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From Strategic Node to Regional Connectivity Hub: The Formation Mechanism of Chabahar Port under the International North-South Transport Corridor

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Abstract: *Turning strategic infrastructure into a regional connectivity hub has become one of the more persistent questions in the study of transnational transport networks. Chabahar Port sits squarely inside that debate: as a key component of the International North-South Transport Corridor (INSTC), it has drawn a good deal of attention for what it might do — link the Indian Ocean with Central Asia and, beyond that, with the Eurasian hinterland. What the literature has tended to emphasize, however, is the port's geopolitical significance. How connectivity capacity is actually built, and through what process, remains rather less clearly explained. Drawing on work on economic corridors, port regionalization, and connectivity governance, this study sets out an analytical framework in three dimensions: node formation, network embedding, and governance support.The analysis shows that Chabahar Port's regional connectivity capacity is not the simple product of location and investment; it takes the interaction of spatial conditions, transport networks, and institutional arrangements for that capacity to appear at all. Joining the INSTC has certainly widened the port's potential. Even then, infrastructure gaps, day-to-day operational limits, and the uncertainty that still hangs over cross-border cooperation keep the port from working as a full regional hub. By following the port's path from strategic infrastructure node to regional connectivity hub, the study arrives at a framework for explaining how young transport corridors manage to generate connectivity under difficult geopolitical and institutional conditions.*

Keywords: *Chabahar Port, Regional Connectivity Capacity, International North–South Transport Corridor, Economic Corridors, Port Regionalization, Connectivity Governance*

1. Introduction

Transnational infrastructure networks have redrawn the map of regional connectivity, tying transportation systems to economic activity and institutional cooperation. Ports sit at the center of this change, increasingly read not as transport facilities but as strategic nodes joining maritime routes to regional markets beyond the waterfront. The International North–South Transport Corridor (INSTC) offers a concrete setting in which to watch this transformation happen. Chabahar Port sits on Iran's Gulf of Oman coast, and the promise is a straightforward one: a link from the Indian Ocean to Central Asia, and on into the Eurasian hinterland. Once folded into the INSTC, the port is meant to work as a regional connectivity platform where several networks meet. Yet location and investment do not produce working connectivity by themselves; the road from strategic node to connectivity hub depends on infrastructure foundations, network integration, and institutional arrangements moving together. Scholarship on Chabahar, for its part, has had a great deal to say about the port's geopolitical meaning. How its connectivity capacity actually takes shape has attracted far less notice.

To close that gap, the study builds an analytical framework on three dimensions: node formation, network embedding, and governance support. Chabahar figures here not as a dot on the map but as an infrastructure node on the move within wider regional networks. Working from economic corridor theory, port regionalization, and connectivity governance, the study traces how strategic infrastructure grows into a regional connectivity hub under demanding institutional conditions. As for method, this is a qualitative single-case study. Its evidence base combines three kinds of material: academic work on corridors, ports, and infrastructure governance; policy documents on the INSTC and the Chabahar agreements; and secondary reporting on the port's operational record. Reading these materials against the three dimensions, iteratively, shows where connectivity capacity takes hold and where it stalls. The framework is interpretive rather than statistical — its job is to organize explanation, not to test

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hypotheses.

2. Literature Review and Theoretical Framework

2.1. Economic Corridors and Regional Connectivity Formation

Economic corridors give us a way into the question of how infrastructure reshapes regional connections. A corridor is not simply a route. It binds transportation systems, economic activities, and institutional arrangements together so that regional interaction can widen. Work in this area stresses that corridor development rests on coordination mechanisms as much as on physical infrastructure. Brunner treats economic corridors as integrated development spaces connecting trade, investment, and regional economies [1]. Kunaka and Carruthers make a related point about cross-border corridors: performance there depends on infrastructure coordination, regulatory compatibility, and institutional cooperation [2,3]. More recent research links infrastructure corridors with spatial restructuring and with geoeconomic processes [4]. Read this way, Chabahar Port's role within the INSTC becomes easier to grasp. The port is not just a maritime facility; it is a potential node connecting different transportation systems and different economic regions.

