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Original Article

Institutional Coordination, Customs Clearance Efficiency and Trade Facilitation at an East African One-Stop Border Post: Evidence from Holili–Taveta, Tanzania–Kenya

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ABSTRACT: *One-stop border posts (OSBPs) are key to East African trade facilitation, but their effectiveness depends on more than the physical co-location of border agencies. This study examines how customs clearance efficiency, transaction cost reduction and inter-agency coordination influence perceived trade facilitation at the Holili–Taveta OSBP on the Tanzania–Kenya border. Guided by Trade Facilitation Theory and a border-management perspective, primary data were collected from 120 respondents comprising traders, transporters, clearing and forwarding agents, customs officers, immigration officers, and other border officials. Of the 130 questionnaires distributed, 120 were returned and analyzed, yielding a 92.3% response rate. Multiple regression analysis was used to assess the independent and combined contributions of the three explanatory variables to trade facilitation. Data analysis included descriptive statistics, correlation, and regression; interviews provided context. Constructs showed good reliability (Cronbach's alpha 0.823–0.892). Perceived trade facilitation was high (M=4.26), as were customs clearance efficiency, inter-agency coordination, and transaction-cost reduction. All three variables were positively related to trade facilitation, with inter-agency coordination showing the strongest link ($r=0.804$, $p<0.01$; $\beta=0.448$, $p<0.001$), followed by customs clearance efficiency and transaction-cost reduction. The model accounted for 74.1 percent of the variation in the dependent variable (adjusted $R^2=0.734$; $F(3,116)=110.74$, $p<0.001$). These results suggest that institutional variables determine how well OSBPs function—shared infrastructure provides a basis for operation, while coordinated decision-making, interoperability among procedures, and efficiency in processes allow for realization of benefits. Given the cross-sectional design and stakeholder perceptions, the results reflect associations rather than causality. The study offers location-specific insights and emphasizes a shift from an infrastructure focus to integrated, digital, and jointly governed border management.*

KEYWORDS: *One-Stop Border Post, Trade Facilitation, Customs Clearance Efficiency, Transaction Costs, Inter-Agency Coordination, Coordinated Border Management, Holili–Taveta, Tanzania, Kenya.*

1. INTRODUCTION

The efficiency with which goods cross international borders is a critical determinant of trade competitiveness because border procedures affect time, uncertainty, compliance costs and the reliability of supply chains. Trade facilitation therefore extends beyond the physical movement of cargo: it concerns the simplification, modernization and harmonization of the administrative processes through which goods, vehicles and people are cleared. The World Trade Organization (WTO) Trade Facilitation Agreement (TFA), which entered into force in 2017, explicitly links faster movement, release and clearance of goods with cooperation among customs and other border authorities. Article 8 of the TFA further identifies coordinated border procedures, common facilities and joint controls, including one-stop border posts, as mechanisms for improving cross-border trade (WTO, 2017).

The African context makes this agenda particularly consequential. High trade costs, infrastructure constraints, administrative fragmentation and non-tariff barriers continue to reduce the competitiveness of African firms and constrain regional integration. The African Continental Free Trade Area (AfCFTA) has increased the importance of reducing such frictions, as the gains from tariff liberalization can be undermined when firms continue to encounter costly, unpredictable and duplicative border procedures. The latest empirical research supports this view that the use of trade-facilitation measures reduces customs wait times, which will further enhance integration of African markets (De Melo et al., 2025).

In the East African Community (EAC), OSBPs have been established as an alternative method of dealing with what has long been one of the most frustrating sources of trade friction - namely, the repetition of border requirements among adjacent countries. The OSBP concept is designed to substitute sequential and repetitive processes with coordinated processing, joint or complementary controls, shared facilities, and exchange of information. Research on OSBPs in East Africa shows they can

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lower border dwelling times and transport operational costs. However, the extent of these savings differs from one crossing point to another and will depend on how the OSBP institutional framework is implemented (Ayele et al., 2023; Mendez-Parra and Calabrese, 2023).

The Holili–Taveta crossing is strategically important because it connects northern Tanzania with Kenya and facilitates the movement of goods, people and services across the two countries. The Tanzania Trade Portal identifies a sequence of customs and border procedures for goods cleared through Holili, including customs documentation, release orders, bonded transportation, cargo manifests, physical verification and inspection. The existence of these procedures illustrates why OSBP performance cannot be inferred solely from the presence of an integrated facility: traders' practical experience depends on how efficiently the constituent procedures are connected and coordinated.

A key challenge arises when an OSBP is physically integrated, but its institutional processes stay fragmented. The above can cause other problems, including: lack of communication among agencies; differences in operational procedures; digital system failures; repeated inspections; and continued expenses associated with transportation, fuel, documentation, and compliance after border processing is streamlined. Studies conducted recently in Tanzania show that simplifying procedures will enhance the perceived efficiency of clearance. However, delays at borders, difficulty in acquiring permits, complicated tax clearance procedures, and corruption may continue to impede further improvements (Urassa et al., 2025).

