

## Original Research Article

## An Inquiry on the Concept of Vernacular Architecture of Mazandaran in the Contemporary Era Case Study: Sari City\*

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### Abstract

**Problem statement:** The emergence of vernacular architecture is the physical manifestation of the interaction between geographical and human components within a given ecosystem. In traditional eras, this interaction evolved through a gradual process; however, the transition to modernity has transformed this progression. What are the constructive components of an ecosystem, and how have they influenced the formation of vernacular architecture in Mazandaran Province across different historical periods?

**Research objective:** This study aims to identify the constructive components of an ecosystem and critically reflect on the concept of vernacular architecture in contemporary Mazandaran. Subsidiary objectives include extracting criteria and sub-criteria influencing physical manifestations of vernacular architecture.

**Research method:** Employing a qualitative approach with a historical-analytical method, the city of Sari was selected as the case study. Meta-synthesis of literature was conducted using MaxQDA 20 to identify criteria and sub-criteria. Pairwise comparison was used to calculate sub-criteria weights. Through purposive sampling, documentary studies, and field observations, contemporary vernacular architecture in Mazandaran was analyzed using a combined Emic (insider perspective) and Etic (outsider perspective) framework.

**Conclusion:** Results identify 43 constructive sub-criteria of the ecosystem, categorized under 5 geographical and 7 human criteria. Emic analysis reveals that the historic Āb-Anbār-e-No neighborhood scored 628.66 points, while the contemporary Bakhsh-e-hasht scored 197.66. The etic comparison demonstrates incompatibility in contemporary sari's physical manifestations due to misalignment with 21/ 43 sub-criteria, including precipitation & humidity, solar exposure & temperature, wind patterns & ventilation from geographical factors and habits & norms, customs & ethics, rituals & traditions from human factors causing dissonance with vernacular principles.

**Keywords:** *Vernacular Architecture, Ecosystem, Contemporary Human, Contemporary Era, Mazandaran, Sari.*

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## Introduction and Problem Statement

Vernacular architecture is regarded as the result of the organic interaction between humans and their surrounding ecosystem, leading to the emergence of a physical product. The architecture born from this bilateral human-ecosystem interaction evolved throughout historical periods, culminating in the formation of traditional architecture or pattern-based architecture through evolution and pattern development (Hojjat, 2014). From this perspective, traditional cities are the outcome of organically formed architecture -traces of evolutionary genesis patterns over time- manifested as physical spaces that advance through self-organizing principles (Leach & Snooks, 2010).

Accordingly, vernacular architecture in organically evolved traditional cities constitutes a dynamic, adaptable system. It emerges through the interplay of internal components and interactions with external surroundings, forming a structured pattern over time like any emergent system (Johnson, 2002). Hence, this qualitative study examines the genesis and evolution of vernacular architecture in Mazandaran to reflect on its conceptualization in the contemporary era. By selecting Sari as the case study, it identifies stable, persistent concepts underpinning vernacular architecture, describes its manifestations across historical periods, and conducts a comparative evaluation using both emic and etic approaches -weighting physical components- to answer: What are the components of the ecosystem in the contemporary Mazandaran, and how have they influenced vernacular architecture formation across different periods?

## Literature Review

Recognizing vernacular architecture as the physical outcome of interactions between humans and their ecosystem has long been emphasized by architectural and urban theorists from both conceptual and physical perspectives. This emphasis persists today through advancements in new sciences and computational tools.

