Journal of Human Resource & Leadership

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ISSN: 2616-8421

Stratford Peer Reviewed Journals and Book Publishing
Journal of Human Resource & Leadership
Volume 8||Issue 5||Page 20-34 ||October||2024|
Email: info@stratfordjournals.org ISSN: 2616-8421

Moderating Effect of Technology Staff Competence on the Relationship between Scanning Technological Attributes and Custom Revenue Performance: A Case Study of Jomo Kenyatta International Airport

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***How to cite this article*: Nzioki A., T., Tuwey J., & Odunga R. (2024). Moderating Effect of Technology Staff Competence on the Relationship between Scanning Technological Attributes and Custom Revenue Performance: A Case Study of Jomo Kenyatta International Airport. *Journal of Human Resource & Leadership. Vol* 8(3) pp. 20-34.** https://doi.org/10.53819/81018102t2442

Abstract

The study sought to establish the moderating effect of technology staff competence on the link between scanning technological attributes and custom revenue performance at Jomo Kenyatta International Airport. Data were gathered from 229 customs officers from Jomo Kenyatta International Airport using a questionnaire based on an explanatory research design. Hypotheses testing utilized linear regression, Hierarchical regression analysis and mod graphs. technology staff competence. The study found that Baggage scanning accuracy has a positive and significant effect on custom revenue performance, cargo scanning efficiency has a positive and significant effect on custom revenue performance, customs declaration scanning has a positive and significant effect on custom revenue performance, scanning technology integration has a positive and significant effect on custom revenue performance. The study also found that technology staff competence moderates the relationship between baggage scanning accuracy, cargo scanning efficiency, customs declaration scanning, scanning technology integration and custom revenue performance. The study suggested that the management should ensure that any problems that would lead to inefficiency and ineffectiveness of the scanning technology is attended to with urgency and that all staff dealing with scanning technology should be properly trained. The policy makers were also advised to make policies that will guide the management of JKIA customs department to effectively and efficiently use scanning technology in the scanning process.

Keywords: *Baggage Scanning Accuracy, Cargo Scanning Efficiency, Customs Declaration Scanning, Scanning Technology Integration, Custom Revenue Performance, Technology Staff Competence*

Stratford Peer Reviewed Journals and Book Publishing
Journal of Human Resource & Leadership
Volume 8||Issue 5||Page 20-34 ||October||2024|
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1. Introduction

Customs administrations play important roles, which vary from country to country. Their primary tasks relate to facilitation of legitimate goods across administrative boundaries (Azcarraga, Matsudaira, Montagnat-Rentier, Nagy & Clark, 2022). Their duties also include implementation of wide range of government policies such as revenue collection from import tariffs and export taxes, protection against terrorist activities the enforcement of quantitative restrictions on imports or cargo of commodities among others (Montagnat-Rentier & Bremeersch, 2022). According to Taderera and Al Balushi (2018), it is imperative for the customs administrations to go for better methods employing superior security. Thus, the introduction of scanners. Automated systems have been proven capable of introducing massive efficiencies to business processes that can result in increased revenue collections (Olarinde, 2021). Scanners are used worldwide to inspect baggage and cargo for hidden and prohibited items. Mukuwa and Phiri (2019) postulates that the scanning process also eliminates fraud, theft and bribery; because all actions are recorded as cases. This scanning system also helps increase auditability. Customs has the ability to investigate cases, re-investigate cases, check for quality control, interrogate findings, and can determine who did what.

Competencies can be defined by "knowledge, skills, attitudes, values, motivations and beliefs people need in order to be successful in a job. Technological competency is defined as "as the ability to develop and design new product and, process to operate facilities affectively including the ability to learn" (Prencipe, 1997). Technological Competency has been hypothesized by many to be a key element in firm's performance. Technological Competency is achieved when firms are able to utilize equipment and technological information efficiently (Toma, 2019). With technological competency firms can grow faster than the others and thereby increase their market share and business performance (Ainin, Kamarulzaman & Farinda, 2010).

There have been very limited efforts to assess the effect of scanning technology on custom revenue performance with most of the studies focusing on other automation systems. For example, Hanningtone (2022) conducted a study on the effects of automation of customs systems on revenue performance in Kenya. The study by Nganda (2021) focused on the effect of system automation on Custom Revenue Performance at the port of Mombasa in Kenya. Another study was conducted by Omosa, Ogaga and Cheboi (2020) on the effect of systems automation on customs revenue performance in Kenya. This study hence addresses this gap by investigating the moderating effect of technology staff competence on the relationship between scanning technological attributes and custom revenue performance at Jomo Kenyatta International Airport.

