

Smart Urban Growth-Oriented Scenario Planning for the Development of Border Regions in Zabol: A Foresight Perspective

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Abstract

Border region development, through improvements in economic, social, cultural, and security indicators, plays a vital role in enhancing the quality of life for residents. Cross-border interactions and the establishment of border markets are key tools for population stabilization and welfare enhancement. In this context, identifying the factors influencing the development of these regions is essential for sustainable policymaking. This study aims to identify the key factors affecting the development of border areas in the city of Zabol and to formulate plausible future scenarios up to the horizon year 2046 (1425 SH), based on smart growth components. The research methodology combines documentary and survey-based approaches, with data collected and analyzed using the Delphi method, structural cross-impact analysis (Micmac), and morphological analysis. In the initial phase, seven main indicators and 94 criteria were identified, which were refined to 81 criteria following expert screening. The cross-impact analysis revealed 20 key factors, among which “border security,” “electronic services,” and “railway connectivity” had the highest influence. Morphological analysis outlined several alternative scenarios, showing that combinations of security status, technological advancement, and resource management could lead to diverse futures for Zabol’s border regions. The findings suggest that scenario planning is an effective tool for managing uncertainties and shaping sustainable development policies in border areas. Accordingly, prioritizing security enhancement, expanding smart services, and strengthening communication infrastructure are essential for achieving sustainable development in Zabol’s border regions.

Keywords: Futures Studies, Scenario Writing, Smart Growth, Border Regions, Zabol,

Introduction

Border regions in every country hold a special and strategic position from economic, social, cultural, and security perspectives. These regions, as gateways for the exchange of goods, services, and culture, are constantly influenced by bilateral or multilateral interactions with neighboring countries. In Iran, the city of Zabol, due to its unique geographical location and proximity to Afghanistan and Pakistan, is considered one of the most important border areas. Such a position has made Zabol not only a communication bridge between Sistan and Baluchestan Province and its neighboring countries but also a key point in the country’s security, economic, and social equations.

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This article is derived from the Ph.D. dissertation of **Zahra Sarabandi**, entitled “*Foresight of Border Markets in the Southeast of Iran in Line with Smart Urban Growth (Case Study: Zabol City)*”, conducted under the supervision of **Dr. Gholamreza Miri** and the advisory of **Dr. Masoumeh Hafez Rezazadeh** at the Islamic Azad University, Zahedan Branch.

In recent years, extensive climate changes, water crises, technological transformations, and regional political and security complexities have increasingly affected living conditions and development in border areas. These developments have intensified the need to reconsider development policies and to adopt new approaches to urban planning. One of these approaches is smart urban growth, which emphasizes the optimal use of resources, environmental protection, improvement of quality of life, and sustainable infrastructure development. Scholars argue that economic activities in border areas can play a vital role in economic growth, improving living standards, reducing poverty, achieving a more equitable distribution of income, and strengthening cross-border cooperation (Chandoevvit, 2004: 145). Moreover, the existence of complex human issues—often more challenging than natural problems—and the emergence of unpredictable changes have made urban planning increasingly dependent on innovative and future-oriented perspectives. In this context, foresight and futures studies provide systematic scientific approaches that enable the analysis of technological and scientific developments and the anticipation of potential future pathways (PourMohammadi et al., 2010: 37). Among the key tools in this field is scenario planning, which helps decision-makers design flexible and effective programs by analyzing various situations, key factors, and uncertainties. Development experiences have also shown that success in border regions is not achievable without considering security conditions, communication infrastructures, and the use of modern technologies. In Zabol, although border markets function as engines of local economic growth, security instabilities, water scarcity, infrastructural limitations, and regional political dynamics pose serious threats to the future of this area. On the other hand, the rapid growth of information and communication technologies and electronic services has created new opportunities to compensate for developmental backwardness and enhance productivity. If these opportunities are accompanied by intelligent security and infrastructural policies, a sustainable and prosperous future can be envisioned for Zabol. Therefore, there is a pressing need for an analytical–foresight model to identify key factors and design alternative development scenarios. Such a model can assist policymakers in making informed decisions based on scientific analysis and a clear understanding of possible futures. The innovation of the present study lies in its simultaneous focus on smart urban growth and foresight in border area development—a topic that has received little attention in previous domestic research. By integrating the concepts of smart growth, sustainable development, and future scenario planning, this study provides an analytical framework for evaluating the status of Zabol’s border markets in order to identify optimal development pathways. Accordingly, the main objective of this research is to evaluate the condition of border markets and identify the key components of smart urban growth in achieving sustainable development in the region

Theoretical Foundations

Border Markets

Border markets are enclosed areas located at the zero point of the border and adjacent to customs offices authorized to perform clearance procedures, where residents on both sides of the border can supply goods and products needed, in compliance with export and import regulations. In fact, economic activities in border areas aim to **promote the economic development of border**

cities, overcome geographical isolation, expand regional infrastructure, and stabilize population settlements (Gandami, 2019: 141).

Border markets can contribute to the development of border regions, particularly urban areas, by fostering **road and railway construction, improvement of housing quality, expansion of urban infrastructure, enhancement of job security, and promotion of cross-border cooperation**. With proper planning, these markets can serve as a driving force for the development of border regions and the advancement of border cities (Janparvar et al., 2021: 182).

At the very least, border markets enhance **population retention in border areas, increase national security levels, generate employment, and improve the production of local goods** (Ahmadipour, 2009: 2).

Smart Growth

Smart growth refers to a development approach that prioritizes **the promotion of civic life, social vitality, public transportation, and the reduction of adverse environmental impacts**. Revitalizing the city as a healthy and dynamic environment that can ensure a desirable future for all citizens is considered the primary goal of this approach (Seifeddini et al., 2018: 63).

Futures Studies

Research concerning the future is called “Futures Studies.” In other words, futures studies involve scientific inquiry aimed at achieving a better future and are often associated with related concepts such as foresight, forecasting, futurology, and scenario planning (Jashari & Moradi, 2019: 53).

Although these concepts differ, they are closely interrelated: to gain a **broad vision of the future (foresight)**, we must first **understand it (futures studies)**; and to achieve such understanding, we must **research and study it (futures studies)**. Thus, futures studies can be regarded as the foundation of these other terms (Mozaffari et al., 2010: 30; Pourmohammadi et al., 2010: 42). Unlike speculation, futures studies are based on **scientific methods for anticipating future trends** (Babajani et al., 2017: 128).

