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Supply Chain Risk and Resilience: Strategies for Managing Disruptions in East Africa

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Abstract

As the regional trade grows, transport networks become better, and companies are increasingly integrated into international markets, the East African supply chains are acquiring strategic significance. Meanwhile, the area is vulnerable to disrupted and systemic shocks due to climate extremes, infrastructure failures, border delays, geopolitical shocks, public-health crises, currency and fuel-price excursions, insecurity, and reliance on a few marine gateways and roadways. This paper is a review of supply chain risk and resilience in East Africa and assesses the approach to anticipating, absorbing, responding, and recovering disruptions. This analysis follows a systematic desk-review methodology, which combines existing supply chain resilience theory with recent findings in Kenya, Uganda, Tanzania, Ethiopia and Djibouti and the East African Community in general. The review indicates that the East African resilience is not similar to the models that are built primarily on the rare catastrophic shocks: the companies within the region tend to experience continuous small-scale disruption as well as the large-scale crisis periodically. Operational buffers and structural capabilities are thus mandatory in terms of effective resilience. The major strategies are supplier and route diversification, strategic inventory, regional sourcing, enhanced corridor and border performance, digital visibility, joint risk management, flexible transport solutions, climate-resilient infrastructure, scenario planning, and enhanced public-private coordination. The agri-food, manufacturing, logistics, and maritime trade evidence further indicate that risk-mitigation measures may shift the vulnerability to other parts of the network when designed in isolation. The paper finds that supply chain resilience in East Africa needs to be seen as a regional systems capability, which integrates firm-level preparedness with the reliability of the corridors, facilitation of trade, digitalization, adaptation to climate change, and institutional coordination.

Key words: *Supply chain risk; supply chain resilience; East Africa; logistics; transport corridors; trade facilitation; disruption management*

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1. Introduction

Supply chains are now much more susceptible to disruptions that lie far beyond the confines of individual companies. Increased efficiency and vulnerability has been brought about by global sourcing, lean

inventory, complicated supplier networks, geopolitical instability, climate change, and reliance on digital and transport infrastructure. Supply chain resilience has thus become a strategic capability that is focused upon preparing to be disrupted, sustaining critical operations, responding to pressures, and recovering to a satisfactory or even better condition (Christopher and Peck, 2004; Ponomarov and Holcomb, 2009; Tukamuhabwa et al., 2015).

Resilience is particularly crucial in the East African context. The region relies on quite limited ports and long inland transport corridors to link landlocked economies to international markets. The Port of Djibouti and the Addis-Djibouti channel bear the brunt of Ethiopia's external trade, the hinterlands of Mombasa and Dar es Salaam are large, and the Port of Djibouti is the hub of most external trade. According to the World Bank, over 95% of Ethiopia international imports and exports by volume are established on the Addis-Djibouti route, proving how corridor congestion can turn into a supply risk nationwide instead of a transportation issue at the local level (World Bank, 2023a).

The trade flows have been enhanced by regional integration, although it has not eradicated vulnerability. Intra-EAC trade, the East African Community noted, rose significantly between 2020 and 2023, and the Single Customs Territory and One-Stop Border Posts decreased clearance times on key routes. Meanwhile, non-tariff barriers, logistics bottlenecks, and lack of export diversification, as well as unequal infrastructure, are all limiting the reliability of regional trade (East African Community [EAC], 2025). Expanding trade consequently adds value to resilient corridors, ports, borders, warehouses, information systems and supplier networks, economically.

The external shocks experienced recently demonstrate how East African supply chains are exposed. Shipping crisis on the Red Sea made a lot of ships to bypass the Suez Canal and use the Cape of Good Hope which extended the journey and made freight, fuel, insurance, and inventory more expensive. UNCTAD estimates that about 15 percent of Kenya and 10 percent of Tanzania foreign trade in volume is normally transited through the Suez Canal as compared to the exposure of Djibouti, which is significantly greater. The increased delivery time was also a factor in the container shortage and impacted the export chains of tea, coffee, and avocados (UNCTAD, 2024a, 2024b).