1.1 Theoretical review

The study was anchored on the technological determinism theory and human capital theory discussed herein. Veblen is credited with coining the term "technological determinism" (1978). According to the technological determinism (TD) idea, change is driven by technology. Among other things, TD modifies an organization's cultures, structures, reporting lines, conventions, and operational procedures (Buchanan & Huczynski, 2019). TD is a philosophical worldview that operates under the premise that technology controls human society by causing unavoidable societal changes. Technology is viewed as an independent force that functions independently of society (Hofmann, 2006). Thanks to technological advancements, completing a variety of transactions is now simple (Balconi, 2002). Technological determinism (TD) holds that technology is a social system or a power that drives change. It is perceived as a culture's driving force behind civilization,

dictating the course of its history (Brette, 2003). Technology affects not just the switching states but also the organization, attitude, responsibility line, norms, and other aspects of the organization. Technological determinism is based on two basic ideas: first, technology advances according to a predictable, traceable route that is unaffected by political or cultural factors; and second, technology organizes society in a way that advances technology itself (Mardiana & Daniels, 2019). By applying the theory to the research, it can be inferred that the necessity to increase Custom Revenue Performance and notice changes in the way customs operations are conducted has made the use of technology in scanning necessary. Thus, the independent variables in this study—baggage scanning accuracy, cargo scanning efficiency, customs declaration scanning, and scanning technology integration—were anchored by this hypothesis.

The human capital theory is given to Schultz (1961). The human capital theory states that increasing education and skill development can increase productivity. Businesses are forced to find and develop the human capital within their current workforce, claims Becker (1994). This theory holds that human capital can spur technological advancement, inventions, and innovations, all of which can contribute to growth. Human capital increases a nation's capacity to adopt technologies that have already been developed elsewhere, which promotes convergence. This has been the consistent finding of several recent studies (Griffith et al., 2004, Benhabib and Spiegel, 2005, Kneller & Stevens, 2006). According to Nelson and Phelps (1966), the adoption of new technology is facilitated by a workforce with higher levels of education. Employee development and training must be done in a methodical way since technological advancement is accelerating in today's industrial environment. The organization manages its workforce to increase workability and enable them to execute at a greater level (Jones & Jenkins, 2010). This theory was used to anchor the variable Technology Staff Competence. The employees of the customs department at JKIA need to improve their skills and knowledge of scanning. This would see to it that they improve their performance through improvement on human capital.

2. Literature Review and hypothesis is development

Cheruiyot (2019) highlights that improved baggage scanning accuracy is statistically significant in enhancing revenue collection for customs. Similarly, John Smith (2019) found a positive correlation between higher baggage scanning accuracy rates and increased customs revenue performance. This study also identifies key factors affecting revenue performance, such as the competence of customs officers regarding technology and the efficiency of enforcement procedures.

Yu (2018) suggests two strategies for improving baggage scanning accuracy and efficiency: operational strategies and off-the-job training, both of which can lead to better customs revenue outcomes. Furthermore, Skorupski and Uchroński (2018) found that enhancements in baggage screening speed significantly improve revenue performance, achieved by upgrading screening devices at hold baggage checkpoints and increasing the frequency of training sessions. Philip et al. (2021) indicated that implementing advanced imaging technology and machine learning algorithms significantly enhances the accuracy of baggage screening processes. Their research suggests that such innovations not only improve detection rates of prohibited items but also streamline the overall customs procedure, consequently boosting revenue. The study hypothesized that;

H_{O1}*: Baggage scanning accuracy has no statistically significant relationship with custom revenue performance at the Jomo Kenyatta International Airport.*

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Journal of Human Resource & Leadership
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Oduor and Mincu (2018) aimed to ascertain how cargo scanning affected Kenya's port of Mombasa's ability to collect revenue. A sample of the customs officers was chosen through the use of cluster sampling. There were 165 custom officers among the population of interest. The data was gathered via a formal questionnaire. To examine the data, percentages and frequencies were employed. It was discovered that there is a significant negative impact on revenue collection from scanner downtime. The goal of Omosa, Ogaga, and Cheboi's (2020) study was to determine how scanner technology affected Kenya's customs and border control department's revenue performance. The study, which covered the years 2017 to 2019, included secondary data from pertinent sources that represent academic research in addition to primary data collected through the use of structured questionnaires. Descriptive and inferential statistics were generated from the data analysis. It was discovered that the effectiveness of cargo scanning has a major impact on Kenya's customs revenue performance. Philip et al. (2022) found that cargo scanner technology has a significant impact on customs revenue performance in Kenya. Kitolo (2022) highlighted that effective management of cargo scanners at the Inland Container Depot in Nairobi has substantially improved the revenue collection process. Furthermore, Visser et al. (2016) emphasized that implementing advanced X-ray technology in cargo scanning enhances both the efficiency and effectiveness of inspections, ultimately leading to improved customs revenue performance. Kyenche (2023) concluded the influence of electronic cargo tracking systems on customs compliance. The study hypothesized that;

H_{O2}: Cargo scanning efficiency has no statistically significant relationship with custom revenue performance at the Jomo Kenyatta International Airport.