Christopher Alexander, in *Notes on the Synthesis of Form* (Alexander, 1964) distributed the constructive components of the ecosystem into 13 clusters, elucidating their relationships through graph theory. To compare physical structures with vernacular culture, Amos Rapoport (Rappaport, 1969; 1977) and Bill Hillier (Hillier, 1984; 1996) in space syntax focused on hierarchical graphs and comparing physical profiles with cultural profiles, advocating for etic approaches alongside emic approaches as essential. With the rise of new sciences and socio-cultural concerns -including chaos theory- architecture began to be studied as a fluid organic entity. Jane Jacobs (Jacobs, 1992) emphasizing human relationships and spontaneous processes, pioneered this approach. Alexander, in *A City Is Not a Tree* (Alexander, 1966) characterized human-ecosystem interactive architecture as multilayered complexity. Building on this, Nikos Salingaros (Salingaros, 2010) explored spontaneous, fluid structures using contemporary mathematics. Steven Johnson (Johnson, 2002) identified this architecture as a dynamic, adaptable system and a manifestation of emergence. Adopting this emergent perspective and data-driven software, Rob Roggema (Roggema, 2013; 2015; 2016) compared physically emergent results of self-adaptive processes with planned designs. Abdulmueen Hasan (Abdulmueen Hasan, 2022), examining Arabic traditional cities, analyzed the role of foundational interactions in shaping vernacular fabrics. Tang (Tang, 2020) contends architectural emergence stems from explicit processes rooted in deep cultural-physical layers of the ecosystem. Turner (Turner, 2022) demonstrated human-centric urbanity by comparing residents' preferences with planned layouts, stressing the need for physical-spatial alignment with ecosystem components. For historical comparison, Holtzman (Holtzman, 2018) studied physical outcomes across 200 years in New York's 800 Block. Guided by the view that vernacular fabric is the physical product of self-organizing interactions among ecosystem components, this

study enumerates these components and examines their role in the vernacular architecture of Mazandaran.

### Theoretical Foundations

Although the concept of emergence in recent architectural discourse has primarily been applied to algorithmic design, it is equally observable in organically evolved urban structures. These emerge through interactions and self-organization of internal components and responses to external environmental forces (Abdulmueen Hasan, 2022). By defining vernacular architecture as the product of geographical and human component interactions, it can be conceptualized as a living system. This idea, developed through Gestalt theory in the 1920s, views systems not as discrete products but as entities grown from emergent patterns and self-organization (Batty, 2013, 54). Self-organization a concept expandable through emergence theory- is a dynamic, adaptive process where systems achieve organization without external direction, maintaining coherence amid unforeseen internal/external changes (Roggema, 2016). From the chosen perspective in this study, human-ecosystem interaction drives an emergent evolutionary process culminating in vernacular architecture. Upon pattern crystallization, it transitions into traditional architecture, the evolved embodiment of vernacular experiences. While sharing ecosystem-adaptive traits with vernacular architecture when contextually applied, traditional architecture differs by relying on predetermined patterns rather than emergent structures. Hall's Cultural Iceberg Model distinguishes visible/manifest layers from hidden cultural foundations, positing tangible outcomes as products of deeper, often imperceptible strata (Hall, 1959; 1976). In the contemporary era -marked by disconnection from traditional practices- re-engaging with emergent structures aligned with modern conditions is imperative. With cloud/data-driven layers now permeating daily life, understanding these deeper strata and their impact on built environments is

critical (Leach, 2022; Neil, 2024). Given current governance oversight of construction, evolutionarily formed architecture must now be realized not as in traditional times, but through novel approaches: participatory architecture, Design with people, and Design by people (Eslami & Kamelnia, 2014; Eslami & Eslami, 2024).

### Research Methodology

This qualitative study employs a historical-analytical approach, with Sari Iran as the case study, operating at documentary and field levels. Initially, a meta-synthesis of literature was conducted using MaxQDA 20 to identify criteria and sub-criteria influencing vernacular architecture emergence. Subsequently, a pairwise comparison in Gephi 0.10. 1 was conducted and the relative weights of these criteria were calculated. Through purposeful sampling, the organic/historic neighborhood of Āb-Anbār-e-No and the planned/contemporary neighborhood of Bakhsh-e-Hasht were selected for comparative analysis. Data collection integrated documentary studies (archival records, oral histories of the traditional neighborhood; planning documents for the contemporary area), researcher interviews, and field observations (particularly for the contemporary site). A combined emic (insider-perspective) and etic (outsider-perspective) analytical framework was applied to delineate existing conditions. As Rapoport (Rappaport, 2012) contends through anthropological lenses, vernacular architecture as an emergent system necessitates this dual approach: researchers and designers typically adopt etic stances, yet deeper cultural understanding requires emic examination from within the system itself, emphasizing its unique internal characteristics. Specifically, the emic analysis evaluated internal system interactions using ecosystem-defined parameters without researcher bias; while the etic analysis conducted macro-scale comparative assessments independent of internal components (Olukoya, 2021). Complementing this, resident participation in etic analysis incorporated lived experiences to eliminate ecosystem-

