Assessment of the current condition of Mongolian road border ports

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ABSTRACT

The formation and development of border ports is the result of the development of regional economy and world economy. The border port is the gateway of land opening and the hub node of international trade and social-cultural exchanges among the countries. Mongolia is a landlocked country, connected to neighboring countries by airports, road border ports, and railway border ports. As of 2024, Mongolia's total foreign trade reached 27.3 billion USD. Of this total, 34.5% was conducted through the Zamyn-Uud border port, 30.4% through Gashuunsukhait, 9.5% through Sukhbaatar, and 8.9% through Shiveekhuren. The share of foreign trade conducted through other border port remained below 5%. Limited infrastructure and reliance on a single port contribute to elevated costs and delays, particularly during peak seasons. This logistical bottleneck hinders economic growth and raises consumer prices. Therefore, it is essential to identify, from an economic geographical perspective, the border ports that will play a key and beneficial role in the national, regional, and local socio-economic development in the short and medium term. This study aims to assess the current conditions of Mongolia's road border ports and to identify those that play a key role in regional socio-economic development. Within the scope of the study, an assessment of the current conditions of 20 road border ports was conducted using the Multi-Criteria Analysis (MCA) method, based on 27 criteria in 9 groups. The assessment of 20 road border ports in Mongolia revealed that the Zamyn-Uud, Altanbulag, Bulgan, Tsagaannuur, Bichigt, and Ereentsav ports received the highest scores. These ports are characterized by favorable conditions such as regional cooperation, well-established basic infrastructure, and advantageous border port classifications and operational regimes. Furthermore, based on the methodology employed in this study, it is possible to evaluate railway port and airport and it is possible to identify the border ports that require prioritized development at the national level.

KEYWORDS

1. INTRODUCTION

The formation and development of border ports is the result of the development of regional economy and world economy[1]. The border port is the gateway of land opening and the hub node of international trade and social-cultural exchanges among the countries. The border ports play an important controlling role for the system of national land development and the integration of international communication networks[2].

Mongolia is a landlocked country, connected to neighboring countries by airports, road border ports, and railway border ports. Mongolia has 39 border ports established through agreements with neighboring countries and government resolutions, and 24 border ports are in regular operation[3].

As of 2024, Mongolia's total foreign trade reached 27.3 billion USD. Of this total, 34.5% was conducted through the Zamyn-Uud border port, 30.4% through Gashuunsukhait, 9.5% through Sukhbaatar, and 8.9% through Shiveekhuren[4]. The share of foreign trade conducted through other border port remained below 5%. Mongolia, a landlocked nation between Russia and China, relies heavily on the Xingang Tianjin port for over 34% of its imports. To reach seaports, Mongolia must transport cargo 3800 km by land through Russia to the Vladivostok port or 1870 km to China's Tianjin port[5]. Among the 32 landlocked countries, it is estimated that 18 incur transportation costs that are approximately 10% higher than average, leading to significantly elevated import trade expenses[6]. Limited infrastructure and reliance on a single port contribute to elevated costs and delays, particularly during peak seasons. This logistical bottleneck hinders economic growth and raises consumer prices[5].

The western cities of Mongolia Khovd, Ölgii, and Ulaangom are located 1,370 to 1,600 kilometers from Ulaanbaatar, while the eastern cities of Choibalsan and Baruun-Urt are situated 560 to 660 kilometers away[7]. Due to this distance, goods and services are delivered to these regions with higher transportation costs and additional expenses. Given the above circumstances, there is a growing need for expanding border ports and improving infrastructure in landlocked countries.

In order to reduce higher transportation costs, it is crucial to increase foreign trade through the development of border ports in regions and local areas. On the other hand, enhancing and expanding the role of border ports in the social and economic development of local communities is of significant importance. Particularly, border ports serve as key drivers of trade, tourism, manufacturing, and employment[8].

The long-term policy of Mongolia, 'Vision-2050,' and the medium-term program 'New Recovery Policy' aim to address six key issues that are limiting the country's development. The first of these issues is related to border ports[9]. The National Committee for Port Revitalization has defined the role of border ports and developed its vision around the '5 E.' These include: 1) Clarifying the legal environment, 2) Categorizing and ranking border ports based on their operational functions and regional involvement, 3) Ensuring accountability by assigning responsibilities for events occurring at the ports, 4) Resolving land use issues for ports operations, and 5) Transforming border ports into economic engines for development rather than obstacles[10]. In order to implement this policy, it is necessary to identify border ports at the regional and local levels that contribute to economic diversification and play significant roles.

In recent years, various studies have been conducted on topics such as border ports foreign trade, reforms in Mongolia's foreign policy[11], coal export logistics and transportation[12], the current status and development potential of the Sumber-Rashaan border port[13], cooperation at the Mongolia-China border during the COVID-19 pandemic[14], and the internal and external factors affecting border security and adjacent territories[15]. While these studies have addressed challenges at border ports and specific issues within certain economic sectors, there has not yet been a comprehensive comparative analysis that evaluates the current status of border ports and ranks them accordingly.