Disruption due to climate is also important. Flooding destroys roads and bridges, agricultural production and water supply are impacted by drought, and transport, energy, and storage systems are disrupted by extreme weather. Experience in Tanzania indicates that transport and power dislocation associated with floods may result in large indirect business losses even when the firms themselves are not physically affected. In Kenya and Uganda, restrictions in the pandemic period showed how a lack of mobility and the inability to access inputs and markets can decrease agricultural production and trading activities, indicating the strong interdependence of transport, food security, and livelihood (Bitzer et al., 2024; World Bank, 2021).

East African resilience should thus respond to both significant shocks and chronic operational upheavals. A study on manufacturing supply networks in Uganda discovered that companies were deeply worried about more chronic, small scale disruptions, such as infrastructure issues, unreliable suppliers, administrative barriers and other threats that reoccurred. Such disruptions can interplay and move around the network when a single mitigation response transfers risk to another actor or place (Tukamuhabwa et al., 2017). This discovery dismantles resilience measures that concentrate on infrequent disasters and endorses continuous risk management.

This paper examines the primary causes of supply chain risk in East Africa and evaluates the measures that can be taken to enhance resilience. It combines regional data with the larger resilience theory to investigate supplier diversification, inventory, visibility, collaboration, logistics flexibility, regional sourcing, corridor development, trade facilitation, climate adaptation, digital systems, and institutional coordination. The main

thesis is that resilience in East Africa is not a firm-level capacity by itself; it is a network and regional capacity produced by the quality of transport corridors, border systems, information exchange, infrastructure, institutions, and relationships between the people and institutions (Pettit et al., 2010; Brandon-Jones et al., 2014).

2. Literature Review

2.1 Conceptualizing Supply Chain Risk and Resilience

Supply chain risk is the uncertainty that may disrupt the flow of materials, information, finances or services and decrease the capability of a supply network to achieve its goals. The source of risk can be internal (process failure, capacity issues, poor quality, labor issues or information breakdowns) or external (suppliers, transport systems, markets, regulation, conflict, natural hazards, and macroeconomic shocks). Supply chain risk management thus integrates the identification, assessment, mitigation, monitoring and response across the organizational boundaries (Tang, 2006; Bode et al., 2011).

Resilience makes the traditional risk management processes to be more durable since all disruptions cannot be foreseen or avoided. According to Christopher and Peck (2004), resilient supply chains are those that can respond to unforeseen events and restore to a satisfactory state. Ponomarov and Holcomb (2009) highlight adaptive ability, preparation, response, and recovery, whereas Pettit et al. (2010) present resilience as a balance between vulnerability and ability. These views suggest that resilient supply chains must have the ability to respond to surprises as well as be insured against the known risks.

The dynamic capability theory also describes resilience as the capacity to perceive threats and redesign resources and operations. Empirical studies reveal that the disruption awareness is not enough; companies require resource reconfiguration capacity and risk-management infrastructure (Ambulkar et al., 2015). Chowdhury and Quaddus (2017) conceptualize the supply chain resilience in light of proactive capability, reactive capability, and quality of supply chain design. This differentiation comes in handy in East Africa since companies have to plan ahead when faced with consistent constraints and at the same time be able to improvise when faced with major shocks.

2.2 The East African Risk Landscape

The East African supply chains are influenced by the geographic concentration, infrastructure disparities, and long distances inland, and high reliance on road freight, creating a risk environment within the supply chain. The landlocked nations depend on cross-border and regional ports, and this generates ripple effects when a port, border, road, or supply of fuel is affected. The strategic significance of the Northern, Central, and Addis-Djibouti corridors imply that resilience cannot be measured at the level of individual facilities; network nodes and transport links should be evaluated as a unit (World Bank, 2023a; EAC, 2025).

Geopolitical and maritime risks may be spread very quickly into the region. Suez Canal Traffic: Instability in the Red Sea since late 2023 has caused ship rerouting, increased freight rates, shipping distances, and uncertainty. East African countries, according to UNCTAD, face a greater exposure due to their trade connections with Europe and Asia, and longer transit times impact imports and time-sensitive exports. The disruption of maritime can thus spread into input shortages in manufacturing, losses in export of agricultural goods, food prices, and issues with containers and working-capital strains (UNCTAD, 2024a, 2024c).