incompatible assumptions (Stender, 2017). Contemporary vernacular architecture concepts in Sari were further elucidated through additional documentary and field studies. Finally, logical reasoning systematized case study findings into a conceptual model of contemporary architecture in Mazandaran, leveraging its capacity to synthesize extensive theoretical literature into coherent conceptual systems yielding high-explanatory structures (Groat & Wang, 2012, 334).

### Case Study Introduction

Settlement in Mazandaran dates to >3000 BCE when the Aryan migration reached the Iranian Plateau. The Marda tribe settled between ancient Sari and Damghan (Eslami, 1993, 20).

Sari’s urban expansion (Fig.1) has generated three distinct neighborhood typologies: new neighborhoods: Programmed developments post-1932, initiating modernization during the First Pahlavi period; old neighborhoods: Organically formed settlements dating from approximately the Safavid era onward; and historic neighborhoods: Documented in sources by name only, with no surviving physical evidence (Ahmadi, 2012). Excluding historic neighborhoods lacking tangible manifestations, Āb-Anbār-e-No (representing old organic typology) and Bakhsh-e-Hasht (representing new planned typology) were selected through purposeful sampling. Āb-Anbār-e-No features a fully organic fabric adjacent to the city’s historic core (Fig. 2). Conversely, Bakhsh-e-Hasht exhibits a grid layout in Sari’s eastern periphery, strategically planned near recreational spaces along the Tajan River (Haft-Shahr-e-Aria Consulting Engineers, 2015).

### Findings

The research findings are presented in two aspects: first, identifying components influencing vernacular architecture formation; second, contextualizing findings within the case study to elucidate vernacular architecture in Sari.

#### • Components influencing vernacular architecture formation

To identify the constructive components of

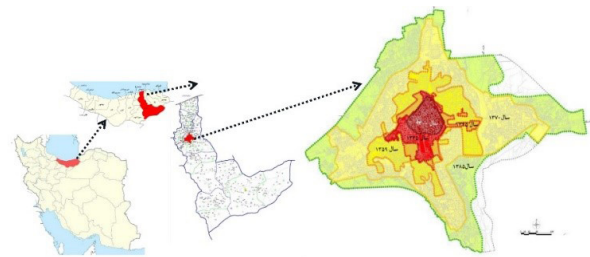


Fig. 1. Location and Expansion Trajectory of Sari City. Source: MazandTarih Consulting Engineers, 2015.

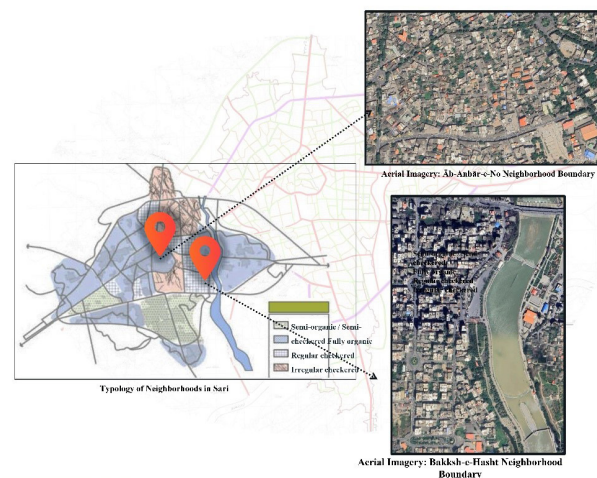


Fig. 2. Location of two case studies next to the typology map of the city’s texture. Source: Haft-Shahr-e-Aria Consulting Engineers, 2009, 30; Google Earth.