2.2. Port Regionalization and Network-Based Development

Port studies have moved on. Ports are no longer pictured as isolated transportation facilities so much as network-based platforms, and as global supply chains have developed, a port's regional influence has come to depend on how well it connects maritime routes with inland transportation networks. Notteboom and Rodrigue argue that modern ports have entered a regionalization stage, one in which their functions reach well beyond traditional waterfront operations [5]. Later research points the same way: hinterland connections and logistics integration have become important factors in shaping port competitiveness [6,7]. All of this gives a firm basis for examining Chabahar's transformation. Its strategic importance is bound up with its geographical location, no doubt. Its long-term connectivity capacity, though, depends on something else — whether it can become embedded within wider Eurasian transportation networks.

2.3. Governance Conditions for Cross-Border Connectivity

Infrastructure and transportation networks cannot guarantee sustainable connectivity by themselves. Cross-border corridors draw in multiple actors, which puts institutional coordination close to the heart of how the network operates. Research on infrastructure governance suggests that connectivity outcomes are shaped by cooperation mechanisms, by regulatory arrangements, and by wider geopolitical conditions. Schindler and colleagues press the point further: infrastructure corridors are embedded within geoeconomic processes, and governance capacity leaves its mark on regional outcomes [4,8]. Studies of Chabahar say much the same — that cooperation among the participating actors bears on whether the port can turn strategic potential into practical connectivity functions [9,10]. Governance support, then, is an essential dimension of connectivity formation rather than an addition to it. It helps explain why broadly similar infrastructure projects can end up with such different outcomes under different institutional environments.

2.4. Analytical Framework for Connectivity Hub Formation

Each of these literatures illuminates a different aspect of connectivity development: economic corridor theory is chiefly concerned with regional integration, port regionalization theory with network transformation, and governance studies with institutional conditions. What is harder to find is an integrated explanation of how strategic infrastructure evolves into a regional connectivity hub. This study proposes one — an analytical framework made up of three interconnected dimensions: node formation, network embedding, and governance support.

Figure 1 sets out the three dimensions. Node formation covers the geographical advantages, infrastructure foundations, and strategic positioning that allow a location to become a significant infrastructure node in the first place. Network embedding describes the process through which Chabahar Port is drawn into wider transportation systems, the INSTC above all; existing studies indicate that the port's future role will depend increasingly on that integration rather than on geographical advantages alone [9,11]. Governance support refers to the institutional conditions that

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decide whether connectivity capacity can be maintained and then extended, cross-border cooperation, regulatory coordination, and institutional stability all bear on how effectively infrastructure and networks operate [4,10]. Taken together, the three dimensions trace how Chabahar Port gradually works its way from a strategic infrastructure node toward a regional connectivity hub.

