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Enhancing Efficiency and Connectivity: A Supply Chain Analysis of the Dhaka Elevated Expressway in Bangladesh

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Introduction

"Once the project is implemented in 2026, traffic congestion in the Abdullahpur-Ashulia-Bypail-Chandra corridor, which connects Dhaka city to 30 districts, will be greatly reduced," said Shahabuddin Khan, project directorof the Dhaka Elevated Expressway Expansion Project (DAEEP).

With this ambitious infrastructure initiative, the Dhaka Elevated Expresswayis set to revolutionize the transportation landscape of Bangladesh's capital city, addressing the mounting challenges posed by urban congestion. This research paper aims to provide a comprehensive supply chain analysis of theDhaka Elevated Expressway, examining its potential to enhance efficiency, connectivity, and economic growth within the region.

Background and Significance

Dhaka, the bustling capital city of Bangladesh, has been grappling with the adverse effects of rapid urbanization, population growth, and mounting traffic congestion. These issues have severely impacted the efficiency of logistics and supply chain operations, resulting in increased transportation costs, prolonged delivery times, and hindered economic productivity. In response to these challenges, the Dhaka Elevated Expressway has emergedas a significant infrastructure project, poised to offer a viable solution by providing an alternative route that bypasses congested areas, therebyfacilitating faster and more efficient transportation.

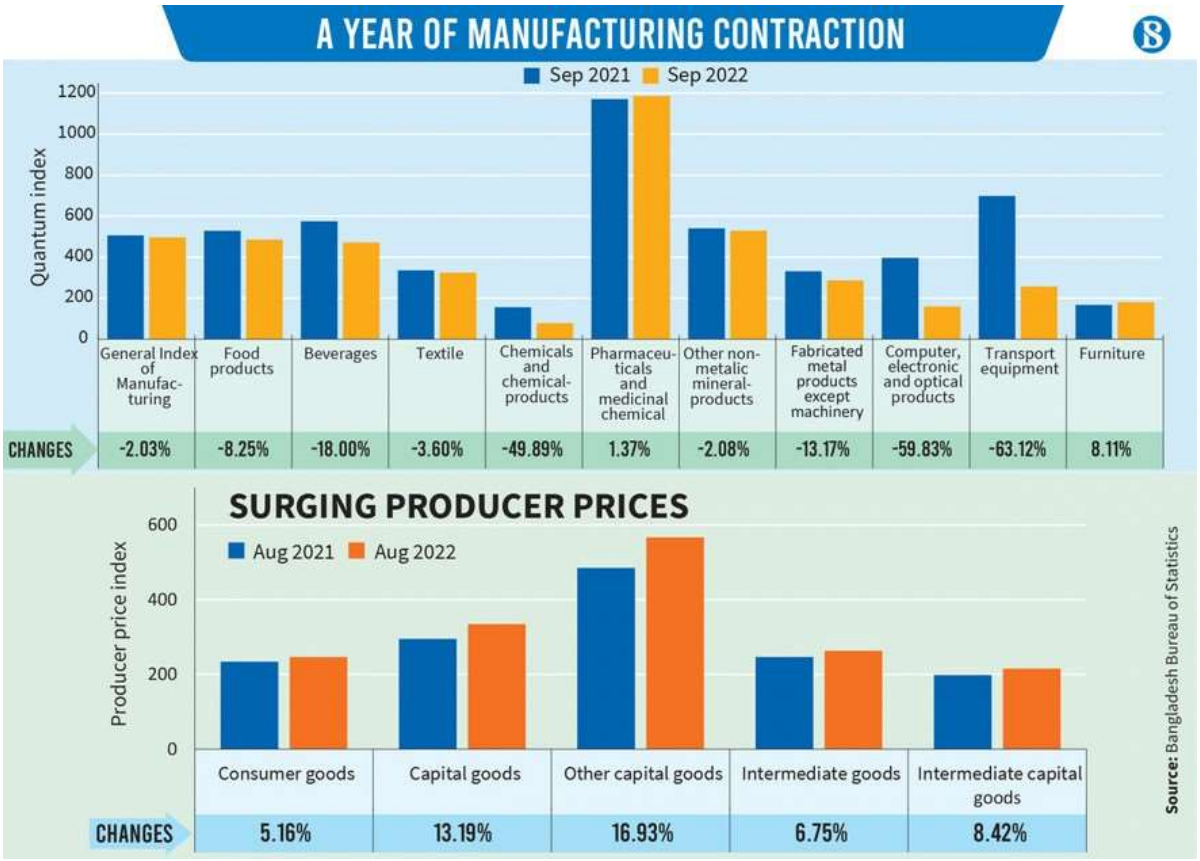
DHAKA-ASHULIA ELEVATED EXPRESSWAY AT A GLANCE