vernacular architecture, a systematic meta-synthesis of Persian and international literature was conducted. The reviewed sources comprised peer-reviewed articles, Ph.D. theses, and master dissertations, with the latter two restricted to a 20-year timeframe while articles were identified via keyword searches without temporal constraints. Initial focus on Persian-language databases (NoorMags, MagIran, SID) facilitated deep conceptual engagement with the ecosystem as an intrinsically Persian construct, enabling critical examination of scholarly interpretations. Subsequently, 16 seminal international theses and articles were manually incorporated to inform codebook development and clustering during the coding process. Systematic screening identified 2,159 records for the ecosystem and 7,921 for the vernacular, totaling 10,071 studies. After duplicate removal and title screening, 6,345 abstracts were assessed, yielding 529 texts for

full review. Ultimately, 89 studies underwent in-depth coding using MaxQDA20, organized within two macro clusters: geographical and human components. Geographical criteria have 5 sub-criteria (Climate, Natural Topography, Natural Resources, Flora, Fauna). Human criteria have 7 sub-criteria (Physiological, Economic, Social, Cultural, Religious-Spiritual, Artistic-Literary, Technical-Engineering).

Aligning with Abraham Maslow's framework (Maslow, 1943), geographical and physiological criteria constitute foundational priorities, enabling physiological comfort. Economic, social, cultural, spiritual-religious, and artistic-literary criteria occupy subsequent hierarchical tiers. Hojjat (Hojjat, 2014) further contextualizes architectural evolution through three phases: Formation (primitive architecture), evolution (traditional architecture), and transformation (modern and postmodern architecture). Traditional architecture -the summer of this evolutionary process- represents optimized solutions derived from vernacular experiences of the spring phase. Modernity disrupted this progression, introducing ecosystem-incongruent responses. Though frameworks like the UN Sustainable Development (United Nations, 1994) offer corrective measures, their predominantly sectoral solutions for socio-environmental adaptation fail to address the sequential integrity of emergent-evolutionary processes. Consequently, the trajectory from architectural emergence to contemporary

transformation unfolds across four distinct phases (Fig. 3).

Vernacular architecture must therefore engage the deep strata of the ecosystem -products of geographical-human component interactions. This study examines contemporary architectural alignment with vernacular components through empirical case analysis in Mazandaran.

#### • Identifying vernacular architecture manifestations in the case study

The historic neighborhood of Āb-Anbār-e-No (among the central neighborhoods of Sari) dates to the late Qajar period (Fig. 4), while the planned Bakhsh-e-Hasht (eastern Sari, established 1953) followed modernist urban principles with 450m<sup>2</sup> and 700m<sup>2</sup> plots (Fig. 5).

Dual analytical approaches were applied. The emic analysis examines each neighborhood internally and the etic comparison quantitatively contrasts both sites. Data collection methods differed temporally. For Āb-Anbār-e-No (1964 context), documentary analysis formed the basis (Eslami, 1993; Emadi, 1993; Ahmadi, 2012; Hidal-Hezareh Hashtom Consulting Engineers, 2014), supplemented by oral histories and researcher interviews. Findings revealed sparse houses amid native greenery, minimal environmental intervention, and indigenous avian habitats supported by native flora. For contemporary Bakhsh-e-Hasht, systematic field observations documented resident behaviors in communal spaces across diurnal and seasonal cycles

