Understanding Stakeholder Perspective on Multi-Modal Route Optimization Through New Border Crossing Point of Kharlachi on The Central Asian Regional Economic Cooperation (CAREC) Corridor

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Abstract

Pakistan's major border land ports of Torkham and Chaman are located on the CAREC (Central Asia Regional Economic Cooperation) corridor and currently handle the transit trade under the 11-member CAREC Cross-Border Trade Facilitation Agreement and the bilateral Afghanistan-Pakistan Transit Trade Agreement to which Pakistan is a signatory. Both Torkham and Chaman face periodic supply chain disruptions and cargo traffic congestions on the CAREC Corridor. The present research therefore intends to understand stakeholders' perspective to choose an alternate trade route at the Pakistan-Afghanistan border. Qualitative method was used through survey questionnaire to identify the critical factors of port competitiveness related to port infrastructure, regulatory frameworks, port costs, and port location for such interventions at Kharlachi BCP. A sample of 15 well-experienced respondents from the domains of supply chain management, logistics, trade and public sector were selected. The study affirmed that Kharlachi Border Crossing Point (BCP) located at the Pak-Afghan border having prospective multi-modal facilities is best suited to help distribute the prospective CAREC transit cargo load by rail and road transportation to overcome such disruptions. The multi-modal facility is also expected to reduce transportation costs and time. However, being in a primitive state, Kharlachi BCP requires critical development intervention to make itself regionally competitive among other BCPs to attract and manage

the regional trade flow.

Keywords: Port Competitiveness, CAREC, Land Ports, Border Crossing Points, Port Infrastructure, Port Governance, Transit Trade, Route optimization.

Introduction

For cargo clearance, a Border Land Port (BLP) or a Border Crossing Point (BCP) facilitates clearance of imports, exports, and cross-border transit trade, and cross-border movement of passengers through their profiling and immigration. Both BCPs and BLPs are alternatively used and have become pivotal areas for cross-border land trade and passenger facilitation in the contemporary development landscape (Li et al., 2021). Border Land Ports are especially beneficial when cross border fostering of trade is a priority in which physical distance creates the greatest obstacles of interaction.

Port Competitiveness is a recently emerged phenomenon under research that derives its roots from strategic management practices adopted to increase port performance (Dang et al., 2017; Koliousis et al., 2018; Li et al., 2021; Stavroulakis et al., 2020). Port competitiveness is the degree to which a port competes with another

port in a region based on its performance and strategic interdependence among firms, terminal operators, and external authorities that regulate supply chains (Chang & Talley, 2019; Hidalgo-Gallego, 2021).

The Central Asian Regional Economic Cooperation (CAREC) Program aims to facilitate cross-border trade and transportation among eleven member states, including Afghanistan, Azerbaijan, China, Georgia, Kazakhstan, Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan. (CAREC Integrated Trade Agenda-2030, 2020; CAREC Transport Strategy-2030, 2013; Xie et al., 2015). Eight members of the CAREC Trade Facilitation Agreement are also signatories of the ten-member Economic Cooperation Organization (ECO).

Pakistan aims to improve regional connectivity on the CAREC Corridor by developing Border Crossing Points at the Pak-Afghan border (Kim et al., 2022). The strategic importance of border land ports of Torkham and Chaman located at Pakistan-Afghanistan border is manifested by their facilitation in clearance of 1200 cargo consignments each. Apart from these border land ports, Khralachi and Ghulam Khan Khel and Angoor Adda are other small BCPs which have been traditional routes to handle cross-border bilateral trade and passenger movement to a lesser extent between Pakistan and Afghanistan. Kharlachi and Ghulam Khan Khel are operational whereas Angoor Adda is currently closed since 2017.

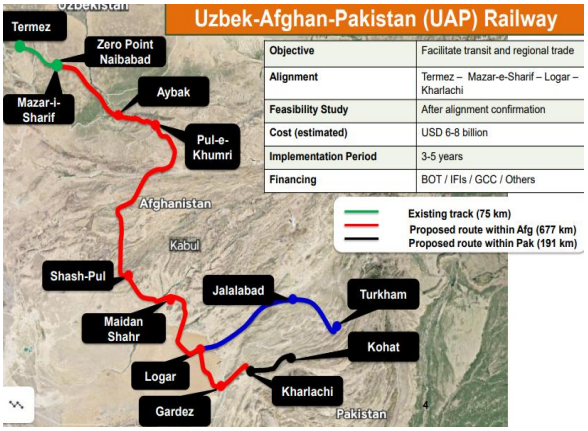
The Pakistan-Afghanistan border which is the main trade link between central and south Asia is often strained by political instability, geographical upheavals and infrastructural deficiencies which interfere with the sound flow of a supply chain existing in the CAREC region. BCPs such as Torkham and Chaman usually face traffic congestion due to high volume of the cargo being handled there and their susceptibility to disruptions. Severe supply chain disruptions enroute to Torkham and Chaman have been occurring until recently due to local unrest or floods which tend to choke the huge CAREC transit trade flow. Kharlachi has a rail link between Pakistan and Afghanistan in addition to road transport network. Its multi-modal nature therefore distinguishes itself as a strategic capability in terms of facilities available within other BCPs in the region. The CAREC trade flow can also be facilitated for all weather long-haul transit through Kharlachi BCP.

