Spektrum Iran | Vol. 39 | Issue 1 | Winter & Spring 2026 | pp. 77-112 |

Original Research Paper

The geopolitics of modern architecture in Iran: the role of Swedish engineering firms during the first Pahlavi era

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Received: Aug. 1, 2026 **Accepted:** Nov. 30, 2026

Abstract

This paper examines the role of Swedish engineering firms in Iran's architectural modernization during the First Pahlavi era, foregrounding infrastructure as a critical yet underexplored instrument of state formation, national integration, and geopolitical self-assertion. While the contributions of prominent European engineering firms to Pahlavi modernization have long been recognized, the role of Scandinavian companies has received little scholarly attention. Addressing this lacuna, the study investigates the technical, conceptual, and cultural dimensions of Swedish engagement in Iran, with particular reference to the Ahvaz White Bridge and the Ghazian–Mian Poshteh Bridge. Adopting a descriptive–analytical methodology and drawing on archival materials, historical documentation, architectural records, and field investigations, the research traces how Scandinavians facilitated the transfer of modernist ideas, reconfigured spatial orders, and reshaped Iran's building culture. The findings suggest that Swedish firms performed a role far exceeding that of contractors or technical service providers. Their projects introduced advanced materials, including reinforced concrete and steel, together with movable bridge technologies previously unknown in Iran, while simultaneously embodying the broader discourse of Pahlavi modernisation. These structures emerged not only as feats of engineering, but also as visible symbols of state authority and of Iran's aspiration to reposition itself within global modernity. Their deliberate siting in strategically sensitive regions further underscores their geopolitical significance and their function as instruments of territorial integration. Beyond their technical contribution, Swedish companies acted as cultural agents and conduits for international architectural models, participating in a form of "architectural diplomacy" that facilitated the social reception of new architectural vocabularies, and thereby helped legitimise modernist aesthetics. By bringing these issues into focus, this study contributes to scholarship on transnational architectural history, technology transfer, and the geopolitics of infrastructure. It demonstrates how peripheral European actors shaped non-Western trajectories of modernisation and how the built environment was instrumentalised in state-building projects.

Keywords: Swedish construction company SENTAB, architectural modernism in Iran, building culture, construction history

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How to Cite this Article:
Motamedmanesh, M., & Vahidi, S. (2026). The geopolitics of modern architecture in Iran: the role of Swedish engineering firms during the first Pahlavi era. *Spektrum Iran*, 39(1), 77-112.
https://doi.org/10.22034/spektrum.2026.551240.1039

مقاله پژوهشی

ژئوپلیتیک معماری مدرن در ایران: نقش شرکت‌های مهندسی سوئدی در دوره رضاشاه پهلوی

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دریافت: ۱۴۰۵/۰۵/۱۰؛ **پذیرش:** ۱۴۰۵/۰۹/۰۹

چکیده:

این پژوهش نقش شرکت‌های مهندسی سوئدی را در مدرن‌سازی معماری ایران در دوره نخست پهلوی بررسی می‌کند و زیرساخت را به‌عنوان ابزاری مهم، اما کمتر مطالعه‌شده، در فرآیند دولت‌سازی، یکپارچگی ملی و تثبیت موقعیت ژئوپلیتیکی ایران مورد توجه قرار می‌دهد. اگرچه نقش شرکت‌های مهندسی برجسته اروپایی در روند نوسازی دوره پهلوی مدت‌هاست مورد توجه پژوهشگران بوده است، نقش شرکت‌های اسکاندیناویایی تاکنون کمتر بررسی شده است. این پژوهش با هدف پر کردن این خلأ، ابعاد فنی، مفهومی و فرهنگی حضور سوئدی‌ها در ایران را مطالعه می‌کند و به‌طور ویژه بر پل سفید اهواز و پل غازیان—میان‌پشته تمرکز دارد. این تحقیق با بهره‌گیری از روش توصیفی ـ تحلیلی و با استفاده از اسناد آرشیوی، مستندات تاریخی، مدارک معماری و مطالعات میدانی، بررسی می‌کند که چگونه کنشگران اسکاندیناویایی انتقال ایده‌های مدرنیستی را امکان‌پذیر کردند، سازمان فضایی را بازپیکربندی نمودند و فرهنگ ساخت‌وساز ایران را متحول ساختند. یافته‌های پژوهش نشان می‌دهد که شرکت‌های سوئدی نقشی فراتر از پیمانکاران یا ارائه‌دهندگان خدمات فنی ایفا کردند. پروژه‌های آنان ضمن معرفی مصالح پیشرفته‌ای مانند بتن مسلح و فولاد، و همچنین فناوری‌های نوین پل‌های متحرک که پیش از آن در ایران شناخته‌شده نبود، بازتاب‌دهنده گفتمان گسترده‌تر نوسازی دوره پهلوی نیز بودند. این سازه‌ها نه‌تنها دستاوردهایی برجسته در حوزه مهندسی به شمار می‌آمدند، بلکه به‌عنوان نمادهای آشکار اقتدار دولت و تلاش ایران برای بازتعریف جایگاه خود در مدرنیته جهانی عمل کردند. افزون بر این، استقرار هدفمند این سازه‌ها در مناطق دارای اهمیت راهبردی، اهمیت ژئوپلیتیکی آن‌ها را به‌عنوان ابزارهایی برای یکپارچگی سرزمینی برجسته می‌سازد. شرکت‌های سوئدی فراتر از نقش فنی خود، به‌عنوان کنشگران فرهنگی و واسطه‌های انتقال الگوهای معماری بین‌المللی نیز عمل کردند؛ آنان در نوعی «دیپلماسی معماری» مشارکت داشتند که پذیرش اجتماعی واژگان جدید معماری را تسهیل کرد و به مشروعیت‌بخشی به زیبایی‌شناسی مدرنیستی کمک نمود. این پژوهش با تمرکز بر این ابعاد، به مطالعات تاریخ معماری فراملی، انتقال فناوری و ژئوپلیتیک زیرساخت‌ها کمک می‌کند. همچنین نشان می‌دهد که چگونه کنشگران اروپاییِ خارج از مراکز اصلی قدرت غربی، مسیرهای نوسازی در جوامع غیرغربی را شکل دادند و چگونه محیط ساخته‌شده در پروژه‌های دولت‌سازی به ابزاری برای تحقق اهداف سیاسی و اجتماعی تبدیل شد.