Scenario

In general dictionaries, a scenario is defined as an outline of a natural situation or expected events. However, in a more specialized sense, a scenario is a **descriptive narrative of plausible alternatives** that focuses on a particular aspect of the future (Rahnama & Maroufi, 2014: 128).

Scenarios are not simple descriptions of the present, but rather tools for **visualizing potential futures and analyzing complex environmental variables**. As one of the key methods in foresight, scenarios help decision-makers make **long-term strategic choices under high**

uncertainty, integrating medium- and long-term futures with short- and mid-term planning (Ashrafnazari et al., 2015: 17)

Research Background

A) Domestic Studies

Bahrami Jaf, S. (2024), in a study titled *"Evaluation of Sustainable Urban Governance in Small Border Cities: Case Study of Sardasht"*, examined urban governance as a key strategy for achieving sustainable development, focusing on the border city of Sardasht. Using an interactive and systemic analysis approach, the study identified 12 key variables influencing governance and assessed their roles in sustainable urban development through cross-impact analysis and real-time Delphi methods.

The findings indicate that variables such as citizen participation, institutional coordination, public meetings, organizational alignment, and engagement with academic institutions have the greatest impact on the path toward sustainable development. Furthermore, scenario analysis reveals the potential emergence of critical conditions in the future development of Sardasht.

Safaei-Pour, M. et al. (2024), *"Identifying Key Drivers Affecting Tourism in Khorramabad City with a Futures Studies Approach."*

This study aimed to identify the key drivers influencing tourism in Khorramabad and to examine how these drivers affect one another. The findings indicate that, based on the distribution of the variables influencing the future state of tourism in Khorramabad, the system is in an unstable condition. Four major factors were identified as the most influential on the future of tourism in Khorramabad: easy accessibility, favorable climate, suitable and strategic geographical location, and the presence of historical–monumental sites. Based on the analysis of matrices and evaluation of the direct and indirect influence of the key factors, a total of twelve critical variables were identified, including: comprehensive tourism plan, integrated management, private sector investment, development of recreational and tourism centers, easy accessibility, strategic location, favorable climate, macro-level government policies, number of tourism attractions, increase in accommodation facilities, presence of important historical–monumental sites, and security.

Rabani, T. et al. (2024), *"Scenario Planning for the Long-Term Development of Free Trade Zones in the Western Border Areas of Iran: A Case Study of the Mehran Free Trade Zone."*

This research examined development scenarios for the Mehran Free Trade Zone and identified the challenges and opportunities ahead. The findings revealed five final scenarios representing a range of possible futures. Scenario one envisions full prosperity and the transformation of Mehran into an international hub. Scenario two portrays the worst-case situation with security and economic challenges. Scenario three emphasizes the role of technology and innovation. Scenario four highlights environmental and economic problems, while scenario five focuses on local growth and the development of a specific industry. The results suggest that the region's future is heavily influenced by critical uncertainties, including: the future of Iran–U.S. relations, Iran–Iraq relations, the role of major East–West trade routes, and Iraq–U.S. relations. The combination of these uncertainties produces diverse scenarios representing the possible futures of the Mehran Free Trade Zone.

Zoghi Barani et al. (2022), in their article titled *"Border Cities Development Strategy with a Systemic Approach: Case Study of Taybad"*, examined the city of Taybad due to its geopolitical position, cultural ties with Afghanistan, and its natural and cultural attractions. These factors provide Taybad with a high potential to be placed at the center of strategic planning programs aimed at offering urban development strategies as a model for managing and planning border regions.

The findings indicate that variables such as expanding the role of the private sector in infrastructure investment, strengthening regional cohesion, linking national and local levels, promoting international partnerships, reducing poverty, and enhancing both formal and informal participation have the greatest impact on the development of Taybad as a border city.

The results suggest that sustainable development in Taybad requires a bottom-up approach and the formulation of strategies tailored to local and regional conditions.

Zeynali Azim, A. (2022), *"Assessment of Urban and Environmental Sustainability through Smart Urban Growth: A Case Study of Jolfa City."* This study examined the adoption of the smart city concept as a solution for achieving urban and environmental sustainability in Jolfa. The findings reveal that "Smart Living" has the strongest effect with a path coefficient of 0.659 (0.433), followed by "Smart Environment" 0.439 (0.193), "Smart Mobility" 0.346 (0.119), "Smart Governance" 0.273 (0.740), "Smart People" 0.240 (0.058), and finally "Smart Economy" 0.189 (0.036). Moreover, survey data analysis confirmed that the identified smart city dimensions are applicable in facilitating smart city adoption in Jolfa, thereby enhancing urban and environmental sustainability.

Zangeneh, S. et al. (2022), *"Measuring and Evaluating the Compatibility of Urban Neighborhoods with Smart Growth Principles: A Case Study of Mashhad City."* Using the SWARA weighting method, the WASPAS ranking method, and GIS, the researchers analyzed 26 smart growth indicators across 156 neighborhoods of Mashhad and ranked them according to their degree of compatibility with smart growth principles. Results show that Azadshahr, 10-Day, and Koohsangi neighborhoods achieved the highest rankings, while Shahid Bahonar, Moud, and Keshavarz neighborhoods ranked the lowest. Mashhad neighborhoods were most aligned with the principle of mixed land use, and least aligned with the principle of providing diverse transportation opportunities. Furthermore, the distribution pattern of neighborhoods compatible with smart growth was centralized, indicating spatial inequality. Most of the city's physical expansion occurred along southwestern and western axes toward Torghabeh and Shandiz, rather than along the northeastern axis envisioned in Mashhad's master plan. Overall, the degree of alignment of Mashhad's neighborhoods with smart growth indicators was found to be moderate to low.