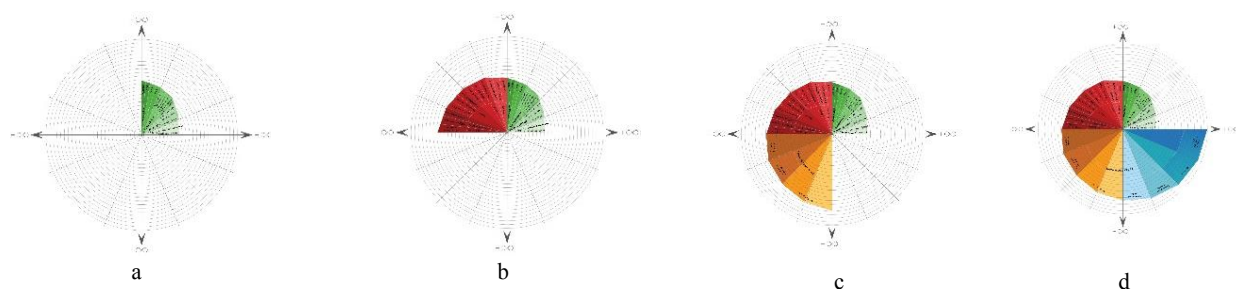


Fig. 3. Gradual Trajectory of Vernacular Architecture's Emergence and Evolution Across Four Seasons.

- (a) Spring of Vernacular Architecture (Formation phase)
- (b) Summer of Vernacular Architecture (Evolution phase)
- (c) Autumn of Vernacular Architecture (Transformation phase: Modernity)
- (d) Winter of Vernacular Architecture (Transformation phase: Postmodernity)

Source: Authors, adapted from Hojjat, 2014.

(Gehl, 2013), revealing disconnection from vernacular principles. Spatiotemporal manifestations were qualitatively mapped against the ecosystem's timeless components (Fig. 6), enabling quantitative weighting (Fig. 7). For instance, under the Natural Resources criterion, historical practices minimized forest/meadow intervention, while contemporary development showed unsustainable extraction, indicative of eroded vernacular alignment.

Since sub-criteria carry unequal weights in vernacular formation, pairwise comparison in Gephi 0.10.<sup>1</sup> determined their relative significance within the specific ecosystem of Mazandaran (Fig. 8). Weight assignment considered contextual relevance (e.g.,

water resource criteria weighted zero where hydrology was irrelevant.

In Fig. 7 each identified manifestation in both neighborhoods was evaluated within its spatiotemporal context for alignment with locale criteria/sub-criteria. Symbol + denotes harmony with the surrounding ecosystem and × indicates disregard for vernacular principles. Scores were calculated based on sub-criteria weights. Zero-weight items reflect the contextual irrelevance of that sub-criterion within the studied neighborhoods. The cumulative score demonstrates that vernacular coherence in Āb-Anbār-e-No in 1964 was 3.5 times greater than Bakhsh-e-Hasht in 2024. Specifically, Bakhsh-e-Hasht aligned with only 10 sub-criteria, and-



Fig. 4. Aerial Photo of the Ab-Anbar-No Neighbourhood and the Physical Remains Left From the 1960s. Source: Authors; Hidar-Hezarah Hashtom Consulting Engineers.

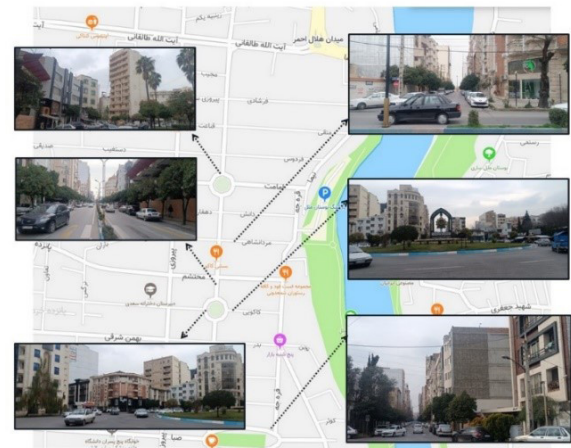


Fig. 5. Aerial Photo of the Bahsh-e-Hasht Neighbourhood and Examples of Contemporary Architecture in This Area. Source: Authors.