The literature also indicates a need to distinguish between the existence of an OSBP and the mechanisms by which it generates trade facilitation outcomes. Research on the Taveta–Holili crossing is part of a broader regional evidence base, including a multi-border study of Taveta–Holili, Busia and Malaba that found positive relationships between customs-related institutional arrangements and cross-border logistics performance. However, the present study adopts a narrower, complementary approach by focusing on Holili–Taveta and jointly modeling three operational mechanisms customs clearance efficiency, transaction-cost reduction and inter-agency coordination against a common trade-facilitation outcome.

This study explores how customs clearance efficiency, reduction of trade transaction costs, and inter-agency coordination relate to trade facilitation performance at the Holili OSBP. Specifically, the study was set: (i) to analyze the link between customs clearance and trade facilitation; (ii) to evaluate how transaction-cost reduction affects trade facilitation; and (iii) to investigate the connection between inter-agency coordination and facilitation. The key contribution of this paper is analytical, viewing the OSBP as an institutional system where infrastructure, procedures, costs, and organizational coordination interact. It also identifies which mechanisms have the strongest statistical correlation with perceived facilitation outcomes.

2. CONCEPTUAL AND THEORETICAL FRAMEWORK

2.1. TRADE FACILITATION AS AN INSTITUTIONAL PROCESS

Trade facilitation aims to make the processes required for moving products across borders simpler, more efficient and consistent. The main economic rationale behind trade facilitation is that the costs associated with administrative and procedural barriers increase the cost of doing business internationally. For example, long delays, repeated documentation, poor inspection methods, uncertain regulatory environments, and inadequate information technology systems contribute to higher costs when companies engage in cross-border trade. Therefore, trade facilitation is both an administrative reform and an economic policy designed to minimize the time spent, uncertainty faced, and resources used in international trade (Wilson et al., 2003, 2005; Portugal-Perez and Wilson, 2009). Research indicates that customs efficiency, regulatory quality, infrastructure, and electronic systems enhance trade performance, demonstrating that institutional factors are equally important as physical infrastructure in determining the success of trade policies (Wilson et al., 2003, 2005; Portugal-Perez and Wilson, 2012).

This is particularly true for Africa. Trade costs in Africa have been historically high and, as a result, the region has had low levels of intra-regional and international trade. Portugal-Perez and Wilson (2009) demonstrated that lowering trade costs in Africa could substantially increase trade. They also emphasized that improving logistics, border management, and business climate would be much more beneficial to increased trade than simply lowering tariffs. Border institutions are thus part of the economic infrastructure affecting trade.

Within this institutional setting, One-Stop Border Posts (OSBPs) serve as a mechanism to reduce procedural duplication. The East African Community (EAC) OSBP framework views it as a coordinated border management system in which the procedures of neighboring countries are integrated into a shared environment. This model aims to streamline border controls, reduce duplication, and facilitate movement of goods, people, and vehicles across borders (East African Community [EAC], 2016, 2023). It is an institutional innovation transforming multiple national procedures into a more coherent cross-border process.

The analytical significance of an OSBP extends beyond the construction of a shared physical facility. Physical integration creates opportunities for efficiency, whereas institutional and operational integration determines whether those opportunities are realized. Agencies operating within the same facility may still retain different mandates, procedures, information systems

and organizational incentives. Coordinated border management therefore requires mechanisms that enable customs and other regulatory agencies to cooperate, exchange information and align their operational activities (World Customs Organization [WCO], n.d.). The effectiveness of an OSBP consequently depends on the extent to which physical co-location translates into functional institutional integration.

This study views trade facilitation at an OSBP as a way to reduce the time, cost, and uncertainty of cross-border transactions through three mechanisms: improving customs clearance efficiency, reducing transaction costs, and strengthening inter-agency coordination. These mechanisms link institutional integration to improved trade outcomes.

2.2. TRADE FACILITATION THEORETICAL PERSPECTIVE

This study is built around a trade facilitation model, which links reduced procedural, administrative, and logistical barriers to increased efficiency and reliability when conducting international commerce. This model suggests that the ability of a country to conduct international commerce successfully will depend on the effectiveness of its institutions and operations, as well as the amount of money spent on tariffs. Research conducted by Wilson et al. (2003, 2005) indicates that improvements in customs procedures, regulatory frameworks, physical infrastructure, and use of technology can increase the volume of goods traded internationally. In addition, research conducted by Portugal-Perez and Wilson (2009, 2012) demonstrates the importance of trade costs, infrastructure, and regulations for developing nations and African nations in particular.