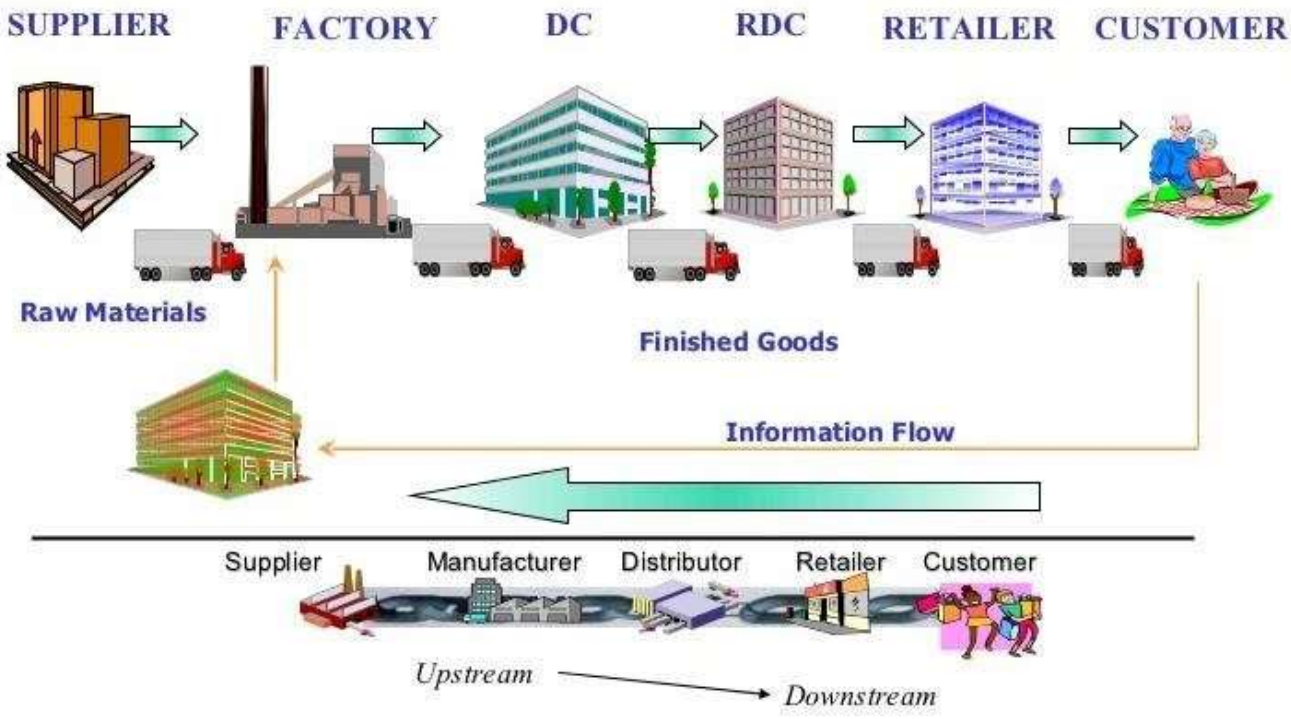
Project name	**Dhaka-Ashulia Elevated Expressway**
Project length	24km of expressway with 10.84km of ramp and 14.28km of connecting road
Ecnec approval date	October 24, 2017
Estimated cost of the project	Tk16,901cr; China Exim Bank will provide Tk10,949cr and rest of the amount will be funded by the Bangladesh government
Major utility of the project	Vehicles from northern districts will not have to face Dhaka traffic on their way to Chittagong
Constructing firm	China National Machinery Export and Import Corporation