Another layer of systemic risk is climate hazards. Droughts may decrease the supply of agriculture and hydropower, whereas floods destroy road systems, disrupt last-mile distribution, slow workers, and block markets. Food supply chains face the particular impact of climate-related risk since this risk may simultaneously impact production, transport, storage, price stability, quality, and access. A recent survey of food supply chain finds increasing indications that extreme rainfall, temperature, and drought may

undermine various food system phases, which suggests that chain-wide responses are necessary, as opposed to responding individually on a farm basis (Tchonkouang et al., 2024).

Structural vulnerabilities were also identified with public-health and mobility shocks. Bitzer et al. (2024) discovered that the COVID-19 restrictions in Kenya and Uganda curtailed movement, transport choices, access to agricultural inputs, and access to markets. The short-term coping strategies used by farmers and small market participants diminished their future buffering capacity. This fact indicates that resilience strategies should safeguard small suppliers, traders, informal logistics actors since their vulnerabilities can diminish resilience across larger food and retail systems.

Institutional and operational chronic risks affecting the developing-country supply chains are also less addressed in global resilience models. The analyzed case of the Ugandan manufacturing, which was studied by Tukamuhabwa et al. (2017), revealed the existence of interconnected threats and demonstrated that mitigation causes the risk to migrate. Indicatively, increasing inventory can cushion against supply delay, but at the cost of increased financing and storage exposure; switching suppliers can cushion against sourcing risk, but at the cost of quality or transport risk. Resilience thus necessitates a systems perspective of trade-offs, as opposed to single mitigation projects.

2.3 Core Capabilities of Resilient Supply Chains

One resilience capability, visibility, is mentioned multiple times. To be able to react early, firms require precise data concerning inventories, supplier position, transport whereabouts, demand, lead times, and threats arising. In their results, Brandon-Jones et al. (2014) discovered that resilience and robustness are supported by information sharing and connectivity leading to supply chain visibility. Digital cargo tracking, customs systems, mobile communications and integrated corridor platforms can help minimize uncertainty in East Africa but the value of technology is determined by the quality of the data and its interoperability.

Flexibility and redundancy are complementary methods to disruption management. Redundancy encompasses reserve inventory, supplier backup, reserve capacity, alternative transport provider and emergency stock. Flexibility encompasses the capability to alternate paths, replace inputs, modify production plans, reassess inventory, or quickly certify new vendors. According to Sheffi and Rice (2005), redundancy and flexibility are two methods that can be used to strengthen resilience, although redundancy is expensive and should only be applied to the most important items and nodes.

Cooperation is also significant since supply chain risks are inter-organizational. Collective response is enhanced with shared forecasts, shared contingency planning, supplier development, communication protocols, and public-private coordination. According to Blackhurst et al. (2011), some of the key features of resilient supply networks include communication, availability of resources, visibility, and relationships among others. Information integration is also found to facilitate innovativeness and resilience in the supply chain of manufacturing businesses in Uganda, confirming the significance of information and relationship capabilities in developing countries (Muhwezi et al., 2023).

Regional sourcing and localization will minimize reliance on remote suppliers and long international supply chains. Local supply chains are systematically reviewed, demonstrating that localization can sustain resilience during, preceding, and following significant disruptions through its exposure mitigation strategy and quicker adaptation (McDougall and Davis, 2024). Yet, regional sourcing is not resilient necessarily in case local suppliers are subject to typical climate, infrastructure, or funding hazards. Balancing between geographic diversification and supplier development and risk assessment should therefore be considered.

2.4 Infrastructure, Corridors, and Trade Facilitation

The resilience of firms at the firm level is limited when the infrastructure in the region is not reliable. Shared supply chain assets are ports, roads, railways, warehouses, power systems, and border posts. According to

the 2023 Logistics Performance Index, the World Bank focuses on reliability, the quality of infrastructure, customs performance, the competence of logistics, tracking, and timeliness as the structural aspects of the logistics performance. These two dimensions directly relate to resilience since this variability in clearance and transit times boosts the safety stock and working capital needed to cushion service levels (World Bank, 2023b).

Some of these weaknesses have been alleviated through the East African trade facilitation programs. According to the EAC, the Single Customs Territory has also decreased the amount of time spent at the border clearing cargo along major corridors and decreased duplication at the border due to One-Stop Border Posts. There have also been improvements in transparency and time of resolution (EAC, 2025) by digital non-tariff-barrier reporting. These reforms build resilience as quicker, more foreseeable routine streams establish more capacity to take interruption as situations worsen.