At the global level, the World Trade Organization Trade Facilitation Agreement (WTO TFA) encourages quicker movement, release and clearance of goods by using various methods, including access to information; simplification; automation; risk management; and cooperation at borders (WTO, 2017). Of note, Article 8 emphasizes the importance of cooperation between border agencies via mechanisms such as coordinated processes, joint controls and single-stop border posts. This shows that institutional coordination is a key part of modern trade-facilitation policy.

The theoretical framework involves three interconnected mechanisms. Customs clearance efficiency represents a procedural component of trade facilitation by reducing the time required for documentation, inspection, and delivery of goods; transaction cost reduction represents an economic component of trade facilitation by reducing both the money and delays associated with border crossings; and inter-agency coordination represents an institutional component of trade facilitation through increased cooperation between various agencies involved in border controls through joint inspections, information sharing, and harmonization of procedures. All three components are designed to create better trade facilitation outcomes such as: faster movement of cargo across borders; decreased delays at borders; lower trade burdens; more effective operations at borders; and improved trade across borders.

The idea is consistent with the trade-facilitation literature, which states that improving access to information, reducing document complexity and standardizing them, simplifying and automating procedures will help reduce the cost of trading, and make transactions more predictable (OECD, 2015; WTO, 2017). Trade facilitation comprises several different reform areas, such as providing a more efficient customs process, but it only has minimal benefits if there is duplication of inspections by other agencies, or if the agencies do not provide each other with the required information.

The framework promotes a mechanism-based interpretation of OSBP, expecting it to facilitate trade by reducing procedural duplication, speeding clearance, lowering transaction burdens, and improving agency coordination in border control.

2.3. CUSTOMS CLEARANCE EFFICIENCY

Customs clearance is a key point in the interface between regulation and goods movement. The time to process declarations, verify documents, inspect, and release goods affects inventory, transport, vehicle use, and supply chain performance. Therefore, trade literature considers customs efficiency crucial for the overall trade environment (Wilson et al., 2003, 2005).

Trade facilitation is currently focused on the use of electronic documentation, automation, prior-arrival processing, risk management, and formal processes designed to minimize delays in a controlled environment. Both the World Trade Organization (WTO) Trade Facilitation Agreement (TFA) and the World Customs Organization (WCO) emphasize that risk management, interagency collaboration at the border, and modernizing existing customs practices will allow for more effective border management (WTO, 2017; WCO, n.d.). Digitalization and reducing the complexity of cross-border trade transactions are emphasized by the United Nations Conference on Trade and Development (UNCTAD) as ways to improve efficiency and increase transparency during cross-border trade transactions (UNCTAD, 2023).

The East African Community (EAC) OSBP framework also defines reducing clearance times at the border and removing procedural duplications as major components of the OSBP model. In addition, the framework aims to combine all of the border-control activities in one shared building, and simplify the processes for moving both people and merchandise through the various member states' borders (EAC, 2016, 2023). These arrangements will be extremely useful for reducing the logistics and regulatory costs associated with long border delays for those involved in trading and transportation.

2.4. TRADE TRANSACTION-COST REDUCTION

Beyond the direct cost of customs duties, there are many other types of administrative and economic costs associated with conducting international trade. Some examples include documentation requirements, regulatory compliance, time spent waiting for goods to cross borders, fuel consumption, and transport inefficiencies. Each of these can affect how competitive cross-border trade is and how predictable it is (Portugal-Perez and Wilson, 2009; Wilson et al., 2005).

In general, transaction costs are very high when it comes to African trade. According to Portugal-Perez and Wilson (2009), there are extremely high levels of trade costs within Africa, and if trade conditions were improved, this would increase trade flow. It is stressed by Portugal-Perez and Wilson that both physical and institutional factors will reduce the cost of conducting international business. Furthermore, their 2012 study showed that improving both hard and soft infrastructure at the same time will result in an increase in export performance; however, improving only physical infrastructure will not eliminate all of the trade barriers.

The importance of these One Stop Border Posts (OSBP) in East Africa is demonstrated by evidence indicating that the reduction of costs at borders and increased efficiency at borders can have positive effects on both international trade and the broader economy (Ayele et al., 2023).

An OSBP lowers transaction costs because it eliminates duplicate border procedures; it reduces waiting time at borders; it allows for shared processing. The OSBP framework within the EAC has two main objectives: to decrease business costs and to increase the efficiency of moving goods (EAC, 2016, 2023). However, the cost of border interventions does not represent all of the costs associated with trading along a corridor. There are many other factors that contribute to the cost of trading along a corridor, including the condition of roads, traffic congestion, fuel prices, the level of competition in the transportation sector, regulatory constraints, and additional logistics-related challenges outside of the scope of border control.