Ghasemi, F. et al. (2020), *"Foresight of Governance in Small Border Cities: A Case Study of Uraman Takht and Sarvabad."* Focusing on the application of foresight in governance for sustainable development, this study identified possible future scenarios for governance in the border cities of Uraman Takht and Sarvabad. The findings consist of four main parts: (1) identification of key barriers to

governance for sustainable development using documentary analysis, Real-Time Delphi (RTD), and MICMAC cross-impact analysis; (2) identification of key drivers affecting governance through documentary analysis and Real-Time Delphi to prioritize them in terms of importance and uncertainty; (3) scenario development; and (4) modeling the status of governance barriers under each scenario using fuzzy cognitive mapping (FCM). Results indicate that, based on three critical uncertainties, out of eight possible scenarios, four were selected after addressing internal inconsistencies. Only one scenario suggested a decreasing trend in governance barriers, while the rest pointed to chaotic conditions leading to an increase in such barriers.

Alvandi, A. et al. (2020), *“An Analysis of the Requirements and Prerequisites for Smart Urban Growth: A Case Study of Tuyserkan City.”*

This research examined the requirements and prerequisites for implementing smart urban growth in Tuyserkan. Using SPSS for analysis, the results showed that Tuyserkan lacks the necessary readiness for adopting smart growth. None of the smart urban growth processes were found to be in a favorable condition due to inadequate infrastructure. Among the infrastructures, e-services had the weakest status (mean rank 1.92), while environmental and green spaces (2.99), quality of life (2.65), mixed land use (2.25), walkability (2.24), and socio-economic dimensions (1.99) were relatively better compared to other infrastructures.

Khadem-Nejad, A. et al. (2020), *“Foresight of Urban Physical Development Trends Using Scenario Planning: A Case Study of Maku City.”*

This study identified the status of physical development in Maku using the Holdren model, and then, through futures studies, attempted to outline potential scenarios for the city’s development. A total of 27 key indicators influencing Maku’s physical development were considered, of which 8 drivers were identified as critical through MICMAC analysis. To determine plausible futures, the drivers were evaluated as assumptions in the Scenario Wizard environment by experts. Results showed that the physical development of Maku follows two main scenario categories: strong and plausible scenarios. Strong scenarios included three cases (an optimal scenario and two critical ones), with no static state among them. Overall, 21 plausible scenarios for Maku’s physical development toward 2025 were identified, comprising four desirable and seventeen critical scenarios. Among these, scenarios 1, 2, and 3 were deemed most likely to occur.

B) International Studies

At the international level, scenario planning is recognized as one of the key tools of futures studies in urban and regional development.

Hong Zhang & Xin Wei (2022) this study investigates the impact and mechanism of intra-urban border effects on the coordinated development of regional economies in emerging markets. Using a quasi-natural experiment on the reorganization of municipal boundaries in China and satellite nighttime light data, the authors demonstrate that intra-urban border effects play a significant role in promoting coordinated regional economic development. The findings indicate that the restructuring of county-level administrative boundaries leads to an increase in the average level of public services, thereby enhancing coordinated development among them. Accordingly, urban borders are not only administrative demarcations but also possess strategic roles in shaping regional development patterns. Ultimately, this study emphasizes that the

“border effect” can serve as an effective tool for strengthening coordinated regional development in emerging economies.

Somboon Sirisunhirun (2018) this research, titled “*Multilevel Structural Equation Modeling for Urban Development Based on Local Population Expectations in the Border Special Economic Zone of Western Thailand*”, explores the role of local residents’ expectations in the success of development policies in border special economic zones. In response to ASEAN’s liberalization policies and the establishment of border SEZs in member states, the author applied multilevel modeling. Data were analyzed using Mplus 7.3 software. The findings reveal that awareness of policies does not have a direct effect on urban development expectations. However, through indirect effects—particularly public participation and management of SEZs—policy awareness plays a crucial role in the success of sustainable management and development. Accordingly, the study highlights the necessity of local community participation in the decision-making and policy implementation process within border SEZs. Moreover, the public sector must actively persuade citizens to engage in policy execution in order to provide a foundation for achieving developmental objectives.

Jenny C. Aker, Michael W. Klein, Stephen A. O’Connell & Mush Yang (2010) this study, titled “*Are Borders Barriers? The Impact of International and Internal Ethnic Borders on Agricultural Markets in West Africa*”, addresses two key economic issues: first, the role of national borders and ethnicity in market performance, and second, the degree of market integration at both international and domestic levels in Africa. The regression-based findings show that when significant ethnic commonalities exist among populations on both sides of a border, the influence of borders on prices diminishes. Conversely, ethnic differences can become a key factor in price variation in border markets. Thus, borders are not merely geographic or political barriers; rather, ethnic similarities and differences play a decisive role in shaping and driving the dynamics of border markets. The authors further propose a set of policy tools aimed at enhancing cross-border transport permeability, thereby strengthening integration and efficiency in border interactions. Accordingly, improving cross-border transportation can serve as a key factor in fostering economic, social, and cultural linkages in border regions.

Collectively, these studies demonstrate that border regions—particularly in developing countries—are more susceptible to environmental, political, and economic uncertainties compared to other areas. This underscores the necessity of adopting futures studies approaches for their development.

Research Methodology

This study is applied in nature and descriptive–analytical in method, with a foresight approach. The statistical population consisted of 30 experts, including specialists from management and executive organizations related to the border areas of Zabol, as well as academic scholars in the fields of urban planning and regional planning. The sampling method employed was non-probability snowball sampling. In this process, a number of key experts were initially identified and selected, and each of them subsequently introduced other qualified individuals for participation in the study. This procedure continued until the required sample with the desired

characteristics—namely scientific and practical expertise on the subject, relevant work experience, and willingness to participate—was completed.

Data collection was carried out through library and documentary studies in order to establish the theoretical framework, identify concepts, perspectives, and theories related to the development of border areas, and to examine the geographical and economic characteristics of the region

Stage	Method/Tool	Objective
1	Library and Documentary Studies	Extraction of Initial Indicators and Criteria
2	Delphi Technique (Three Rounds)	Screening of Indicators and Selection of Final Criteria
3	MICMAC Software	Analysis of Relationships and Mutual Effects among Criteria
4	Identification of Critical Uncertainties	Selection of Key Variables for Scenario Building
5	Morphological Analysis (Morphol)	Generation of Alternative Scenarios
6	Scenario Analysis and Interpretation	Formulation of Strategies for Preferred Scenarios

Table 1. Stages of the Data Analysis Process

Source: Research Findings, 2024

Based on the stages outlined in Table 1, a total of 7 main indicators and 81 final criteria were selected for analyzing the development of border regions in Zabol. These criteria are presented in the table below:

