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Time and Cost Spent on Transit Cargo at the Tunduma Cross-Border Point and Their Influence on Trade Flows

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Abstract

The study examined the historical time and cost spent on transit cargo at the Tunduma cross-border point and their influence on trade flows. Specifically, it examined the quantity of goods crossing the border, customs clearance times, and how regional trade agreements have helped speed up regional trade. The study was guided by the Absolute Advantage Theory. Using practical philosophy and a mixed-methods design, the study targeted a population of 1,200 people, including cargo truck drivers, customs officers, and TANROADS staff. A sample size of 112 respondents was chosen using Yamane's formula. Quantitative data was analyzed using descriptive statistics in SPSS version 29, while qualitative data was examined using thematic analysis in NVivo version 17. The findings showed that past trade was badly hurt by manual paperwork, multiple inspections, and poor teamwork between government offices, causing delays ranging from 72 hours to over a week. These problems led to heavy traffic jams, high transport costs, and low trade volumes. The study concludes that trade at Tunduma used to suffer from slow paperwork, long delays, and high expenses. However, upgrading the border with digital systems, better teamwork between countries, and investments in good roads and technology has successfully made the trade route much faster, smoother, and more competitive. Finally, the study recommends a comprehensive strategy combining digital automation, inter-agency coordination, regional regulatory alignment, and infrastructure investments to eliminate bottlenecks, reduce clearance times, and lower transport costs.

Keywords: Transit cargo, cross-border point, Customs clearance and Trade flow

Background of the Study

Global trade potential is driven by internal management and external governmental support, requiring standardization and trade facilitation to minimize non-tariff barriers (Ruangsriroj et al., 2023; Kim & Mariano, 2020). Countries worldwide approach trade differently based on geography and natural resources (Gnoleb, 2023). For instance, the USA fosters cross-border cooperation through goods trade, technical services, and institutional partnerships (Fiagbe, 2023). In Asia, Thailand relies heavily on international trade, particularly with neighbors like Cambodia (Ruangsriroj, 2023), while Central Asia prioritizes infrastructure for trade integration (Kim & Mariano, 2020).

Across Africa, small-scale cross-border trade is common, yet Sub-Saharan economies continue to face the highest trade costs globally (World Bank, 2017; 2020). In West Africa, trade significantly drives wealth creation (Gnoleb, 2023), whereas in Ethiopia, informal food flows are often triggered or ignored due to the arbitrary enforcement of laws and bribery requirements (Lesser & Moisé-Leeman, 2009).

Within Southeast Africa, Malawi, Zambia, and Tanzania participate in regional economic blocs such as COMESA, SADC, and the EAC, allowing preferential or duty-exempt tariffs (UNCTAD, 2020). The EAC Customs Union initially included Kenya, Uganda, and Tanzania, later expanding to include Rwanda and Burundi (Siu, 2019). Furthermore, Tanzania is a signatory to the African Continental Free Trade Agreement (AfCFTA), with growing business awareness (Stanbic Bank, 2023). However, Tanzania experiences persistent time delays and high transaction costs at cross-border points due to bureaucratic hurdles, inadequate infrastructure, duplication of inspections, and uncoordinated agency operations, which reduce the price competitiveness of exports (Fontagné, 2023; Wassie et al., 2025).

Because Tanzania serves numerous landlocked neighbors within the EAC and SADC, the government invests heavily in transit corridors (Kweka, 2019). Consequently, Tanzania and Zambia have signed agreements to resolve key trade hurdles and reduce truck congestion at the Tunduma border (Trademark Africa, 2023; Mwendapole, 2024). Additionally, the government of Zambia entered into a Partner Support Agreement to upgrade the Nakonde One Stop Border Post (OSBP) along the Dar es Salaam Corridor to slash cargo clearance times and streamline operations (Trademark Africa, 2023). Despite these regional initiatives, a clear research gap remains concerning site-specific, granular assessments of high-traffic borders like Tunduma. This study bridges this gap by investigating the Tunduma cross-border point, examining the quantity of goods crossing the border, analyzing customs clearance times, and determining how trade facilitation through regional agreements and procedural simplifications influences overall trade performance.