Mpekethu (2018) revealed that customs verification processes, including customs declaration scanning, negatively impact small importers' ability to conduct business. The objective of Nabwire and Mincu's (2019) study was to assess how the implementation of customs import inspections has affected the performance of used car dealers in Mombasa County. The study utilized a structured questionnaire as its primary data collection tool, targeting a population of 110 used automobile dealers in Mombasa, employing a descriptive research design. The researchers applied a combination of simple random and purposive sampling techniques, arriving at a sample size of 86 auto dealers based on Slovin's formula. Their findings indicated that customs import inspections had a significant adverse effect on the performance of used car dealers in Mombasa County.

In addition, Li et al. (2022) proposed the use of artificial intelligence algorithms to replace the current manual declaration process, facilitating automatic identification of commodity information and streamlining declarations. This innovation is expected to significantly enhance the accuracy and efficiency of customs declarations, thereby improving revenue performance. Furthermore, Murugi (2022) found that customs declaration scanning improves compliance rates among importers by facilitating quicker processing times and reducing instances of errors in documentation. This increase in compliance not only enhances the overall efficiency of customs operations but also leads to a boost in government revenue through more accurate declaration practices and reduced fraud. The study hypothesized that;

H_{O3}: Customs declaration scanning has no statistically significant relationship with custom revenue performance at the Jomo Kenyatta International Airport.

Njigigua and Mincu (2018) conducted a study on the effects of technology on customs revenue performance at the Port of Mombasa. Their research established that non-intrusive technology has a positive impact on customs revenue performance. Kitolo (2022) aimed to assess the factors

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affecting the performance of the Scanner Management Unit at the Inland Container Depot in Nairobi. The study identified several variables that significantly affect the efficiency of scanner management, including the number of network downtimes per month. Omosa (2022) revealed that scanner technology has a major influence on revenue performance in Kenya. The findings indicated that scanner technology accounts for a 53.8% variation in revenue performance, suggesting that since the implementation of the new system, customs administration has experienced a significant increase in revenue collection. Khisa (2022) identified three primary technologies adopted by the depot for revenue enhancement. The first involves intelligence-based cargo intervention, where scanner technology aids in detecting undeclared goods, hidden items, and those that are restricted or prohibited. This innovative approach aims to improve accuracy in revenue collection and compliance with customs regulations. The study hypothesized that;

H_{O4}: Scanning technology integration has no statistically significant relationship with custom revenue performance at the Jomo Kenyatta International Airport.

Technological competency refers to a firm's ability to efficiently organize and deploy its technological resources in conjunction with other resources to maintain a competitive advantage. Bharadwaj (2000) emphasizes that this involves using existing technology effectively, while Jiao, Chang, and Lu (2008) view it as a combination of enterprise formation, transfer, and deployment of technological resources that enhances a firm's unique capabilities. Rousseva (2008) also notes the importance of varied measures for assessing technological competency, as firms differ in size, structure, and industry, indicating a need for tailored evaluations. In the context of employee performance, studies by Pitafi et al. (2018) and Kim (2021) demonstrate the critical role of IT competency and technological capabilities across various industries in enhancing work performance and sustainable growth for small and medium-sized enterprises (SMEs).

Further research highlights the interconnection between information technology competencies and organizational performance. Ul Abdin et al. (2021) found that components of IT competency, particularly information technology infrastructure, significantly predict organizational performance in Pakistan. However, these competencies alone do not ensure financial performance. Amoako et al. (2022) explored the impact of organizational leadership and structure on the successful implementation of electronic Human Resource Management (e-HRM) systems. Their findings reveal that both organizational structure and employee technological capabilities positively influence the success of e-HRM implementations, underscoring the importance of aligning technological and organizational factors for achieving desired outcomes..