Initiating development in Kharlachi to become a fully functional multi-modal facility based of road and rail routes therefore needs to be prioritized towards resolving the existing infrastructural deficiencies along the CAREC Corridor as it constitutes part of Pakistan's wider trade enhancement strategy. Studies indicate that Multi-modal transport systems are effective in improving the flexibility, efficiency and responsiveness of supply chains, especially in high-risk areas. Integrating road activities along with Railways makes Kharlachi offer seamless transfer of cargo and assorted transit options that may enhance supply chain flow when other routes become unfavorable. This initiative is also in line with the CAREC's mission of enhancing economic resilience of its member states through building infrastructure that is robust enough to recover from shocks and promote sustainable trade routes that are competitive among the member countries.

Physical infrastructure development of Kharlachi BCP expects to provide an alternate long-haul multi-modal route for transit goods by diversion of cargo load from the congested nodes of Torkham and Chaman BCPs in case of any supply chain disruptions and its multi-modal distribution from Kharlachi. In enhancing Kharlachi's capacity and operational efficiency, Pakistan will not only enhance its trade routes but also develop more robust supply chain network in the CAREC region. The findings will offer strategic insights for policymakers seeking to strengthen Pakistan's connectivity and economic ties with its neighbors, bolstering the CAREC Corridor's role as a dependable artery for cross-border trade in Central Asia.

This paper therefore aims to address the shortcomings of Kharlachi BCP by identifying the most critical factors of port competitiveness which need to be incorporated into its development plan by the policy makers for enhancing its port efficiency for cross-border trade facilitation in the CAREC region.

Figure-1: Uzbek-Afghan-Pakistan (UAP) Railway Network across Kharlachi BCP



Literature Review

The Port Competitiveness refers to the state of rivalry that ports of different countries in a geographical region develop based on port efficiency and transportation network and resultantly opt for strategic options to achieve a comparative advantage over each other to attract the supply chains (Bhatti, 2024; Hanaoka et al., 2021; Wei & Dong, 2019). In this case, the port must have some capacity in order to participate in the regional competition and eventually become the competitor of another (or other) port. If a port has such a capacity, it is considered a "competitive port". An efficient port may therefore be regionally more competitive (Ayesu et al., 2023).

Though the technical requirements of ports, aimed at bringing operational efficiency, remain standard owing to WCO Framework and OECD Port Cities Program, the competitiveness of land ports is influenced by institutional and operational requirements specific to the regions (Bhatti, 2024; Miraj et al., 2020). In terms of price competition, the main purpose of comparison will be the cargo handling cost and port fees per TEU. Therefore, the port's proximity to major markets and transportation can play an important role in competitiveness, as the chosen location reduces delivery times and costs (Brooks et al., 2017; Parola et al., 2018).

Port efficiency refers to the capability of logistics providers and Government agencies in terms of shipment processing offered through value-added services by the available infrastructure and logistics superstructures (Beresford et al., 2012; Bichou & Gray, 2004; Hanjra et al., 2017; Le-Griffin et al., 2006; Sanchez et al., 2003; Tongzon, 2009; Yeo & Song, 2003). Additionally, port efficiency is measured by the total amount of time required to handle products, the port's consistency, and the capacity to supply substitute options (Vandyck et al., 2015).

Trade facilitation is defined by Gichuhi (2021); Koopman et al. (2020); and Yeo and Deng (2020) as the ease of port and logistical operations. Trade Facilitation's operational measures include the provision of automation enablement layer for paperless trade, digital infrastructure, digital usage, and digital security, the introduction of new supply chain des, signs and development of optimal physical infrastructure and logistics supra-structure at ports to reduce cargo dwell time (Batista, 2012; Hassan et al., 2021; Ismail, 2020). Trade facilitation usually derives its strength from the regulatory interface created between government entities and traders and global value chains at national borders (Kano et al., 2020).

Trade harmonization complements trade facilitation through simplification, modernization and mutual adaptation of export, import and transit processes, and reconciliation of trade documentation (Kormych, 2018). Trade harmonization is achieved by effective cooperation among the Customs administrations and other appropriate authorities on Customs compliance issues for standardization of mutually acceptable trade documents for compatibility in view of the international agreements on Customs cooperation, especially the Trade Facilitation Agreement (TFA) of the WTO (Ortiqov, 2023).

Cargo tonnage measured in Tons Equivalent Units (TEUs) or number of cargo vehicles carrying TEUs is the most fundamental measure of the port throughput. Cargo tonnage at a land port includes the weight of non-

containerized, containerized or Over-Dimensional Cargo (ODC) carried by trucks, open-bed prime-movers, or railway boggy carrying dry bulk and liquid bulk cargo as Over-Dimensional Cargo (ODC) (De Langen & Van Meijeren, 2012; Talley, 2011). The Land Port Dwell Time refers to the amount of time that a cargo spends at a land port before being transported to its final destination by the consignee or its agent after all formalities regarding permits, Customs procedures, and other clearances (Bhatti, & Hanjra, 2019; Gao et al., 2018).

Supply chain disruptions include physical threats like sit-ins and public agitations to stop cargo movement to ports or to kidnap the consignments by armed miscreants, enroute piracy and pilferage of cargo, smuggling, tampering of container seals, and sabotage of port and transportation infrastructure (Altemöller, 2011; Moteff et al., 2002; Nguyen & Wang, 2018; Tukamuhabwa et al., 2017). Cyber-attacks on supply chain information systems communicating with the terminal operating systems of the port operators and port authorities may lead to cargo traffic congestions at the port entry (Alcaide et al., 2020; Urciuoli et al., 2013). Inadvertent or deliberate negligence in the handling of Hazardous Materials (HazMats) can have severe consequences, including loss of life, property damage, environmental pollution, and economic disruptions (Stecke & Kumar, 2009). Manners-Bell (2017) discusses designing supply chains that are resilient to disruptions.