The Tunduma border, connecting Tanzania and Zambia as a One-Stop Border Post, is a vital trade route that links the Port of Dar es Salaam to landlocked countries like Zambia and the Democratic Republic of Congo (DRC). Even though this border is extremely important for the regional economy, it has long struggled with serious operational problems, high costs, and long waiting times. Cargo trucks often get stuck waiting for days because of poor parking facilities, manual inspections,

overlapping paperwork, and poor coordination between the Tanzania Revenue Authority (TRA) and the Zambia Revenue Authority (ZRA) (TradeMark Africa, 2018; Wassie et al., 2025).

These ongoing delays cost businesses a lot of money through extra fees, higher storage costs, and lost time, which makes regional businesses less competitive (Hoffman, 2023). Although recent government agreements and upgrades (such as modern equipment and better scanning tools) are trying to fix these problems, slow procedures and structural delays still disrupt the flow of goods (Trademark Africa, 2018; Trademark Africa, 2023). Furthermore, while many reports talk about these general border challenges, there are still inadequate empirical studies showing the exact numbers on how the amount of goods crossing the border relates to past and current customs clearance times. This study fixes this gap by looking closely at what is happening at the Tunduma border. Specifically, the study is guided by two questions: How many goods cross the border and how long does it takes to clear customs? And to what extent does the post-agreement framework accelerated intra-regional trade flows? By looking at these numbers, the research provides clear, evidence-based ideas on how cutting down waiting times and improving trade rules can make trade smoother and increase trade volumes across the region.

Theoretical Framework

This paper is guided by two theories, namely, Comparative Advantage theory Theory and Trade Facilitation Theory.

Comparative advantage theory

Comparative advantage theory was promulgated by David Ricardo in 1817. The theory stated that even if Country A had the absolute advantage in the production of two products, specialization and trade could still occur between the two countries. Comparative advantage means the comparison of relative price differences between nations to explain the pattern of trade. For example, compare the relative price of wheat in terms of cheese at home to the same relative price in the foreign economy in a hypothetical equilibrium with no trade (autarky) or with restricted trade. The country with the lower relative price of wheat is said to have a comparative advantage in wheat, while the other country has, symmetrically, a comparative advantage in cheese. The “buy low, sell high” logic predicts that a country will export the good in which it has a comparative advantage. Note also that by this reasoning a country must have a comparative advantage in some good. Prices of non-traded factors of production adjust in general equilibrium so that each country ends up in the trade equilibrium with a competitive or absolute cost advantage in the goods in which it has a comparative advantage.

When a country or business has multiple resources to produce various goods and services rather than focus on just one product, it may look for a comparative advantage. The opportunity cost of a given option is equal to the forfeited benefits achieved by choosing an available alternative in comparison (Segal, 2024). Likewise, Tanzania has a comparative advantage as it has an opportunity to import and use its infrastructure to benefit by increasing the efficiency and effectiveness of the transport of goods by cargo transit through the Tunduma border. Time and cost should be reduced to facilitate trade and hence benefit more.

While comparative advantage theory explains the theoretical benefits of trade between Tanzania and its landlocked neighbors, it fails to measure or explain why border congestion lasting 72 hours to 7 days destroys profit margins and reduces trade volumes. Therefore, the study employs trade facilitation theory to successfully account for customs clearance, wait times, and administrative red tape.

Trade facilitation theory

Trade facilitation started out as simple, practical rules used by global groups like the WTO to make shipping easier. Later, between 2003 and 2005, economists John S. Wilson, Catherine L. Mann, and Tsunehiro Otsuki turned it into an academic science. They used World Bank data and math models to prove exactly how border delays hurt trade (Wilson et al., 2003; Wilson et al., 2005).