This research will define this variable as the amount of perceived trade transaction cost reduction, rather than simply as "trade transaction costs." The larger the number on this scale, the more an individual believes they have experienced reductions in both the financial and non-financial expenses associated with conducting cross-border business. The expected positive correlation between the improved cost performance and the level of trade facilitation will be consistent with this definition.

2.5. INTER-AGENCY COORDINATION

Interagency coordination allows OSBP to transition from a physical presence to an operational system. There are many agencies involved in the border crossing process, such as customs, immigration, standards, health, security and other authorities. Each has its own legal mandate and responsibility. Without some form of interagency coordination, the agencies could potentially function independently of one another, even though they share the same physical location.

The literature of coordinated border management emphasizes the need for coordination among border agencies through cooperation, information exchange, compatible processes and procedures, and joint operations to improve border performance. For the WCO, coordinated border management is a means by which border agencies can work together to achieve increased efficiencies in their operations while still exercising control over borders. To do so, the WCO recommends the use of coordinated border management techniques such as risk assessment, information sharing, procedural harmonization, common use of facilities, and inter-agency collaboration.

The institutional importance of coordination is particularly clear in Article 8 of the WTO Trade Facilitation Agreement. The provision requires border authorities and agencies to cooperate and coordinate their activities and encourages cooperation between countries sharing a common border. The measures identified include the alignment of working hours, procedures and formalities; the development and sharing of common facilities; joint controls; and one-stop border-post controls (WTO, 2017). Inter-agency coordination is therefore embedded within the international normative architecture of trade facilitation.

The EAC framework reinforces this institutional logic. The EAC OSBP Procedures Manual has laid out how different agencies will coordinate with each other in the shared border environment of the OSBP Model. Therefore, it is clear that OSBP success does not simply rely on the shared infrastructure but is dependent on effective governance, which can support continuing coordination among the various agencies.

Trade facilitation is enhanced in several different ways. Repeated physical inspections are reduced by joint inspections. Repeated requests for information are reduced by information sharing. Uncertainties in clearing products through customs are reduced by similar procedures. In addition, the use of compatible digital systems enables the transfer of information and reduces the need for paper. These are consistent with international studies showing that automation, access to information and similar procedures are some of the most important components of trade facilitation (OECD, 2015; WTO, 2017; UNCTAD, 2023).

The suggested link between OSBP performance and shared infrastructure and institutional coordination suggests that these factors affect the trade benefits of OSBPs. Therefore, it may be appropriate to assess how inter-agency coordination impacts the ability of Holili-Taveta to facilitate trade.

2.6. RESEARCH GAP AND HYPOTHESES

The reviewed literature indicates that trade facilitation at border crossings is shaped by customs efficiency, transaction costs, and institutional coordination. However, limited evidence has jointly examined the relative contributions of these factors at the Holili–Taveta OSBP. Existing studies also provide insufficient empirical evidence regarding whether procedural efficiency, cost reduction, and inter-agency coordination constitute the principal dimensions of trade facilitation performance. This study addresses these gaps by examining the three factors simultaneously within the Holili–Taveta OSBP context.

Based on the theoretical and empirical literature reviewed, the study tested the following hypotheses:

- H1: Customs clearance efficiency is positively and significantly associated with trade facilitation performance at the Holili–Taveta OSBP.
- H2: Trade transaction-cost reduction is positively and significantly associated with trade facilitation performance at the Holili–Taveta OSBP.
- H3: Inter-agency coordination is positively and significantly associated with trade facilitation performance at the Holili–Taveta OSBP.

3. MATERIALS AND METHODS

3.1. RESEARCH DESIGN AND STUDY SETTING

The study employed a positivist orientation and a cross-sectional research design. Data were collected at one point in time to examine the prevailing relationships among the study constructs. The research was conducted at the Holili OSBP in Rombo District, Kilimanjaro Region, Tanzania, on the Tanzania–Kenya border. The site was selected because it brings together customs, immigration and other regulatory agencies and serves traders, transporters and other actors involved in bilateral cross-border activity.

The cross-sectional design is appropriate for estimating associations among stakeholder assessments, but it does not establish temporal precedence or causal effects. Accordingly, the statistical results are interpreted as evidence of association and explanatory power rather than as a causal estimate of the effect of the OSBP or any individual reform.

3.2. POPULATION, SAMPLING AND SAMPLE REALIZATION

The target population included traders, transporters, carbon officers, immigration officers, and border agency officials. Due to their different roles and experiences with border processes, stratified random sampling was used. Based on Krejcie and Morgan's method for an estimated 200 stakeholders, a sample of 132 was planned.