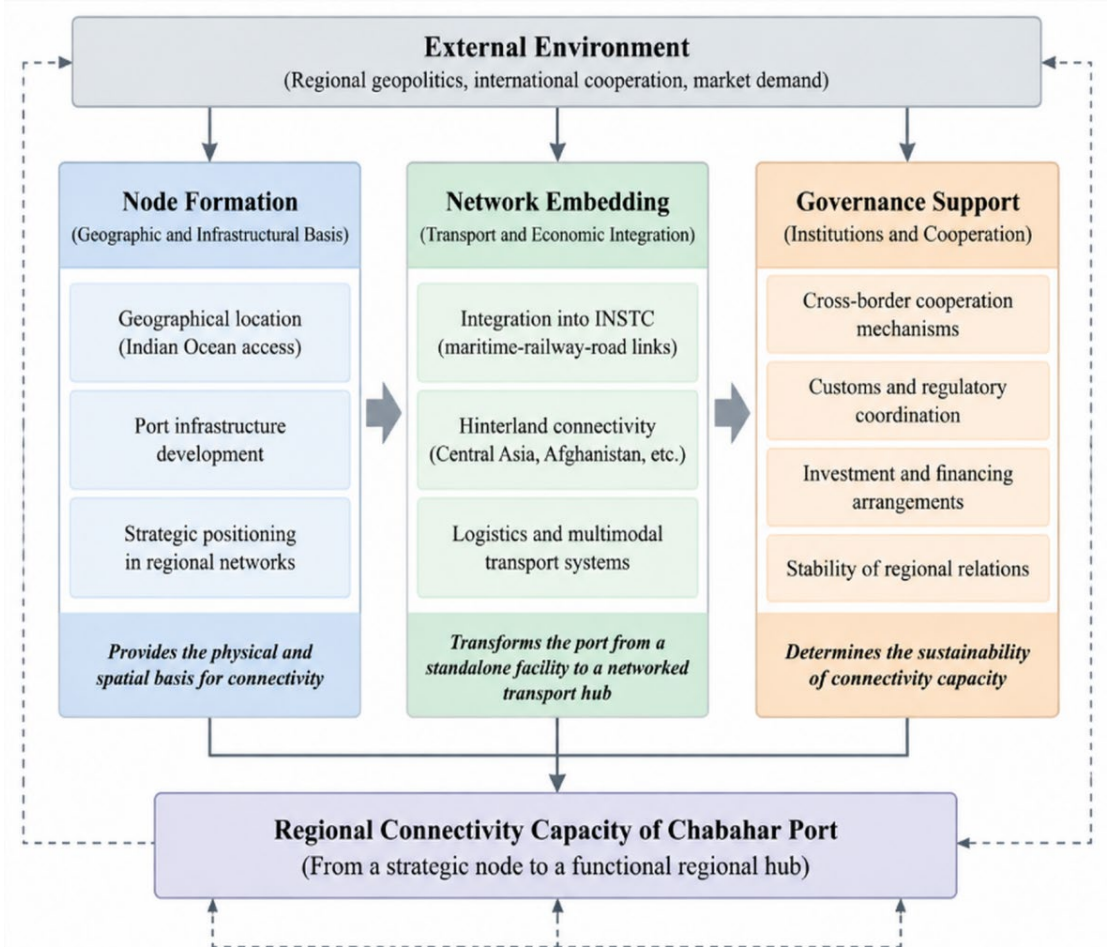


Figure 1: Analytical Framework of Chabahar Port's Regional Connectivity Capacity.

3. Formation Process of Chabahar Port's Regional Connectivity Capacity

3.1. From Geographic Advantage to Strategic Infrastructure Node

Regional connectivity capacity begins with the emergence of a strategic infrastructure node. Geographic conditions supply the initial potential; infrastructure development and strategic positioning decide whether a location goes on to acquire broader regional significance. Chabahar Port, on Iran's Gulf of Oman coast, has an advantage that is hard to miss — direct access to the Indian Ocean. Set against ports tucked inside enclosed maritime areas, it offers an alternative gateway connecting South Asia, Central Asia, and the Eurasian hinterland. That geographical position has done real work in establishing its strategic importance within regional transportation planning [9]. Location alone, however, does not create connectivity capacity. A port becomes strategically significant only when its locational advantages are matched by infrastructure foundations and functional integration. Previous studies suggest that what matters about Chabahar is less its physical position than its potential to connect different economic regions through wider transportation networks and cooperation mechanisms [9,10]. Seen from the angle of economic corridor development, infrastructure nodes acquire regional functions gradually. Investment lays down the physical foundation, while strategic positioning shapes how a node takes part in broader networks [1,2]. Node formation is therefore the opening stage of connectivity development — the point at which geographical potential is turned into strategic infrastructure value. India's engagement with the port traces the sequence: a framework of transport cooperation agreed with Iran as early as 2003, and the development of the deep-water Shahid Beheshti terminal as the port's modern core, mark the stages through which Chabahar's locational promise

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acquired institutional and physical form [11,12].

3.2. Network Embedding through the International North-South Transport Corridor

Node formation creates the foundation; network embedding is where regional connectivity capacity gets realized. A strategically located port will not become a regional hub without integration into broader transportation systems and economic networks. For Chabahar Port, the INSTC supplies the main framework within which its regional connectivity role expands. Corridor-based development differs from traditional port development models, which concentrate mainly on maritime functions: it emphasizes the interaction between maritime routes, inland transportation, and regional markets. Research on Chabahar traces a gradual change of register — from a geopolitical project toward a broader geoeconomic initiative, in which transportation efficiency and regional economic linkages carry growing weight [10]. Studies of the INSTC point the same way, holding that the corridor's effectiveness depends on better multimodal integration and on stronger connections among different transportation networks [13,14]. Network embedding, it should be said, involves more than establishing physical connections. What changes is the functional role of the infrastructure itself. Hooked into railway and road systems, Chabahar can extend its influence beyond the coastline and connect with inland economic regions. Transport geography puts the point rather bluntly: connectivity depends on where a node sits within wider networks, not on infrastructure capacity alone [15]. So the key challenge for Chabahar is not simply constructing transportation facilities — it is making sure those facilities generate continuous flows of goods, capital, and information. In this sense, Chabahar's transformation amounts to a shift from "building a port" to "constructing a connectivity network." The INSTC itself dates to a framework agreement among Russia, Iran, and India signed in 2000, and its roughly 7,200-kilometer multimodal network now reaches from the Indian Ocean to the Caspian and onward toward Central Asia and Northern Europe. Chabahar's embedding has proceeded through concrete instruments: the trilateral transit agreement signed by India, Iran, and Afghanistan in May 2016; the Zaranj–Delaram highway, some 220 kilometers built by India and handed over in 2009, tying the port into Afghanistan's interior; and the wheat consignments India began moving to Afghanistan through the port from 2017 onward [16].