The theory states that the economic friction of moving goods across borders, manifested as administrative red tape, physical delays, and compliance fees, acts as an artificial tariff (Wilson et al., 2003). Because countries have mostly lowered traditional taxes on goods, these hidden border problems, like bad paperwork and poor roads, are now the biggest blockages to trade (Arvis et al., 2016). Looking at the Tunduma border through this lens shows that past delays and expenses are not just minor traffic problems; they are major roadblocks that shrink trade and slow down cooperation between Tanzania, Zambia, and the wider SADC and COMESA regions (Limao & Venables, 2001).

Inside this theory, time and cost work in different ways to hurt businesses. Time represents how much supply chain trouble a shipment faces (Djankov et al., 2010). At Tunduma, slow checks and unorganized offices create long, unpredictable delays, which lead to empty shelves, extra storage costs, and lost sales for time-sensitive cargo (Hummels & Schaur, 2013). Looking at past timelines helps researchers see how changes like turning the border into a One-Stop Border Post (OSBP) changed trade over the years (Zaki, 2015). At the same time, trade costs include both official fees and hidden expenses, like daily fines for stuck trucks, wasted fuel, and money tied up waiting on shipments (Minor & Tsigas, 2008). These high costs make goods much more expensive and ruin the profit margins of regional trade routes.

Ultimately, economic trade models show that trade volumes go down whenever costs and wait times go up, and vice versa (Anderson & van Wincoop, 2003; Wilson et al., 2005). This means that if Tunduma can cut down on delays and expenses, trucks will move faster, businesses will become more competitive, and overall trade between the countries will grow significantly.

Conceptual Framework

Based on Comparative Advantage and Trade Facilitation theories, this framework shows how smooth operations at the Tunduma border directly affect the amount and value of trade. Things like long customs delays and slow logistics act like hidden taxes, making business harder, lowering profits, and reducing import and export volumes. On the other hand, cutting down clearance times helps cargo move faster and boosts overall regional trade.

Moreover, tools like trade agreements, regional integration, and clear border policies help Tanzania make the most of its natural trade strengths. While comparative advantage gives countries a reason to trade, red tape and poor policies can block those benefits. Putting strong institutional systems in place removes these roadblocks and lowers hidden costs, creating a competitive environment that supports long-term growth in cross-border trade.

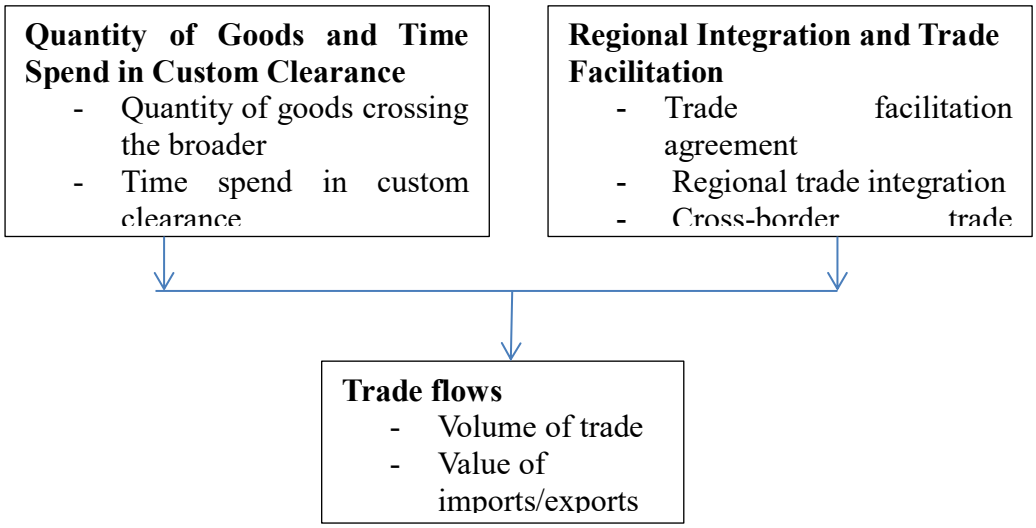


Figure 1: Conceptual framework: Showing the historical time and cost spent on transit cargo at the Tunduma cross-border point and their influence on trade flows