Route optimization is the process of determining the most cost-effective trade route to a port or a destination (Shahriar & Hasnat, 2021). Route optimization is the phenomenon of choosing an alternate route on a trade corridor to mitigate the risk of a supply chain disruption or ensuring delivery of time-critical perishable goods in a time-varying scenario (Qureshi et al., 2013; Ramazanova, 2024). As travel cost increase further and further, route optimization also get further imperative Route choice behavior depends on many parameters but mostly on travel time, traffic safety, intervals, fuel cost, traffic signs, traffic jam and queuing, road type, landscape, road constructions, carbon emission and habitual effects (Alvind et al., 2008; Bhatti, 2024; Khan et al., 2024; Zakir et al., 2024; 2022). Route optimization, powered by real-time data, advanced algorithms and GIS-Gravity models, is essential for building resilient supply chains that can adapt to disruptions and minimize their impact (Khan et al., 2024). The influence of time-varying factors on the traveling speed of vehicles in the transportation network is considered in the route selection of a cold chain container during multimodal transportation, and the traveling speed of cars, trains and ships is analyzed in a geographical terrain with certain political conditions. Significant research indicates that diversifying suppliers, production sites, and logistical routes can reduce the risks associated with localized interruptions (Saidahrolovich & Numonzhonovich, 2023). Proactive risk management for route optimization requires enhanced visibility, predictive analytics, and operational efficiency, which may be achieved by integrating technologies like AI, IoT, blockchain, and cloud computing (Karanam et al., 2024).

Introduction of multi-modal facilities for carrying goods to long distances with reduced costs has attracted researchers to focus on advanced algorithms and data analysis to determine the most cost-effective combination of transport modes (truck, rail, ship, etc.) for a given route, considering factors like distance, fuel costs, infrastructure availability, and cargo type (Hu et al., 2018; Vinokurov et al., 2022). Development of multimodal connectivity has been identified by Van Klink and Van den Berg (1998) and later reinforced by Roberson et al. (2015) who argue that the area of interest of traders need to be expanded beyond the conventional road transport networks for reduction in port costs during long haul by using rail network. Cargo handling efficiency at a border land port can thus vary based on several factors, including the infrastructure, technology, equipment, management practices, the volume of cargo being processed, and the availability of multi-modal transportation facilities designed to help transfer of cargo among trucks, trains, and ships time (ESCAP, 2022). Multimodal transport can reduce emissions compared to relying solely on trucks, especially for long hauls (Pålsson et al., 2017). Improving intermodal connectivity for goods transfers has led to effectively handle the time and expense of transferring cargo by a goods transporter between various modes to choose the shortest possible route to save time and cost (De Langen et al., 2013; Gao et al., 2024). Developing standardized containers, intermodal terminals and cargo loading systems by the logistics industry tends to streamline goods transfer and reduces handling costs as efficient terminals with adequate capacity and technology can significantly speed up transfers (Nekhoroshkov et al., 2022; Tian et al., 2024).

The Central Asian Regional Economic Cooperation (CAREC) Program aims to facilitate cross-border trade and transportation among eleven member states, including Afghanistan, Azerbaijan, China, Georgia, Kazakhstan, Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan (CAREC Integrated Trade Agenda-2030, 2020). The program focuses on facilitating transit trade, enforcing simplified regulations, automating Customs procedures, adopting standard international codes, improving infrastructure, and implementing risk-management systems (CAREC Transport Strategy-2030, 2019; Xie et al., 2015). The Central Asian region is the least integrated within itself and with its neighboring states in terms of border-crossing services offered for cargo and passengers, and any further improvement therein tends to decrease international transportation costs, border crossing time (Abdullayev, 2022; George, 2012; ADB, 2013a; Sadozaï & Blondin, 2023; Samad & Abbas, 2021; Tanabe et al., 2015; Verskun et al, 2023). Border land ports, if well-developed, are expected to play a crucial role in facilitating international trade and connectivity, particularly in landlocked regions such as those associated with the Central Asia Regional Economic Cooperation Program (CAREC Integrated Trade Agenda-2030, 2020).

Kharlachi BCP is located in Kurram District, KPK province. In 2005, the Federal Government issued a notification declaring Kharlachi as a Customs Station. The fencing upon Pak-Afghan bilateral, both, undeclared and declared, trade via land routes, connecting District Kurram with vilayat (province) of Paktia, Ningahar and Khost of Afghanistan, has forced all cargo traffic and passenger movement to divert to Kharlachi for legal clearance in the area. Customs operations remained suspended from 2008 to 2012 due to sectarian clashes. Military operations in erstwhile FATA also adversely affected trade and economic activity in the area from 2014 to 2018. In 2018, NLC took over the border trade operations, and facilities and infrastructure were improved to some extent. Currently, there is a railway line passing through the area that connect to the Afghan side. Currently, NLC is responsible for terminal operations, and Customs for checking of goods and collection of duties and taxes. Security is looked after by the Army and Frontier Corps. Kharlachi is the only legal border crossing in the Kurram District and is about 19 kms from Parachinar. The Kurram River passes near the BCP facility which is the main source of water in the area and most of agriculture depends on river water. Presently there is huge import activity of coal from Afghanistan (Amin, 2023; Bhatti, 2024; Khan, 2017).