Criteria	Key Indicator	Row
Border security sustainability, control of goods and fuel smuggling, security cooperation with neighboring countries, expansion of surveillance equipment, local community participation in security, reduction of border conflicts, crisis management in security issues	Border Security and Management	1
High-speed internet coverage, development of e-government, access to digital banking services, establishment of innovation centers, training in technological skills, geospatial data infrastructure (GIS), intelligent transportation systems, smart citizen service centers, application of renewable energy in public services	Smart Services and Technologies	2
Development of railway lines, connection to national and international rail networks, improvement of intercity roads, increase in border terminal capacity, expansion of public transportation fleet, development of goods transit, establishment of multimodal transport routes, improvement of road safety, reduction of transportation costs	ortation Infrastructure	3
Flourishing border markets, facilitation of exports, attraction of foreign investment, establishment of agro-processing industries, development of home-based businesses, promotion of local product branding, expansion of agricultural value chains, increase in border transport income, support for border residents' 5cooperatives	Local Economy and Cross-Border Trade	4
W6ater crisis management, restoration of Hamoun Wetland, control of dust storms, reduction of air pollution, development of urban green spaces, waste management, biodiversity conservation, sustainable exploitation of groundwater	Environment and Natural Resources	5

resources, adaptation to climate change		
Reduction of unemployment rate, vocational and technical skills training, improvement of general education level, strengthening of social capital, development of inter-ethnic cooperation and trust, reduction of youth migration, increase of women's participation in economic activities, expansion of cultural and artistic activities, improvement of public health indicators	Human and Social Capital	6
Transparency and accountability of local institutions, coordination among executive bodies, participatory planning, attraction of sustainable financial resources, use of technology in urban management, integrated policymaking, improvement of budgetary efficiency, enhancement of monitoring mechanisms, formulation of medium- and long-term development programs	Urban and Regional Governance	7

Table 2. Final Criteria for the Development of Border Regions in Zabol Based on the Smart Growth Approach

Source: Research Findings, 2024

Study Area

The city of Zabol, located in the northern part of Sistan and Baluchestan Province and adjacent to the Iran–Afghanistan border, serves as the administrative center of Zabol County and is one of the most significant residential and economic hubs of the Sistan region. Geographically, it is situated at approximately 31° N latitude and 61° E longitude, with an average elevation of about 483 meters above sea level.

Zabol shares borders with Afghanistan to the north and east, Hirmand County to the west, and Zahak County to the south. The presence of the Milak international border crossing and the Milak border market has turned Zabol into one of the main gateways for foreign trade and cultural exchanges between Iran and Afghanistan.

The region's climate is hot and arid desert, with an annual average precipitation of less than 60 mm. Environmental challenges include the 120-day seasonal winds, recurrent droughts, and the decline in the water level of Hamun Lake. Nevertheless, its border location and access to major transit routes provide significant potential for the economic and commercial development of the region. The geographical location of the study area is shown in Figure 1. (*Statistical Yearbook of Sistan and Baluchestan Province, 2022*).

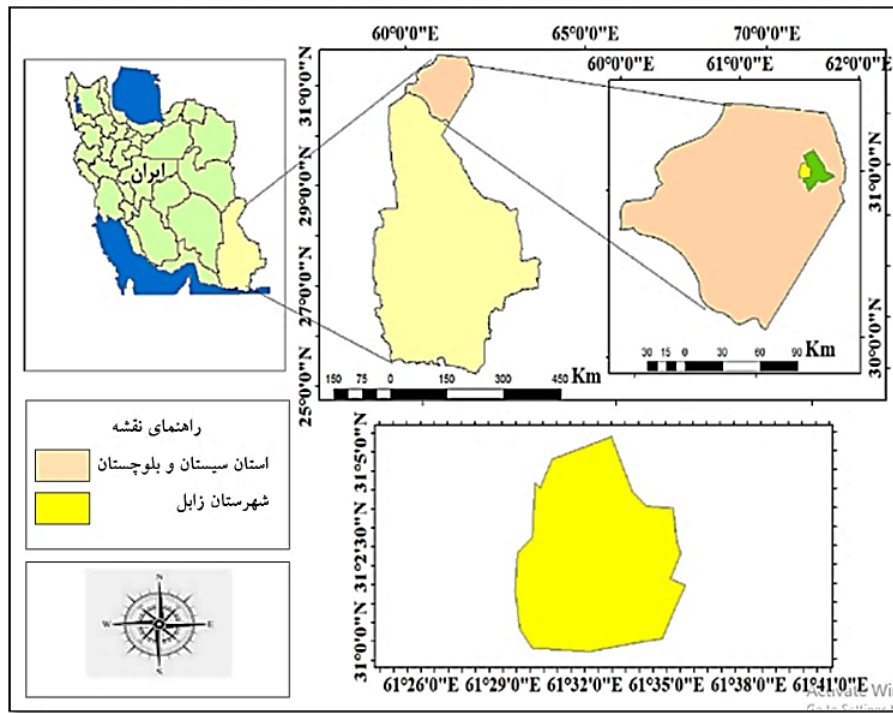


Figure 1. Location of Zabol in the country, province, and region

Drawn by the author, 2024

Potentials, Facilities, and Infrastructures of Zabol City for Smart Growth in Border Areas:

1. Geographical and Border Potentials

- Strategic location in the north of Sistan and Baluchestan Province, adjacent to the Afghanistan border.
- Presence of the Milak International Border Crossing as one of the country's active and official trade gateways.
- Accessibility to international transit routes with the potential to connect to East–West and North–South trade corridors.

2. Transport and Communication Infrastructure

- Intercity highways connecting Zabol to major provincial and national centers.
- Milak Border Terminal with potential for expansion of trade exchanges.

- Zabol Airport with the capacity for upgrading domestic and cargo flights.
- Expansion of telecommunication networks and high-speed internet in the city center and some peripheral areas.

3. Economic Capacities

- Milak Border Market as a hub of trade exchange with Afghanistan.
- Potential for establishing and expanding agro-processing and livestock industries.
- Opportunities for the growth of border-related businesses and logistic services.
- Prospects for attracting private sector investment and Afghan investors for joint activities.