Source: Researchers' construct (2026)

Study Methodology

This study adopted a pragmatist research philosophy and a mixed-methods approach utilizing a descriptive and analytical cross-sectional design to examine transit cargo dynamics at the Tunduma border in Tanzania. The target population comprised approximately 1,200 individuals, including cargo truck drivers, customs officials, and TANROADS personnel. From this population, a sample size of 112 respondents was determined using Yamane's formula. The study utilized a combination of stratified random sampling for the quantitative phase, ensuring representative proportions across drivers, customs officers, and road authorities and purposive sampling for the qualitative phase to target key informants with direct operational experience. Cargo truck drivers served as the primary unit of analysis due to their firsthand experience with border procedures and transaction costs.

Data collection combined both quantitative and qualitative instruments. Quantitative data was gathered using structured questionnaires administered to respondents, achieving a high response rate of 96.4% (108 out of 112 questionnaires returned), while qualitative data was collected through semi-structured interviews with 5 customs officers and 10 cargo truck drivers. To guarantee credibility and accuracy of the findings, content validity was evaluated through expert reviews and a pilot test, and reliability for the quantitative tool was tested using Cronbach's Alpha coefficient, with a target threshold of 0.70 or higher. Triangulation across methods and audit trails for qualitative data further strengthened the overall dependability of the instruments.

Data analysis was split into two parallel streams corresponding to the mixed-methods design. Quantitative data from the questionnaires were processed and analyzed using the Statistical Package for Social Sciences (SPSS) version 29, employing descriptive statistics such as frequencies, percentages, means, and standard deviations to measure time, cost, and trade flows. Simultaneously, qualitative data from the interviews were transcribed and subjected to thematic analysis using NVivo software version 17 to identify core patterns, administrative bottlenecks, and emergent themes regarding border delays and trade facilitation.

Findings and Discussion

Quantity of Goods Crossing the Border and Time Spent in Customs Clearance

This section examines the quantity of goods crossing the border and time spent in customs clearance. The analysis focuses on the quantity of goods crossing Tunduma border and time spent in Customs clearance (Table 4.2).

Table 3.1: The quantity of goods crossing the border and time spent in custom clearance (n = 108)

Statement	SD	D	U	A	SA	M	Std. D
The quantity of goods crossing Tunduma border was lower compared to the current situation	3.7%	8.3%	10.2%	51.9%	25.9%	3.88	0.98
Customs clearance time spent was between 72 hours to 7 days	5.6%	12.0 %	10.2%	45.4%	26.8%	3.76	1.07
Customs clearance time spent was between one week and above	11.1 %	16.7 %	14.8%	36.1%	21.3%	3.40	1.24

Source: Field Data, 2026

Key: SD = Strongly Disagree, D = Disagree, U = Undecided, A = Agree, SA = Strongly Agree, M = Mean, Std. D = Standard deviation

Volume of Goods Crossing Tunduma Border

Regarding the quantity of goods crossing Tunduma Border, the findings revealed that 77.8% of the respondents acknowledged that historically the volume of goods crossing Tunduma Border was lower compared to the current situation. This consensus is reflected in the descriptive statistics, yielding a mean score of 3.88 with a standard deviation of 0.98. Conversely, the data indicated that historical customs operations were characterized by systemic inefficiencies. Participants noted that previous procedural bottlenecks specifically regarding manual documentation processes resulted in cargo congestion and protracted transit times, which negatively impacted the overall efficiency of cross-border trade. This sentiment was corroborated by a key informant who noted:

> *...the challenge experienced in the past was the time spent at Customs awaiting clearance. Documents required manual movement between offices, which delayed processing. Consequently, this increased operational costs, as transporters incurred*

additional expenditures for fuel, parking, food, and accommodation during extended wait times at the border. However, currently there is a reduction in transit delays (Key Informant 2, May 2026).