This study considers the Stakeholder Theory as its base theory to address the research problem of exploring an alternate and draws inference from the Resource Based Theory as well for port development. Ian Mitroff (1983) first postulated this theory as the ‘Stakeholders of the Organizational Mind’ (Hirschhorn, 1984). The Stakeholder Theory looks at port competitiveness to explore the relationship between a principal and an agent which may be cooperative but may have different stakes and attitudes toward risks impacting port performance and their mitigation measures. Stakeholder theory (ST) is a theory of business ethics and organizational management (Schaltegger et al., 2019). According to the Stakeholder Theory, organizations aim to generate multiple benefits for different stakeholders (i.e., groups and individuals who can affect or be affected by the organization - e.g., civil societies, communities, customers, employees, governments, shareholders, suppliers) (Barney, 2018; Freeman et al., 2021). The study of interagency coordination and capacity of personnel at ports may also be guided by the Stakeholder Theory (Widdowson et al., 2018).

The Resource Base Theory postulates that organizations and industries endowed with abundant resources and distinctive capabilities are better equipped to withstand creative destruction. An enterprise is regarded as a collection of specific resources, and the heterogeneity of resources gives the enterprise its unique characteristics which become the source of its competitive advantage towards performance improvement (Aydiner et al., 2019). These basic ideas led to the development of the Resource-Based View (RBV) whereby RBV replaces ‘products’ with ‘resources; and considers that enterprises are a unique combination of tangible and intangible resources rather than product marketing activities. Resource-Based View (RBV) aims to develop physical infrastructure and professional capacity to help maximize throughput and increase customer-centric volume competitiveness associated with the ability of port operations to reduce dwell time. Consequently, the amount of port operational efficiency, reliability, and cargo handling charges all have an impact on port competitiveness (Bhatti & Hanjra, 2019; Cho, 2014; Li, 2017).

Research Method

The literature Review revealed that although the assessment of factors for choosing a suitable port by relevant stakeholders is nothing new, yet there is a dearth of discussion among the scholars on the determination of critical factors direly required for development of border land ports along the CAREC Corridor. This research is exploratory, descriptive, and explanatory in terms of its outcomes, however, due to uniqueness of the topic, especially in context to Pakistan, the Study is primarily exploratory. It adopted a mixed-method approach through collection of primary and secondary data and analysis of the same.

In a mixed-method approach, the qualitative technique incorporates the participant's subjective experience to bolster the credibility of the findings, while the quantitative method uses structured questionnaires to generalize the information (Kajornboon, 2005; Tavakol & Sandars, 2014). To make findings of the Study applicable at multiple levels of policy formulation and implementation, the responses were taken from a diverse sample of respondents. Qualitative data was therefore acquired through semi-structured interviews and open and closed-ended questionnaires. Through the semi-structured interviews, the respondents were prompted to express their own views and opinions on each question posed.

This allowed extraction of answers to critical questions and an in-depth investigation of activities linked to facets of operational efficiency, port infrastructure, business process digitization, trade harmonization among CAREC signatories, multi-modal transportation, port costs, port location and port governance. The research also used official statistical data on cargo flow at land ports, which was derived from larger samples for generalization. The quantitative data was obtained from various sources including trade facilitation agencies (Pakistan Customs, Federal Investigation Agency and Ministry of Commerce etc.), terminal operators (National Logistic Corporation and Pakistan Railway etc.), freight forwarders, clearinghouses, shipping lines, importers and importers, and the Federal and Provincial Chambers of Commerce and Industry.

Research Participants

A total of 15 stakeholders were initially interviewed related to port management and trade facilitation for location-specific border land ports. Stakeholders who were interviewed were also provided survey questionnaires to fill as respondents. All 15 stakeholders returned the questionnaire filled w.r.t various aspects of cross-border trade and passenger facilitation. The Survey was conducted to uncover the factors within the two dimensions (operational competitiveness based on cargo volume etc., and investment competitiveness based on port governance etc.) because of the subjective experience-based responses of participants. Their opinions formed the basis of exaction of criteria for prioritizing the factors of competitiveness.

Table-3.1: Respondents' Profile

Sr	Area of Relevance	Education	Experience	Gender	Remarks
1.	Importer/Exporter	B.A.	21	Male	Coal Importer
2.	Clearing Agent	B.A.	14	Male	Clearing House & Logistics
3.	Chamber of Commerce	B.A.	18	Male	Provincial Office Bearer
4.	Banker	MBA	14	Male	Investment Portfolio
5.	Transporter	Matric	15	Male	Open Truck
6.	Customs Official	M.A.	10	Female	Appraisement
7.	PSW Official	M.A.	11	Male	IT Management
8.	Immigration Official	M.A.	10	Male	NADRA Project
9.	Plant Protection Official	B.Sc.	16	Male	DPP
10.	Terminal Operator Official	M.A.	14	Male	Border Terminal Operations
11.	Frontier Corps Official	B.A.	16	Male	Commandant

Table-3.1: Respondents' Profile					
Sr	**Area of Relevance**	**Education**	**Experience**	**Gender**	**Remarks**
12.	Pakistan Railways	M.Sc.	12	Male	Rail-Cop
13.	Ministry of Commerce	M.A.	12	Female	WTO Desk
14.	Ministry of Communications	MBA	14	Male	JS-II Technical
15	Transportation Facilitation Consultant	BSc Civil Engineering	26	Male	UNESCAP-SSWA
16	Pakistan Railways	M.Sc.	12	Male	Railcop
17	Pakistan Railways	M.A.	09	Male	Railway Operations
18	Pakistan Railways	B.A.	11	Male	Land Record
19	Pakistan Railways	B.A.	13	Male	Infrastructure Development
20	Customs Advisor	M.B.A.	30	Male	Legal Consultant
21	Pakistan Engineering Council (PEC)	B.Sc.Engg	14	Male	Infrastructure & Contract Management
22	Port Equipment Vendor	B.B.A.	18	Male	Scanners/Weighbridges
23	Port Equipment Vendor	M.Sc.	17	Male	e-Gates/ Data Centers
24	Frontier Corps Official	B.A.	16	Male	Commandant
25	Infrastructure Consultant	MBA	22	Male	Donor Agency