4. Natural Resources and Environment

- The Hamun International Wetland as an environmental and tourism opportunity, if rehabilitated.
- Agricultural lands with potential productivity, provided sustainable water resources are secured.
- Solar energy resources with high potential for clean electricity production.

5. Human and Social Capital

- Availability of a young workforce familiar with cross-border cultures.
- Ethnic and cultural diversity as a comparative advantage in trade and border interactions.
- Existence of higher education institutions in Zabol for training skilled professionals.

6. Service and Technological Infrastructure

- Government and municipal service centers with capacity for expanding e-services.
- Potential for establishing data centers and smart urban management systems.
- Possibility of implementing intelligent transportation systems (ITS) and border monitoring technologies.

(Findings of the researcher, 2024)

Research Findings

Based on preliminary data and baseline studies, the initial development indicators were extracted and subsequently distributed among experts through a structured questionnaire. To score the extracted indicators and identify the key driving forces, the Delphi technique was applied in the form of an expert panel. This technique was conducted in several rounds to ensure reflection of opinions from 30 experts and to achieve consensus on the most critical factors.

The selection criteria for Delphi panel members included:

- Scientific expertise in the subject matter,
- Practical experience in border area development,
- Analytical capability and willingness to participate in the study,
- Accessibility for iterative consultations.

In the Delphi process, 7 indicators with 94 criteria were initially presented to the expert panel. After revisions, scoring, and consolidation through the second and third Delphi rounds, the list was refined to 7 indicators with 81 criteria.

Rank	Rank	Indicator	Row
2	27.45	Social	1
1	80.67	Economic	2
4	13.69	Political and Security	2
5	13	Transportation and Accessibility	3
3	22.61	Environmental and Natural Resource Protection	4
6	10.43	Urban Infrastructure and Facilities	5
7	10.67	Physical and Spatial (Morphological)	6

The scoring of these indicators by Delphi panel members is presented in Table 3

Source: Research Findings, 2024

Based on the conducted analyses, the identified indicators and criteria represent the initial factors influencing the development of border regions with a smart growth approach to urban development, serving as the foundation for scenario formulation in subsequent stages. Subsequently, the data obtained from the Delphi method were entered into the MICMAC software in order to examine the relationships and mutual effects among the key factors. One of the major capabilities of MICMAC software is its ability to measure the degree of influence and dependency of each key factor, both directly and indirectly. This type of analysis enables the researcher to identify strategic variables from among a wide range of factors and to utilize them in the design of forward-looking scenarios. The results of the analysis indicate that some factors are more influenced by other variables and thus act as dependent forces within the system. Accordingly, the component of “Expansion of Cross-Border Trade”, with a score of 159, demonstrated the highest level of dependency among the factors and has been recognized as the most significant dependent factor in the growth of border markets. This component is highly influenced by economic, security, infrastructural, and social factors, and any changes in these variables can directly affect the trajectory of cross-border exchanges

Rank	Component	Degree of Influence
1	Expansion of Cross-Border Exchanges	159
2	Status of Waste Production	157
3	Status of Wastewater Disposal	156

4	Urban Sanitation and Cleanliness	155
5	Occurrence of Flooding and Waterlogging	155
6	Availability of Green Spaces	154
7	Employment Facilitation	153
8	Public Political Participation	153
9	Awareness of Trade Methods	153
10	Leisure and Recreation Spaces	153
11	Entrepreneurship Opportunities and Potential	152
12	Improvement in Goods Supply	152
13	Pollution from Industrial Workshops	152
14	Investment in Housing	152
15	Status of Manufacturing Units and Factories	151
16	Transport Income	150
17	Mobile and Internet Coverage in Border Areas	150
18	Municipality Performance in Improving Urban Space Quality	150
19	Housing Area	150
20	Existence of an International Air Refueling Center	150

Table 4. Factors with the Highest Level of Dependency

Source: Research Findings, 2024

The selection of these 20 components was based on the results obtained from MICMAC software analysis and the examination of their weights and impact rankings. These factors not only play a significant role in the causal relationships within the system but are also recognized as key drivers in the process of sustainable growth and development of border regions.

Formulation of the Key States of the Main Drivers

In the present study, the key factors influencing the components of smart urban growth, which affect the growth and development of the border markets of Zabol city, were identified. Given the decisive role of these factors in shaping the probable future of smart urban growth, these drivers are considered essential for scenario-building.

At the beginning of the scenario development stage, in order to identify the potential states for each driver, the environmental scanning method was used. In this regard, through surveys conducted with experts and specialists in related fields, a set of possible states for each factor was extracted. As a result of this process, 60 possible states were defined for the 20 key drivers.

For each driver, the states were designed along a spectrum ranging from the ideal state to the undesirable state, so that they could cover a range of scenarios from realistic to utopian and critical. This categorization provides the opportunity for a more precise and comprehensive analysis of possible futures and serves as a foundation for combining the final scenarios.

According to Table (5), the status of the influential indicators in Zabol's smart growth, with an emphasis on futures studies, is presented. The results show that the assumptions forming each scenario vary in terms of analytical support and internal consistency. To measure the degree of coherence and validity of the assumptions, the "Consistency Value" index was employed. This index measures the difference between the impact score of one assumption and the impact score of the best alternative assumption. In other words, the consistency value reflects the degree of alignment and reliability of an assumption within the structure of a scenario compared to other assumptions.

Subsequently, the scenario components were ranked based on their consistency value. The analysis of this ranking indicates that some scenarios include assumptions with weak analytical support. This implies that:

- The mentioned scenarios suffer from a level of internal inconsistency;
- Their assumptions lack conceptual alignment and, in practice, may face contradictions or infeasibility.

The use of such scenarios in the decision-making process requires caution, revision, and reinforcement of the fundamental assumptions. Consequently, the consistency value index, as a key tool in evaluating the quality of scenarios, plays an effective role in identifying valid, reliable, and realistic scenarios and can serve as a basis for optimizing the decision-making process.