واژه‌های کلیدی: شرکت ساختمانی سوئدی SENTAB ، مدرنیسم معماری در ایران، فرهنگ ساخت‌وساز، تاریخ فناوری ساخت‌وساز

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https://doi.org/10.22034/spektrum.2026.551240.1039

Spektrum Iran | Jg. 39| Nr. 1| Winter und Frühling-2026| S. 77-112 |

Original-Forschungsarbeit

Die Geopolitik der modernen Architektur im Iran: Die Rolle schwedischer Ingenieurfirmen während der Ära Reza Schah Pahlavis

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Eingegangen: 1. Aug. 2026 **Angenommen:** 30. Nov. 2026

Zusammenfassung:

Diese Studie untersucht die Rolle schwedischer Ingenieurfirmen bei der architektonischen Modernisierung Irans während der ersten Pahlavi-Ära und betrachtet Infrastruktur als ein bislang unzureichend erforschtes Instrument der Staatsbildung, nationalen Integration und geopolitischen Selbstbehauptung. Während der Beitrag bedeutender europäischer Ingenieurbüros zur Pahlavi-Modernisierung anerkannt ist, blieb die Rolle skandinavischer Unternehmen weitgehend unbeachtet. Die Forschung schließt diese Lücke durch die Analyse der technischen, konzeptionellen und kulturellen Dimensionen des schwedischen Engagements anhand der Weißen Brücke von Ahvaz und der Ghazian–Mian-Poshteh-Brücke. Auf Grundlage einer deskriptiv-analytischen Methodik sowie von Archivmaterialien, historischen Dokumenten, architektonischen Aufzeichnungen und Felduntersuchungen wird gezeigt, wie schwedische Akteure den Transfer modernistischer Ideen ermöglichten, räumliche Strukturen veränderten und die iranische Baukultur beeinflussten. Die Ergebnisse zeigen, dass ihre Rolle über die eines technischen Auftragnehmers hinausging. Durch die Einführung neuer Materialien wie Stahlbeton und Stahl sowie innovativer beweglicher Brückentechnologien trugen ihre Projekte zur technologischen Modernisierung bei und wurden zugleich zu Symbolen staatlicher Autorität und nationaler Modernisierungsbestrebungen. Darüber hinaus fungierten schwedische Unternehmen als kulturelle Vermittler internationaler Architekturmodelle und wirkten an einer Form der „Architekturdiplomatie“ mit. Die Studie leistet somit einen Beitrag zur transnationalen Architekturgeschichte, zum Technologietransfer und zur Geopolitik der Infrastruktur.

Schlüsselwörter: Bauunternehmen, SENTAB, architektonischer Modernismus im Iran, Baukultur, Bautechnikgeschichte

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Wie dieser Artikel zu zitieren ist:
Motamedmanesh, M., & Vahidi, S. (2026). The geopolitics of modern architecture in Iran: the role of Swedish engineering firms during the first Pahlavi era. *Spektrum Iran*, 39(1), 77-112.
https://doi.org/10.22034/spektrum.2026.551240.1039

1. Introduction

Architecture, understood not simply as a physical artefact but as a profound expression of cultural consciousness and social transformation, carries multiple layers of meaning. Within the development of contemporary Iranian architecture, one of the most persistent theoretical debates turns on the tension between continuity with tradition and confrontation with modernity. Tradition, in this context, exceeds the mere reproduction of historical forms or the imitation of earlier models; it denotes the endurance of foundational intellectual frameworks and "modes of dwelling" across time, forming the ontological basis of the cultural identity of lived spaces (Naqizadeh, 1999, p. 90). That identity is not a fixed essence but a dynamic process, shaped within changing historical and social conditions—a way of "remaining oneself" while sustaining an ongoing dialogue with past and present (Mahdavinejad, 2005, quoting Edward Said). Historically, this architectural identity took shape at the intersection of history, cognition and culture (Rahimzadeh, 1996, pp. 261–273; Alizadeh et al., 2025, p. 92).

The advent of modernism, however, brought a systematic rupture: a failure to sustain dialogue between traditional concepts and internalised modern paradigms. Current scholarship often traces these ruptures to the reductive functionalism and technological fixation of the Modern Movement (Alexander, 2002, p. 9). However, such criticism tends to pass over the intricate geopolitical mechanisms of the contemporary era, and the specific "agents of change" through which this transition was effected. During the reign of Reza Shah, the built environment served as a strategic instrument for projecting a modernised national identity. This process was accelerated by the involvement of foreign architects and firms, who introduced new construction models and systematic approaches, leading to the formation of a new building culture.

Historians have scrutinised the role of dominant foreign powers in Iran's modernisation, yet the strategic input of so-called politically neutral catalysts remains a conspicuous lacuna in the literature. This study addresses that omission by examining Swedish construction firms active during the First Pahlavi period. Analysing the formal, technical and cultural dimensions of their output, the research evaluates how neutral international actors contributed to the formation of a modern building

culture—a process situated at the crossroads of technological diplomacy, political non-alignment and vernacular accommodation.

2. Literature Review

Scholarship on Iranian architecture during the First Pahlavi period is varied, extending from stylistic analysis to socio-political critique. For the purposes of the present study, the literature may be organised into four principal thematic areas.

2.1. Intellectual Currents and the Synthesis of Modernity

Early scholarship concentrated on the internal logic and intellectual shifts that enabled the departure from Qajar traditions. Kiani (2004) offers a seminal account of these transformations, moving beyond descriptive narration to examine the intellectual currents (both conscious and unconscious) that underlay the emergence of contemporary Iranian architecture. A particular strength of his work lies in its shift of emphasis from completed forms to methods of design. Bani-masoud (2009), likewise, traces a comprehensive genealogy of the period, drawing attention to the "hybridity" that emerged as traditional concepts became entangled with Western paradigms in the urban landscape. Ghobadian (2014) sharpens this trajectory through a comparison of the Qajar and Pahlavi eras, arguing that although the Qajar period introduced spatial innovations, it was the Pahlavi state's adoption of European modernist tendencies that produced a distinctly "quasi-modernist" pattern in Tehran (i.e. a spatial expression of the country's wider geopolitical turn towards the West).

2.2. State-Building and the Geopolitics of Space

A substantial body of scholarship treats architecture as an ideological instrument of the state, and socio-historical work has done much to establish the political terrain on which these questions unfold. Abrahamian (1998, 2010) contends, for example, that Reza Shah's state-building amounted to a comprehensive project in which architecture served to recast Iran's public image while consolidating both domestic and regional authority. Cronin (2004) develops a related argument, stressing that the modernization of the built environment was inseparable

from state nationalism, with architecture and ancient history mobilised as instruments of identity formation. Akbari (2006) demonstrates how the Pahlavi dynasty fashioned a modern national identity through legal reform, public education and what he terms "geopolitical architecture," thereby transforming the urban fabric into a vehicle for state propaganda.

2.3. The Agency of Foreign Practitioners and Professional Shifts

The role of international actors is perhaps the best-documented dimension of this period. Hasanpour et al. (2017) offer a valuable comparative study of Iran and Turkey, observing that in Iran, foreign architects such as André Godard and Maxime Siroux cultivated a distinctive "antiquarian" traditionalism, in marked contrast to the radical secularism of Turkish modernism. These figures, together with Nikolai Markov, Roland Dubrulle and others, have been the subject of detailed monographs produced by the Architecture of the Period of Transformation Research Group (e.g. Soroushiani et al., 2008), which document their involvement in establishing modern institutional infrastructures alongside private-sector buildings. Yet, as Rahimnia et al. (2017) point out, the prominence of these foreign practitioners marginalised traditional Iranian architects, reducing their role from that of master builders to conservation specialists. The result was a professional field increasingly shaped by Western systematic methodologies and industrial-scale construction.

2.4. Critical Historiography and Methodological Debates

Recent scholarship has taken a more critical turn, as established narratives of Pahlavi modernisation have come under increasing scrutiny. Nari Ghomi (2015) offers a critique of interpretive-historical research in the field, contending that many studies remain constrained by reductive perspectives and calling instead for a more multidimensional and critical approach adequate to the complexity of architectural change. Haeri (2008) reinforces this position by challenging prevailing representations of intellectual currents in Pahlavi architecture and pressing for greater historical precision. Taken together, these debates register a growing dissatisfaction with purely descriptive or Eurocentric histories and indicate the need for new analytical lenses through which to grasp the nuanced role of "other" actors in the modernisation process.