Data Collection and Analysis

Face-to-face in-depth interviews were conducted with the respondents who were the primary stakeholders in CAREC cross-border trade facilitation and operationalization from Kharlachi BCP like Pakistan Customs, PSW, Immigration, Plant Protection Department, Border Terminal Operator (BTO) and the Frontier Constabulary. The other key respondents included officials from the ministries of Railways, Commerce, and Communications for policy input. Interviews were also conducted from a prominent clearing house, logistics provider and freight forwarded. To get feedback from the international forum of UNESCAP for Customs digital transformation and road transport network development in the CAREC region was also obtained. Interviews approximately lasted between 30 and 45 minutes. Subsequent to sharing the trade flow data at Kharlachi and other Pakistani BCPs, with the respondents, they were subjected to key questions and probing questions, as well as throw-away questions within the semi-structured survey format. All the responses were later transcribed to code the data for scaling down to meaningful themes as stressed by Bhatti et al. (2016); Miles and Huberman (1994). In addition, the respondents were encouraged to freely express their opinion on the issue.

Findings and Discussions

This section shows the findings reported in view of the research objective in the exploratory study. The following themes were extracted from the interviews:

Theme 1: CAREC Corridor and its Significance to Pakistan

In giving their viewpoint about the Central Asia Regional Economic Cooperation (CAREC) Program, *Respondents 1, 3, 6, 13* and *15* affirmed that CAREC is the new vision for regional connectivity and economic empowerment of the people in the area. The signatories of the CAREC Cross-border trade Facilitation Agreement intend to link their landlocked hinterland to the deep seaports in the Arabian sea as well as to ensure that trade links with South and South-East Asia and Africa are established. *Respondents 14 apprised* that from 2001 to December 2023, CAREC investments reached almost $51 billion spanning around 276 regional projects. Of the total, ADB financed more than USD 17.6 billion, USD 23.4 billion by other development partners, and USD 10 billion by the CAREC governments. He further informed that Pakistan has invested around USD 2.4 Billion in the CAREC Program in various project streams and tranches

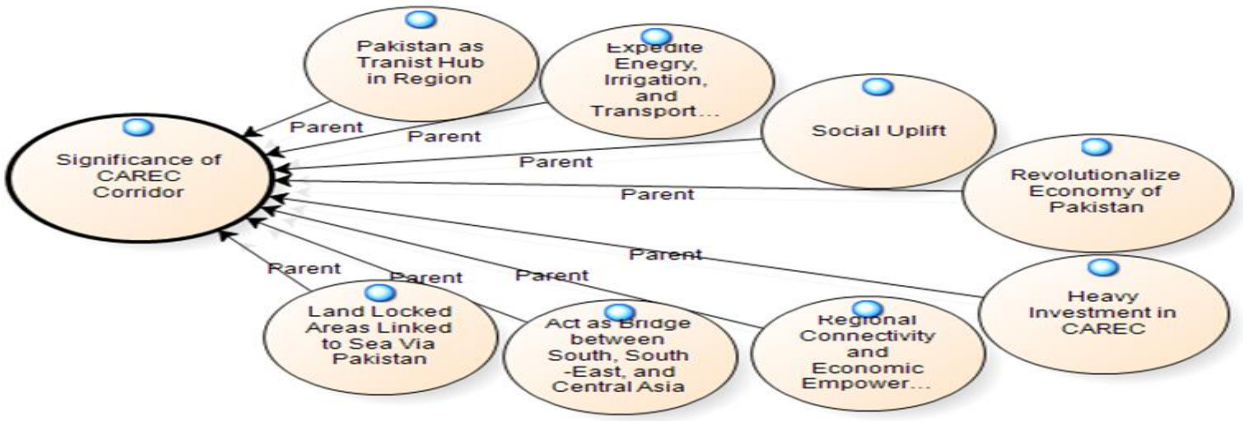
which amounts to 4.6% of the overall investment. *Respondents 7* and *15* avowed that the CAREC was likely to revolutionize Pakistan's overall economic condition and improve the lives of millions of people across the region. *Respondents 3, 4, 6,* and *7* were of the view that CAREC would further strengthen the ties among its eleven signatories through an effective trade corridor. Respondent 5 expected the CAREC Corridor to act as a bridge between South & South-East Asia and Central Asia., hence, rendering Pakistan a transit hub in the region. All respondents were of the view that development of the CAREC Corridor would be much beneficial in terms of the socio-economic uplift of the local populace, infrastructure development of its BCPs, and for the regional trade in general, thus benefitting Pakistan. Respondents 6, 7, 12, 13, 14 and 25 added that the imminent energy, irrigation and transport projects announced as part of the CAREC Agreement would also overcome Pakistan's needs in these sectors. Figure-1 depicts the code/node map of Theme-1.

Proposition

Optimal utilization of the CAREC Corridor would significantly ameliorate the overall economic condition of Pakistan by making it a regional transit hub, besides initiating the social uplift of the populace living near the border areas.