	Technical-Engineering	Artistic-Literary	Religious-Spiritual	Cultural	Social	Economic	Physiological	Fauna	Flora	Natural Resource	Natural Topography	Climate	Criteria																										
Lack of Recognition and Lack of Participation of the User in the Design and Implementation	Expert Workforce from Ab-Anbar-e-No	Urban Transportation Network, Road, Cu. Strip	On Foot And in A Carriage	Lack of Efficiency And Telecommunication Coverage	Fast Supply With Haze	Water Supply From Ab-Anbar-e-No	Education & Homes or At The Madia's House	Night Watches	Headwear And Treatment Relying on A Local Doctor or Healer	Comprehensive Technological Response to Geographical Impact And Human Needs	Adherence To Materials Available on Site	Consistent In Most Cases	Religious Rituals	Family Skills Settling In The Neighborhood	Ritual Occasions	Multigenerational Residential Units	Regulation & Laws	Customs & Ethics	Habit & Norms	Social Interactions	Local Language	Financial Capacity	Labourhood	Clothing	Food	Invertebrates, Reptiles, Amphibians, Aquatic Species, Mammals, Birds, Mammals	Flowers & Shrubs, Mushrooms, Herbs, Agricultural Crops	Water Resources	Soil Resources	Energy Resources	Mineral Resources	Deserts & Rangelands	Faults & Alluvial Channels	Plains & Lowlands	Depressions & Elevations	Wind Patterns & Ventilation	Solar Exposure & Precipitation	Humidity	Ab-Anbar-No (1964)
Expert Workforce from Ab-Anbar-e-No	Urban Transportation Network, Road, Cu. Strip	On Foot And in A Carriage	Lack of Efficiency And Telecommunication Coverage	Fast Supply With Haze	Water Supply From Ab-Anbar-e-No	Education & Homes or At The Madia's House	Night Watches	Headwear And Treatment Relying on A Local Doctor or Healer	Comprehensive Technological Response to Geographical Impact And Human Needs	Adherence To Materials Available on Site	Consistent In Most Cases	Religious Rituals	Family Skills Settling In The Neighborhood	Ritual Occasions	Multigenerational Residential Units	Regulation & Laws	Customs & Ethics	Habit & Norms	Social Interactions	Local Language	Financial Capacity	Labourhood	Clothing	Food	Invertebrates, Reptiles, Amphibians, Aquatic Species, Mammals, Birds, Mammals	Flowers & Shrubs, Mushrooms, Herbs, Agricultural Crops	Water Resources	Soil Resources	Energy Resources	Mineral Resources	Deserts & Rangelands	Faults & Alluvial Channels	Plains & Lowlands	Depressions & Elevations	Wind Patterns & Ventilation	Solar Exposure & Precipitation	Humidity	Bakhsh-e-Hasht (Contemporary Era)	

Fig. 6. Manifestations Influencing Vernacular Architecture at Neighbourhood Level. Source: Authors.

Fig. 7. Weighting and Comparative Evaluation of Two Case Study Neighbourhoods. Source: Authors.