These findings suggest that the implementation of trade facilitation measures and the subsequent optimization of border operations had been primary drivers of increased trade throughput. The data support the inference that the reduction in procedural delays and associated transaction costs had created a more conducive environment for cross-border logistics. These findings were consistent with those of Gnoleb 2023 and Kim and Mariano 2020 that demonstrated improving goods flow and reducing delays in cross-border trade as a result of trade facilitation measures. Likewise, Wassie et al. (2025) reported that ambitious trade facilitation measures, such as reducing trade delays, had been empirically linked to substantial increases in export and import volumes. The findings also confirmed the Trade Facilitation Theory, which states that the simplification and modernization of customs processes had positive impacts in terms of cargo movement. This means that the customs systems were not efficient in terms of creating uncertainties in operations and less reliable cargo transport schedules.

Customs Clearance Time: 72 Hours to 7 Days

A large proportion of respondents indicated that customs clearance previously took between 72 hours and 7 days. The main causes cited were manual documentation, multiple inspections, and lack of coordination between agencies. Specifically, 72.2% of the respondents agreed with the observation. The consensus among participants was supported by a mean score of 3.76 and a standard deviation of 1.07, reflecting a high level of agreement. Similar findings were established during the interview with one of the TANROAD officers, who reported that,

> *...in the preceding years, trucks used to sit at the border for more than three days awaiting document verification, inspection and final clearance before they could cross the border and goods could be delivered to customers, due to lack of coordination among the involved authorities and manual procedures in customs clearance* (Key informant 1, May, 2026)

Similar findings were revealed by another key informant who argued that congestion and slow customs clearance in the past had a negative impact on the movement of goods and regional trade operations. In emphasizing this, the key informant reported;

> *...prior to the implementation of the border management systems, trucks used to take several days to be cleared at the border and during peak periods congestion became worse, which led to significant reduction in the speed of movement of goods and discouraged smooth movements of goods at the border to neighboring countries* (Key informant 3, May 2026)

These results suggest that historical border clearance processes were characterized by significant inefficiencies and protracted durations. Consequently, these prolonged clearance times contributed to substantial operational delays, inflated transportation costs, and diminished overall trade efficiency at

the border. Studies confirm that labor-intensive, manual customs procedures are a major source of delays in Sub-Saharan Africa. The reliance on paper-based documentation often results in lost records, repetitive inspections, and human error, which significantly extends the time required for cargo clearance (Ndonga & Laryea, 2024). The findings also align with Trade Facilitation Theory, which posits that administrative red tape, physical delays, and compliance fees act as an "artificial tariff" that restricts trade volumes

Customs Clearance Duration: One Week or Longer

The findings indicate that 57.4% of respondents agreed that the customs clearance process required a duration of one week or longer. The statement yielded a mean score of 3.40 with a standard deviation of 1.24, reflecting a moderate level of consensus among respondents. These findings point to significant historical delays in customs and cargo clearance procedures. Such delays likely contribute to increased transaction costs, port congestion, and overall inefficiencies within cross-border trade operations. Empirical studies in developing contexts often mirror your finding of "one week or longer" as a common threshold for inefficiency. In many sub-Saharan African ports, for instance, dwell times frequently exceed two weeks due to systemic factors such as poor coordination among government agencies, lack of automation, and bureaucratic documentation requirements (Wanyama, 2017).

Regional integration and trade facilitation under the broader post-agreement

This section examined regional integration and trade facilitation under the broader post-agreement framework. It specifically dealt with trade facilitation agreements, regional trade integration and cross-border trade policies (Table 3.2).