Objectives

- Conduct a comprehensive analysis of the Dhaka Elevated Expressway's impact on the efficiency of supply chain operationswithin the city of Dhaka.
- Explore the potential cost savings and productivity gains resultingfrom improved transportation and logistics efficiency facilitated bythe elevated expressway.
- Examine the implications of the expressway on the connectivity and accessibility of key industrial zones, commercial centers, andports in Dhaka.
- Evaluate the anticipated economic benefits and trade facilitationopportunities brought about by the Dhaka Elevated Expressway.
- Identify potential challenges and risks associated with the implementation and operation of the elevated expressway andpropose suitable mitigation measures.
- Provide recommendations for policymakers, transportation authorities, and logistics stakeholders to leverage the benefits ofthe Dhaka Elevated Expressway in optimizing supply chain operations and driving economic growth.

Narayanganj **Munshiganj** **Manikganj**





Problems of Supply Chain Beforethe Dhaka Elevated Expressway

- **Traffic Congestion:** Dhaka's extensive traffic congestion was a significant obstacle to smooth supply chain operations. Longtraffic jams, especially during peak hours, resulted in delayed deliveries, increased transportation costs, and unpredictable travel times.

- **Travel Delays:** Extended travel times due to congested roads meant that goods took longer to reach their destinations. Thisdelayed the entire supply chain, impacting businesses' ability tomeet deadlines and fulfill orders promptly.

- **Inefficient Route Planning:** Limited road infrastructure and congested routes made it challenging to optimize transportationroutes for supply chain activities. Lack of viable alternative routes led to suboptimal planning and increased operational costs.

- **High Transportation Costs:** Traffic congestion and inefficient routes contributed to higher transportation costs, as companiesneeded to allocate additional resources to compensate for delays and inefficiencies.

- **Inconsistent Delivery Times:** Inconsistent travel times and delays in the supply chain meant that businesses struggled to maintain consistent delivery schedules, leading to customer dissatisfaction and reduced reliability.

- **Urban Sprawl:** Rapid urbanization resulted in unplanned development and sprawl, leading to congested road networks,inadequate infrastructure, and increased complexity for transportation and logistics.

- **Limited Connectivity to Industrial Zones:** Many industrial zones and commercial centers were located far from major road networks, making the movement of goods to and from these areas challenging and time-consuming.

- **Impact on Inventory Management:** Extended delivery times and uncertain transportation schedules forced businesses to hold larger inventory buffers, tying up working capital and increasing storage costs.