Corridor investment is also able to provide alternative routes and minimize congestion. The projects supported by the World Bank on the Addis-Djibouti corridor and other routes in the region are aimed at enhancing connectivity, quality of roads, logistics centres, and efficiency of institutions. Nevertheless, expansion is not the sole means to infrastructure resilience. Climate extremes should be taken into account in the design and maintenance of roads, bridges, drainage, ports, and terminals, and emergency response plans should know critical links that failure would cause disproportionate losses to the network (World Bank, 2023a; Logistics Cluster, 2024).

2.5 Measuring Supply Chain Resilience

The measurement of resilience is challenging since it involves preparation, absorption, recovery and adaptation. Loss of money is not a complete picture of how swiftly a supply chain can stabilize or whether it can come out even stronger after being disrupted. According to Pettit et al. (2010), resilience can be discussed in terms of the correlation between vulnerabilities and capabilities, whereas Chowdhury and Quaddus (2017) suggest a multidimensional scale of proactive and reactive capabilities and quality of supply chain design. These structures help organizations to quantify capabilities prior to disruption as opposed to only documenting losses after the fact.

Some practical indicators of resilience in East Africa can be supplier concentration, proportion of critical items that have qualified alternatives, days of strategic inventory, port and corridor lead-time variability, border dwell time, percentage of shipments that can be digitally tracked, recovery time, time-to-activate an alternative route, supplier financial health, cold-chain continuity, and exposure to climate hazards. The traditional KPIs can be supplemented with network reliability and scenario stress testing, which demonstrate the spread of the failure in the system due to one node (Goldbeck et al., 2020; Lin and Lin, 2026).

3. Methodology

In this article, the authors employed a systematic desk based literature review to investigate supply chain risk and resilience strategies as applied to East Africa. The review combined peer-reviewed evidence on supply chain resilience, risk management, logistics, agri-food systems, manufacturing, and developing-country supply networks with institutional evidence of the East African Community, UN Trade and Development, the World Bank, African regional transport initiatives and humanitarian logistics sources. A review design was suitable as resilience is a multi-level issue that cuts across firms, suppliers, transport networks, ports, border agencies, infrastructure and regional policy.

The search was based on literature that focused on five themes, which are: definitions and theoretical basis of supply chain resilience, empirical evidence in the East African or similar developing-country context, regional transport corridors and trade facilitation, climate, geopolitical, and public-health disruptions, and resilience measures including diversification, redundancy, collaboration, visibility, digitalization,

localization, and infrastructure adaptation. Resilience work foundations were kept due to their mainstream concepts, and more recent work as of 2023-2026 was highlighted as the emergent disruption patterns and East African developments.

Sources which contributed directly to the knowledge of disruption exposure, resilience capabilities, or practical responses were included. Priorities were given to East African evidence where possible, such as Ugandan and Kenyan studies, research analyses on Kenyan tea and agri-food supply chains, regional trade reports, and Addis-Djibouti and EAC corridor studies. When there was limited evidence region-specific evidence, broader international studies were employed to interpret mechanisms like visibility, resource reconfiguration, supplier diversification and network design.

The analysis of the literature was not done in a statistical manner but in a thematic manner. Results were categorized in disruption and resilience strategies, and explained in terms of a systems perspective that considers interdependence between companies and common logistics infrastructure. This approach does not give a causal estimate of any individual strategy pooled; rather, it recognizes common mechanisms, trade-offs, and priorities in implementation that can be applied to the East African supply networks. Uneven publication evidence within East Africa countries and industries also constrains the review as Kenya and Uganda are more evident in the academic literature than some of the neighboring markets.

4. Findings and Discussion

4.1 East African Supply Chains Face Layered Rather Than Isolated Risks

This review indicates that supply chain risk in East Africa is interrelated and cumulative. Companies can also encounter global shipping delays, fluctuations in fuel prices, border delays, exchange-rate strain, climatic disasters, supplier inefficiencies, infrastructure breakdown, and demand instability. This stratified exposure implies that resilience cannot be constructed based on a hazard. The Ugandan evidence on risk migration is particularly crucial as a response to a disruption can introduce a new vulnerability to the network (Tukamuhabwa et al., 2017).