2.5. The Gap

For all the depth of this scholarship, however, a clear gap remains in relation to lesser-known engineering firms. French, German and Russian influences have been studied in considerable detail, yet the role of Swedish architects and firms has received almost no attention. That absence matters, because it leaves unexamined one aspect of architectural change during the First Pahlavi period: the contribution of actors not directly aligned with the dominant foreign powers commonly associated with Iran's modernisation. It has also narrowed discussion of the ways technical expertise, political positioning and architectural production intersected in this period. The present study takes up this gap by examining the work of Swedish construction companies and by clarifying their place within the broader processes of modernisation, identity formation and architectural exchange.

3. Methodology

This study employs a descriptive-analytical methodology within a historical-interpretive framework. It examines the role of Swedish engineering firms in reshaping contemporary Iranian building culture, treating built works as historically situated artefacts formed at the intersection of political ambition, technical expertise and local spatial conditions. Data collection proceeds through the systematic triangulation of primary and secondary sources. Primary evidence comprises archival materials from Iranian and Swedish national repositories, historical technical records, photographs, maps, and physical field surveys of the selected structures. These materials are read alongside secondary scholarship on Pahlavi-era modernisation, cultural geopolitics and bilateral Iran–Sweden relations, allowing the material characteristics of the projects to be situated within their broader political frameworks.

The research centres on two purposefully selected case studies: the Ghazian–Mian Poshteh Bridge in Bandar Anzali and the Ahvaz White Bridge. Both were major infrastructural interventions that introduced modern steel and concrete technologies to Iran, yet they occupied distinct geopolitical nodes. Bandar Anzali, on the Caspian coast, functioned as Iran's northern gateway and as a primary contact zone for transnational

trade and political influence. Ahvaz, by contrast, served in the south as a vital industrial and economic artery tied to oil extraction, transport and state-led regional development. Bringing these two sites into comparison makes it possible to analyse how foreign-built infrastructure operated under differing regional dynamics. The analytical framework considers these bridges across three interrelated dimensions:

Formal and Spatial: analysing the architectural expression, urban integration, and physical relationship of the bridges to their surrounding landscapes.

Technical: examining the construction systems, material technologies, and the transmission of specialised engineering expertise.

Cultural-Geopolitical: investigating how these projects operated as instruments of Pahlavi state-building and "technological diplomacy."

The research unfolds in four stages. It first establishes the theoretical intersections between architectural identity and technological diplomacy. It then reconstructs the historical conditions that enabled Swedish enterprise in Iran. The third stage undertakes a comparative architectural and historical analysis of the two bridge projects. The final stage synthesises these findings in order to discuss the broader implications of Scandinavian engineering for the emergence of a modern building culture in Iran.

4 .Theoretical Framework

4.1. Contemporary Iranian Architecture and the Crisis of Identity

4.1.1. The Ontological Disruption of Lived Space

One of the central questions in contemporary Iranian architectural discourse is the "crisis of identity," a condition produced by the profound displacement of intellectual paradigms, cultural frameworks, and modes of spatial production. As Stuart Hall (2013) argues, identity is a fluid process that operates both as a marker of selfhood and as a mechanism of differentiation within social relations. To understand identity is to recognise the "self" against the "other," a dialectic that Charles Jencks (1977) describes as the classification of objects and individuals through the act of relating oneself to an external reference. Read alongside Woodward's (2004) emphasis on the assessment of identity through similarities and differences,

this suggests that architectural identity is not a fixed inheritance but a continuing process of differentiation and recognition.

In pre-modern Iranian architecture, identity was anchored in the continuity of archetypal patterns, indigenous aesthetics, and accumulated experiential knowledge. Design was not an exercise in individualist creativity but a refinement of established principles that harmonized environmental, cultural, and spiritual needs (Hojjat, 2005, p. 59). This traditional spatial structure possessed an inner semantic stability such that innovation occurred through the reinterpretation—rather than the rejection—of the past (Motamedmanesh 2025a, p. 11).

With the arrival of modernity and the Industrial Revolution, that coherence began to unravel. Technology, instrumental rationality, and the growth of industrial cities imposed new conditions on architecture. A decisive force in this transformation was the change in humankind's understanding of itself—its place, role, and meaning in the world (Naqizadeh, 2000, p. 81). The transition from traditional to modern society was accompanied by far-reaching intellectual, philosophical, economic, and technological shifts, which in turn generated new conceptions of space and its function. In this sense, the problem of identity in the modern world arose directly from these upheavals, and architecture, as a structure of meaning, entered into crisis as well (Ghotbi, 2008, p. 81).

4.1.2. Geopolitical Dimensions of Architectural Identity

These transformations were not simply aesthetic. They were embedded in shifting structures of cultural and spatial geopolitics. Architecture, as the materialization of state power, became a principal instrument of nation-building and modernization. This is especially evident in modernizing societies that sought to redefine themselves under the "gaze of the other," negotiating between internal self-representation and international prestige. The industrialization of construction practices produced a growing detachment from climatic and local specificities, as buildings were increasingly replicated according to globalized Western models. The rise of absolute functionalism, which privileged economic efficiency over psychological and spiritual resonance, resulted in what Mahdavinejad (2005, p. 9) describes as the imprisonment of humanity within a "mechanized lifestyle." By reducing architecture to a construction-driven process (Naqizadeh, 2000, p. 85) and embracing the homogenizing

"International Style," the modern era generated spaces that were technically advanced yet rootless, devoid of a genuine "sense of place" (Norberg-Schulz, 1996, p. 424). In Iran, this rupture was sharpened by the First Pahlavi state's "top-down" modernization policies. During this period, the state prioritized the importation of Western forms as part of a geopolitical strategy to recast Iran's international image (Molaei & Azghandi, 2011, p. 141). Because this modernization lacked an indigenous theoretical framework, it produced built environments that were often alien to Iran's social fabric.

This strategy was most visible in the "frontier cities" of the modernization project, notably Ahvaz and Bandar Anzali. In these strategically significant urban centres, the involvement of European engineering firms constituted a deliberate act of techno-diplomacy. Infrastructure projects became the primary sites of mediation between European technological modernity and Iranian spatial reality. As shown in Table 1, the identity crisis in Iranian architecture resulted from the convergence of the external pressures of global modernity with an internal rupture in traditional continuities. A superficial engagement with modernism, coupled with the erasure of meaning-bearing traditional elements, produced urban spaces defined by function, economy, or form rather than by identity and belonging.

Table 1. The identity crisis in Iranian architecture and its influencing factors

Period	**Architectural Features**	**Crisis Factors**	**Consequences**
Global Modernity	Industrialization; Functionalism; Detachment from local context.	Instrumental rationality; Technological obsession; Neglect of semantic meaning	Crisis of Meaning: Decline in psychological and spiritual resonance.
Global Modernity	Industrialization; Functionalism; Detachment from local context.	Instrumental rationality; Technological obsession; Neglect of semantic meaning	Crisis of Meaning: Decline in psychological and spiritual resonance.
First Pahlavi Period	Importation of Western forms; Rupture with traditional typologies.	Accelerated, state-led modernization; Absence of indigenous design frameworks	Cultural Detachment: Urban spaces as tools of geopolitical image-making.
Contemporary Era	Placeless architecture; Emphasis on "Form-as-Spectacle."	Globalization; Systematic erasure of vernacular memory; Instrumental view of space.	Rootless Urbanism: Production of spaces devoid of belonging and identity.