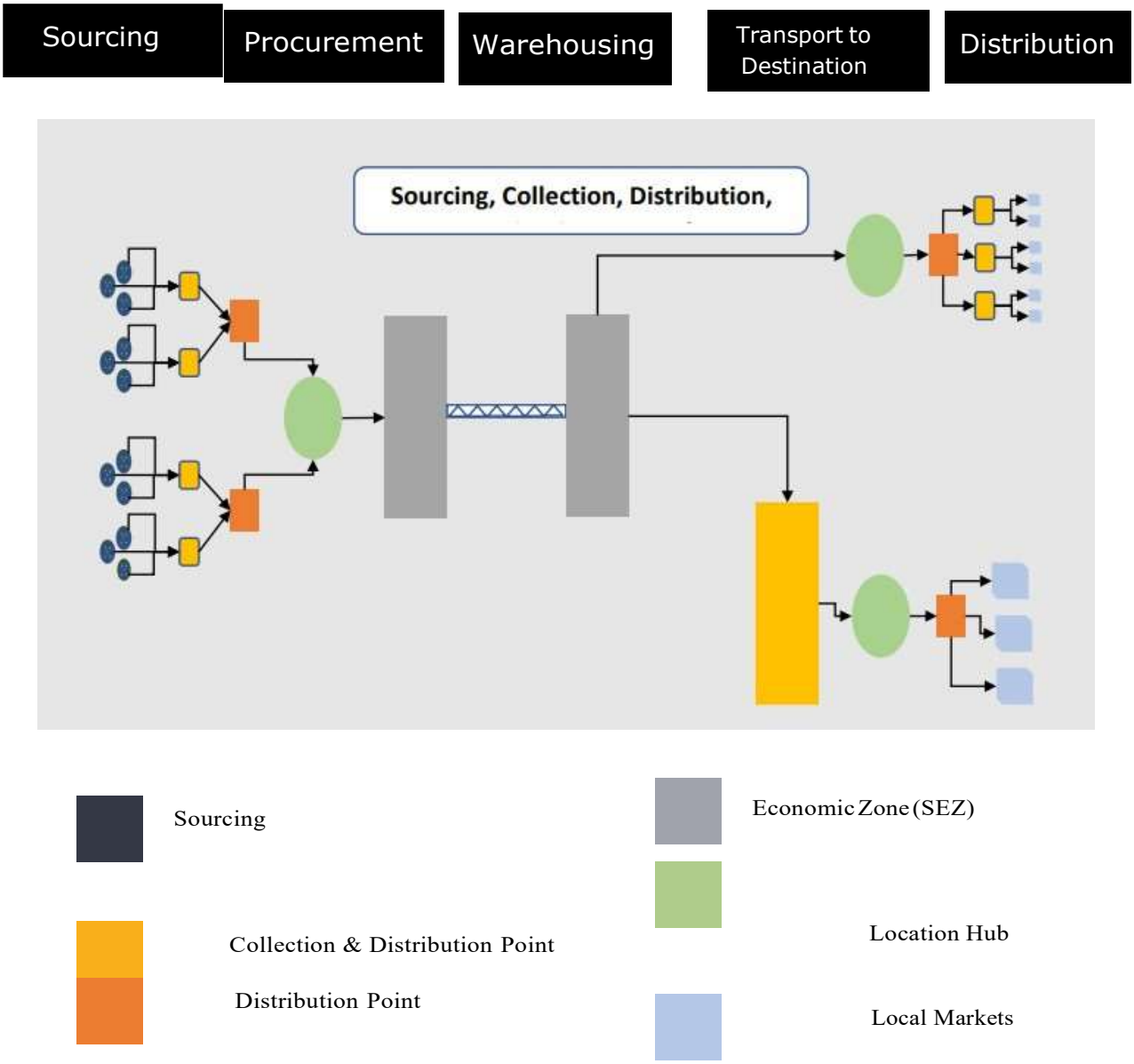
- **Environmental Impact:** Traffic congestion led to increased emissions and air pollution, negatively affecting the environmentand contributing to health concerns for both citizens and workers.

- **Logistical Inefficiencies:** Inefficient logistics operations, including longer loading and unloading times due to traffic congestion, further exacerbated the challenges in the supplychain.

- **Trade and Economic Constraints:** Delays and inefficiencies in the supply chain impacted trade activities, limiting the overalleconomic growth potential of the region.

- **Infrastructure Limitations:** The existing road infrastructure struggled to cope with the growing demands of a rapidly expanding city, leading to bottlenecks and hindrances in themovement of goods.

Proposed Supply Chain Planning Details



Vehicles Used in Network

- **Delivery Trucks:**
  - Various sizes of delivery trucks would be used for transporting goods from distribution hubs to regionalwarehouses and retail outlets.
  - Different truck sizes can accommodate different shipment volumes, ensuring efficient transportation based on demand.

- **Refrigerated Trucks:**
  - Refrigerated trucks would be employed for transporting perishable goods that require temperature control, such asfresh produce and dairy products.

- **Small Vans and Pickups:**
  - Smaller vehicles like vans and pickups would be utilized for last-mile deliveries, particularly in densely populated areas orareas with narrow roads.

- **Container Trucks:**
  - Container trucks would be suitable for transporting standardized cargo containers to and from ports and logistics hubs connected to the elevated expressway.