Therefore, the objective of this study is to conduct a comprehensive assessment of the current conditions of border ports based on relevant evaluation criteria, in order to rank them and identify priority border ports for development.

This study is the first of its kind in Mongolia to assess the current status of border ports from a geographical science perspective. It is innovative and significant in that it contributes to identifying the role of border ports in economic diversification and regional development, as well as supporting the prioritization of their development planning.

2. RESEARCH METHODS

Mongolia has 39 border ports established through agreements with neighboring countries and government resolutions. These include: 6 airports, 6

railway border ports, and 27 road border ports. In this study, 20 out of the 27 designated road border ports were selected for analysis, excluding those that are non-operational or lack fully developed infrastructure(Figure 1).

Figure 1. Study area

In assessing the current conditions of border ports, data on the classification and operational regimes of border ports were obtained from the General Authority For Border Protection, information on port throughput capacity, customs laboratory data, the right to introduce prohibited goods, and foreign trade data were obtained from the Mongolian Customs General Administration, information on road classifications and types of pavement was obtained from the Ministry of Roads and Transport of Mongolia, information on the electricity supply to the ports was obtained from the National Atlas of Mongolia 2022, Data on population and passenger traffic movements were collected from the primary sources available on the National Statistics Office of Mongolia website.

In identifying border ports with significant socio-economic importance at the regional and local levels, the Multi-Criteria Analysis (MCA) method was employed. The MCA method consists of the following three stages.

1. Identifying the evaluation criteria and factors.

In determining the evaluation criteria for border checkpoints, 27 criteria in 9 groups were identified, based on the specific conditions and context of Mongolia. These include the alignment of each ports with regional cooperation, basic infrastructure (border port capacity, electricity supply, road classification, and pavement type), border ports classification and operational regime, the right to introduce prohibited goods, customs laboratory, proximity to the nearest city, foreign trade, passenger traffic, and population.

2. Comparing the evaluation criteria

The process of hierarchical ranking and weighting (AHP) is one of the multi-criteria decision-making methods originally developed by Prof. Thomas L. Saaty. In short, it is a method for deriving ratio scales from paired comparisons. According to his definition, the hierarchical model is a production research model that combines both quantitative and qualitative factors, which allows decision-makers to break down issues into hierarchical forms[16]. When comparing multiple factors, one is typically more significant than another and therefore carries a greater weight. In ranking the

evaluation criteria, the AHP method employs a weighted linear pairwise comparison approach.

To ensure consistency and precision in weighting, two indices are proposed: the Consistency Index (CI) and the Consistency Ratio (CR). The Consistency Index (CI) is defined by the following formula.

$$CI = \frac{\lambda_{max} - n}{n - 1} \qquad (1)$$

Where:

λmax – the maximum eigenvalue
n – the number of elements (order) in the matrix.

The Consistency Ratio (CR) can then be calculated by comparing the Consistency Index (CI) with the Random Index (RI), as shown below.

$$CR = \frac{CI}{RI} < 0.10 \qquad (2)$$

CI – Consistency Index,
RI – Random Index.

3. Conducting a composite evaluation

The following formula is then used to derive the composite evaluation.

$$S = \sum_{i=1}^{n} W_i X_i \qquad (3)$$

Where:

S – the integrated value of the given object
Wi – the weighted average of factor i
Xi – the number of criteria