Table 3.2 Regional Integration and trade facilitation

Statement	SD	D	U	A	SA	M	Std.D
Trade facilitation was influenced by regional agreements and simplification of procedures	2.8%	6.5%	11.1%	52.8%	26.8%	3.94	0.89
The level of regional trade integration was influenced by agreements under SADC or EAC frameworks	3.7%	7.4%	9.3%	50.9%	28.7%	3.94	0.93
Cross-border trade was facilitated by government policies on tariffs	4.6)	8.3	12.0%	50.0%	25.1%	3.82	0.99

Source: Field Data, 2026

Key: SD = Strongly Disagree, D = Disagree, U = Undecided, A = Agree, SA = Strongly Agree, M = Mean, Std. D = Standard deviation

Trade Facilitation through Regional Agreements

Respondents acknowledged that regional frameworks such as SADC and EAC had begun to influence procedures, but implementation at Tunduma was inconsistent. Table 3.2 revealed that 79.6% of the

respondents agreed that trade facilitation was influenced by regional agreements and simplification of procedures. The statement yielded a mean score of 3.94 (SD = 0.89), indicating a high level of consensus among the participants. The study findings also noted that regional trade agreements were successful in enhancing coordination of customs activities between the border and reducing the duplication of customs activities, which has a positive impact on the movement of goods. This was reported by one of the key informants, who had this to say;

> *...In the past, transporters' trucks used to face long waiting times because there was no proper coordination of the verification systems among the country's customs institutions, but presently, there is better coordination, and this has reduced delays for transporters transporting goods through the border* (Key informant 5, May 2026).

The strong stakeholder consensus regarding regional integration underscores the success of procedural harmonization in modernizing customs administration. By mitigating redundant verification processes and non-tariff barriers, these collaborative frameworks have directly reduced the "time-cost" of trade, proving that institutional alignment is essential to optimizing cross-border supply chain efficiency. Empirical studies on the East African Customs Union and similar regional blocs suggest that deep integration, which focuses on lowering trade costs through procedural cooperation, results in substantial welfare and trade gains for participating countries (Balistreri et al., 2014; Wassie et al, 2025). The findings align with Trade Facilitation Theory, which asserts that cutting down procedural friction and waiting times exponentially increases trade flows and business competitiveness.

Regional Trade Integration under SADC and EAC Frameworks

Despite membership in SADC and EAC, non-tariff barriers and differences in operating hours continued to hinder smooth cargo movement. The findings indicate that 79.6% of the respondents acknowledged that regional trade integration under the SADC and EAC frameworks has significantly impacted cross-border trade activities. The statement yielded a mean score of 3.94 (SD = 0.93), reflecting a high degree of consensus among participants. These results demonstrate that regional integration policies have fostered improved cooperation among member states and facilitated smoother trade flows across borders. Consequently, regional economic integration plays a pivotal role in enhancing the efficiency of trade operations and promoting the development of cross-border commerce. The findings are similar to those obtained from one of the Key informants. This quantitative evidence is corroborated by qualitative insights from a TANROADS official, who noted:

> *... Before the implementation of coordinated border systems and harmonized procedures, multiple clearance steps were repeated on both sides of the border, leading to congestion and delays. However, the subsequent implementation of these systems has significantly improved vehicle throughput and streamlined the clearance process* (Key Informant 4, June 2026

Regional integration is a fundamental driver of modern trade corridors. By moving toward synchronized, cross-border systems, the SADC and EAC frameworks have successfully reduced procedural duplication, effectively alleviating border congestion and streamlining the movement of

goods. These findings underscore that policy harmonization is a necessary, practical shift toward a more efficient and cohesive trade ecosystem. The consensus regarding the positive impact of SADC and EAC frameworks aligns with recent regional assessments, which highlight that policy harmonization and the implementation of coordinated border management are essential for eliminating procedural redundancies and enhancing vehicle throughput (EAC, 2026). The findings align with Comparative Advantage Theory, demonstrate that countries can benefit from trade and cooperation when regional economic opportunity costs are minimized and trade systems are supportive.