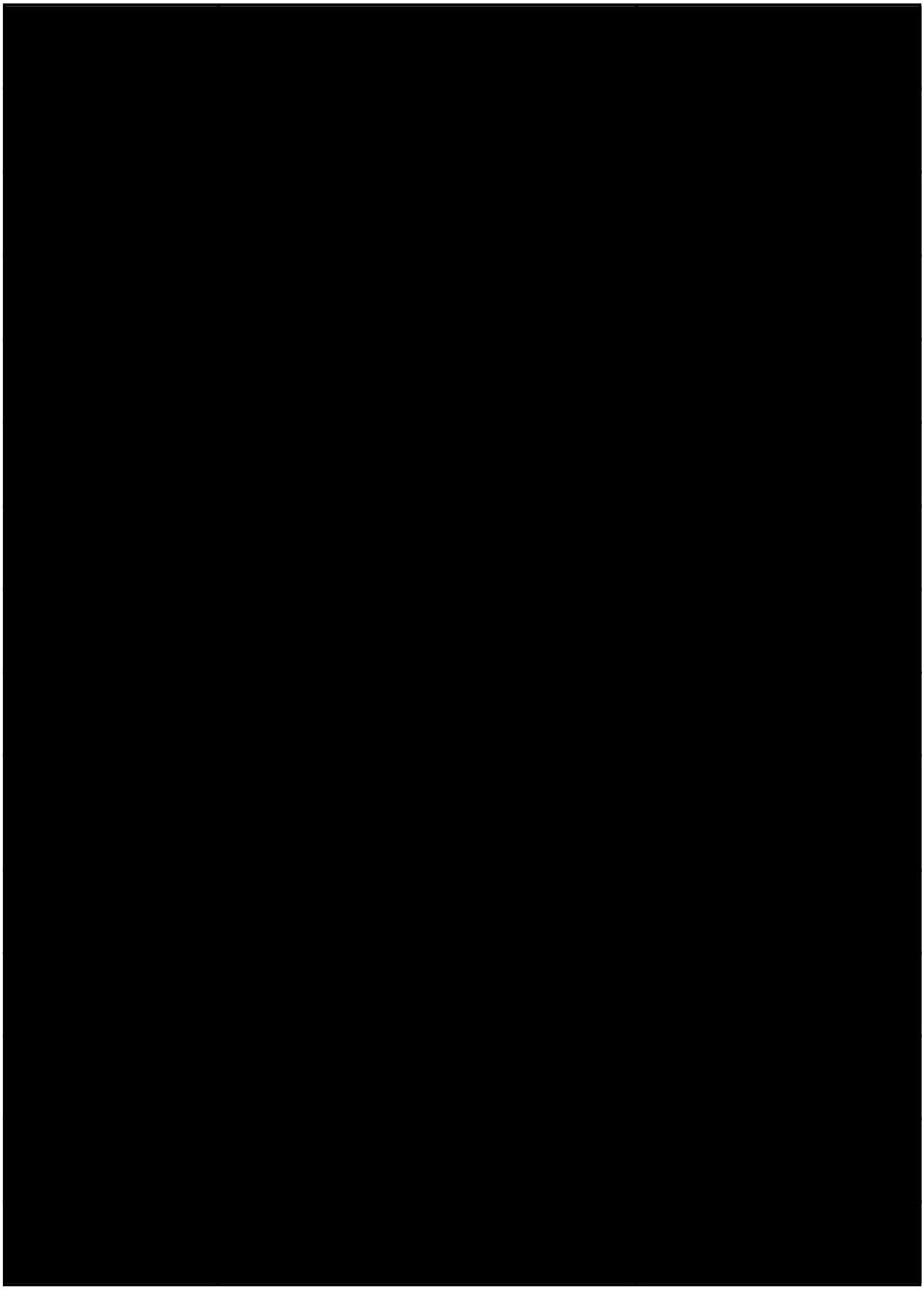
- **Flatbed Trucks:**
  - Flatbed trucks could be used for transporting oversized orirregularly shaped goods that cannot fit inside standard trucks.

- **Cargo Bikes or Cycles:**
  - In congested urban areas, cargo bikes or cycles could be employed for environmentally friendly and efficient last-miledeliveries.

- **Electric Vehicles (EVs):**
  - As part of sustainability efforts, electric vehicles (EVs) could be integrated into the fleet to reduce emissions and promoteeco-friendly transportation.