As an example, companies can raise imported safety stock to cushion against shipping delays, but at the cost of raising working-capital requirements and currency depreciation. A firm might to decide to change to local suppliers to mitigate the maritime risk, but faces variability in quality or weather-related supply issues. Alternative corridor diversion can ensure the continuity of deliveries but at the cost of higher transport expense or border complexity. The resilience strategies thus are to be considered as portfolios whose synergistic impacts are stress-tested in various conditions (Pettit et al., 2010; Gaudenzi et al., 2023).

4.2 Supplier and Geographic Diversification Reduce Concentration Risk

Supplier concentration is a significant weakness in the event of the critical inputs being supplied by one company, nation, or transport path. Production can be halted by a single disruption, and multi-sourcing and geographic diversification can help prevent this. Studies regarding resilient supplier selection indicate that the multi-region suppliers, inventory reservation, and alternative shipment strategies can lead to high service levels in the context of regional disruptions (Suryadi & Rau, 2023). This principle applies directly to East African importers, who need industrial supplies, medicines, machinery and packaging which are produced in Asia, Europe or the Middle East.

Selective diversification should however be applied. The qualification, co-ordination, quality-control and procurement costs are higher since there are many suppliers to maintain. The items can be categorized based on criticality analysis which can be used to determine the supply risk, difficulty in substitution, value, and operational consequence. Dual sourcing or pre-qualified backups are justified in high-criticality items and not in routine items. Diversification can be complemented by regional supplier development to expand local

capacity and reduce lead times without cutting off access to suppliers around the world (McDougall and Davis, 2024; Tukamuhabwa, 2023).

4.3 Strategic Inventory Is Necessary but Should Not Become the Main Resilience Strategy

East African companies tend to have unpredictable lead times, making buffer inventory of critical materials more valuable. Strategic stock may cushion production in the case of congestion at the port, maritime diversion, road blockage or slow clearance at the customs. One of the valid resilience strategies identified by Sheffi and Rice (2005) is redundancy, especially where replenishment cannot be replenished in quick time. Minimum emergency stocks can thus be necessary in such areas as health, food, energy, and manufacturing.

Inventory is however costly where there is high cost of financing, currency risk, warehouse capacity and perishability. Surplus inventory might also help in covering the lapses in logistics instead of resolving them. A more robust strategy incorporates precision inventory and enhanced visibility, supplier choices, flexible transportation, demand sensing, and expedited border operations. It is not the maximum stock but the minimum buffer that is necessary based on realistic disruption and recovery time (Christopher and Peck, 2004; Chowdhury and Quaddus, 2017).

4.4 Regional Sourcing Can Improve Resilience When Local Capabilities Are Strengthened

The sourcing opportunity in the region provides a significant resilience opportunity since East African markets are becoming increasingly integrated. A smaller supply chain can help decrease reliance on maritime transport, offer faster replenishment, and facilitate more easily coordinated relationships during disruption. Localization literature suggests that local supply chains may lead to greater resilience, especially in cases when global operations are limited (McDougall & Davis, 2024). This strategy can be strengthened with the help of EAC integration and the African Continental Free Trade Area that will increase the number of regional suppliers.

However, regional sourcing can not be regarded as automatic alternative to global sourcing. Drought, floods, power instability, credit limits and transport bottlenecks are common to many East African suppliers. A strong regionalization plan then incorporates development of suppliers, quality control, financial assistance, joint forecasting, digitalization and availability of alternative transportation. Regional sourcing develops resilience by building a competent supplier ecosystem and not just by shifting the location of purchasing nearer (Tukamuhabwa et al., 2023; Mwangi et al., 2022).

4.5 Corridor and Route Diversification Is Central for Landlocked Markets

Uganda, Rwanda, Burundi, South Sudan, Ethiopia, and other markets that are landlocked or depend on corridors, in particular, need transport resilience. When disruption happens, firms ought to know what products can move between Northern and Central Corridors, between road and rail, or between various crossings of the border. In areas where there is a cheaper alternative path in standard operating conditions, business familiarity, carrier connections, documentation preparedness, and proven routing choices can greatly decrease the time to recovery during a crisis (World Bank, 2023a; EAC, 2025).