4.2. Building Culture and the Process of Its Transformation

4.2.1. Building Culture as a Geopolitical Construct

A central conceptual pillar of this study is the notion of "building culture," defined here as a collective system of knowledge, social relations, and cultural values that not only shapes the material form of space but also serves as a repository of a society's collective memory. As Davis (2006, p. 24) argues, the built environment manifests historical and cultural processes and is continually reconstructed through the interplay of social institutions and human consciousness. This culture is never static. It changes, at times through gradual sedimentation, at others through abrupt intervention, in dialogue with prevailing geopolitical and economic conditions. Within this framework, the transformation of Iranian building culture during the First Pahlavi period cannot be reduced to a merely stylistic or technical shift; it must be understood as a geopolitically conditioned process in which foreign actors served as structurally significant agents of change.

By the late nineteenth century, the unprecedented rise of Western powers had shifted the global centre of civilisation, science, and technology westward. Iran progressively lost its historical position within the spheres of political and cultural power, precipitating a profound identity crisis. Unlike the Western experience, the emergence of a modern identity in Iran was oscillatory, caught in a persistent tension between the tendencies of Orientalism and Occidentalism. This divided identity, interacting with indigenous, historical, and nationalist currents, created a complex framework for architectural transformation. From the mid-nineteenth to the twentieth century, Iran's architectural culture consequently became an instrument through which the state sought to project a stable and powerful image in a competitive geopolitical arena (Grigor, 2004, p. 22). Building culture, in this sense, was a spatial response to Iran's precarious geopolitical condition and its tense relations with foreign powers.

At the turn of the twentieth century, military defeats and economic instability fostered among Iranian intellectuals a sense of national backwardness, accompanied by an ardent desire to recover the glories of past empires (Ansari, 2003, pp. 61–69). Out of this emerged an eclectic architectural movement that operated as a political language, an attempt

to articulate cultural independence through an "Iranian-style" modernization. Architects used this movement to reproduce national identity as a medium for articulating power against colonial encroachment (Kiani, 2004, p. 267; Grigor, 2013, pp. 221–222).

During the reign of Reza Shah, this project expanded into a broad modernization of the economy, education, health, and transportation. Architecture was mobilized to reshape the nation's cultural-political image in line with European nation-building models. The importation of foreign experts formed part of a systematic effort to accelerate the physical development of cities and to institutionalize modern architectural concepts. In Tehran, the erasure of Qajar urbanism and the emergence of Neo-Achaemenid and modernist styles inaugurated a new national narrative, one that privileged a modern, consumer-oriented middle class (Grigor, 2013, p. 28).

4.2.2. Technology Transfer and the Evolution of Building Culture

Contrary to common assumptions of sudden rupture, construction history shows that building culture evolves conservatively and remains deeply rooted in socio-cultural habitus (Davis, 2006, p. 5). Technological change is rarely instantaneous; it emerges through complex negotiations between tradition and innovation (Pi-Sunyer & De Gregori, 1964, pp. 247–248).

Modern industrial materials entered Iran through specific geopolitical channels, often by way of technical contracts that mirrored the wider global balance of power. The industrialization of construction shifted material production from the artisan's workshop to the factory, introducing standardized precision through emerging capitalism and competition (Davis, 2006, p. 174; Peters, 1996, p. 30). Traditionalist cultures, however, often resisted such innovations. As Forty (2012, p. 79) notes, the "culture of construction" is inherently risk-averse; builders often reject new materials because of cultural attachment and unfamiliarity. The high risk of structural failure also rendered the construction sector more conservative than other fields (Fitchen, 1986, pp. 35–36).

In Iran, this resistance was both cultural and structural. Traditional builders, tied to familiar resources and wary of technical uncertainties, adopted a cautious approach, while anti-industrial sentiment in the nineteenth century, together with economic constraints, further limited

the uptake of industrial materials. Architecture thus became the principal arena for the symbolic confrontation between East and West, tradition and modernism, and cultural independence versus political influence. In this context, each new material and construction technique carried a specific message of geopolitical positioning and ideological preference.

Crucially, this spatial transformation was an exercise in techno-diplomacy. Reza Shah's administration navigated the competitive landscape of colonial influence by seeking partnerships with politically "neutral" countries. The engagement of Scandinavian firms enabled the state to acquire advanced Western technological expertise while avoiding the political entanglements associated with the Great Powers. These firms therefore functioned as vital intermediaries, techno-diplomatic agents through whom the Iranian state negotiated the tension between modernity and sovereignty. This dynamic of negotiated modernization found one of its most potent expressions in large-scale infrastructure projects, where Swedish expertise acted as a catalyst in the transformation of the Iranian culture of building.

4.3. The First Pahlavi Period: The Geopolitics of Transition

4.2.3. Stylistic Currents and the Politics of Form

The First Pahlavi period brought a fundamental reordering of architectural production in Iran, driven by the state's deliberate programme of modernization. Architecture no longer remained simply a craft tradition. It became an instrument of political authority and a medium through which a nascent national identity could be articulated. Within less than two decades, three overlapping stylistic currents took shape.

The first was a transitional hybrid rooted in late-Qajar forms. Native builders absorbed selected elements of European neoclassicism alongside traditional motifs, producing buildings that sustained a measure of cultural continuity while marking a break with the immediate past (Banimasoud, 2009, p. 27). The second current, which gained momentum as state institutions consolidated their role as principal patrons, was early international modernism. Influenced by the Viennese school, German Expressionism, and French Art Nouveau, and reinforced by the return of European-trained Iranian architects, this work introduced new spatial

logics and building typologies into the urban fabric (Bani-masoud, 2009, p. 187). The third current, Achaemenid and Sasanian revivalism—referencing the most significant pre-Islamic dynastic periods (Motamedmanesh, 2026, p. 92; 2025b, p. 22)—served an explicitly ideological function. Through evocations of imperial grandeur, the state projected historical depth and territorial legitimacy onto public architecture (Kiani, 2004, p. 41). This plurality is evident in the infrastructure of large cities, where each project negotiated the tension between nationalist symbolism and technical pragmatism.

These currents were made possible by a sweeping reorganisation of urban spaces. Traditional fabrics were demolished to create broad boulevards, with governmental buildings strategically placed as civic anchors. These boulevards became stages on which architecture was performed, compelling architects to design façades that projected a modern public image (Rajabi, 1976, p. 112). The result was a profound shift in architectural logic: from traditional introversion to modern extroversion. Traditional Iranian architecture, which was organised around central courtyards and climate-responsive privacy, gave way to outward-facing buildings in which the façade became the principal medium of urban interaction (Kiani, 2004, p. 183). The shift was not merely formal. It carried ideological weight: the new society had to render modernity visible in the public realm.

This rapid transformation generated wholly new building types (e.g. hospitals, schools, transport hubs, and banks) that had no historical framework within indigenous tradition. As a result, not only spatial forms but also the language of design, materials, and visual patterns underwent a fundamental metamorphosis (Flamaki, 1992, pp. 277–290). Yet the speed of change produced a cultural rupture. Many structures operated less as spaces rooted in collective memory than as top-down symbols of state power. Even where indigenous elements were incorporated, they often remained "superficial," failing to establish an organic connection with the existing social fabric.

4.2.4. Cultural Geopolitics under Reza Shah

Under Reza Shah, architecture and urban planning served as instruments through which the Pahlavi state projected domestic power and constructed a revised international image. The physical

modernization of cities should therefore be read as a geopolitical project: a deliberate effort to reposition Iran within the modern global order through space and infrastructure as instruments of internal authority and external signalling. This was not gradual reform, but a state-directed confrontation with modernity, producing one of the most critical ruptures in the history of Iranian urbanism (Kiani, 2004, pp. 31–40).