Government Policies on Tariffs and Cross-Border Trade

Government tariff policies and levy structures were identified as additional cost drivers that affected the competitiveness of transit cargo. Table 4.3 indicates that 75.1% of respondents perceive government tariff policies as a facilitator of cross-border trade. The statement yielded a mean score of 3.82 (SD = 0.99), reflecting a high level of consensus among the participants. Similar findings were reported during the interview with key informants, which emphasized that government policies on tariffs were conducive to cross-border trade activities. In this matter, one of the customs officers narrated that:

> *...the government has improved road infrastructure from the border to lower operational challenges, and the cargo trucks have now moved faster, than in past years when roads were poor, and paperwork took a longer time. There have been some delays at the border, which have been reduced thanks to the government's policy of improving roads and modernizing procedures at the border* (Key informant,7, May, 2026)

It was further found that there is a higher volume of goods and cargo trucks crossing the border in recent years due to better customs processes, more integration of the regions, improved transport infrastructure and stronger border management systems. This was reported by one of the customs officers, who reported that;

> *...in the past, many transporters avoided some routes due to excess delays and congestion, but it has been noted that the clearance systems are now quicker and there are improvements in the procedure of the border, thus encouraging more traders to use the Tunduma border* (Key informant 10, May 2026)

The findings reveal a synergistic link between fiscal policy, infrastructure investment, and procedural efficiency. Stakeholders view government intervention as a proactive trade facilitator that mitigates the "dual bottleneck" of poor infrastructure and administrative delays. By removing these systemic barriers, the government has successfully encouraged route adoption and increased trade volumes, highlighting the critical importance of concurrent investment in both "hard" infrastructure and "soft" trade procedures to maintain the Tunduma border's competitive advantage. The consensus that government policy acts as a primary trade facilitator aligns with regional findings suggesting that when fiscal policy is coupled with strategic investments in transport infrastructure and digital customs, it creates a 'synergistic effect' that significantly boosts trade volumes (AfDB, 2026). The findings align with Comparative Advantage/Absolute Advantage principles, confirming that nations

leverage their infrastructure and efficient exchange systems to optimize cross-border commerce and resource allocation.

Conclusions

The study concluded that trade used to be held back by slow paperwork, long clearance times, and overall inefficiency. In the past, clearing cargo trucks often took anywhere from three days to a week or more. Because everything was done by hand and different government offices did not work well together, trucks got stuck in long traffic jams. This cost transport companies a lot of extra money for fuel, food, and parking, and it kept overall trade volumes low. Fortunately, things have improved. Newer border operations, digital systems, and regional agreements through groups like SADC and the EAC have helped clear out many of these old problems. When countries coordinate better, match their rules, and clear goods together, it cuts out duplicate work and makes cross-border trade much faster and smoother. The main takeaway is that removing red tape and investing in both good roads ("hard" infrastructure) and digital customs systems ("soft" infrastructure) are essential. By making transit processes fast and simple, Tunduma can move past its history of delays and become a fast, competitive, and successful trade corridor.

Recommendations

The study recommends that remaining manual paperwork should be eliminated through fully integrated, end-to-end digital systems to cut clearance times below 72 hours and reduce human error. It also recommends that joint inspection frameworks among customs, standards, and transport authorities should be established to eliminate repetitive checks and speed up vehicle movement. In addition, the study recommends that persistent non-tariff barriers and mismatched operating hours between neighboring countries should be removed through deeper regulatory alignment under SADC and EAC frameworks. Finally, the study recommends that proactive investments in road networks, parking, and staging facilities should be carried out to prevent congestion and lower transport costs.

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