TABLE 1 Distribution of Estimated Population and Planned Sample Size Across Stakeholder Groups

Stakeholder group	Estimated population	Planned sample
Traders	90	59
Transporters	40	26
Clearing and forwarding agents	25	16
Customs officers	20	13
Immigration officers	15	10
Other border officials	10	8
Total	200	132

Although the calculated sample size was 132, 130 questionnaires were distributed, and 120 usable responses were returned. The resulting response rate was therefore 92.3% (120/130). This distinction is made explicit because the achieved sample, rather than the planned sample, is the basis for the inferential analyses.

3.3. DATA SOURCES AND MEASUREMENT

Primary quantitative data were collected using a structured questionnaire, while semi-structured interviews were used to obtain institutional perspectives. Questionnaires were administered principally to traders, transporters and clearing and forwarding agents, while interviews were conducted with customs, immigration and other border officials. Secondary documentary evidence was also identified as part of the research design, including border reports, customs records, policy documents, trade statistics and EAC-related publications. However, the statistical results reported in this manuscript are based on the 120 usable questionnaire responses.

Questionnaire items were measured on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The constructs and indicators were organized as follows.

TABLE 2 Operationalization of Research Constructs, Measurement Indicators, and Likert Scale

Construct	Operational indicators	Scale
Customs clearance efficiency	Border processing time; inspection duration; documentation approval time	1–5 Likert
Trade transaction-cost reduction	Border fees/charges; transport delays; fuel costs; informal payments	1–5 Likert
Inter-agency coordination	Joint inspections; information sharing; harmonized procedures	1–5 Likert
Trade facilitation performance	Faster cargo movement; reduced delays; lower trading costs; efficient border operations; improved cross-border trade	1–5 Likert

A key measurement issue is the direction of the first two explanatory constructs. Because the hypotheses predict that improved efficiency and reduced costs should be associated with better trade facilitation, the analysis interprets higher scores as improvements in customs clearance efficiency and reductions in transaction-cost burdens. This interpretation is consistent with the positive regression coefficients reported below.

3.4. ANALYTICAL STRATEGY

Quantitative data were edited, coded, cleaned and analyzed using SPSS Version 26. Descriptive statistics were used to characterize respondents and summarize the central tendency and dispersion of each construct. Pearson product-moment correlations were then used to examine bivariate associations. Multiple linear regression was used to estimate the simultaneous association among customs clearance efficiency, trade transaction cost reduction, inter-agency coordination, and trade facilitation performance.

The estimated model was specified as:

$$TF = \beta_0 + \beta_1 CCE + \beta_2 TCR + \beta_3 IAC + \varepsilon \quad \text{.....(1)}$$

where TF denotes trade facilitation performance; CCE denotes customs clearance efficiency; TCR denotes trade transaction-cost reduction; IAC denotes inter-agency coordination; β_0 is the intercept; β_1–β_3 are the regression coefficients; and ε is the error term. Statistical significance was evaluated at $\alpha = 0.05$.

Multicollinearity was assessed using tolerance and variance inflation factor (VIF) statistics. Internal consistency was assessed using Cronbach's alpha, and content validity was supported through expert review. Interview evidence was analyzed thematically and used to contextualize the quantitative findings. The manuscript does not report additional regression diagnostics, such as residual normality, heteroskedasticity or influential observations, because those statistics were not included in the source manuscript. These should be added before submission to a journal that requires full OLS diagnostic reporting.

3.5. RELIABILITY AND ETHICAL PROCEDURES

All construct-level Cronbach's alpha coefficients exceeded 0.80, indicating satisfactory internal consistency. The study followed institutional research procedures, obtained the necessary access permissions and informed participants about the purpose of the research. Participation was voluntary; respondents could withdraw, and confidentiality and anonymity were maintained. Data were handled securely and used for academic purposes.

4. RESULTS

4.1. RESPONSE RATE AND MEASUREMENT RELIABILITY

Of the 130 questionnaires distributed, 120 were completed and returned, producing a 92.3% response rate. The reliability results indicate that the instrument had strong internal consistency across the four constructs.

TABLE 3 Reliability Analysis of Constructs Using Cronbach's Alpha

Construct	Items	Cronbach's α
Customs clearance efficiency	4	0.841
Trade transaction-cost reduction	4	0.823
Inter-agency coordination	4	0.876
Trade facilitation performance	5	0.892
Overall instrument	17	0.858

The reliability coefficients range from 0.823 to 0.892, indicating that the items within each construct were sufficiently correlated for composite analysis.

4.2. RESPONDENT PROFILE

The respondent pool comprised both private-sector border users and public-sector border officials. Men represented 65.0% of respondents and women 35.0%. The largest age category was 31–40 years (39.2%). The majority of respondents, 85%, had some form of post-secondary education. The top occupational groups were traders at 41.7%, followed by transportation workers at 18.3%, and then clearing/forwarding agents at 13.3%. Government employees as a group made up 26.7% of the total number of respondents. A significant portion of respondents, 80.8%, stated they had worked for five years or longer within the field of cross-border trade/border management; therefore, it is safe to assume that most respondents had experience with the activities being measured. The stakeholder makeup of OSBP is significant since different stakeholders will have varying experiences with OSBP. For instance, traders and carriers view the border as a costly and time-consuming process, whereas government officials perceive the border as a means for coordination and compliance.