Before this period, Iranian architecture remained grounded in indigenous traditions. With the rise of Reza Shah, this continuity was decisively broken. Architecture was transformed from a community-rooted practice into a centralized instrument of the state (Pakzad, 2010, p. 344). Intellectually, the shift was propelled by a nationalist-modernist orientation that imagined Iran's future as inseparable from Western progress (Katouzian, 1993, pp. 210–225; Grigor, 2009, pp. 20–28). Under Reza Shah's autocratic modernization, even antiquarian revivalism was recast as an official expression of patriotism; architecture thus became a medium for representing the legitimacy of the centralized state (Davari Ardakani, 2021, p. 110; Abrahamian, 2010, pp. 171–185).

This nationalist-modernist orientation resonated with wider global conditions. In the early twentieth century, many modernizing states in the Global South came under the influence of Western developmentalist projects. Seeking alignment with this trajectory, the Pahlavi state adopted Western scientific and cultural knowledge while reforming social and urban structures. The process gave rise to a new class of architects and professionals who sought to realise modern ideals within the redefined landscape (Atabaki, 2006, p. 8; Beheshti, 2016, pp. 229–242). Projects such as hospitals, schools, and banks became spatial embodiments of nation-building, instruments of spatial geopolitics that communicated discipline, cohesion, and Iran's aspiration to join the community of modern states.

This logic of spatial representation extended beyond the capital. In strategically significant gateway cities such as Tabriz, Ahvaz and Bandar Anzali, architecture formed part of the state's "politics of representation," transmitting signs of authority and progress to domestic citizens and international observers alike. Within this framework, infrastructure, particularly bridges, carried a double significance: as technical achievements enabling economic integration, and as geopolitical statements of territorial control and modern statehood.

Iran's industrialization also introduced a new form of industrial architecture. Factories, bridges, and way stations symbolized the power, function, and rationality of the modern state (Pahlevanzadeh & Pahlevanzadeh, 2013, pp. 340–355). The materialization of such projects also required social infrastructure, notably the dispatch of students to European universities. On their return, these graduates shaped a distinctive "Iranian quasi-modernism" by blending European styles with local conditions (Askari Chavardi et al., 2017, p. 100). Although architectural production was influenced by local resources and by the architect's outlook, the decisive role belonged to the state and its institutions, which acted as the principal patrons (Mokhtari Taleghani, 2017, p. 55).

Alongside domestic developments, foreign architects and construction companies played a pivotal role. Seeking to accelerate modernization, the state formally invited Western designers to participate in governmental projects. Their early influence was largely decorative, but they later designed fully modern structures with entirely new functions (Kiani, 2004, p. 153). The government strategically invited architects from countries such as Germany and France to oversee major projects, gradually transforming the face of Iranian cities (Shabani & Kamiab, 2012, p. 88). At the same time, the state did not set aside its reliance on neutral European powers. This direct interaction between foreign experts and European-trained Iranian graduates facilitated the transfer of new styles and technologies, ensuring that modernization operated as both a technical and a cultural-geopolitical process. This dynamic reached its techno-diplomatic apex through the intervention of Swedish engineering firms.

4.4. Identity, Modernity, Cultural Geopolitics: A Conceptual Framework

The three core concepts structuring this analysis (i.e. identity, modernity, and cultural geopolitics) are not discrete categories but mutually constitutive ones. Each operates at a different analytical level, yet together they furnish a coherent lens through which to read architectural transformation in early twentieth-century Iran.

Identity is understood here not as a fixed attribute, but as a dynamic and contested process shaped by historical continuity, collective memory, and spatial practice. In Iranian architecture, identity is expressed through the relationship between built form and cultural tradition. Such a relationship can be fundamentally disrupted during an era of profound

self-questioning. The rupture with indigenous building practices, together with the marginalisation of climatic, symbolic, and communal logics, produced what we term an "architectural identity crisis": a condition in which new forms were imposed without corresponding shifts in cultural consciousness or social meaning.

Modernity, in turn, is treated not as a universal developmental trajectory, but as a geographically and politically mediated process. In Iran, modernity arrived not through endogenous intellectual or technical evolution, but through the state-directed importation of Western models. This imported modernity was selective, instrumental, and often symbolic, deployed to signal Iran's membership in the modern world rather than to address indigenous spatial or social needs (Figure 1). Architecture became the chosen medium through which the state performed modernity, addressing at once a domestic audience and an international one.

Fig 1. Architecture and urban planning under Reza Shah as instruments of geopolitical representation

The modernization of Iranian cities functioned as a spatial strategy to project national authority and reposition Iran internationally. The image illustrates the inherent contradictions of this period: while the city embraced symbols of Western lifestyle—such as the Tehran Opera House (ordered by Reza Shah in 1935 following his visit to Turkey)—it lacked basic infrastructure like sewage systems. In the foreground, a water cart illustrates the continued reliance on traditional supply methods in a metropolis aspiring to European standards (Photograph: Dmitri Kessel © The Picture Collection Inc.)

Cultural geopolitics refers to the spatial dimension of power relations between states and cultures, in which architecture and infrastructure operate as instruments of political representation and territorial signalling. In the First Pahlavi context, architecture was inseparable from

Iran's geopolitical positioning: every material choice, construction technique, and stylistic reference carried implications for Iran's relationship with the West, its assertion of sovereignty, and its negotiation of neutrality amid competing imperial powers. Infrastructure projects stood at the intersection of technological diplomacy and spatial control, embodying both functional necessity and geopolitical messaging.

These three concepts are mutually implicated. The identity crisis arose because modernity was imported in a manner that bypassed indigenous tradition. On the other hand, the particular form that modernity assumed was itself shaped by the geopolitical context in which Iran sought to redefine itself. Architecture, within this framework, becomes legible as a site where identity is negotiated, modernity is performed, and geopolitical relations are spatially inscribed.

It is within this integrated model that the role of Scandinavian engineering firms, and the infrastructures they constructed, can be properly understood: not merely as technical contractors, but as techno-diplomatic mediators who facilitated the transfer of modern construction culture while operating within the spatial logic of cultural geopolitics. The following section examines how this mediation unfolded in the specific case of Sweden–Iran relations and the bridges that materialised through them.

5. Modernity as Geopolitical Transfer: From Military Reform to Spatial Order

5.1. The Introduction of Modernity to Iran through Contacts with Europe

Modernity entered Iran neither by accident nor as a wholly internal development. It took shape through sustained contact with Europe: first under the pressure of military necessity, then through state policy, and eventually in spatial, infrastructural, and architectural form.

At the beginning of the nineteenth century, the Middle East had become a strategic arena for Europe's imperial powers. Repeated military defeats and the threat of colonial domination pushed Iranian elites towards the reform of traditional structures, above all the army and security apparatus. The systematic modernisation of Iran's military began with Abbas Mirza, the reform-minded Qajar crown prince. Deeply

affected by the consequences of Iran's defeats in the Russo-Persian wars, Abbas Mirza initiated a series of targeted measures intended to familiarise the country with Western military technology. These included sending students and envoys to Europe, translating scientific and military texts into Persian, and inviting foreign military advisers to train Iranian troops (Jahanbeglou, 2000, pp. 228–231).