It was hypothesized that:

H_{O5a}: *Technology staff competence does not moderate the relationship between Baggage scanning accuracy and custom revenue performance at the Jomo Kenyatta International Airport.*

H_{O5b}: *Technology staff competence does not moderate the relationship between Cargo scanning efficiency and custom revenue performance at the Jomo Kenyatta International Airport.*

H_{O5b}: *Technology staff competence does not moderate the relationship between Customs declaration scanning and custom revenue performance at the Jomo Kenyatta International Airport.*

H_{O5d}: *Technology staff competence does not moderate the relationship between Scanning technology integration and custom revenue performance at the Jomo Kenyatta International Airport.*

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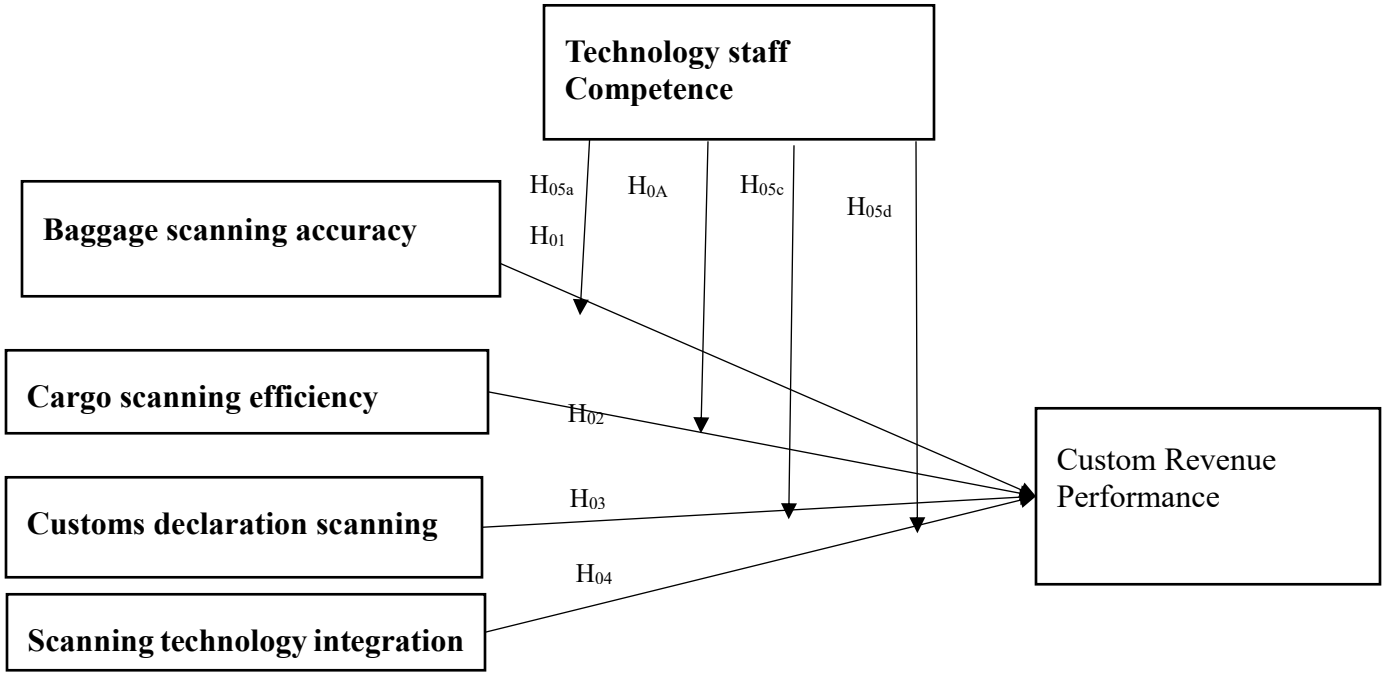

Figure 1: Conceptual Framework

3. Methodology

Sampling

The target population for this study comprised 538 customs officers employed by the Kenya Revenue Authority (KRA) at Jomo Kenyatta International Airport. To obtain valid and detailed information, purposive sampling was used to select customs officers with relevant expertise, while simple random sampling ensured that every member of the population had an equal chance of being included, minimizing bias. A questionnaire was distributed to 229 customs officers, yielding 162 completed responses and resulting in a response rate of 71%.

Validity and Reliability

The pilot testing was conducted on 4 respondents (10 percent of the study population) who were recruited from KRA customs department, were be used to test reliability. The data was evaluated to see if it meets the Cronbach's alpha standard for measuring reliability. The instrument was reliable for data collection as all the Cronbach alpha values were >.70. The content validity of this study was determined by expert assessment, with the instrument being given to supervisors who made ideas for enhancements to the questionnaire. Factor analysis technique was used to assess construct validity. Face validity was measured using the opinion of respondents who reported whether in their view the questionnaire measures the intended purpose. Criterion validity was measured by embedding questions in the main survey.