3.3. Governance Support for Sustainable Connectivity Functions

Infrastructure and networks provide the material basis of connectivity. Sustainable regional functions, though, require effective governance support behind them. Cross-border corridors involve multiple countries, institutions, and economic actors, and coordination is what keeps them operating over the long term. Within the INSTC, governance conditions reach into transportation standards, investment arrangements, customs procedures, and cooperation mechanisms alike. Infrastructure projects of this kind are not only economic initiatives; they are also institutional arrangements shaped by broader geoeconomic relations [17,18,19]. Previous research on Chabahar suggests that cooperation among the participating actors, together with regional stability, influences whether the port can transform its strategic potential into practical connectivity functions [10]. Without workable coordination mechanisms, infrastructure advantages tend to remain underused [20]. Governance support should therefore not be treated as an external factor added on after infrastructure development. It is a core dimension of connectivity formation, and it determines whether infrastructure and network connections can operate effectively and hold their regional influence over time. Chabahar's own institutional record bears this out. India Ports Global took over operations at the Shahid Beheshti terminal in December 2018, under an American sanctions waiver granted only the month before, and in May 2024 signed a ten-year contract with Iran's Ports and Maritime Organization for the terminal's operation and development — an arrangement whose durability still rests on the wider sanctions environment.

3.4. An Integrated Framework for Connectivity Transformation

On this reading, the formation of Chabahar Port's regional connectivity capacity is best understood as an interactive process running through node formation, network embedding, and governance support. Node formation establishes the initial conditions by combining geographical advantages, infrastructure foundations, and strategic positioning. Network embedding widens the functional scope of the port by connecting it with wider transportation systems, the INSTC above all. Governance support supplies the institutional conditions required to maintain those connectivity functions. The three are not independent stages so much as mutually reinforcing processes. Geographical advantages create connectivity potential, network integration converts that potential into practical functions, and governance

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mechanisms sustain the development over time. It is through this process that Chabahar Port gradually evolves from a strategic infrastructure node into a regional connectivity hub.

4. Constraints on Connectivity Capacity Development

4.1. Infrastructure Integration and Operational Limitations

Chabahar Port possesses significant geographical advantages and strategic value. Infrastructure availability on its own, however, does not automatically generate effective regional connectivity. The key challenge lies in the gap between strategic potential and operational capacity within a broader transportation system. Studies of port development indicate that modern port competitiveness depends increasingly on integration with hinterland transportation networks rather than on port facilities alone [6]. From that angle, Chabahar's connectivity development requires maritime infrastructure and something more besides: effective coordination among maritime, railway, and road systems. At present, the incomplete integration of transportation networks remains an important constraint. Direct access to the Indian Ocean is one thing; the port's regional functions depend on whether its transportation links can support efficient movement between coastal areas and inland markets. Transport geography studies make a related point — corridor performance is determined by interactions among multiple nodes and transportation modes, not by individual infrastructure facilities [13]. The main challenge facing Chabahar, then, is not the absence of infrastructure but the difficulty of transforming infrastructure potential into stable connectivity functions. Recent studies of transportation networks in Chabahar point to the same conclusion: infrastructure coordination goes a long way toward determining how effective regional connectivity turns out to be [21]. The Chabahar–Zahedan railway is the standing illustration. The roughly 630-kilometer trunk line linking the port to Iran's national rail network has been repeatedly delayed, and India stepped back from financing it in 2020 under sanctions pressure, leaving the seam between maritime capacity and inland links as the port's most visible physical constraint.