Table 5: Strength of Components Based on Consistency Score in Scenarios

Rank	Component	Probable State	Compatibility Value
1	T: Use of Electronic Services	T1: Increase in electronic services in the city and establishment of an electronic and smart city	25
2	J: Border Security	J1: Increase in border security	21
3	F: Railway Connectivity	F1: Establishment and expansion of railway lines	19
4	L: Migration Status	L1: Reduction of migration	19
5	O: Level of Employment Facilitation	O1: Increase in planned facilities for employment	19
6	N: Defense of Sovereignty (Internal & External)	N1: Enhancement of sovereignty defense in internal and external dimensions	18

7	E: Status of Production in Industrial Units and Factories	E1: Increase in production and exports	16
8	M: Utilization of Local Products	M1: Increase in officials' attention to local products	16
9	• D: Tourist Attraction Rate	D1: Increase in tourist attraction (responsible authorities' attention to tourism)	14
10	C: Physical Expansion of the City	C2: Continuation of the current trend	8-
11	A: Social Welfare and Security Status	A3: Neglect of social welfare and security	14-
12	R: Prevention of Ethnic and Tribal Divisions	R2: Continuation of the current trend	14-
13	B: Unemployment Situation	B3: Increase in unemployment rate	16-
14	Q: Transportation	Q2: Continuation of the current trend	16-
15	S: Increased Activity on Social Media	S2: Continuation of the current trend	17-
16	G: Ethnic Relations and Trust	G2: Continuation of the current trend	18-
17	P: Participation of Locals in Marketplace Management	P2: Continuation of the current trend	19-
18	I: Water Crisis and Drought Status	I2: Continuation of the current trend	20-
19	H: Establishment of Industrial Units and Factories	H2: Continuation of the current trend	21-
20	K: Status of Public Fearful Spaces due to Increased Constructions	K2: Continuation of the current trend	21-

Table 5: Strength of Components Based on Consistency Score in Scenarios
Source: Research Findings, 2024

Based on the conducted analyses and the ranking of scenarios, it can be concluded that among the components related to smart urban growth, three key components, which according to the consistency index showed the highest alignment with other scenario assumptions, are as follows:

- Use of electronic services with hypothetical state **T1**: “Expansion of electronic services in the city and establishment of an electronic and smart city”;
- Border security with hypothetical state **J1**: “Increased border security”;
- Railway connection with hypothetical state **F1**: “Establishment and expansion of railway lines.”

These three components ranked first to third in the consistency index and hold high potential to play a pivotal role in the growth and development of border marketplaces.

Therefore, in selecting the final scenarios, among strong, weak, and consistent scenarios, those that are logically defensible and can be analyzed and developed inductively have been considered. In this process, all key factors influencing the growth of border marketplaces have been included in the scenario structure to envision three possible future situations for the border marketplaces of Zabol city:

- **Golden Scenario:** Full realization of key components and achievement of sustainable growth;
- **Believable Scenario:** Partial realization of components with acceptable results;
- **Catastrophic Scenario:** Non-realization of components and facing serious challenges in development.

This scenario categorization provides a suitable basis for formulating developmental strategies and can serve as an effective tool in forward-looking policymaking and planning. However, achieving the goals of each proposed scenario requires the provision of a set of analytical and structural prerequisites. Among the most important of these prerequisites are the development of a **Scenario Cross** and scenario-based reasoning.

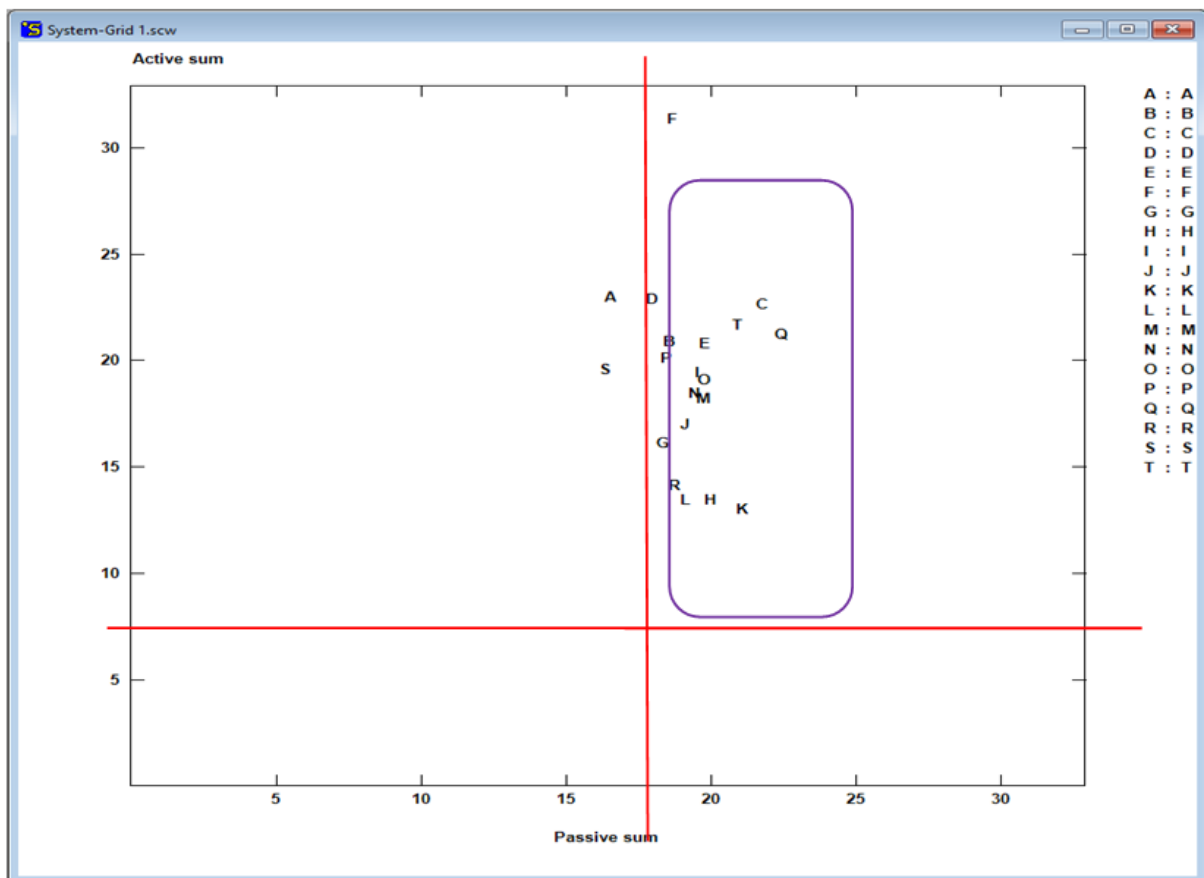


Figure 2: Scenario Cross and Scenario Logic

In this study, a set of key factors with the greatest significance and influence in shaping future scenarios have been identified. These factors are: rail connection (F), level of tourist attraction (D), unemployment status (B), production status of manufacturing units and factories (E), use of electronic services (T), physical expansion of the city (C), transportation (Q), water crisis and drought status (P), utilization of local products (I), border security (N), border management (M), and investment attraction (J).