Figure-1

Code/Node Map – Theme-1 (CAREC Corridor and its significance to Pakistan)



Theme 2: Contribution Of CAREC Investments in Infrastructure and Services for Regional Port Competitiveness

All respondents were of the view that adequate port infrastructure consisting of Customs Control Zone (CCZ) having import, export and transit trade yards, cargo handling equipment, help in provision of value-added services at all Pakistani BCPs which would lead to enhanced operational efficiency, and would therefore attract and facilitate more CAREC transit trade flow. Respondents 1,2, 3 and 15 proposed that round-the-clock value-added services if made available at Kharlachi BCP, may further reduce transit time of the CAREC cargo to the seaports of Gawadar and Karachi. They were of the staunch view that this would help in meeting export deadlines. Respondents 1, 2, 4, 22 and 23 further opined that the customized cargo scanning and handling equipment at Kharlachi would expedite cargo clearance of the main commodities like fresh fruit by providing temperature-controlled warehouses, and building a dedicated open examination shed for the mineral and bituminous coal would mitigate the risk of their accidental ignition. Respondent 10 stated that leveraging technology for efficiency may help real-time cargo tracking and providing visibility regarding the cargo whereabouts to the Border Terminal Operators (BTOs) of Pakistani BCPs for better coordination and reduces delays. He hoped that through the BTO's Terminal Operating System (TOS) duly integrated with Pakistan Single Window (PSW) and other regional TOS and Single windows. They were of the view that this would help the BTO to get the cargo load distributed in advance to less congested BCPs. Respondents 7 & 8 emphasized that the availability of digital

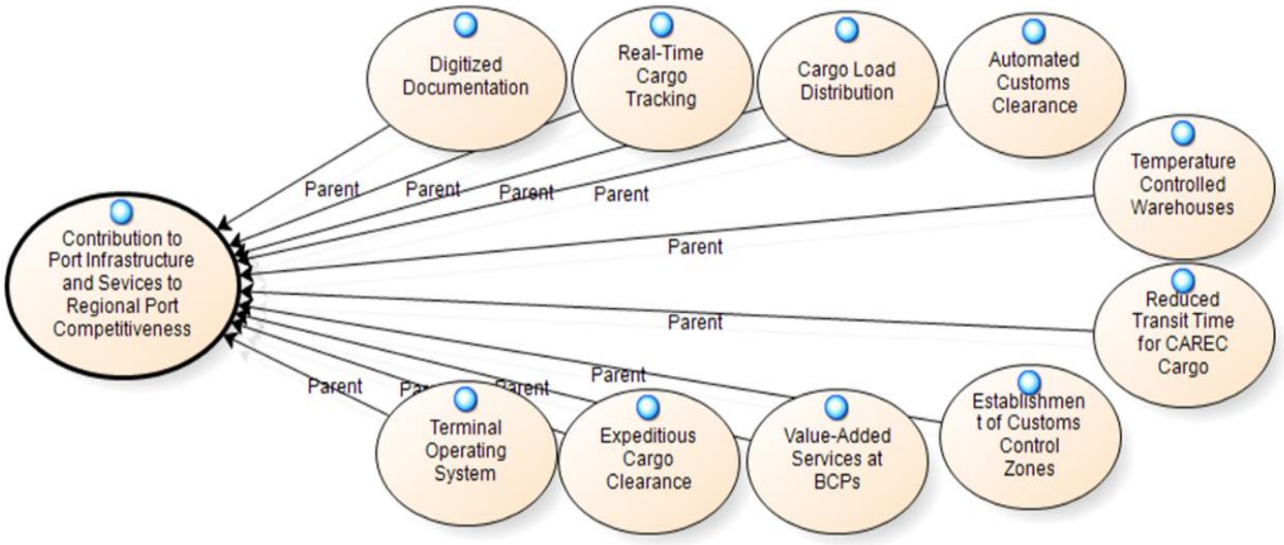
documentation and automated Customs processing at all BCPs' ICT enablement layer would minimize paperwork, speed up border crossing clearance and passenger movement and reduce administrative costs.

Proposition

Adequate and customized port infrastructure and value-added services at all Pakistani BCPs in general and Kharlachi BCP in particular would lead to enhanced trade facilitation in case of supply chain disruptions at other BCPs on the Pak-Afghan border, thereby increasing its competitiveness on the CAREC Corridor.

Figure-2

Code/Node Map – Theme-2 (Contribution of CAREC investments ort infrastructure and services to regional port competitiveness)



Theme 3: Route Optimization through Kharlachi may Mitigate Supply Chain Disruptions