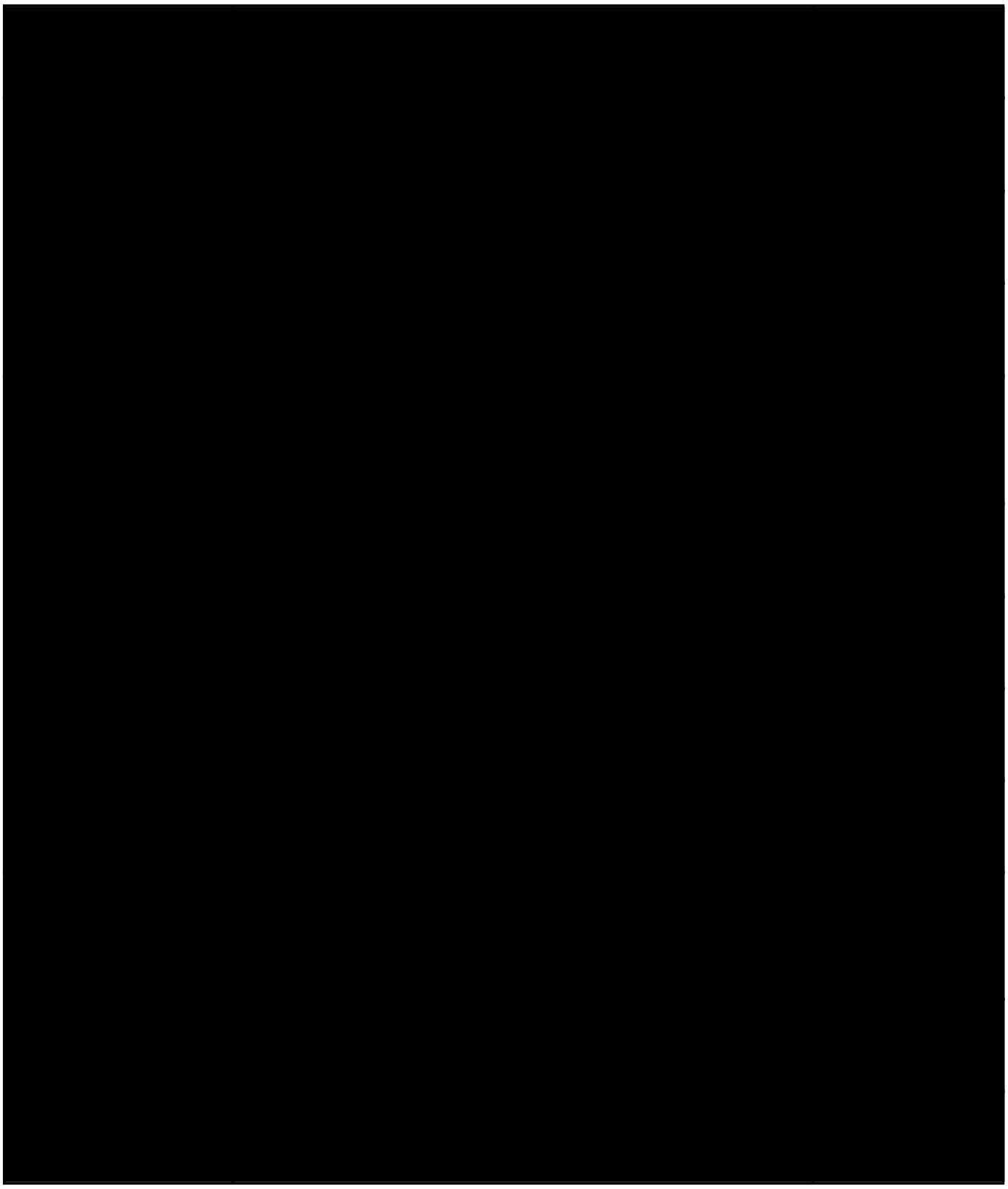
People Involved in Network

Role	Responsibilities	Individuals/Positions
Supply ChainManager	Oversee end-to-end supply chainoperations.	Supply ChainManager
Distribution Hub Manager	Manage operations atdistribution hubs.	Hub Manager Warehouse
Warehouse Manager	Supervise activities at regionalwarehouses.	ManagerLogistics Coordinator
Logistics Coordinator	Coordinate transportation andlogistics.	Route Planner Inventory
Route Planner	Plan optimal routes based onreal-time data.	Manager Fleet Manager
InventoryManager	Manage inventory levels andstock movement.	Delivery Drivers
Fleet Manager	Oversee the vehicle fleet andmaintenance.	Supplier RelationshipManager
Delivery Drivers	Execute last-mile deliveriesefficiently.	Retail ManagerIT
Supplier Relations	Manage relationships withsuppliers.	Support
Retail Manager	Oversee retail outlets andcustomer interactions.	Sustainability Officer
IT Support	Provide technical support forsystems.	Quality ControlSpecialist
SustainabilityOfficer	Implement eco-friendly practices.	Operations Analyst
Quality Control	Ensure product quality andcompliance.	
OperationsAnalyst	Analyze data to optimize supplychain processes.	