From the early nineteenth century until the rise of the Pahlavi dynasty, Iran hosted several foreign missions, each with its own strategic orientation: three French, three British, two Austrian, one informal Italian, one Russian in the form of the Cossack Brigade, and finally a Swedish mission tasked with organising the gendarmerie (Cronin, 2008: 201). The formal recruitment of the Swedish military mission in 1910 marked a decisive turning point: approved by the National Consultative Assembly, the measure was justified primarily by Sweden's neutrality in global colonial rivalries. At a moment when imperial competition in Iran had reached its height, the selection of Sweden (i.e. a minor yet trusted European power) offered the Iranian state a calculated means of pursuing military modernisation without granting political concessions.

The first tangible result of this collaboration was the establishment of a state gendarmerie under Swedish command during the First World War. By 1915, the force numbered more than 7,000 men under the leadership of seventy-five Iranian and Swedish officers, and served as the country's only coherent military unit at the time (Miroshnikov, 1978, pp. 90–96). Its success in maintaining domestic order led the government to extend the contracts of the Swedish officers; in July of that year, a bill approving the continued service of six Swedish officers was submitted to parliament and ratified (Ghaem Maqami, 1976, p. 320).

Although initially concerned with military reconstruction, this phase of modernisation gradually extended its reach into political, social, administrative, spatial, and cultural domains. Foreign military officers and advisers stationed across Iran were not merely instructors. They also embodied Western lifestyles, spatial disciplines, and civilisational values. Concepts such as modern spatial order, administrative efficiency, and engineered aesthetics gradually entered the consciousness of Iranian administrators, community, and architects. Thus, the presence of Swedish officers within Iran's military institutions

can be read not only as part of an endogenous reform project, but also as an element in the geopolitical transfer of technology and culture under the guise of security diplomacy.

5.2. The Historical Background of Iran's Relations with the Scandinavian Countries

Relations between Iran and the Scandinavian states, particularly Sweden, have in recent centuries been most visible in diplomatic, economic, and cultural cooperation. Their roots, however, extend further, into shared interests in heritage, archaeology, and security. These relations can be traced to the seventeenth century, when Safavid Iran drew the attention of European adventurers. Swedish travellers such as Bengt Oxenstierna and Nils Mattsson Kiöping visited Iran, exploring historic sites including Persepolis and Naqsh-e Rostam. At the same time, the diplomatic mission of Ludvig Fabritius to the court of Shah Abbas I marked the first significant step towards formal and commercial ties between the two countries. A gold coin from 1700, struck to commemorate Fabritius' presence in Isfahan, remains tangible evidence of these early exchanges (Motamedmanesh, 2022, p. 302; Nylander, 1979, pp. 345–359).

By the nineteenth century, Iranian–Swedish relations had moved beyond cultural contact. Amid imperial rivalries, smaller European states sought a place in the political geography of the Middle East through cultural, scientific, and security diplomacy, while Iran sought neutral partners for its development projects. Military and security ties between Iran and Sweden, as noted earlier, played a decisive role in establishing the national security. A further turning point came in 1920 with the formal establishment of the Iranian embassy in Stockholm, inaugurating a new phase of bilateral diplomacy (Embassy of Iran in Stockholm, 2017).

By the 1930s, Swedish scholars were active in linguistics, religious studies, and Iranian history. Figures such as Nathan Söderblom, Henrik Samuel Nyberg, Geo Widengren, Stig Wikander, and Sven Hartman laid the foundations of Iranian studies in Scandinavia and created an intellectual platform for cultural diplomacy between the two nations. The first Swedish-led archaeological excavations in Iran began in 1932, with surveys at sites such as Shah Tepe (Arne, 1945) and Takht-e Soleyman (von der Osten & Naumann 1961), advancing knowledge of ancient Iranian civilisations. The Swedish archaeologist Ture Arne assembled

collections of Luristan and Amlash bronzes and compared them with material from China, Italy, and Scandinavia, exploring the possibility of historic civilisational contacts (Arne, 1934; Marino-Hultman, 1974, pp. 61–65). From the 1960s, this activity expanded to include research by Swedish archaeologists on Achaemenid art and architecture (Nylander, 1970; 1966; Tilia, 1972).

5.3. The Role of Scandinavians in Development of Iran's Urban Infrastructures

Technical and industrial collaboration developed alongside these ties. The Swedish company Verkstad Motala AB designed and built a steel bridge over the Karun River in Ahvaz in 1906, one of the earliest Scandinavian engineering contributions to Iran's infrastructure. The Danish construction firm Kampsax A/S contracted with the Iranian government in 1933 for the construction of the Trans-Iranian railway, employing a large number of Danish, Norwegian, and Swedish engineers and workers; the project was successfully completed in 1938 (Nouri & Soleymani, 2021, p. 83). Decades later, in 1964, the Swedish SKF Bearing Co. signed a contract to establish a bed-frame production plant in Iran, reflecting the sustained expansion of industrial cooperation (Embassy of Iran in Stockholm, 2017).

Beyond completing the infrastructures, Scandinavian firms, particularly Kampsax, played a formative role in cultivating Iran's emerging engineering sector. Newly established Iranian construction companies were entrusted with portions of the work, allowing them to learn modern building practices through direct collaboration with European engineers. At the same time, thousands of Iranian labourers received systematic training in contemporary construction methods, creating a skilled national workforce whose expertise continued to shape civil administration long after the project's completion (Andersen, 2008, 645). Indeed, Danish construction companies represented a notable feature of the interwar international construction landscape. Their ascent was instrumental in fostering post-WWI economic globalisation, a period marked by surging demand that propelled construction firms into expanded activity across domestic and foreign markets (Geoffrey, 2005, p. 119).

These collaborations must also be understood within their geopolitical setting. Scandinavian states, with their policies of neutrality, models of sustainable industrial development, and high international rankings in

transparency and governance, consistently ranked among Iran's preferred partners. During the reign of Reza Shah, when liberal economic policies and industrial modernisation programmes were pursued, conditions were especially favourable for attracting investment from neutral, development-oriented countries. Iran's strategic position, abundant energy resources, and large consumer market added to this appeal. Within this framework, Sweden—with its historical record of cooperation, absence of political entanglements, and focus on technological advancement—emerged as one of Iran's most trusted partners (IRNA, 2003).

5.4. The Swedish Construction Firm SENTAB in Iran

At the centre of these collaborations stood the Scandinavian consortium SENTAB (Svenska Entreprenad AB) of Stockholm. SENTAB was established by the Swedish engineer Jacob Mellegård, who came to Tehran as an engineer in the 1930s. The company secured major contracts under Reza Shah and contributed to the construction of the modern nation. Its work included key infrastructure and buildings across Iran, including bridges, hospitals, and roads. The University of Tehran and Mehrabad Airport in Tehran are among the company's best-known projects (Mellegård, 2020).

By the 1960s, SENTAB had become closely integrated with the Swedish construction giant Skanska (then known as Skånska Cementgjuteriet). Skanska, now recognised as one of the world's largest and most reputable construction companies, began operations in Malmö in 1887. Within a decade of its founding, the company undertook its first international commission, and it has since remained active in global infrastructure projects. Known for technical innovation, high standards, and an interdisciplinary approach, Skanska has helped shape the architectural and infrastructural landscapes of numerous countries. Its landmark projects include London's St. Mary Axe ("the Gherkin"), New York's Madison Square Garden, and parts of the city's subway system, developments that have consolidated its reputation as a major force in global construction (Skanska Annual Report, 2011). This international pedigree underscores the significance of SENTAB's involvement in Iran's modernisation projects, revealing that Pahlavi-era development drew directly on the capacities of a leading global construction firm (Figure 2).