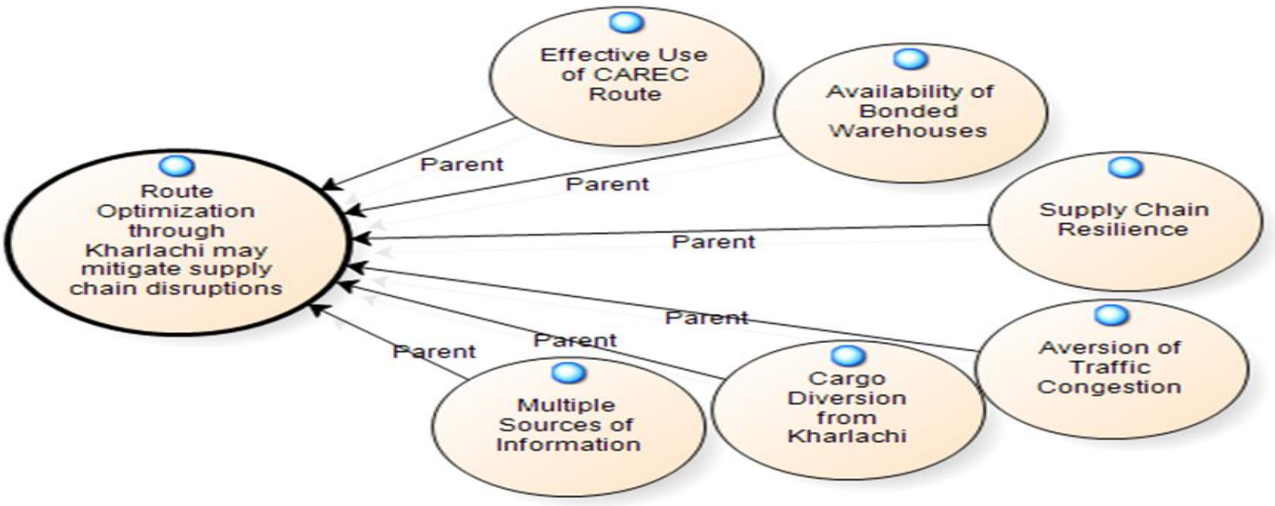
Respondents 1, 2, 3, and 5 opined that Kharlachi BCP is at a suitable location from where the CAREC transit cargo load heading towards Torkham and Chaman can easily be diverted to Kharlachi and distributed to the main traffic arteries in case of traffic congestion. However, Respondents 1, 2,3 5, 6, and 13 were of the view that due to frequent supply chain disruptions arising out of sit-ins by the local tribes, and occasional law and order situation in the area of both Torkham and Chaman, long queues of trucks and containers are formed which hamper normal traffic as well. They were of the view that provision of ample storage space for cargo in the form of bonded warehouses in and around Kharlachi BCP may also help in clearing congestion in the goods examination sheds in case all goods are diverted to Kharlachi. Respondents 6 and 13 were of the view that the cross-border trade route if optimized to pass through Kharlachi BCP may significantly avert the probability of traffic congestion or blockade in case any supply chain disruptions. All respondents were in unison that the route optimization through Kharlachi has potential to make effective use of the CAREC Corridor. Respondents 1, 2, 3, 5 and 20 opined that Kharlachi BCP is at a suitable location from where the CAREC transit cargo load heading towards Torkham and Chaman can easily be diverted to Kharlachi and distributed to the main traffic arteries. They were of the view that provision of ample storage space for cargo in the form of bonded warehouses in and around Kharlachi BCP may also help in clearing congestion in the goods examination sheds in case all goods are diverted to Kharlachi. Respondents 6, 7 and 10 urged that data related to supply chain disruptions regarding sudden closure of a trade route can come from various sources like news feeds, sensor networks, GPS tracking of shipments, weather reports, and even social media updates. They were therefore of the view that all BCP may be duly connected to the nearest major cities with optic fiber cable to get immediate access to such information for supply chain resilience.

Proposition

Route optimization relies on real-time data about the supply chain disruption and resultant sudden closure of a trade route. This information may include the severity of the disruption, estimated duration, and its impact on transportation routes and node capacity. Kharlachi, being at a suitable location between Torkham and Chaman BCPs, may provide the transition arrangement during a trade route disruption. To make route optimization critically effective through Kharlachi BCP, a robust ICT infrastructure and optic fiber connectivity to the nearest major city is imperative.

Figure-3

Code/Node Map – Theme-3 (Route Optimization through Kharlachi may mitigate supply chain disruptions)



Theme 4: Multi-Modal Transportation Network for CAREC Route Optimization

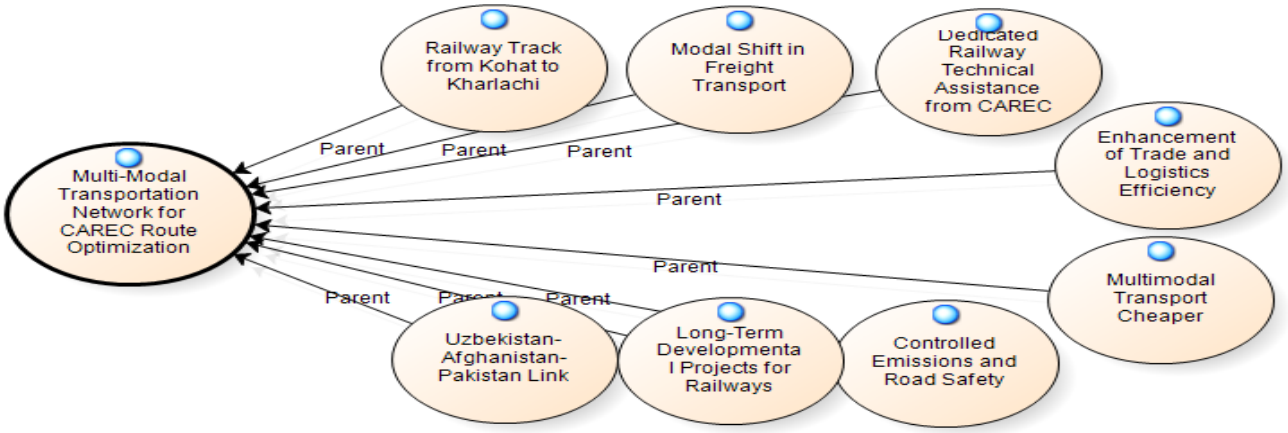
Respondent 12 informed that a 192 Km long Railway development Project has been planned from Kohat to Kharlachi via Parachinar District for coal transportation in the Federal budget 2024-25. He informed that it will be part of a 573 Km Uzbekistan–Afghanistan–Pakistan Railway Project which is an extensive project undertaking with the objective of creating a direct railway link between Uzbekistan and Pakistan, passing through Afghanistan's territory. Respondents 6, 12, 13, 15, 16, 17, 18 and 19 were of the consolidated view that this project aims to enhance trade and logistics efficiency of Kharlachi BCP by establishing a 573-km rail connection in parallel to the road network from Kohat to Tashkent, the capital of Uzbekistan, via Kabul. Respondent 12 apprised that currently the feasibility study is in progress by a team of consultants for the 1st phase of 192 Km from Kohat to Kharlachi via Tehsil Thal in Hangu District in Khyber Pakhtunkhwa Province. Respondents 13 and 14 apprised that the long-haul cargo movement through railway multi-modal transport is cheaper. Respondent 15 and 17 added that the cost of transportation per unit of carried goods will be reduced along with the quantity of emissions and improved road safety, as fewer trucks are required to ply on the trade routes. He added that the modal shift in freight transport that was triggered by surging ocean freight rates benefited the CAREC Corridor 2 and heightened interest in developing it into a more viable overland route, preferably by rail to drastically reduce transportation costs beyond 600 kms. He apprised that a railway strategy for CAREC (2017–2030) has been formulated which supports the long-term development of the railway sector in all CAREC countries to facilitate cross-border trade and promote economic development in the region. Respondent 12 affirmed that a dedicated railway sector Technical Assistance (TA) has been launched in 2019 by the CAREC Program to provide practical support to the concerned railway ministries through prefeasibility studies, knowledge sharing and management support. He hoped that completion of the Uzbekistan–Afghanistan–Pakistan Railway Project passing through Kharlachi BCP and connecting the rail Corridor with major cities of Pakistan would foster the utilization of less-costly rail transportation for long distances in the CAREC region.

