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Identifying and Prioritizing Compatible Spatial Organization Theories for the Analysis of Tabriz's city Historic Urban Fabric

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Abstract
Background and Objective: The inherent order within complex urban systems has consistently generated interwoven flows and intricate relationships within the city's spatial organization. Understanding this order necessitates comprehending the position of elements and the profound relationships among the components of spatial organization. Based on such a necessity, in the case study of the historical context of Tabriz, the question is raised: which theories and perspectives on spatial organization are most compatible in analyzing the spatial organization of the historical context of Tabriz? Accordingly, the present research aims to identify and prioritize spatial organization theories and their representative indicators based on the characteristics of Tabriz's historic urban fabric. Ultimately, it seeks to propose a multi-faceted approach derived from the integration of theories compatible with the studied context.
Methodology: This research employed both quantitative and qualitative methods to achieve its objectives and data collection was through a survey strategy (field-library). This research was based on an applied purpose and was of a descriptive-analytical type.In the quantitative section, a questionnaire tool was used to gather harmonized views and opinions from eight qualified and sufficiently specialized individuals selected as an expert panel. The acquired data was then scored and compiled in two stages, by the Delphi method. In the qualitative section, the results obtained from the quantitative data were analyzed and interpreted about the contextual characteristics by leveraging the strengths and weaknesses of each theory.
Findings and Results: The findings of this research include the prioritization of spatial organization theories and the prominent indicators within each theory. Additionally, a multi-faceted approach is presented, stemming from the consensus of expert opinions and the prioritization of spatial organization theories based on the characteristics of Tabriz's historical urban fabric. Adopting such integrated, applied, and context-based approaches, beyond simply using existing tools, with in-depth analysis and classification of spatial organization theories, paves the way for more comprehensive and meticulous analyses for contexts with special structures and adds to the richness of knowledge in this field.

Extended Abstract
Introduction:
Every civilization operates under an inherent order that defines its understanding of the world, society, and urban environments —a concept fundamental to its very existence (Zafari-Vahid & Shia, 1404). Cities, as integrated systems, possess internal unity and coherence, fostering dynamic interactions and vitalizing urban life through the deliberate arrangement of elements into a coherent spatial pattern (Tabibian, 1390). The spatial organization of urban systems is

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paramount for their vitality; without such order, cities would decline (Mansouri & Mohammadzadeh, 1396; Ghaffari-Sadeh, 1373). Ultimately, urban design aims to impose order on a city's spatial and physical composition (Tavassoli, 2003). While understanding historical urban structures is crucial for designers, the increasing complexity of modern cities makes a comprehensive analysis of their morphology and relationships challenging (Raheb & Farhadian, 1402).

Historic urban fabrics are a vital reality, connecting city centers and neighborhoods through their unique structures (Ghorbani et al , 1402). The evolution of their spatial organization profoundly impacts their future; uncontrolled changes jeopardize preservation, while gradual, harmonious transformations ensure continuity (Karimi, 2000). Thus, identifying and analyzing the spatial organization within historical contexts is essential to deduce their inherent order. This requires selecting theoretical frameworks aligned with the local and indigenous conditions, as the fabric's foundation is intrinsically linked to its cultural and evolutionary aspects. Current research often over-relies on a single analytical method without considering the study area's unique spatial identity, which can reduce practical outcomes. This study addresses this gap by identifying and prioritizing spatial organization theories for analyzing Tabriz's historic urban fabric. A hybrid and integrated approach is proposed, utilizing a mixed-methods approach (qualitative content analysis and quantitative Delphi method) to achieve expert consensus and interpret results in the context of specific characteristics. This novel, systematic approach offers a more comprehensive and precise analytical framework for uniquely structured urban fabrics, enriching knowledge in the field.

Methodology:

This applied research utilizes a descriptive-analytical design with a mixed-methods approach (qualitative and quantitative) to identify and prioritize spatial organization theories applicable to the analysis of Tabriz's historic fabric. The study focuses on the historic-cultural fabric of Tabriz metropolis, encompassing approximately 514 hectares. This area includes the Grand Bazaar, old city walls, residential areas, and their conservancy zones, serving as the central and most crucial part of Tabriz (Mashavaran Naghsh Mohit, 1397; Zeinali Azim et al., 1402). The initial phase involved a qualitative content analysis of academic literature to meticulously extract the criteria, strengths, weaknesses, and core perspectives of various spatial organization theories.

The subsequent phase employed the Delphi technique to achieve expert consensus on the theories' compatibility and prioritization for the Tabriz case study. An expert panel of eight specialists in urban planning, urban design, and urbanism was selected via purposive and snowball sampling, ensuring deep theoretical knowledge and practical experience (Skulmoski et al., 2007). Structured questionnaires, incorporating indicators derived from the qualitative analysis, were distributed, with explanations to ensure conceptual clarity. Experts evaluated these indicators using a five-point Likert scale. The validity of the questionnaire was confirmed by external urban planning professors, and its reliability was ensured through the iterative Delphi process and the calculation of Kendall's Coefficient of Concordance, leading to robust expert consensus.