Cluster	Criteria Code	Criteria	Sub-Criteria Code	Sub-Criteria	Sub-Criteria Weight	Ab-Anbar-No Neighbourhood (1964)		Bakhsh-e-Hasht (Contemporary Era)	
						Ecosystem Compatibility	Score	Ecosystem Compatibility	Score
Geographical	W	Climate	W1	Precipitation & Humidity	33	+	33	×	0
			W2	Solar Exposure & Temperature	33	+	33	×	0
			W3	Wind Patterns & Ventilation	33	+	33	×	0
	T	Natural Topography	T1	Depressions & Elevations	26	---	---	---	---
			T2	Plains & Lowlands	24	+	24	×	0
			T3	Faults & Alluvial Channels	19	+	19	+	19
	N	Natural Resource	N1	Deserts & Arid Lands	25	---	---	---	---
			N2	Forests & Rangelands	25	+	25	×	0
			N3	Mineral Resources	15	---	---	---	---
			N4	Energy Resources	15	+	15	×	0
			N5	Soil Resources	24	+	24	×	0
	P	Flora	P1	Flowers & Shrubs, Bushes & Hedges, Trees, Agricultural Crops	20	+	20	×	0
	Human	B	Physiological	B1	Food	30	+	30	+
B2				Clothing	27	+	27	×	0
F		Economic	F1	Livelihood	37	+	37	+	37
			F2	Financial Capacity	17	+	17	×	0
S		Social	S1	Language & Dialect	2	+	2	+	2
			S2	Social Interactions	12	+	12	+	12
C		Cultural	C1	Habits & Norms	24	+	24	×	0
			C2	Customs & Ethics	15	+	15	×	0
			C3	Regulations & Laws	23	+	23	×	0
			C4	Residential Lifestyle	14	+	14	×	0
			C5	Rituals & Traditions	16	+	16	×	0
			C6	Sports & Recreation	17	+	17	+	17
H		Religious-Spiritual	H1	Religious Ceremonies	14	+	14	×	0
R		Artistic-Literary	R1	Artistic Taste & Aesthetics	11	+	11	×	0
E	Technical-Engineering	E1	Accessible Materials	19	+	19	+	19	
		E2	Construction Technologies	14	+	14	×	0	
		E3	Service Networks	25	+	25	v	16.66	
		E4	Infrastructure Facilities	22	+	14.66	+	22	
		E5	Transportation Network	23	+	23	+	23	
		E6	Labor Force	13	+	13	×	0	
		E7	Design & Construction Process	14	+	14	×	0	
		<b>Score</b>					<b>628.66</b>	<b>197.66</b>	

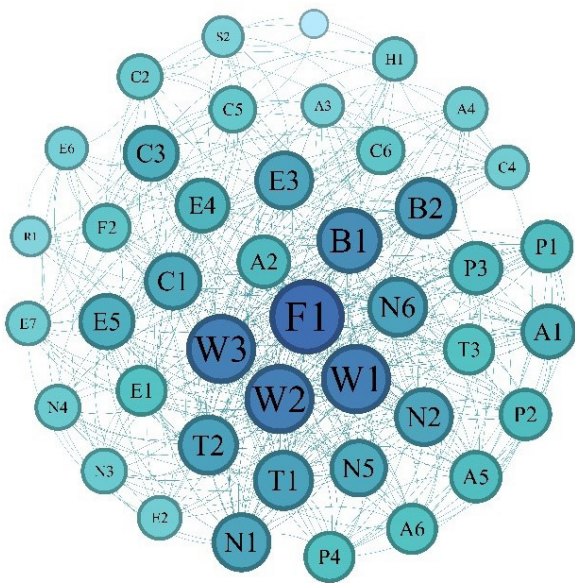


Fig.8. Constructive Components of Vernacular Architecture: Network Visualization of Interdependencies and Relative Significance. Source: Authors.

Architectural responses in the remaining cases neglected the inherent capacities and opportunities of the ecosystem.

### Discussion and Conclusion

The Mazandaran Plain, benefiting from a temperate-humid climate and diverse geography spanning foothill forests to coastal plains, has provided optimal conditions for establishing human settlements. Human habitation in this region over centuries has led to the formation and evolution of economic, social, cultural, spiritual-religious, and artistic-literary criteria, whose interaction with geographical components of this ecosystem has facilitated the evolution of vernacular architecture. With modernity’s advent and the redefinition of architecture as an output of the construction industry, new components emerged in vernacular architecture formation. These can be categorized under technical-engineering criteria such as accessible materials, construction technologies, and service networks. Identifying these components and extracting their relative weights provides the answer to this study’s primary research question regarding constructive components of the ecosystem. Addressing the second research question -how ecosystem components have influenced vernacular architecture in Mazandaran across different periods- in the pre-modern era when neighborhoods formed organically, physical

manifestations represented spatiotemporal responses to the transcendent concepts of the ecosystem. These transcendent concepts refer to the 43 identified sub-criteria, among which livelihood, food, and clothing (human cluster), precipitation and humidity, solar exposure and temperature, and wind pattern and ventilation (geographical cluster) are most significant. In the contemporary period, where new technologies enable diverse responses to geographical and human components, attention to these profound transcendent concepts has diminished.