Proposition

Multi-modal facility at Kharlachi BCP may have a higher rate of attracting CAREC Cargo flow which would provide comparatively low cost for transporting goods to long distances.

Figure-4

Code/Node Map – Theme-4 (Multi-Modal Transportation Network for CAREC Route Optimization)



Discussion

Interrelation of Key Factors (Themes and Sub-Themes)

The multi-modality and alternate port location tends to influence the competitiveness of border land ports in addition to the administrative efficiency and development of port physical infrastructure as determined by this study. These factors are interconnected and work together to determine the overall competitiveness of a port as has been found by Hu et al. (2018): Vinokurov et al. (2022). Having well-defined and consistent infrastructure development policies helps to achieve the compliance standards for expediting trade processes (Bhatti, 2024; Khan et al., 2024). Respondents highlighted the importance of reducing dwell time, alternate supply chain route, multi-modal transport facility improve port competitiveness. These elements work together to create a stable and predictable environment that strengthens port competitiveness and promotes regional trade integration (Nekhoroshkov et al., 2022; Tian et al., 2024).

Implications for Regional Trade

Tackling the identified obstacles by the government can result in substantial advantages for regional trade. Efficient investment facilitation can reduce costs, enhance logistics efficiency, and attract foreign investment, which can contribute to economic growth desired by every government (Gumbo & Nkala, 2024). Improving port operational efficiency can speed up cross-border trade, minimize delays, and facilitate smooth transactions, thereby promoting envisioned regional connectivity (Kaledio & Elisha, 2024). Respondents emphasized the significance of these enhancements in establishing Pakistani border land ports as key centers within the CAREC Corridor, promoting regional economic integration and collaboration (Bhatti, 2024; Cocuzza, Ignaccolo, & Campisi, 2024).

Comparative Analysis

A comparison with other regional studies and worldwide best practices indicates the two-pronged strategy of alternate port selection for route optimization and the adoption of the modal facility in freight transport elsewhere for long-distance freight cost reduction in the CAREC region (CAREC 2017–2030) which may become part of the long-term development of the railway sector in all CAREC countries to facilitate cross-border trade and promote economic development in the region. These examples indicate that implementing similar best practices can improve the competitiveness of Pakistan's border land ports (Bhatti, 2024).

Conclusion

This article highlights the significance of an adequate port infrastructure and provision of digitalized value-added services at the Pakistani Border Crossing Points, ensuring reduced dwell time and port costs, and in return attracting more CAREC transit trade flow, being regionally more competitive. Frequent supply chain disruptions have been observed recently en-route to Torkham and Chaman BCPs at the Pak-Afghan border due to local tribe sit-ins and law and severe weather, causing long queues of trucks and containers.

The paper therefore explores the development prospects of Kharalchi BCP in Pakistan as a means of providing an alternate cargo clearance border terminal for interruption-free cross-border cargo movement. Kharlachi BCP, currently operational but much smaller in size compared to Torkham and Chaman BCPs, holds the prospects of offering the cargo load, congested at other BCPs, to be distributed through it if the trade route on the CAREC Corridor is optimized for utilization of Kharalachi. Thus, the excess transit cargo can easily be diverted to alleviate traffic congestion if the infrastructure development of Kharlachi BCP is carried out on priority.

As the 573 km Uzbekistan–Afghanistan–Pakistan Railway Project is expected to pass through Kharlachi BCP, CAREC trade flow will also have a multimodal transportation network for low-cost, long-haul movement of goods. All the key stakeholders from the corporate and public sectors emphasized that Kharlachi BCP may be developed as a priority to avail route optimization and multi-modal facility for enhanced interruption-free cross-border trade facilitation on the CAREC Corridor. The paper, therefore, suggests certain policy interventions for development planners in this regard.

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