Measurement of Variables

The dependent variable of the study was customs revenue performance. Customs revenue performance was measured based on Likert type scale based on four items validated by Čevers

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and Gaile-Sarkane (2019). The respondents were asked to state the extent of agreement on statements regarding the customs revenue performance. Scanning technology integration was the independent variable measured using a Likert type scale based on four items validated by Gunawi et al (2016). The respondents were asked to state the extent of agreement on statements regarding the scanning technological attributes integration. The moderating variable for the study was technological competence. Technological competence was measured based on Likert type scale based on four items validated by Zhang and Tansuhaj (2007) and Zhang, Sarker and McCullough (2008). The respondents were asked to state the extent of agreement on statements regarding the technological competence.

Regression Models

Before conducting the inferential analysis, the data was checked for the regression assumptions. Diagnostic tests, such as Residual autocorrelation, Heteroscedasticity of errors, Normality, Multicollinearity were conducted. The link between the research independent variables and the dependent variable was determined using linear regression analysis and Hierarchical Regression model was used in assessing the moderating role of technology staff competence.

4. Results

Descriptive and correlation Statistics

The descriptive statistics in Table 1 reveal the means and standard deviations for the various variables studied. The mean score for customs revenue performance is 4.28, with a standard deviation of 0.33, indicating a generally high level of revenue performance among respondents. Baggage scanning accuracy has a mean of 4.15 and a standard deviation of 0.56, while customs declaration scanning shows a mean of 4.27 with a standard deviation of 0.52. Cargo scanning efficiency has the highest mean score of 4.37 and a standard deviation of 0.50, suggesting that respondents perceive cargo scanning processes to be particularly effective. Scanning technology integration received a mean score of 3.82 and a higher standard deviation of 0.78, indicating variability in perceptions of the effectiveness of technology integration. Lastly, technology staff competence has a mean of 4.32 and a standard deviation of 0.70, which indicates a strong competency level among staff.

Correlation analysis reveals significant positive relationships between the independent variables and customs revenue performance. Notably, baggage scanning accuracy is positively correlated with customs revenue performance ($r=0.617$), suggesting that higher accuracy in scanning processes leads to improved revenue performance. Cargo scanning efficiency also shows a positive correlation with customs revenue performance ($r=0.461$), indicating that efficient scanning contributes positively to revenue performance, albeit less strongly than baggage scanning accuracy. Customs declaration scanning further demonstrates a robust positive association with customs revenue performance ($r=0.584$, $p=0.000$), highlighting the importance of effective management of customs declarations in driving revenue. Scanning technology integration is positively associated with customs revenue performance as well ($r=0.539$, $p=0.000$), indicating that improvements in technology integration yield better results in customs revenue performance. Additionally, technology staff competence demonstrates a positive correlation ($r=0.449$), suggesting that competent staff play a significant role in enhancing revenue performance.

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Table 1: Descriptive and correlation Statistics

	Mean	Std. Dev	CRP	BSA	CSE	CDS	STI	TSC	Age
Customs Revenue Performance (CRP)									
	4.28	0.33	1						
Baggage scanning accuracy (BSA)	4.15	0.56	.617**	1					
Customs declaration scanning (CDS)									
	4.27	0.52	.461**	.351**	1				
Cargo scanning efficiency (CSE)	4.37	0.50	.584**	.510**	.389**	1			
Scanning technology integration (STI)	3.82	0.78	.539**	.441**	.314**	.357**	1		
Technology staff competence (TSC	4.32	0.70	.449**	.332**	.211*	.335**	.213**	1	
Age			.233**	.133**	.655**	.155**	.233**	.123**	1

** Correlation is significant at the 0.01 level (2-tailed).

Testing of Hypotheses

The findings from this analysis provide substantial insights into the relationships between various factors related to customs processes and customs revenue performance at Jomo Kenyatta International Airport. For Hypothesis 1, baggage scanning accuracy demonstrates a significant positive relationship with customs revenue performance ($\beta = 0.180$, $p < 0.05$), leading to the rejection of the null hypothesis (HO1) that asserts no significant relationship. Similarly, for Hypothesis 2, cargo scanning efficiency also exhibits a significant positive effect ($\beta = 0.106$, $p < 0.05$), allowing us to reject the null hypothesis (HO2). Customs declaration scanning further reinforces this trend with ($\beta = 0.180$, $p < 0.05$), resulting in the rejection of Hypothesis 3. Moreover, scanning technology integration shows a significant positive correlation ($\beta = 0.107$, $p < 0.05$), leading to the rejection of Hypothesis 4, indicating that improvements in these areas can positively influence customs revenue performance.