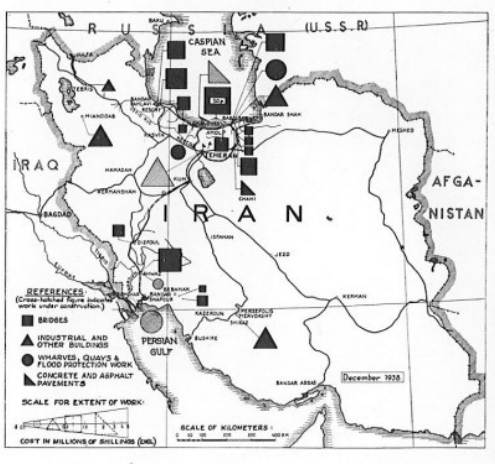

Fig 2. Map of buildings and infrastructure projects constructed by SENTAB (The Swedish National Archive)

5.4.1. The Ahvaz White Bridge: A Paradigm of Structural Sovereignty

SENTAB's formal entry into Iran's infrastructural landscape was codified through a landmark twelve-article agreement, ratified on 7 June 1934. Signed by Mirza Ali Khan Mansur, then Minister of Roads and Communications, and Oscar Lindahl, representing SENTAB (Islamic Azad University), the contract exceeded the terms of a commercial transaction. It effectively mandated a transfer of "structural sovereignty," as the Swedish firm assumed comprehensive responsibility for the geotechnical surveying, architectural drafting, and subsequent construction of a massive bridge over the Karun River.

The pre-eminent achievement of this bilateral cooperation was the Ahvaz White Bridge (Pol-e Sefid). Completed in 1936, the structure stood as Iran's first steel suspension bridge and was reputedly the fourth of its kind globally. Architecturally, the bridge marked a clear departure from the lithic traditions of Persian masonry. Its technical distinction lay in the sophisticated integration of two substantial suspension spans, measuring 136 and 130 metres, with three 49-metre arch sections, producing a total length of 501.2 metres (Mojtahedzadeh, 2015, pp. 234-235). In contrast to the perceived stasis of traditional masonry crossings, this arch-suspension hybrid introduced structural elasticity and aesthetic lightness, facilitated by the German Krupp's advanced steel fabrication.

The five-part segmentation of the bridge demonstrates considerable technical command over the volatile alluvial conditions of the Karun riverbed, turning the structure from a functional crossing into a deliberate display of modern engineering adapted to the Iranian landscape. Its technological significance was defined by highly inventive on-site construction methods: "The foundation work involved the use of interlocking iron sheet piles driven by heavy hammers to create watertight cofferdams. Within these enclosures, the riverbed was excavated using pneumatic drilling and controlled dynamite blasting, followed by continuous dewatering to allow for the casting of reinforced concrete piers. These piers were designed as hollow structures, utilizing a dry-mix concrete that was manually vibrated by rhythmic hammering on the formwork to eliminate air voids… The assembly of the massive steel arches was a logistical triumph; half-arch segments were first prefabricated on shore using triangular wooden trestles and launched into the river over greased slipways. To achieve the millimetric precision required for the hinged connections, engineers utilized a large barge (dobe) as a primitive hydraulic lift—adjusting its buoyancy by filling and discharging water to raise or lower the heavy steel sections into position… Once aligned via a system of pulleys and tensioned cables, the segments were permanently joined with hot-driven rivets, creating a suspension-arch hybrid where the deck's load is entirely transferred to the primary arches through vertical tension rods" (Mohammadi, 1998, pp. 69-76) (Figure 3).

Given the technological constraints of the 1930s, this complexity established the bridge as a leading icon of modern engineering. Beyond its utilitarian function, the structure's enduring status as Ahvaz's defining urban landmark, with substantial cultural and touristic value, was formally recognised in 1999 through its inscription on the National Heritage List (No. 2493).

From a geopolitical perspective, the bridge's location was strategically chosen. By enabling the movement of commodities and personnel across the Karun, the structure anchored oil-rich Khuzestan more securely within the administrative and economic orbit of the central government. This was no small consideration, coming barely a decade after the suppression of Sheikh Khaz'al's rebellion, when the region's autonomy

had been forcibly curtailed and the state's authority over its southern peripheries remained a matter of active consolidation. The bridge therefore functioned as an instrument of soft power, projecting the image of a cohesive, technologically resurgent nation to local tribal hinterlands and to the expanding foreign interests within the regional oil industry.

Fig 3. The construction of the Ahvaz White Bridge by Swedish engineers. Source: (Public Relations Office of Ahvaz Municipality)

5.4.2. The Anzali Corridor: Mobility, Functionalism, and Territorial Control

Another significant expression of Iranian–Swedish cooperation during the First Pahlavi period was the construction of the strategic Ghazian–Mian Poshteh Bridge (Figure 4) over Anzali Lagoon. Erected between 1935 and 1937 through a consortium of Swedish and German expertise, these structures represented a model of functionalist architecture, carefully adapted to a pressing geopolitical requirement.

The project's defining architectural feature was its 25-metre movable steel span. This bascule or vertical-lift mechanism offered a sophisticated engineering response to a dual challenge: maintaining terrestrial connectivity between Ghazian and Anzali while ensuring that the maritime gateway to the Caspian remained open to large-scale naval

vessels (Azimi, 2020, pp. 286–287). The 210-metre structure combined reinforced concrete and steel, adopting a utilitarian aesthetic that privileged kinetic efficiency, a core tenet of the International Style that Swedish firms helped disseminate globally. Local folklore poignantly characterised the bridge as "eyes that blinked," a poetic reference to the motion of its lifting spans, which eventually became an enduring element of Anzali's urban identity.

Historically, bridge-building in northern Iran had been constrained by Qajar-era anxieties, as rulers often opposed infrastructural development for fear of facilitating foreign incursions. Under the Pahlavi administration, this isolationist stance gave way to an ambitious programme of modernised infrastructure. Within this new paradigm, the Ghazian Bridge emerged as a potent symbol of national integration and centralised state authority (Yousefi, 2020). The significance of these crossings extended beyond engineering utility. They established the first uninterrupted overland route connecting the Iranian cities of Rasht, Bandar Pahlavi (now Anzali), and Astara, as well as the wider Talesh region, to the Soviet-controlled territories of the South Caucasus. This corridor became a crucial axis for regional commerce and cultural exchange, and a strategic component of Reza Shah's broader attempt to redefine Iran's geopolitical posture along its northern frontier.

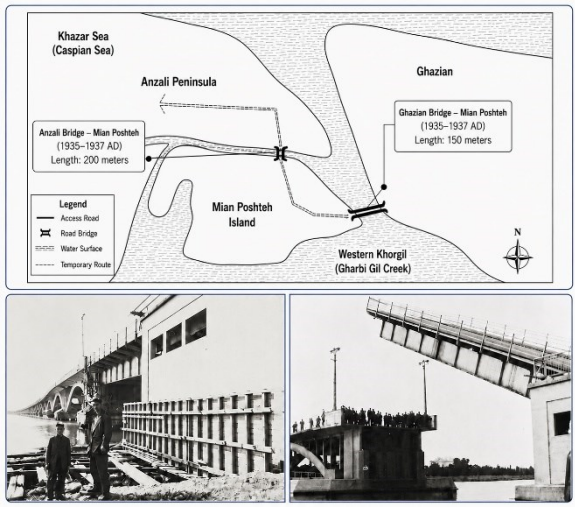

Fig 4. The Ghazian–Mian Poshteh Bridge during the First Pahlavi period. Source: (Azimi, 2020, modified by the authors)

5.4.3. Theoretical Synthesis: Bridges as Active Agents of Statecraft

Viewed through the lens of "infrastructural diplomacy," these bridges appear not as neutral works of utility, but as active agents of statecraft (Fig 5). They served as primary instruments of territorial integration, transforming the Iranian landscape into a more coherent geopolitical entity. While the Ghazian-Mian Poshteh corridor functioned as a streamlined artery for trade with the Soviet Union and Europe, the Ahvaz White Bridge acted as a structural anchor for central government in the restive, oil-rich south.

