Sustainable Urban & Regional Development Studies Quarterly

Volume 6, Issue 4 - Serial Number 22, Winter 2025 **Online ISSN: 2783-0764**
Journal Hompage https://www.srds.ir/
https://www.srds.ir/article_220542.html?lang=en

Comparative comparison of historical textures (bridges) of the cities of Ardabil and Isfahan and the effect of geographical features on their construction

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Received Date: 03 March 2025 **Accepted Date:** 09 May 2025

Abstract

Background and Objective: This research presents a comparative study of the historical bridges of Ardabil and Isfahan during the Safavid era, focusing on the influence of each region's geographical features on the architecture and construction of these bridges. During the Safavid period, both Ardabil and Isfahan were recognized as significant political, cultural, and economic centers of Iran. Bridges of this era, beyond their function as crossings, played a crucial role in enhancing communication, facilitating economic exchanges, and even serving military purposes. The design and construction of these bridges were influenced by geographical, climatic, topographic conditions, and available local resources. In this context, examining how architects and engineers responded to natural challenges reveals the degree of architectural adaptation to the environmental context. The findings of the study indicate that geographical differences have led to variations in the design, construction, and functions of the bridges. Bridges in Ardabil, suited to mountainous conditions and variable rivers, exhibit more robust structures, while bridges in Isfahan, influenced by the urban setting and the Zayandeh Roud River, feature more open, decorative designs with multifunctional roles.

Methodology: The research methodology is descriptive-analytical, and data has been collected through library sources, historical texts, architectural documents, and geographical analyses. The core of this analysis consists of a comparison of design, structural types, materials used, and the functions of the bridges.

Findings and Conclusion: The main objective of this study is to compare the architecture and structure of prominent historical bridges in Ardabil and Isfahan and to analyze the impact of geographical factors such as climate, topography, and water resources on the formation of their form, materials, and functions. This research aims to identify architectural patterns adapted to environmental conditions through the study of selected examples.

Keywords: Historical Bridges, Ardabil, Isfahan, Safavid Era, Regional Geography.

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Cite this article: Shahbazi Shiran, H. and Jabbarpour, S. (2026). Comparative comparison of historical textures (bridges) of the cities of Ardabil and Isfahan and the effect of geographical features on their construction. *Journal of Sustainable Urban & Regional Development Studies (JSURDS)*, 6(4), 127-134.

Extended Abstract

Introduction:
Bridges have long stood as one of the most remarkable achievements of architecture and engineering, playing a vital role in the advancement of human civilizations. These structures have not only served as means of passage and connection, but throughout many historical periods—particularly in Iran—they have held symbolic significance beyond their technical function, fulfilling social, economic, military, and even religious roles (Momtaz, 2009: 52). The Safavid era is recognized as one of the most prosperous periods in Iranian architecture, during which considerable attention was devoted to the construction of infrastructural edifices, including bridges. In this period, the cities of Ardabil and Isfahan emerged as two major political and cultural centers, significantly influencing the development of architectural models. The importance of the present study stems from the fact that the historical bridges of these two cities, despite being constructed during the same historical period—the Safavid era—display clear differences in terms of design, materials, function, and aesthetics. These differences cannot be solely attributed to architectural preferences or artistic styles; rather, a significant part of them is directly rooted in the geographical, climatic, and environmental conditions of the respective regions (Nejati, 2008: 33). Specifically, factors such as soil type, river flow intensity, rainfall levels, mountainous versus flat terrain, and access to local construction materials have played a decisive role in determining the form, structure, and even the social significance of these bridges.
Existing scholarly literature on Safavid architecture or technical analyses of historical bridges has mainly focused individually on cities such as Isfahan (Karimzadeh, 2011), while comparative studies between two regions with differing climatic conditions-such as Ardabil and Isfahan-have received limited attention. Thus, this research seeks to fill a gap in the existing body of knowledge by exploring the impact of environmental context on the architectural form and function of bridges during a pivotal era in Iran's history.

Methodology:
The methodology of this research is descriptive–analytical, based on library research, analysis of historical maps and images, field visits, and the examination of architectural and geographical characteristics of prominent bridges in each region. Initially, the technical and climatic conditions of the two regions were studied. Subsequently, selected case studies—such as *Si-o-se Pol* and *Khaju Bridge* in Isfahan, and *Yeddi Goz Bridge* and *Ebrahimabad Bridge* in Ardabil-were analyzed in detail.
The results of these analyses indicate that geographical context has had a direct impact on the selection of materials, construction methods, height, span width, and even the aesthetic qualities of the bridges. This has led to the emergence of two distinct architectural patterns in the two regions.

Results and Discussion:
The research demonstrates that geographical differences have led to variations in the design, construction, and function of the bridges. The bridges of Ardabil, adapted to mountainous terrain and variable river conditions, exhibit more robust and resilient structures. In contrast, the bridges of Isfahan, shaped by their urban setting and the stable flow of the Zayandeh River, feature more open, decorative designs with multifunctional purposes.

Conclusion:
The results of this research revealed that Mount Sabalan, with its unique natural features, has provided an ideal environment for the formation and continuity of human communities in Ardabil Province. Abundant water resources, fertile soils, a strategic geographic location, and spiritual beliefs related to the mountain have been four key factors in attracting and stabilizing human populations in this region.
It can also be concluded that ancient communities in Ardabil Province, alongside their intelligent use of natural resources, established a deep and spiritual connection with their environment, which is reflected in their choice of settlement locations and ways of life. The case study of Sabalan shows that the natural environment, beyond being a passive backdrop, played an active and influential role in the cultural and social transformations of human societies. This finding could provide a useful framework for future research in the fields of environmental archaeology and historical geography.
Based on the evidence and analyses presented, the significance of Sabalan as an important settlement hub in the Iranian plateau is becoming increasingly evident. Therefore, the protection, documentation, and expansion of research in this region are undeniably essential, and they could contribute to the enrichment of our country's cultural heritage.

Declarations
•**Funding**: There is no funding support for this study.
•**Authors' Contributions**: All authors contributed equally to the conceptualization and writing of the article. The authors approved the manuscript's content and agreed on all aspects of the work.
•**Conflict of Interest:** The authors declare no conflict of interest.
•**Acknowledgments**: The authors extend their gratitude to all scientific consultants who provided invaluable insights during this research.

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