Corridor resilience needs to be maintained at policy level, be redundant, climate-proof infrastructure, efficient borders, and coordination across jurisdictions. The advantages of a port upgrade may be wasted in case of bottlenecks in roads, customs or inland depots. The experience of Single Customs Territory processes and One-Stop Border Posts that the East African region has had demonstrates that administrative integration can be as significant as physical infrastructure. Policy on resilience must thus consider corridors as end-to-end systems instead of aggregates of individual national assets (EAC, 2025; World Bank, 2023b).

4.6 Digital Visibility and Information Integration Improve Early Response

One of the most scale-able resilience capabilities is visibility as it enhances the quality and speed of decisions. Shipment monitoring, electronic customs information, supplier portals, inventory dashboard, weather alerts and demand analytics can assist companies to identify disruption earlier and predict its impact. Brandon-Jones et al. (2014) associate information sharing and connectivity with visibility and resilience and Ugandan manufacturing experience demonstrates that information integration, innovation, and resilience have positive relationships (Muhwezi et al., 2023).

Regional coordination is also assisted by digitalization. Uncertainty can be minimized by electronic cargo monitoring, single windows, and digital border processes, as well as non-tariff-barrier reporting. Nonetheless, digital resilience should be interoperable, cyber secure, back-up connected, and trustworthy information. When critical decisions are made using a single digital platform and there is no backup, a supply chain is more vulnerable. Instead, technology must be used to enhance, but not substitute contingency planning and trusted relationships among supply chain partners (EAC, 2025; World Bank, 2023b).

4.7 Collaboration and Public-Private Coordination Are Essential

A lot of disruptions in East Africa cannot be resolved by single firms since the cause of the problem is in the common infrastructure or regulation. The congestion of the ports, the closing of the borders, the damage of the roads, the imbalance of the containers, and the emergency restrictions of the movements need the coordination between the businesses, the port authorities, the customs agencies, the transporters, the regulators, and the institutions of the regions. There is an ability to prioritize critical cargo through collaborative planning, exchange information on bottlenecks, align emergency operating rules, and speed up recovery (Blackhurst et al., 2011; Logistics Cluster, 2024).

It is also important to have firm-firm collaboration. The suppliers and customers that communicate their forecasts and constraints are able to make adjustments on production or inventory before shortages are dire. The long-term relations facilitate negotiation in allocation when there is scarce supply and sharing of recovery resources. The literature on developing-country resilience focuses on the embedded relations and context, and it means that the trust and network knowledge is particularly valuable in those cases when formal systems cannot be fully developed, or are slower (Tukamuhabwa et al., 2017).

4.8 Climate Resilience Must Be Embedded in Logistics and Network Design

The decision of adapting to climate must be a mainstream supply chain option, as opposed to an environmental add-on. Floods may cause roads to be blocked so that workers and trucks do not have access to the facilities and drought may have an impact on the agricultural volumes, hydropower, water-based processing, and livestock mobility. The food supply chains are particularly vulnerable due to the fact that climate impacts can be present in the production, storage, transportation, and market access at the same time (Tchonkouang et al., 2024).

Resilience thus necessitates climate risk mapping of suppliers, warehouses, transport connection, and essential utilities. Companies can spread out manufacturing facilities, store stock outside frequent flood zones, enhance back-up power in the cold-chain, pre-arrange emergency supplies ahead of high-risk times of the year, and negotiate other transport capacity. Governments are supposed to emphasize on drainage, bridge resilience, road maintenance, and climate-proofing of the most economically significant parts of the corridors. Tanzania has shown that disruption of transport may produce substantial indirect costs with no firms flooded themselves (World Bank, 2021).

4.9 Agri-Food Chains Require Distinct Resilience Strategies

Food supply chains and agricultural systems simply cannot afford to delay due to seasonal, perishable, and temperature and handling sensitive products. Small traders and farmers can also lack cash reserves and

bargaining power, which means that they can be susceptible to movement limits, input supplies, and sudden price fluctuation. Bitzer et al. (2024) demonstrate that agri-food actors in Kenya and Uganda were significantly affected by COVID-19 on their income and access to the market, whereas short-term coping was mostly undermining future resilience.