For instance, the response to the social interactions sub-criterion in the Āb-Anbār-e-No neighborhood during the historical period manifested in religious gatherings planned at the neighborhood’s Takyeh-ye Āb-Anbār-e-No node. Concurrently, the physical response to climatic components like solar radiation and precipitation materialized through pitched roofs with wall-overhanging eaves. These covered passageways organically became hubs for unplanned, self-organized communal interactions throughout the day. The compatibility of these responses with ecosystem components has sustained observable social interactions in Āb-Anbār-e-No even today, though spontaneous encounters have diminished due to increased vehicular traffic replacing pedestrian mobility. Nevertheless, religious events remain active manifestations of collective engagement in this neighborhood. In the Bakhsh-e-Hasht neighborhood, youth/elder gatherings in enclosed/semi-open cafes, children’s playgrounds with parental supervision, and seniors resting in central green spaces constitute platforms for social interactions- representing responses to this constructive component of vernacular architecture. However, regarding climatic sub-criteria (solar exposure, precipitation, wind patterns), no responsive efforts exist in Bakhsh-e-Hasht. Favorable thermal comfort is artificially achieved through electrical/mechanical systems. Concerning customs and traditions (a cultural sub-criterion under the human cluster) historically manifested in rituals, like Shou-Nisht and Tīr-Māh-e-Sizdah-Shou, contemporary responses are limited to funerals, weddings, and calendar-based ceremonies like Nowruz. Consequently, the cumulative vernacular

coherence score for Āb-Anbār-e-No in its historical context is 628.66, versus 197.66 for contemporary Bakhsh-e-Hasht. This qualitative decline stems from disengagement with ecosystem components in the modern era in Mazandaran (Fig. 9).

Reappraising responses, particularly regarding geographical criteria, while addressing era-specific human spatiotemporal criteria in contemporary Mazandaran, can cultivate architectural excellence aligned with the timeless foundations of its geographical and human ecosystem. This potential is amplified by modern technologies enabling more diverse solutions than historically available. For instance, while wood served as the primary material in historic Āb-Anbār-e-No due to limited alternatives, contemporary use of innovative materials -when compatible with constructive ecosystem concepts in Mazandaran- can optimize environmental impact mitigation. Consequently, urban planners and designers in this region are urged to avoid replicating historical physical manifestations or importing patterns from dissimilar climates/cultures; and should be engage in deliberative consideration of how temporal responses interact with timeless ecosystem concepts in Mazandaran; and develop physical designs responsive to constructive ecosystem components of Mazandaran. Such approaches will gradually foster incremental convergence between contemporary urban forms and the geographical/human characteristics of a present-day ecosystem in Mazandaran.

### Declaration of No Conflict of Interest

The authors declare that they have no conflict of interest

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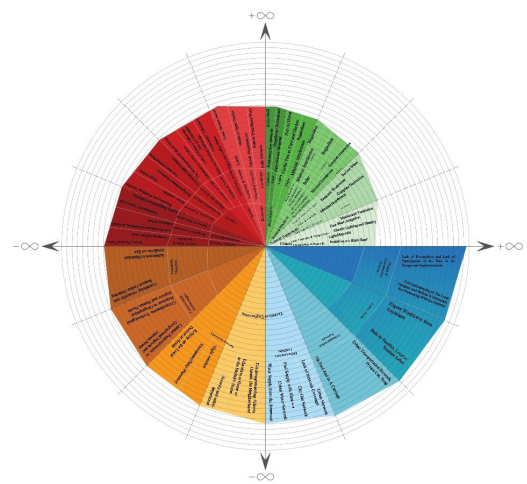


Fig. 9. Evolution of Vernacular Architecture's Physical Manifestations in Mazandaran from Traditional Eras to Contemporary Era. Source: Authors.

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