3. RESULT AND DISCUSSION

An assessment of the current conditions of 20 selected road border ports in Mongolia was conducted. The assessment was conducted using the MCA method based on criteria such as regional cooperation, basic infrastructure, border ports classification, operational regime, rights to introduce prohibited goods, customs branch laboratory, time to the nearest city, foreign trade, passenger traffic, and population. In the assessment of road border ports, Zamyn-Uud ranked first with an index score of 2.96, followed by Altanbulag with 2.91, Tsagaannuur with 2.75, Bulgan with 2.65, Bichigt with 2.41, and Ereentsav with 2.32. Compared to other ports, these border ports demonstrate more favorable conditions in terms of regional cooperation, basic infrastructure, port classification, and operational regime. The border ports of Borshoo, Bayankhoshuu, Gashuunsukhait, Sumber, Khangi, Shiveekhuren, and Khankh were evaluated with index scores ranging from 2.18 to 1.80, primarily due to limited conditions in criteria such as regional cooperation and the right to introduce prohibited goods. On the other hand, the border port of Khavirga, Burgastai, Ulikhan, Tes, Artsuuri, Dayan, and Baitag have been evaluated with indices ranging from 1.78 to 1.30. This lower ranking is attributed to poor conditions in terms of infrastructure, The right to introduce prohibited goods, customs branch laboratory services, and the distance to the nearest city(Figure 2).
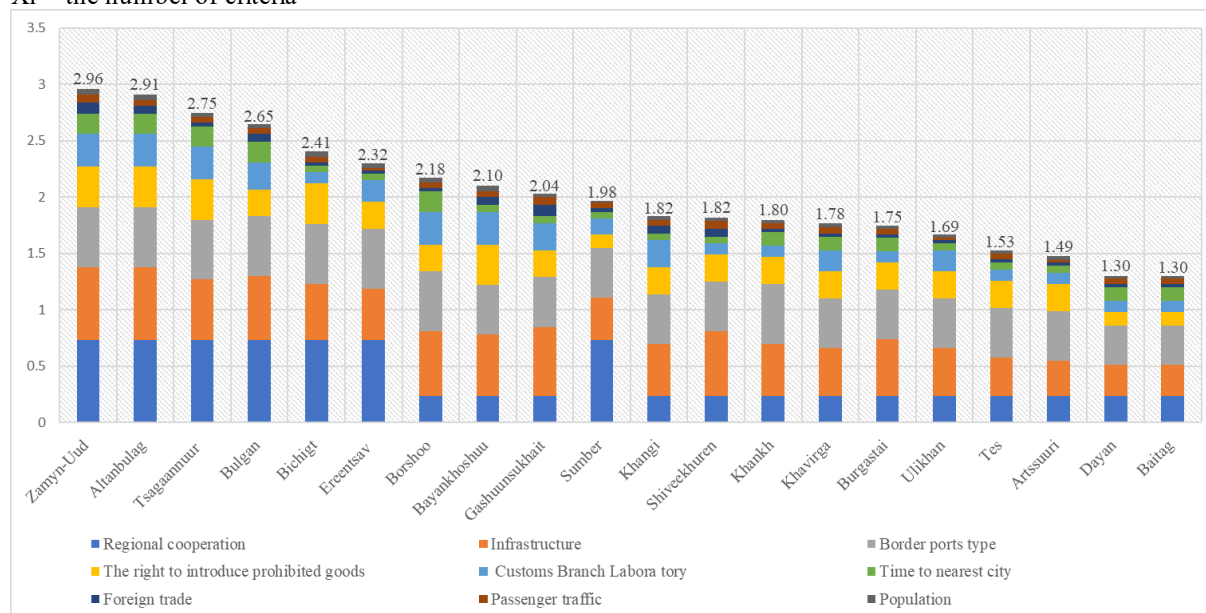

Figure 2. Final Results of the Assessment

Based on the research results, it is recommended to prioritize the development and increase investment in the border ports of Zamyn-Uud, Altanbulag, Tsagaannuur, Bulgan, Bichigt, and Ereentsav, which serve as key gateways along Mongolia's central, western, and eastern transport corridors. There is also

potential to plan and develop the next-tier border ports in a phased manner moving forward.

The road network passing through our country is 748 km shorter than the route through Kazakhstan and 513 km shorter than the route through Manchuria, which provides a significant advantage in connecting Asia and Europe. However, the challenges we face include improving the infrastructure and quality of services in the border ports and transport logistics sector, as well as accelerating technological advancements[6]. Over the past 15 years, the traffic volume passing through border ports has increased due to regional development[17], the expansion of economic territories, and trade turnover, and this trend is expected to continue. Therefore, it is necessary to accelerate the infrastructure development at border ports.

The project General plan for Human settlement and Urban development identifies the roles of border ports, defining their economic diversification and functions in areas such as multifunctional, mining, tourism, trade, and railway transport and criteria such as the classification of border ports, transport networks, and the volume of passenger and freight traffic have been taken into consideration[18]. In contrast, this study not only considers the aforementioned indicators that reflect the current condition of border ports, but also incorporates additional criteria such as regional cooperation, basic infrastructure, the right to introduce prohibited goods the authorization to, the presence of customs branch laboratories, and travel time to the nearest city, thereby ensuring greater analytical precision.

This study is significant in that it establishes a ranking of border ports for the next phase of development and identifies the specific challenges faced by each port based on evaluation results and criteria. The findings serve as a foundation for policy planning by providing insights into which types of investments are needed at each port, taking into account their geographical location.

As for Mongolia establishment of free-trade and economic zone by extending border points with neighboring countries can be a main solution to keep border security, to promote regional development, to develop infrastructure of transportation and to expand trades[3]. Furthermore, based on the methodology employed in this study, it is possible to evaluate railway port and airport and identify the border ports that require prioritized development at the national level.

4. CONCLUSION

This study proposes a set of assessment criteria and a comprehensive methodology for assessing border port. Defining the current status and ranking of border ports is the starting point for determining their level of economic diversification and the role they play in national, regional, and local development. When evaluating the current condition of 20 border ports of using 27 criteria in 9 groups, the border ports of Zamyn-Uud, Altanbulag, Bulgan, Tsagaannuur, Bichigt, and Ereentsav received high ratings. These border ports hold significant importance for the social and economic development of Mongolia, and their prioritized development is essential.

Due to the fact that some of the border ports included in the study are not fully connected to paved roads and lack access to electricity from the Mongolian side, the travel time to nearest city is significantly longed, and the reliability of continuous operations cannot be ensured due to energy supply constraints. Therefore, it is necessary to accelerate the implementation of projects and programs aimed at gradually connecting border ports to paved roads and integrating them into the national power grid.

For Mongolia, allocating investments efficiently based on the strategic prioritization of border ports will create opportunities to support regional development, enhance tourism and transport infrastructure, and increase industrial and trade turnover.

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