Combining these groups provides a broader institutional perspective, although it also introduces the possibility of systematic differences in perceptions that future research could test explicitly.

4.3. DESCRIPTIVE STATISTICS

TABLE 4 Descriptive Statistics and Assessment Level of Research Constructs

Construct	Items	Mean	SD	Assessment
Customs clearance efficiency	4	4.18	0.61	High
Trade transaction-cost reduction	4	3.94	0.72	High
Inter-agency coordination	4	4.12	0.66	High
Trade facilitation performance	5	4.26	0.58	Very high

Trade Facilitation Performance has been given the top score of all performance measures (M = 4.26, SD = 0.58). This is an indicator that there is a very high level of agreement that the Holili OSBP is supporting a faster process for crossing borders. Also, Customs Clearance Efficiency has received a relatively high score (M = 4.18, SD = 0.61). These scores indicate that respondents are generally satisfied with how their shipments are processed, inspected and documented. Inter-agency coordination recorded a similarly high mean (M = 4.12, SD = 0.66).

Trade transaction-cost reduction recorded the lowest mean (M = 3.94, SD = 0.72), although it remained within the study's high range. This difference is substantively important. It suggests that improvements in administrative processes and institutional coordination may be more visible to stakeholders than reductions in the wider cost of trading. In other words, an OSBP may make the border easier to navigate without eliminating the transport, fuel, compliance and corridor-level costs that determine the total cost of trade.

4.4. MULTICOLLINEARITY

TABLE 5 Multicollinearity Diagnostics for Predictor Variables

Predictor	Tolerance	VIF	Interpretation
Customs clearance efficiency	0.651	1.536	No indication of problematic multicollinearity
Trade transaction-cost reduction	0.693	1.443	No indication of problematic multicollinearity
Inter-agency coordination	0.714	1.401	No indication of problematic multicollinearity

All tolerance values exceeded 0.10, and all VIF values were substantially below conventional concern thresholds. The three predictors were therefore sufficiently distinct for simultaneous estimation in the reported regression model.

4.5. CORRELATION ANALYSIS

TABLE 6 Pearson Correlation Matrix for Study Variables

Variable	CCE	TCR	IAC	TF
Customs clearance efficiency	1			
Trade transaction-cost reduction	0.648**	1		
Inter-agency coordination	0.591**	0.617**	1	
Trade facilitation performance	0.782**	0.715**	0.804**	1

*Note: ** $p < 0.01$, two-tailed.*

All three predictors were strongly and positively associated with trade facilitation performance. Inter-agency coordination had the strongest bivariate association ($r = 0.804$, $p < 0.01$), followed by customs clearance efficiency ($r = 0.782$, $p < 0.01$) and trade transaction-cost reduction ($r = 0.715$, $p < 0.01$). The correlations among the predictors were moderate rather than extreme, consistent with the VIF results.

The pattern is analytically meaningful because it suggests that the three mechanisms are related but not interchangeable. Coordination is associated with both customs efficiency and cost reduction, yet it retains an independent contribution in the

multivariable model. This is consistent with the proposition that coordination operates as an organizational mechanism through which procedural and cost improvements can be delivered.

4.6. MULTIPLE REGRESSION ANALYSIS

TABLE 7 Regression Model Summary Statistics

Model statistic	Value
R	0.861
R^2	0.741
Adjusted R^2	0.734
Std. error of estimate	0.382

The regression model explained 74.1% of the observed variance in perceived trade facilitation performance ($R^2 = 0.741$). After adjustment for the number of predictors, the model retained an explanatory value of 73.4%. The overall regression was statistically significant, $F(3,116) = 110.74$, $p < 0.001$.

TABLE 8 Multiple Regression Coefficients for Predictors of Trade Facilitation Performance

Predictor	B	SE	β	t	p
Constant	0.582	0.244	—	2.385	0.019
Customs clearance efficiency	0.286	0.071	0.301	4.028	<0.001
Trade transaction-cost reduction	0.221	0.065	0.249	3.400	0.001
Inter-agency coordination	0.394	0.067	0.448	5.881	<0.001

The estimated equation is TF = 0.582 + 0.286(CCE) + 0.221(TCR) + 0.394(IAC). Holding the other predictors constant, a one-unit increase in the customs clearance-efficiency score is associated with a 0.286-unit increase in the predicted trade-facilitation score. The corresponding coefficients for transaction-cost reduction and inter-agency coordination are 0.221 and 0.394, respectively. Because the variables are measured on the same Likert scale, the standardized coefficients provide the clearest comparison of relative association.

