β = 0.497) as the strongest predictors of cargo security, whereas ICMS (β = -0.421) presents a significant challenge. The 95% confidence intervals confirm the statistical significance of these relationships, with the negative confidence range for ICMS ([-1.048, -0.551]) highlighting its detrimental impact.

4.3 Discussion

The findings from this study highlight the critical role of technological systems in enhancing cargo security, with RECTS emerging as the most impactful from the comparative analysis, followed by ICMS and ISS. In Kenya, the widespread implementation of RECTS has been instrumental in deterring cargo diversion, ensuring real time tracking and providing alerts on seal tampering, enabling swift responses to security breaches (Kenya Revenue Authority, 2023). This aligns with the current study's findings, which indicate that RECTS has the highest mean impact on cargo security. Similarly, ICMS has streamlined customs procedures, reducing clearance times and enhancing transparency. Reports from the Kenya Revenue Authority confirm that ICMS has played a transformative role in expediting cargo processing, thereby strengthening security at key entry points (Kenya Revenue Authority, 2023). This aligns with the study's findings, which highlight ICMS as a critical component in Kenya's customs modernization efforts. Similarly, ISS has reinforced security by improving cargo verification through advanced scanning technologies, though its effectiveness remains contingent upon infrastructure quality and operational efficiency.

Beyond Kenya, comparable trends have been observed across Africa, reinforcing the regional significance of RECTS in bolstering cargo security. In Ghana, the implementation of these technologies has enhanced the efficiency of cargo clearance at major ports, reducing transit delays and strengthening security measures (Mensah & Adjei, 2022). This finding is consistent with the positive impact of RECTS and ICMS noted in the present study, suggesting that digital management solutions are central to improving trade facilitation across the continent. Likewise, Uganda's

adoption of RECTS has led to significant improvement in cargo monitoring and transit security, further substantiating the effectiveness of RECTS in East Africa (Cao & Zheng, 2024). The alignment of findings across these countries indicates that electronic cargo tracking technologies contribute to supply chain security in diverse operational environments, making them a critical tool for trade governance in the region.

However, the effectiveness of these technologies is not universally uniform, as contrasting perspectives emerge from studies in other regions. In South Africa, research on customs modernization highlights the potential of integrated tracking system to enhance trade efficiency but also reveals persistent challenges in cargo interoperability and regulatory harmonization (Expeditors, 2020). This suggests that while technology driven solutions offer substantial benefit, their impact is contingent upon seamless integration across custom jurisdiction and alignment with the national policies. In the European Union, studies indicate that cargo tracking systems significantly enhance supply chain security, yet their effectiveness is highly dependent on regulatory framework and the degree of stakeholder cooperation (European Commission, 2021). This contrasts with findings from Kenya and Uganda, where uniform adoption of RECTS and ICMS has largely yielded positive results. European nation exhibit varying level of efficiency due to policy discrepancies and differential investment in tracking infrastructure. Similarly, in the United States, research highlights the extensive benefits of advanced tracking and scanning solutions in enhancing cargo security. However, emerging concerns such as cybersecurity threats, high implementation costs and ongoing system maintenance requirements pose challenges to the long term sustainability of these technologies (Smith & Johnson, 2020). This therefore reveals the need for continuous investment in digital security measures to safeguard electronic cargo tracking systems against potential vulnerabilities.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusions

Based on the findings of the research, it is evident that technological innovations such as the regional electronic tracking system plays a wider role in ensuring cargo safety and handling in both the global and national levels. RECTS ensures goods are protected by ensuring constant monitoring during transit and storage thus preventing cases of theft, pilferage and cargo mishandling. There existed a higher impact of the tracking system on cargo security as opposed to any technological innovation currently present at the Embakasi Inland Depot.

The study concludes that the electronic cargo tracking system allowed for real time detection and tracking capabilities, allowing custom officials to monitor cargo as it moves through the whole supply chain thus bolstering trade. In addition, majority of all those who participated in the study, gave a positive response on the benefits of RECTS, mentioning it has eased their work, boosted work morale and created a sense of responsibility among them. It has also assisted in creating positive emotional wellbeing by lessening the stress and panic caused by frequent loss of goods.

5.2 Recommendations

The state should invest in upgrading current technology by embracing modern regional electronic cargo tracking systems, to align with the global standards and customer needs. Investment in tracking systems is essential in ensuring Kenya is competitive in the logistics market. Proper implementation, capacity building, continuous staff training and maintenance of the system to ensure it operates at optimal levels is also required. Regular training will improve the technical skills and confidence of personnel while handling the tracking system. This will assist in reducing breeches and improve cargo safety.

There is need to develop inclusive policies involving all stakeholders including custom officials, logistic companies and transport operators. Strengthening of public-private partnerships as a key strategy between KRA and other private sector actors will facilitate better implementation and address operational and technological challenges of RECTS. Finally, the state should encourage research on the role of the private sector in cargo security to gain broader insights into best practices that can be applied in Kenya's cargo security framework.

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