In the context of the moderating effects of technology staff competence, the results reveal significant interactions. For Hypothesis 5a, the interaction term for baggage scanning accuracy and technology staff competence indicates a positive moderation effect ($\beta = 0.047$, $p < 0.05$), allowing us to reject the null hypothesis (HO5a). For Hypothesis 5b, the interaction between cargo scanning efficiency and technology staff competence is also significant ($\beta = 0.004$, $p < 0.05$), resulting in the rejection of HO5b. Additionally, for Hypothesis 5c, the interaction between customs declaration scanning and technology staff competence shows a positive effect ($\beta = 0.013$, $p < 0.05$), leading to the rejection of HO5c. Finally, for Hypothesis 5d, the interaction between scanning technology integration and technology staff competence is also significant ($\beta = 0.031$, $p < 0.05$), allowing us to reject the null hypothesis (HO5d). These findings underscore the critical role that technology staff competence plays in enhancing the effectiveness of technological improvements in customs operations, indicating that skilled personnel are essential for optimizing revenue performance.

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Table 2: Coefficients of Regression

Variable	Model 1 β(Std. Error)	Model 2 β(Std. Error)	Model 3 β(Std. Error)	Model 4 β(Std. Error)	Model 5 β(Std. Error)	Model 6 β(Std. Error)
Constant	1.887 (0.365) *	1.980 (0.298) *	2.784 (0.647) *	2.832 (0.623) *	2.830 (0.651) *	3.415 (0.755) *
Age	0.115 (0.021) *	0.115 (0.020) *	0.109 (0.031) *	0.108 (0.032) **	0.108 (0.032) **	0.108 (0.031) **
BSA	0.180 (0.026) *	0.112 (0.049) **	0.046 (0.022) **	0.074 (0.021) **	0.074 (0.012) *	0.138 (0.053) **
CSE	0.106 (0.017) **	0.079 (0.028) **	0.060 (0.015) *	0.052 (0.011) *	0.051 (0.016) *	0.041 (0.020) **
CDS	0.180 (0.045) *	0.091 (0.031) **	0.109 (0.045) **	0.107 (0.041) **	0.107 (0.017) *	0.110 (0.049) **
STI	0.107 (0.016) *	0.077 (0.011) *	0.075 (0.034) **	0.075 (0.021) **	0.075 (0.023) **	0.033 (0.012) **
TSC		0.187 (0.033) *	0.012 (0.002) *	0.033 (0.010) **	0.034 (0.011) **	0.214 (0.103) **
BSC * TSC			0.047 (0.008) *	0.047 (0.022) **	0.047 (0.023) **	0.057 (0.011) *
CSE * TSC				0.004 (0.001) *	0.004 (0.001) *	0.010 (0.003) **
CDS* TSC					0.013 (0.003) **	0.135 (0.040) **
STI * TSC						0.031 (0.012) **
Model statistics	1	2	3	4	5	6
R	0.75	0.761	0.806	0.81	0.821	0.823
R^2	0.562	0.579	0.65	0.656	0.673	0.678
Adjusted R^2	0.548	0.562	0.634	0.638	0.654	0.656
Std. Error of the Estimate	0.221603	0.218094	0.199374	0.198259	0.193937	0.193294
Change Statistics						
R Square Change	0.562	0.016	0.071	0.006	0.017	0.004
F Change	40.075	6.06	31.474	2.737	7.894	2.014
df1	5	1	1	1	1	1
df2	156	155	154	153	152	151
Sig. F Change	0.000	0.015	0.000	0.100	0.006	0.158

**p<0.01, *p<0.05

Keywords; *CRP = Customs Revenue Performance, BSA = Baggage scanning accuracy, CDS = Customs declaration scanning, CSE = Cargo scanning efficiency, STI = Scanning technology integration, TSC= Technology staff competence*

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The moderation effect of technology staff competence on the relationship between various technological processes and customs revenue performance is illustrated in several figures. Figure 1 demonstrates that a high level of technology staff competence significantly enhances the link between baggage scanning technology and customs revenue performance, resulting in a steeper slope for higher competence levels. This indicates that greater staff competence leads to a more substantial increase in revenue performance associated with baggage scanning technology. Similarly, Figure 2 supports this finding for cargo scanning technology, where higher staff competence again correlates with a more pronounced positive impact on customs revenue performance. Figure 3 continues this trend, illustrating that the effectiveness of customs declaration technology in driving revenue performance is also amplified by higher levels of technology staff competence. Conversely, Figure 4 presents a different outcome regarding scanning technology integration. In this case, the steepest slope is observed at low levels of staff competence, suggesting that staff competence does not enhance the positive effects of scanning technology integration on customs revenue performance.