Agri-food chain resilience thus necessitates aggregation centers, cold storage, diversified market channel, mobile market information, quality rural roads, contract flexibility, access to finance and enhanced local processing. The local and short food supply chains are capable of mitigating part of the exposure to long-range logistics, but they need digital infrastructure and comprehensive market regulation to become effective in terms of scaling (McDougall and Davis, 2024; Moyo and Pisa, 2025). Contingency planning of maritime and air-freight is also crucial in the case of export products like tea, coffee, flowers, and avocados (UNCTAD, 2024a).

4.10 Scenario Planning and Stress Testing Should Replace Reactive Crisis Management

Dependencies are usually realized in organizations when a disruption has taken place. Scenario planning is able to determine single points of failure prior to them escalating into a crisis. Companies ought to simulate an incident like prolonged port closing, massive road floods, shortage of fuel, border congestion, cyber crash, supplier failure, Red Sea event, or a demand and currency shock. The scenarios must indicate early warning, decision threshold, the team to be informed about the decision, alternative suppliers, transport, communication protocol, and anticipated recovery time (Ambulkar et al., 2015; Chowdhury et al., 2026).

Stress testing will particularly be useful in interconnected East African networks due to the second-order effects. The first impact of the disruption can be in the transport but at a later stage, cause the shortage of inventories, production halting, missed exportation opportunities, cash-flow issues, and loss of customers. Resilience models based on networks highlight the importance of failure propagation and repair logistic as much as the initial failure. Suppliers, logistics providers, key customers, and possible relevant public agencies should also be included as part of the scenario exercises (Goldbeck et al., 2020).

4.11 Resilience Requires a Balanced Portfolio of Efficiency and Preparedness

One of the major conflicts of resilience management is the preparedness cost. Redundant supply, spare capacity, inventory, alternative routes, and back-up systems make the system less vulnerable, but may seem inefficient when all goes well. It is a regular refrain in the literature that resilience must involve a proper ratio between vulnerabilities and capabilities and not absolute redundancy (Pettit et al., 2010; Sheffi & Rice, 2005).

In East Africa, criticality, uncertainty in lead-time, difficulty in recovery and importance in society should be used to determine this balance. Essential goods, fuel, staple commodities, strategic production goods and humanitarian goods warrant greater protection compared to commodities that can be easily replaced. Companies ought to estimate the probable disruption expenses and contrast them to the price of resilience alternatives. Hybrid strategies can also be a better option since having moderate inventory, diversified suppliers, enhanced visibility, and flexibility in transportation can collaboratively offer greater protection compared to relying on a single costly buffer (Gaudenzi et al., 2023; Suryadi and Rau, 2023).

4.12 Regional Resilience Is an Institutional and Policy Capability

The review concludes that the resilience of East African supply chains cannot be isolated of the regional governance. Thousands of firms at a time can benefit in a way that systems uncertainty is minimized through trade facilitation, harmonized standards, operating border posts, predictable customs procedures, port efficiency, corridor maintenance, and emergency coordination. The development of the EAC regarding the Single Customs Territory and One-Stop Border Posts proves the possibility of institutional integration to enhance the reliability of routine and crisis response ability (EAC, 2025).

Resilience indicators should thus be integrated into the corridor and trade performance systems in the institutions of the regions. Measures must encompass transit-time variability, border recovery time, climate-related closures, alternative-route preparedness, continuity of critical commodities, digital system availability and container availability alongside average clearance time. These indicators can be reviewed at public-private resilience forums, joint scenarios can be undertaken, and infrastructure investment prioritized. The recent effort by UNCTAD to assess transport and logistics resilience in Kenya is indicative of the increasing awareness among policy makers that they require integrated tools to simulate disruptions and compare response alternatives (UNCTAD, 2026).

5. Conclusion and Recommendations

5.1 Conclusion

The East African region is currently experiencing an increase in both climate, geopolitical, infrastructure, and market disruptions, at the same time as regional trade and integration with the world continue to grow, making supply chain resilience a strategic need. The concentration risk of the region is based on its reliance on big ports and extensive inland routes, and the frequent operational limitations imply that companies have to cope with both continuous disruption and major disasters. The experience of Uganda, Kenya, Tanzania, Ethiopia, and regional trade systems has proven that resilience is not a one-time emergency response but an ongoing ability (Tukamuhabwa et al., 2017; Bitzer et al., 2024; EAC, 2025).