Feasibility

Feasibility Aspect	Criteria and Considerations	Feasibility Assessment
Operational Feasibility	Integration of proposed strategies withcurrent operations.	Feasible
	Availability of required technology andsystems.	Feasible
	Personnel training for new processes andtools.	Feasible
	Budget allocation for technologyintegration.	
Financial Feasibility	Cost of implementing route optimizationsoftware.	Feasible
	ROI projections based on cost savings andefficiency gains.	Feasible
	Resource availability for new vehicle types(EVs, drones, etc.).	Feasible
	Cost-effectiveness of sustainabilityinitiatives.	Feasible
Environmental Impact	Reduction in carbon footprint throughoptimized routes.	Feasible
	Environmental benefits of using EVs andsustainable practices.	Feasible
	Potential reduction in traffic congestionand air pollution.	Feasible
		Feasible



Overall Benefits

Certainly, here's a summary of the overall benefits that can be expected from implementing the proposed supply chain leveragingthe Dhaka Elevated Expressway:

- **Enhanced Efficiency:** The optimized routes and reduced traffic congestion facilitated by the elevated expressway will lead to faster and more reliable transportation, streamlining the supplychain process.

- **Reduced Transportation Costs:** Shorter travel times and optimized routes will result in lower fuel consumption and reduced operational costs, contributing to overall cost savings.

- **Improved Connectivity:** The expressway's strategic interchanges will enhance connectivity between distribution hubs, warehouses, and retail outlets, leading to more efficient goods movement.

- **Timely Deliveries:** Reduced congestion and efficient route planning will ensure on-time deliveries, enhancing customersatisfaction and loyalty.

- **Sustainability Benefits:** Integration of eco-friendly practices and potentially using electric vehicles (EVs) will contribute to environmental conservation and align with corporate social responsibility goals.

- **Economic Growth:** A well-optimized supply chain with efficienttransportation can stimulate economic growth by attracting investments, creating jobs, and boosting trade activities.

- **Operational Visibility:** Real-time tracking and monitoring systems will provide comprehensive visibility into the supplychain, enabling better decision-making and issue resolution.

Overall Benefits

- **Customer Satisfaction:** Consistent and on-time deliveries will lead to improved customer satisfaction and loyalty, enhancingthe overall reputation of the business.
- **Inventory Optimization:** Accurate demand forecasting and JIT inventory management will lead to reduced inventory holdingcosts and efficient stock replenishment.
- **Safety Enhancement:** Separating fast-moving traffic from localroads on the elevated expressway will enhance the safety of delivery drivers and road users.
- **Quality Control:** Effective supply chain management will enablebetter quality control throughout the transportation process, minimizing product damage and defects.
- **Data-Driven Insights:** The integration of technology and dataanalytics will provide valuable insights for continuous improvement and strategic decision-making.
- **Stakeholder Collaboration:** Collaborative partnerships with suppliers, manufacturers, and retailers will foster better coordination and efficiency across the supply chain network.
- **Competitive Advantage:** An optimized supply chain can provide a competitive advantage by offering faster deliveries and more cost-effective solutions compared to competitors.
- **Long-Term Sustainability:** The benefits of improved supply chain efficiency and connectivity are likely to have a lastingpositive impact on the region's economic and logistical landscape.

Limitations

- **Infrastructure Dependency:** The success of the supply chain plan relies on the availability, reliability, and proper maintenance of the Dhaka Elevated Expressway. Any disruptions to the expressway could impact operations.

- **Traffic Variability:** While the expressway can significantly reducecongestion, unexpected traffic incidents and road closures can still impact delivery schedules.

- **Supply Chain Complexity:** Increased connectivity and efficiency can lead to more complex supply chain networks that require careful coordination and management.

- **Regional Variability:** The success of the proposed supply chainmight vary in different regions due to factors like local regulations, road conditions, and market demand.

- **Unforeseen Disruptions:** Despite planning, unforeseen eventssuch as natural disasters or accidents can still disrupt supply chain operations.

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