4.2. Network Operation and the Challenge of Sustainable Flows

Infrastructure creates the possibility of connectivity; regional corridors need continuous economic flows before they can become functional networks. A corridor does not attain regional significance simply because different locations are connected. Its effectiveness depends on whether transportation links can sustain the movement of goods, capital, and economic activity. Within the INSTC framework, Chabahar Port plainly has the potential to connect maritime routes with Central Asian and Eurasian markets. Studies of the corridor nonetheless suggest that operational efficiency, multimodal coordination, and commercial utilization remain important factors in how it performs in practice [13]. Network theory frames the issue much the same way: connectivity depends on the position and interaction of nodes within a larger system rather than on the existence of individual links alone [15]. Chabahar's strategic advantages, in other words, still have to be translated into reliable transportation flows and real economic interactions. Research on the port adds that its transformation from a geopolitical project toward a geoeconomic platform depends on whether those infrastructure advantages can generate practical regional linkages [10]. The current limitation, then, is not a lack of connectivity potential. It is the challenge of converting potential connections into sustainable network functions. Cumulative throughput at the Indian-operated terminal since December 2018 has remained modest beside the port's designed capacity, and traffic still rests to a considerable degree on humanitarian and strategic consignments rather than on routine commercial container flows [22].

4.3. Institutional Coordination and Cross-Border Governance Challenges

Cross-border connectivity is shaped by institutional conditions as well as by infrastructure and network operation. The INSTC involves multiple countries and a good many stakeholders, which makes coordination across transportation standards, investment arrangements, customs procedures, and cooperation mechanisms essential to long-term operation. Infrastructure corridors are also increasingly influenced by broader geoeconomic processes. Existing research suggests that such projects represent economic arrangements and, at the same time, institutional and strategic interactions among different actors [4]. Governance capacity, on that account, affects whether connectivity projects can generate lasting regional effects. For Chabahar Port, institutional coordination remains an important factor in whether connectivity is realized. Previous studies have shown the port's development being shaped by the interaction between economic opportunities, regional cooperation, and external uncertainties [10,17,23].

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From this perspective, governance constraints are better understood as an internal dimension of connectivity formation than as external barriers standing in its way. Infrastructure provides the physical foundation, networks create functional connections, and governance mechanisms influence whether those connections can be maintained over time. For Chabahar the point is concrete rather than abstract. The American sanctions waiver that shelters the port's trade requires periodic renewal, and reports in early 2025 that the waiver might be modified are a reminder of how much the corridor's economics still hang on decisions taken in Washington.

4.4. The Ongoing Transformation toward a Connectivity Hub

The constraints discussed above make one thing plain: the transformation of Chabahar Port from a strategic node into a regional connectivity hub is an ongoing process. Geographical advantages and infrastructure investment provide necessary conditions, but neither independently determines regional connectivity outcomes. Realizing connectivity capacity depends on the interaction among infrastructure integration, network operation, and governance coordination. Infrastructure determines whether physical connections can be established; network operation determines whether those connections generate continuous flows; governance conditions influence how far the whole process can be sustained. The case of Chabahar, in short, cautions against judging strategic infrastructure by location or construction scale alone. What gives the port its regional weight is the ongoing interplay of spatial advantage, network embeddedness, and institutional backing [24].

5. Conclusion

Turning strategic infrastructure into a regional connectivity hub takes time, and it works through the interplay of spatial conditions, transportation networks, and institutional arrangements. Taking Chabahar Port on the International North–South Transport Corridor (INSTC) as its case, this study has argued that neither geography nor investment creates connectivity capacity on its own. The capacity grows along three connected dimensions: node formation, network embedding, and governance support. Location and infrastructure lay the groundwork, network integration widens what the port can do regionally, and institutional coordination decides whether the gains hold.

The contribution is a shift of lens: away from the geopolitical weight of strategic infrastructure, toward the process by which infrastructure nodes pick up regional connectivity functions. The framework offers one integrated account of how strategic nodes turn into connectivity hubs under complicated regional conditions. Its limits deserve a plain statement as well — at bottom, this is a qualitative case study. Quantitative indicators and comparative corridor cases are the natural next step for testing how far the framework travels.

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