The review concludes that there is no resilience strategy that is adequate. Supplier diversification, regional sourcing, inventory, visibility, collaboration, flexible logistic, climate adaptation, and investing in infrastructure are solutions to various aspects of vulnerability. Their worth is multiplied when they are pooled into a co-ordinated portfolio and put into practice under real world conditions. Public systems also play a role in resilience since the unreliable corridors, borders, power systems, or fragmented regulations can never be compensated indefinitely by the private firms (Pettit et al., 2010; Brandon-Jones et al., 2014).

The overall implication is that the East African supply chain resilience must be considered as a network capability including both the enterprise management and regional economic infrastructure. Companies require responsive measures, yet states and regional bodies should supply dependable trade facilitation, dependable transport networks, interchangeable computer systems, and synchronized crisis systems. The construction of this combination will help minimize the economic effects of disruption and contribute to food security, industrialization, regional integration, and competitiveness in exports.

5.2 Recommendations

The first step that the firms must take is to map their supply chain end to end, and single points of failures must be identified. Mapping ought to feature crucial suppliers, tier-two dependencies, where applicable, ports, border crossings, warehouses, transport providers, digital platforms, utilities, and customer concentration. Risk registers are to differentiate between chronic disruption and low-frequency catastrophe events and put owners to monitor and mitigate them (Christopher and Peck, 2004; Tukamuhabwa et al., 2017).

Second, companies ought to diversify supply and logistics options of critical supply. The backup suppliers in other geographical locations should be qualified with high-risk materials, and those in the landlocked markets should have retained viable experience of alternative routes and carriers. The policy of diversification ought to be based on quality, lead time, currency, climate correlation, and transport exposure instead of price (Suryadi and Rau, 2023).

Third, companies ought to have purposeful strategic buffers. Inventory, standby capacity, spare power and emergency transportation should be focused on those items, whose unavailability would halt the operations or cause severe customer or societal damage. Buffer levels need to be connected to achievable recovery time

and be reexamined with changes in the reliability of the corridors and supplier performance (Sheffi and Rice, 2005).

Fourth, the sourcing and supplier development to be implemented regionally should be increased. Long-term contracts, forecasting data, quality support, financing partnerships, and digital integration can empower the local and regional suppliers of huge companies and government entities. This increases the ability of regions to develop industrial capability, but geographic diversification must be maintained in the case of critical items to prevent common-mode regional shocks (McDougall and Davis, 2024; Tukamuhabwa et al., 2023).

Fifth, there should be enhanced digital visibility in both private and public logistics systems. The firms are to combine the procurement, inventory, transport, and supplier-data, and the governments should further enhance cargo-tracking, single-window customs, border information exchange, and non-tariff-barrier reporting. Cybersecurity, backup procedures and interoperable data standards should be part of digital systems (Muhwezi et al., 2023; EAC, 2025).

Sixth, supply chain design and infrastructure planning should include climate resilience. Firms are recommended to map climate exposure and adjust facility location, inventory placement, route, and contingency arrangements of seasonal arrangements. Governments are encouraged to climate-proof their economically important roads, bridges, drainage, ports, rail connections, and power systems and also to provide reliable hazard and closure data to logistics users (Tchonkouang et al., 2024; Logistics Cluster, 2024).

Seventh, scenario planning and stress testing should be institutionalized at organizations and regional agencies. Port closure, border delay, severe flooding, supplier failure, cyber disruption, fuel shortage, and international shipping shocks should be tested by annual exercises. The exercises must yield response playbooks that are actionable, alternative routing decision, emergency communication plan, and recovery-time objectives (Ambulkar et al., 2015; Chowdhury et al., 2026).

Lastly, the governments and regional organizations in East Africa must consider supply chain resilience to be an element of trade and industrial policy. The performance of the corridor must be measured in terms of average transit time as well as the ability to remain reliable during stress. By enhancing the resilience of the region to shocks without retracting gains made in trade integration and economic growth, the region can be fortified with public-private resilience forums, shared disruption dashboards, emergency border protocols, harmonisation of regional standards, and coordinated investments in alternative routes (World Bank, 2023b; EAC, 2025; UNCTAD, 2024a).

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