These factors, represented with the abbreviations (F, D, B, E, T, C, Q, P, I, N, M, J), are located in the first quadrant (upper right) of the scenario cross diagram, indicating that they are both highly influential and highly uncertain. This positioning highlights their critical role in the scenario-building process.

Scenario Development Based on the findings, three future-oriented scenarios can be developed for the border markets of Zabol city:

- **Ideal or Golden Scenario:** Full realization of the key factors leading to sustainable and smart development;
- **Possible Scenario:** Partial realization of the factors with acceptable and manageable outcomes;
- **Catastrophic Scenario:** Failure to achieve the key factors, resulting in structural and functional crises.

These scenarios can serve as a foundation for designing developmental strategies, regional policymaking, and forward-looking decision-making in the domain of border markets and smart urban growth.

Golden Scenario: Desirable Vision for the Development of Border Markets in Zabol City

The golden scenario represents the most desirable and ideal situation for realizing smart urban growth in line with the development of Zabol's border markets. This scenario is based on a set of positive and consistent assumptions and is free of critical or unfavorable components. In some cases, static states may be observed; however, the overall scenario follows a progressive and achievable path.

1. Requirements for Achieving the Golden Scenario

Reaching this desired state requires efficient and smart management in the urban development process. This entails employing skilled and capable professionals in planning, execution, and monitoring to guide the development path with creativity, prudence, and foresight.

2. The Role of Zabol in Border Development

As a border city, Zabol has managed to secure its position among smartly developed cities through controlled physical growth and sound management. Strengthening border security and reducing ethnic and tribal tensions have created the basis for social and economic interactions across the border. Increased public participation in border affairs and markets has stimulated

economic prosperity, reduced political tensions, and transformed border markets into centers of trade and international interaction.

3. Infrastructure and Transportation Development

The expansion of trade with neighboring countries and the increase in commodity exchanges require the development of transport infrastructure. The establishment and expansion of railway lines have ended Zabol's geographical isolation and boosted transport revenues. Furthermore, the construction of public and private facilities in the city and at the border has enhanced public and service infrastructure.

4. Moving toward a Smart City

To achieve a smart city, it is essential to develop electronic services both within the city and at the border. These services provide a suitable platform for financial, currency, and administrative exchanges. Additionally, producing media content and collaborating with public and private media play a significant role in promoting Zabol's tourism potential.

5. Tourism Growth and Job Creation

An increase in tourist attraction, especially in local tourism, stimulates related businesses such as hotels, restaurants, leisure complexes, and traditional accommodations. This trend can reduce unemployment rates in the city. Furthermore, developing manufacturing units and factories with the aim of exporting to neighboring countries will foster economic growth and job creation.

6. Creating a Dynamic Economy and a 24-Hour City

By supporting employment-oriented activities and increasing local production, Zabol can transform into a dynamic city active around the clock. This economic transformation not only boosts municipal revenues but also strengthens Zabol's regional and national position.

Silver Scenario: Maintaining the Status Quo and Slow Urban Growth

The silver scenario reflects a situation in which Zabol follows a slow, gradual, and static growth path. Known as the "believable scenario," it mainly mirrors the city's current state — one characterized by minimal structural changes and a sluggish pace of development.

1. Management and Planning Features

Here, urban management is shaped by conservative, non-transformational approaches. Managers accept the status quo and show little interest in strategic planning for improvement. Their actions largely remain within the framework of preserving existing structures. This leads to stagnation in development processes and lowers public participation.

2. Social Conditions and Border Security

In this scenario, Zabol's borders face ongoing tensions, with the persistent risk of ethnic and tribal conflicts. The absence of stable security reduces public trust and triggers migration of residents to other cities. Such migration diminishes the city's active population, negatively affecting employment, production, and investment.

3. Border Market and Transport Stagnation

Border markets fail to achieve desirable economic activity. Cross-border exchanges decline, and

transport remains limited to traditional and restricted routes. Public transport is confined mainly to taxis and private vehicles, while infrastructure development remains stagnant.

4. Weak Infrastructure and Public Participation

Citizens, lacking a clear vision and development incentives, show little interest in participating in urban renewal or revitalizing abandoned spaces. Public media remain focused on daily news coverage, failing to actively raise awareness or promote the city's potential. Consequently, Zabol remains static, with its developmental capacities left untapped

Catastrophic Scenario: Crisis in the Development Path of Zabol's Border Markets

The catastrophic scenario represents the opposite of the golden one, depicting a crisis situation in which, without effective management, strategic planning, and financial resources, Zabol faces severe stagnation and the collapse of its economic and social infrastructure. This scenario warns of the consequences of neglecting smart urban growth principles in border regions.

1. Institutional Misalignment and Executive Stagnation

Here, institutional and organizational misalignment intensifies, and development projects stall or remain unfinished due to lack of funding. Weak managerial cohesion leads to confusion in policymaking and inefficiency in implementing urban and economic projects.

2. Economic Collapse and Closure of Production Units

The city's economy lacks the capacity to create jobs, develop infrastructure, or support manufacturing units. Consequently, existing factories and workshops suffer declining productivity and ultimately shut down. This process increases unemployment rates and reduces municipal revenues.

3. Environmental Crisis and Population Migration

Prolonged drought and water crises severely affect living conditions, triggering mass migration to neighboring provinces. The decline in active population weakens the city's human capital and disrupts its economic cycle.

4. Tourism Stagnation and Media Weakness

Tourism activities collapse due to lack of financial support and media promotion. Attractions remain unadvertised, and no investments are made in the sector. Public media play no active role in improving the city's image.

5. Infrastructure Breakdown and Transport Disruption

Urban infrastructure gradually deteriorates, losing efficiency due to lack of maintenance and renewal. The urban transport system falters, and development projects such as railway construction are canceled or abandoned due to border insecurity and ethnic tensions.