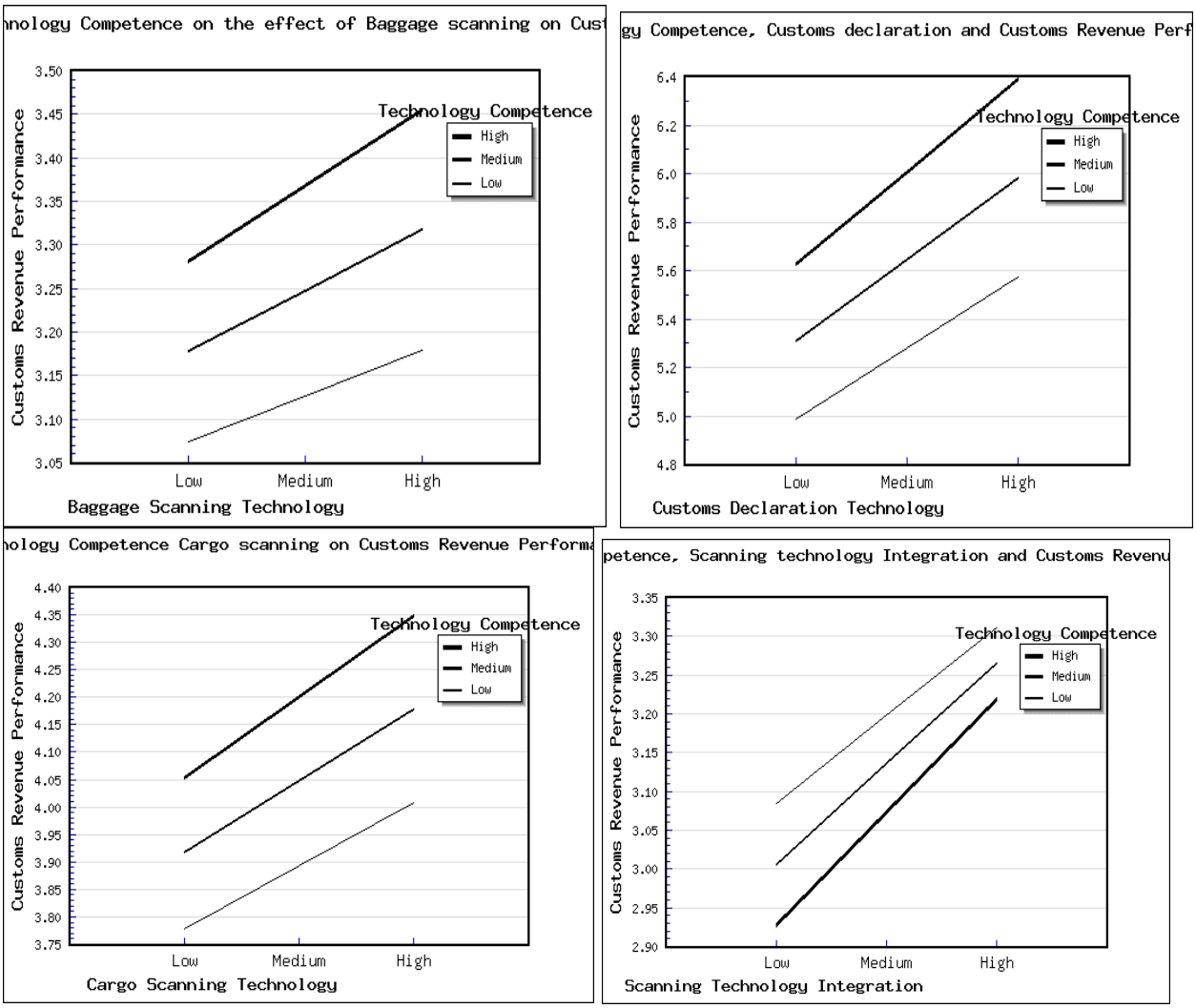

Figure 1: Mod Graphs for moderating effect of Technology Staff Competence

https://doi.org/10.53819/81018102t2442

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5. Discussion

The study aimed to explore various factors influencing customs revenue performance at Jomo Kenyatta International Airport, with a particular focus on the effects of baggage scanning accuracy, cargo scanning efficiency, customs declaration scanning, and scanning technology integration. The first objective found that an increase in baggage scanning accuracy positively impacts customs revenue performance. These results align with the work of Cheruiyot (2019) and Mumia (2021), who emphasized the importance of effective scanning processes in enhancing revenue collection through automation. The second objective examined the effect of cargo scanning efficiency on revenue performance, demonstrating that improved efficiency correlates positively with revenue outcomes. This observation supports the findings of Omosa, Ogaga, and Cheboi (2020), who noted a substantial relationship between cargo scanning effectiveness and customs revenue. Moving to the third objective, customs declaration scanning was also found to have a positive impact on revenue performance, contrasting with Mpekethu (2018), who indicated potential drawbacks for small importers due to customs verification procedures. The fourth objective revealed that scanning technology integration significantly enhances customs revenue performance, corroborating the findings of Metet, Gitonga, and Kipsang (2021) that emphasize the importance of regular updates to scanning equipment.