Results and Discussion:

The Delphi process employed in this research successfully facilitated a robust consensus among experts regarding the prioritization of spatial organization theories for the historic urban fabric of Tabriz. This consensus was achieved over two iterative rounds. In the initial round, the Kendall's Coefficient of Concordance was 0.270, indicating an initial dispersion of expert opinions. The second round yielded a significantly higher Kendall's Coefficient of Concordance of 0.617 ($p < 0.05$). This strong convergence and statistically significant agreement confirmed the Delphi process's effectiveness, leading to its conclusion.

Prioritization of Spatial Organization Indicators

The expert consensus from the Delphi process allowed for a clear prioritization of indicators. Physical Accessibility from Bill Hillier's Space Syntax theory emerged as the highest-ranked indicator, achieving a mean score of 4.63. This consistently high ranking underscores the critical importance experts place on physical access within Tabriz's complex historic fabric. Following closely, Perception of Spatial Wholeness from Christopher Alexander's Living Structure theory and Spatial Distribution of Land Uses from Alain Bertaud's Spatial Organization theory both secured a mean score of 4.50. These highlight the emphasis on a holistic understanding and the crucial role of activity distribution. Identification of Main Axes from Edmund Bacon's Urban Structure theory (mean 4.13) also proved significant, emphasizing the pivotal role of primary movement networks. Other notable high-ranking indicators included Spatial Connectivity Index (Space Syntax, mean 3.75), Traffic (Bertaud, mean 3.75), Population Distribution (Bertaud, mean 3.50), and Identification of Core Elements and Fabric (Bill Erickson's Urban Armature, mean 3.63), all reinforcing the importance of tangible, functional, and foundational spatial aspects.

In contrast, indicators from Nikos Salingaros's Complexity Theory generally received the lowest priority. "Ornamentation and Details" garnered the lowest mean score (1.75), followed by "Fractal Geometry and Algorithmic Processes" (2.25). This suggests that abstract or overly detailed approaches may be less compatible with a comprehensive and practical analysis of Tabriz's historic urban fabric, favoring more tangible and holistic spatial dimensions.

This research's findings align with and significantly extend existing scholarship. The high priority of Space Syntax is consistent with much domestic research on historic fabrics, reaffirming the importance of physical and configurational dimensions regardless of specific context (Abedini, 1396; Ghorbani, 1402; Farhangi, 2022). However, this study's core innovation lies in its multidimensional approach, moving beyond sole reliance on Space Syntax. By elevating indicators from Alexander's Living Structure, Bertaud's Spatial Organization, and Bacon's Urban Structure theories, the research demonstrates that comprehensive historic fabric analysis requires a multi-faceted perspective. This directly addresses a research gap in the literature regarding the lack of a comprehensive integrated framework and resonates with calls for examining the reciprocal interaction between spatial forms and urban functions (Ahar, 1401; Shen, 2017).

Based on these findings, future research should focus on:

1)Operational Model Development: Future studies should create an operational model derived from the prioritized theories, practically illustrating how diverse indicators can be seamlessly combined for analyzing Tabriz's historic fabric.

2)Enhancing Analytical Tools: Developing or adapting software tools (e.g., Space Syntax, GIS, demographic/land-use analysis) is crucial to enable integrated and holistic examination of spatial organization.

Conclusion:

This study aimed to identify and prioritize spatial organization theories and their indicators relevant to Tabriz's historic urban fabric. Through a Delphi process, expert consensus highlighted the high utility of certain indicators for understanding this unique context.

The findings indicate "Physical Accessibility" (Space Syntax, Bill Hillier) as the most crucial indicator (mean 4.63), emphasizing its vital role in Tabriz's complex historic fabric. "Perception of Spatial Wholeness" (Living Structure, Christopher Alexander) and "Spatial Distribution of Land Uses" (Spatial Organization, Alain Bertaud) also received high scores (both mean 4.50), underscoring the importance of holistic understanding and activity patterns. "Identification of Main Axes" (Urban Structure, Edmund Bacon) was another significant factor (mean 4.13), highlighting key movement networks. In contrast, indicators from Salingaros's Complexity Theory, such as "Ornamentation and

Details" (mean 1.75) and "Fractal Geometry and Algorithmic Processes" (mean 2.25), received the lowest priority, suggesting these abstract perspectives are less applicable to macro-level analysis here.

This research, while aligning with the common use of Space Syntax in historic urban analysis, innovates by proposing a multidimensional approach. It integrates key indicators from Alexander's Living Structure, Bertaud's Spatial Organization, and Bacon's Urban Structure theories, demonstrating that a comprehensive analysis of Tabriz's historic fabric requires a nuanced, multi-faceted perspective. This approach addresses a critical gap in the literature for an integrated framework.

Declarations

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