Inter-agency coordination is the strongest predictor (β = 0.448), followed by customs clearance efficiency (β = 0.301) and transaction-cost reduction (β = 0.249). All three hypotheses are supported in the statistical sense specified by the study. However, because the data are cross-sectional and perception-based, the coefficients should not be interpreted as causal effects without a stronger identification strategy.

5. DISCUSSION

5.1. CUSTOMS CLEARANCE EFFICIENCY AND TRADE FACILITATION

Customs clearance efficiency was positively and significantly associated with trade facilitation performance at the Holili–Taveta OSBP ($r = 0.782$; $\beta = 0.301$, $p < 0.001$). This indicates that more efficient processing, inspection and documentation are associated with better overall trade-facilitation performance. The results are consistent with Mendez-Parra and Calabrese (2023), as they have found that OSBPs in East Africa have significantly reduced transportation dwelling time. This reduction was partially due to reduced customs processing and queue times. In addition, these results are also in agreement with de Melo et al. (2025), who showed that implementing Trade Facilitation Agreement measures more effectively could lead to a substantial decrease in customs wait times and therefore lower the cost of trading. The research has great significance for Holili-Taveta, as the border represents a key connection between Tanzania and Kenya, and is part of the overall EAC trading network. Similarly, Ayele et al. (2023), who examined both the Taveta-Holili and Busia OSBPs, discovered that the use of OSBPs led to lower transaction costs and positive impacts on the economy.

The present study extends this evidence by demonstrating that, in the Holili–Taveta setting, perceived customs clearance efficiency remains a significant independent predictor of trade facilitation, even after accounting for transaction costs and inter-agency coordination.

Nevertheless, the result should be interpreted as an association between perceived clearance efficiency and perceived trade facilitation rather than as evidence of a specific reduction in actual clearance time. Clearance performance may vary according to cargo characteristics, inspection requirements, system availability and other operational circumstances.

5.2. TRADE TRANSACTION-COST REDUCTION AND TRADE FACILITATION

Reduced transaction costs for trade were positively and significantly associated with trade facilitation performance ($\beta = 0.249$, $p = 0.001$), although this predictor had the smallest standardized coefficient among the three predictors. This finding confirms that reducing the costs associated with cross-border transactions remains an important dimension of trade facilitation. These costs extend beyond official charges to include delays, fuel consumption, documentation, compliance requirements, and other operational costs.

This result is consistent with Mendez-Parra and Calabrese (2023), who showed that there were significant decreases in transportation costs and delays at the border when OSBP was implemented in East Africa. Additionally, Ayele et al. (2023) demonstrated that the Busia and Taveta-Holili OSBP reduced the trade cost and provided other economic benefits such as impacts on consumer prices and family income. Overall, these results support the claim that improvements in border operations will result in positive consequences outside of the border area.

The low mean score for transaction cost reduction (M = 3.94) indicates that while stakeholders report a perception of improved trade facilitation, transaction cost reduction remains somewhat limited relative to other aspects of the research. It is possible that this is due to some of the costs of conducting international trade occurring outside of the scope of the One Stop Border Post (OSBP) itself. The East African Community (EAC) has been actively working toward regional trade facilitation. To be effective, regional trade facilitation initiatives should be implemented along with improvements to individual border posts; i.e., both local and regional initiatives must be coordinated in order to realize the benefits of the regional initiatives. Therefore, the data supports a corridor-wide approach to trade facilitation instead of focusing solely on the individual border post.

5.3. INTER-AGENCY COORDINATION AND TRADE FACILITATION

The most effective variable in predicting trade facilitation performance was found to be interagency coordination. The highest correlation was observed with interagency coordination ($r = 0.804$, $p < 0.01$) and the largest standardized regression coefficient was also associated with interagency coordination ($\beta = 0.448$, $p < 0.001$). This result suggests that coordination between different border agency types is a key determinant of effective OSBP performance. It is consistent with the institutional logic of the OSBP model, in which the benefits of shared infrastructure depend on agencies coordinating inspections, exchanging information and aligning operational procedures.

The result also complements recent evidence on OSBPs in East Africa. Mendez-Parra and Calabrese (2023) find that when dwelling time decreases after the introduction of an OSBP, it is related to improved customs procedures and less queuing and duplication. Similarly, Ayele et al. (2023) studied Taveta–Holili and Busia and found that OSBPs could result in lower trade costs and increased economic performance overall. While these studies establish the benefits associated with OSBP implementation, the present study adds a more specific institutional finding: among the three dimensions examined, inter-agency coordination has the strongest independent statistical association with perceived trade-facilitation performance.