6. Collapse of Border Markets and Regional Trade

In this crisis, Zabol's border markets gradually cease operations due to insecurity, inadequate infrastructure, and declining economic interactions. Regional trade with neighboring countries halts, stripping Zabol of its role as a border economic hub. This not only reduces municipal revenues but also heightens the city's dependency on limited internal resources, increasing its vulnerability to future crises.

Analytical Dimensions	Golden Scenario	Silver Scenario	Disaster Scenario
Management and Planning	Smart, Creative, Future-oriented	Static, Conservative, Lacking Motivation for Transformation	Uncoordinated, Inefficient, Lacking Cohesion
Border Security	Sustainable, Peaceful, Facilitating Interactions	Tension-Inducing, Unstable, Decline in Public Participation	Critical, Ethnic Conflicts, Halt of Border Activities
Economy and Employment	Dynamic, Job-Creating, Export Development	Recessionary, Labor Migration, Decreased Investment	Economic Collapse, Closure of Production Units, Rising Unemployment
Infrastructure and Transportation	Developed, Railway Lines, Smart City	Limited, Traditional, Weak Public Transportation	Deteriorated, Disrupted, Cancellation of Transport Projects
Tourism and Media	Active, Extensive Advertising, Tourist Attraction	Inactive, Routine Media, Decline in Cultural Interactions	Halted, Lack of Promotion, Elimination of Tourism Capacities
Population and Migration	Population Stabilization, Increased Social Participation	Gradual Migration, Reduced Motivation for Settlement	Mass Migration, Sharp Decline in Active Population Destroyed, Trade Halted, Elimination of Regional Status
Border Markets and Trade	Active, International Exchanges, Economic Growth	Semi-Active, Limited Interaction, Decline in Prosperity	Mass Migration, Sharp Decline in Active Population Destroyed, Trade Halted, Elimination of Regional Status

Table 6: Comparison of Development Scenarios for Border Bazaars of Zabol City

Source: Research Findings, 2024

Comparison of Future-Oriented Scenarios for the Development of Border Bazaars in Zabol City

A comparison of forward-looking scenarios regarding the development of border bazaars in

Zabol shows that the possible future paths of this region can be categorized into three main scenarios: the Golden Scenario, the Silver Scenario, and the Catastrophic Scenario.

- **Golden Scenario** represents a desirable situation in which, through smart management, infrastructure development, strengthening of border security, tourism prosperity, and enhanced economic interactions, Zabol City becomes a dynamic and sustainable border hub. Achieving this scenario requires strategic planning, sufficient resource allocation, and active participation from both government and the public.
- **Silver Scenario** reflects the preservation of the status quo and slow urban growth. In this situation, the city continues its development conservatively and passively, without fundamental transformation or the dynamism needed to address future challenges. While not a crisis, this scenario may gradually erode development capacities and reduce social participation incentives in the long run.
- **Catastrophic Scenario** depicts a critical situation involving the collapse of economic, social, and managerial infrastructures. Here, lack of security, weak management, environmental crises, and economic stagnation lead to mass migration, closure of border bazaars, and the elimination of Zabol's regional role. This scenario serves as a warning of the urgent need for immediate intervention and revision of development policies.

Overall, scenario planning in this study shows that the future of Zabol's border bazaars is highly dependent on management quality, security levels, investment, and public participation. Adopting smart and forward-looking approaches can move the city from the Silver or Catastrophic scenarios toward the Golden Scenario, paving the way for balanced and sustainable development in the region.

Conclusion and Recommendations

Border regions, due to their geographical location and distance from centers of political and economic power, are often among the most deprived areas. Zabol City, as one of the country's border cities, faces challenges such as unbalanced development, weak infrastructure, social disorders, and security threats. However, in the era of globalization, borders are no longer merely points of isolation but opportunities for economic, cultural, and political interactions.

Among these, border bazaars are recognized as one of the most important levers of development in frontier regions. By creating jobs, increasing export revenues, and strengthening regional interactions, bazaars play a significant role in population growth and improved welfare. The findings of this study showed that while bazaars have impacted welfare and economic variables, due to weak infrastructure, inefficient management, and lack of long-term planning, they have not fully achieved their developmental goals. Zabol's physical growth in recent years has been mainly population-driven, with horizontal and scattered expansion leading to reduced population density and increased per capita land use. This pattern indicates unbalanced development and uncontrolled conversion of agricultural lands into built-up areas, which requires guidance and control through smart urban planning.

Therefore, a **foresight-based approach**, focusing on smart urban growth, can serve as a strategic framework for guiding Zabol's development.

In sum, the development of Zabol City depends on combining foresight with the economic capacities of border bazaars and smart urban planning. This path will not only enhance welfare and security in border regions but also contribute to population and economic balance at the national level.

Recommendations

1. Development of physical and transport infrastructure

- Constructing and upgrading transport routes to facilitate exports and imports
- Equipping bazaars with basic facilities including cold storage, weighbridges, quality-control labs, covered warehouses, specialized transport, and welfare/health services
- Precise site selection of bazaars using Geographic Information Systems (GIS) to optimize Zabol's border location

2. Support for local production and employment

- Expanding small and medium-sized production activities suited to local human and environmental capacities
- Implementing economic development projects based on Zabol's border geography and climate
- Allocating bazaar revenues to establish production units in border areas aimed at job creation and poverty alleviation

3. Reforming bazaar management structures

- Shifting management approaches from security-political to economic and development-oriented perspectives
- Assigning bazaar management to community boards and the private sector under government supervision
- Creating a board-of-directors structure with active participation from local stakeholders

4. Attracting and encouraging investment

- Offering long-term facilities and financial incentives to private investors
- Enhancing security in border areas to ensure a safe investment environment
- Channeling capital into border regions through targeted promotion and guaranteed return on investment

5. Urban development and service provision in border areas

- Comprehensive, forward-looking planning for border development with a multi-dimensional approach
- Providing basic services such as water, electricity, telecommunications, education, and healthcare in border villages to retain population and prevent migration

- Allocating part of bazaar revenues to border infrastructure development and improving quality of life for residents

6. Reforming trade laws and processes

- Addressing existing problems in export licensing and simplifying administrative procedures
- Stabilizing trade laws and regulations, and avoiding frequent changes that confuse economic actors

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