The fifth objective assessed the moderating role of technology staff competence, finding that higher competence levels positively influence customs revenue performance. The results confirmed that technology staff competence significantly moderates the relationships between baggage scanning accuracy, cargo scanning efficiency, and customs declaration scanning with revenue performance. Moreover, the study noted that the effectiveness of scanning technology integration is further enhanced when supported by technologically competent staff. This aligns with the conclusions of Amoako et al. (2022), which highlight the critical role of employee technical skills in successful implementation processes. Overall, these findings underscore the importance of investing in technology and staff training to optimize customs operations and revenue collection.

6. Conclusion

The study concludes that baggage scanning accuracy, cargo scanning efficiency, customs declaration scanning, and the integration of scanning technology all positively impact customs revenue performance at Jomo Kenyatta International Airport. The adoption of baggage scanning technology enhances the effectiveness and efficiency of the baggage scanning process compared to traditional methods, leading to reduced scanning time and lower costs. Similarly, cargo scanning technology improves the cargo scanning process by making it more effective and efficient, while also being more cost-effective. Customs declaration scanning technology adds value through its efficiency, time-saving nature, and reduced threats, collectively enhancing customs revenue performance. Furthermore, integrating scanning technology minimizes downtimes and customer delays, which further bolsters revenue outcomes.

The study also emphasizes the critical role of technology staff competence in moderating the relationships between various scanning technologies and customs revenue performance. Competent staff are essential for effectively utilizing scanning technology, thereby ensuring improved scanning processes. To optimize the benefits of these technologies, the management at JKIA is encouraged to maintain high standards of accuracy in baggage scanning and efficiency in cargo scanning while addressing any operational hitches. Additionally, enhancing the effectiveness

of customs declaration scanning is essential for safeguarding scanning processes. The study advocates for proper training programs for staff involved with scanning technologies to boost their competence. These findings support various theories linking scanning technology to improved customs revenue performance, providing a theoretical foundation for future research and suggesting policy recommendations for the effective management of customs processes utilizing technology.

7. Study Implications

Practice and Managerial implication

The study found that all the scanning technology attributes had a positive and significant effect on customs revenue performance. Therefore, the management of JKIA is recommended to ensure that the baggage scanning technology maintains accuracy and cargo scanning technology is efficient by ensuring that the scanners are in good condition and addressing any hitches that may interfere with proper baggage and cargo scanning operations using baggage and cargo scanning technology. The management is also recommended ensure that the customs declaration scanning runs efficiently and effectively by putting in measures that would curb any threats to the safety of the scanning process. The study also suggests that the management should ensure that any problems that would lead to inefficiency and ineffectiveness of the scanning technology is attended to with urgency. Further, following the findings that technology staff competence moderates the link between scanning technology integration and customs revenue performance, the study suggests that all staff dealing with scanning technology should be properly trained.

Implication to Theory

The study supports theories that link scanning technology to improved customs revenue performance. Specifically, the study supports the theories that anchored it which included Technological Determinism Theory, Human capital theory and Task Technology Fit theory. Further, the study provides additional knowledge on the effect of scanning technology on customs revenue performance. By doing so, the study findings will be useful to researchers who expand this study since it acts as a theoretical foundation for their studies.

Implication to Policy

The study makes suggestions to policy makers following the conclusion that scanning technology positively affects customs revenue performance and that technology staff competence moderates the link between scanning technology integration and customs revenue performance. The policy makers are hence advised to make policies that will guide the management of JKIA customs department to effectively and efficiently use scanning technology in the scanning process.

8. Further Research

The scope for this study was limited to the effect of scanning technology attributes including baggage scanning accuracy, cargo scanning efficiency, customs declaration scanning and scanning technology integration on customs revenue performance at JKIA and the moderating effect of technology staff competence on the relationship. A study on the effects of tax incentives on customs duty revenue performance should be conducted.

Funding: This research received no external funding.

Acknowledgments: We acknowledge the contribution and the scholarly support from Moi University, School of Business, and Economics.

Conflicts of Interest: The authors declare no conflict of interest.

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