This finding also accords with de Melo et al. (2025), who identify border-agency cooperation, transparency and coordinated implementation as important elements of the Trade Facilitation Agreement framework. The result therefore supports a distinction between physical and functional integration. Bringing agencies together in a single facility does not necessarily yield seamless border management; the intended benefits depend on whether agencies coordinate their activities and information flows.

5.4. INTEGRATED INTERPRETATION OF THE FINDINGS

The three predictors jointly explained 74.1% of the variance in perceived trade-facilitation performance. This indicates a strong statistical relationship in the study sample, though it should not be taken as evidence that the three factors causally account for 74.1% of trade-facilitation outcomes. The relative coefficients nonetheless reveal a meaningful hierarchy, with inter-agency coordination showing the strongest association, followed by customs clearance efficiency and transaction-cost reduction.

This ordering is consistent with the wider evidence on trade facilitation. Coordination can provide the institutional basis for information exchange, joint controls and harmonized procedures; these arrangements can support more efficient customs processing and potentially reduce the time and operational costs of cross-border trade. De Melo et al. (2025) have similarly demonstrated how implementing trade-facilitating measures will decrease customs processing time, and Mendez-Parra and Calabrese (2023) have shown how the reductions in customs processing time, as well as the reduction in queue waiting time, associated with OSBPs will lead to lower transportation costs. The present study therefore complements rather than contradicts this evidence by identifying coordination as the strongest measured correlate of facilitation performance at Holili–Taveta.

The findings also extend the conclusions of Ayele et al. (2023). Their analysis of Taveta–Holili and Busia showed that OSBPs can reduce trade costs and generate broader economic benefits. The present study goes a step further by examining the mechanisms behind perceived trade-facilitation performance at one of these border posts. The results suggest that the benefits of OSBP infrastructure depend substantially on the quality of institutional coordination and the efficiency with which participating agencies translate shared infrastructure into integrated procedures.

At the same time, the comparatively lower assessment of transaction-cost reduction indicates that improved border administration does not necessarily eliminate all trade-related costs. This distinction is important because an OSBP can improve processes within the border facility, while traders continue to incur costs for transport, logistics, documentation, regulatory requirements, and other aspects of the trade corridor. The study therefore supports a systems perspective in which

trade facilitation is understood as the outcome of interactions among institutions, procedures, information systems, and corridor conditions.

The evidence indicates that the effectiveness of the Holili–Taveta OSBP depends not simply on the existence of a shared border facility but on how effectively participating institutions operate as a coordinated system. This interpretation is consistent with recent regional and continental evidence and provides a more specific explanation of the institutional mechanisms through which OSBPs may contribute to trade facilitation.

6. CONCLUSION AND RECOMMENDATIONS

6.1. CONCLUSION

The study concludes that customs clearance efficiency, trade transaction cost reduction and inter-agency coordination are all positively and significantly associated with trade facilitation performance at the Holili–Taveta OSBP. Among the three factors, inter-agency coordination emerged as the strongest predictor, followed by customs clearance efficiency and transaction-cost reduction. The findings suggest that the effectiveness of an OSBP depends not only on shared physical infrastructure but also on the extent to which participating agencies coordinate procedures, exchange information, and facilitate predictable, efficient border processes. The relatively weak correlation between the two variables, as well as the low rating of the value of reducing transaction costs, also suggests that changes in how the border facilities operate will require supplementary measures to reduce the overall corridor-level constraint. The study has provided additional insight into what affects OSBP performance through its demonstration of the importance of developing integrated institutions that can support efficient processes and lower operational costs.

6.2. RECOMMENDATIONS

As a result of this research, there are numerous potential steps that can be taken. The first step would be for both Tanzania and Kenya's border agencies to work together more effectively by establishing common practices and processes, conducting joint inspections, sharing data with each other on an ongoing basis and reviewing their working relationships periodically. Another possible approach would be to develop interoperable digital systems and electronic documentation that will assist in reducing duplication of effort and enhancing flow of information between the two countries. Customs officials also have the opportunity to implement risk-based inspections and simplified clearance procedures in order to minimize delays experienced by importers/exporters and still ensure that they meet all regulatory requirements. In addition to monitoring trade facilitation at the border, it is suggested that trade facilitation performance measures be developed for corridors; some examples include clearance times, queue lengths, transport costs, system downtime and delays. Finally, future assessments should integrate stakeholder perceptions with administrative and time-release data to improve the measurement of OSBP performance. Given the study's cross-sectional and single-site nature, comparative and longitudinal research across EAC border posts can verify if relationships are consistent across different environments.

CONFLICT OF INTEREST

The authors declare no conflict of interest regarding the publication of this paper.

DATA AVAILABILITY

The underlying questionnaire dataset was not included in the source manuscript. Before journal submission, the authors should state whether anonymized data can be made available and, if not, provide the applicable institutional or confidentiality justification.

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