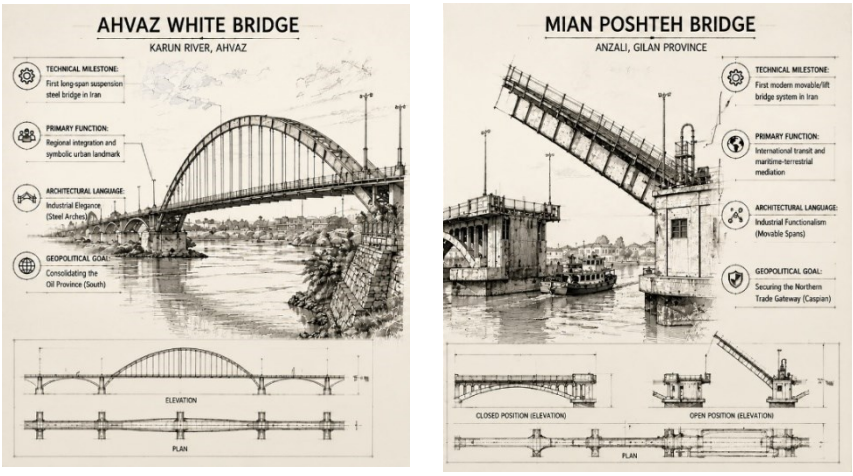

Fig 5. A comparative analysis of the Ahvaz White Bridge and Mian Poshteh Bridge. Source: Authors

By commissioning Swedish engineers, the Iranian state effectively bypassed the colonial overtones associated with British or Russian intervention. In the north, this neutral technology facilitated a "maritime-terrestrial mediation" that respected the fluid character of Caspian trade. In the south, by contrast, the suspension-arch hybrid of the White Bridge provided "visual permanence" and a monumental scale that challenged the dominance of foreign oil companies over the Khuzestan skyline. The architectural language of the two structures was therefore carefully calibrated: the industrial functionalism of Anzali's movable spans prioritised kinetic efficiency and mobility, while the industrial elegance of Ahvaz's steel arches emphasised stability and the symbolic "capture" of the Karun.

The convergence of formal freedom, technological innovation, and architectural respect for the natural landscape reveals the ideological complexity of these projects. Far from mere engineering feats, they materialised a state-led effort to recast Iran's identity at both regional and global scales. Within the framework of architectural diplomacy, the bridges functioned as mechanisms of soft-power projection, aligning the nation with the perceived advanced civilisations of the West while consolidating domestic unity during a period of intense international rivalry.

These projects were the iron and concrete manifestations of a resurgent Iran. Through the technical discipline of SENTAB, the Iranian landscape was reconfigured to support a centralised, modern state, fulfilling the theoretical promise of technology as a catalyst for profound socio-political transformation.

6. Discussion

The architectural transformation of the First Pahlavi era was not merely a stylistic shift. It was the spatial manifestation of a deeper social and institutional reconfiguration. The emergence of Western-educated elites and the modernisation of economic structures generated new demands for urban spaces capable of accommodating the functions of a modern state. Hospitals, schools, railway stations and other public institutions developed under government supervision, became instruments of spatial geopolitics, communicating discipline, national cohesion, and Iran's aspiration to join the community of modern nations.

Modernity entered Iran initially through military and security channels. European officers, and Swedish advisers in particular, introduced concepts of order, efficiency, hierarchy, and spatial organisation that gradually extended beyond the military sphere into architecture, urban planning, and statecraft. This trajectory was later reinforced by foreign architects and engineers, together with Western-educated Iranian elites, fundamentally transforming the country's built environment. Within this process, Scandinavian construction companies, notably SENTAB and Kampsax, played a decisive role in redefining urban spatial structures and introducing modern building technologies. Their

involvement also carried a specific political significance. Because they were perceived as "neutral" in comparison with the dominant imperial powers, Scandinavian firms enabled Iran to pursue modernisation with a greater degree of strategic autonomy, a position later echoed in the country's declaration of neutrality during the Second World War. Their participation therefore constituted a form of architectural diplomacy: a mode of soft geopolitics in which construction operated as a shared language of international collaboration.

Swedish firms functioned as cultural agents, not merely as contractors. The introduction of concrete, steel, and movable bridge technologies, together with simplified industrial forms, signalled an alignment with European modernist discourse and a departure from traditional design vocabularies. Equally important was the visibility of these large-scale projects in everyday urban life: their public presence operated pedagogically. As local populations witnessed the successful implementation of high-performance materials and complex structural systems in their own cities, initial scepticism towards unfamiliar technologies gradually diminished. These bridges were not simply technical milestones, rarher they were performative demonstrations of efficacy. In this sense, they altered public perception, shifting the discourse from anxiety over technological disruption to acceptance of modern industrial logic as a credible and tangible standard of progress.

Exemplary works such as the two bridges studied here became living documents of transition, in which architecture served simultaneously as the language of the modern state and the instrument of modernisation. At the same time, the training of thousands of Iranian workers and collaboration with local contractors created durable forms of knowledge transfer, progressively displacing traditional building practices with an industrial and engineered logic (Moghassemi and Akhgar, 2022, p. 231). The architectural identity crisis of the period should not, therefore, be understood simply as rupture or loss. Rather, it marked a deliberate movement towards a new modern identity—one that used infrastructure as a medium of state authority, territorial integration and international representation, while also preparing society in terms of technique and institutional capacity.

7. Conclusions

This study has shown that the modernisation of Iranian architecture under the First Pahlavi state was a multilayered process in which identity, modernity, and cultural geopolitics were closely intertwined. The participation of Swedish firms was instrumental in this transformation. They provided the technical expertise required for large-scale infrastructural development while also offering a politically "neutral" route to modernisation. Their role extended beyond that of contractors. They acted as cultural agents: conveyors of Western technologies, transmitters of new professional values, and mediators of an architectural language through which the modern state sought to represent itself.

At the theoretical level, this research advances a model of architecture as a site of negotiated modernity. It demonstrates that buildings and bridges were not neutral functional objects, but active participants in the reshaping of Iranian identity and the projection of geopolitical intent. Through infrastructural works, the Pahlavi state consolidated political authority, reorganised spatial order, and reconstructed Iran's image at both national and international scales. Architecture thus became a medium through which modern rationality was materialised, territorial control was strengthened, and state power was reproduced.

An examination of Western participation in the making of modern Iranian architecture further reveals this process as part of a broader project of soft geopolitics. The contribution of Swedish companies, together with Western-trained Iranian architects and engineers, served as a catalyst in the formation of a new building culture; one that, despite its tensions, enabled Iran's transition from inherited traditions to modern forms of spatial production. The case therefore suggests that the history of modern architecture in the non-Western world must be understood not only as a history of form, style, and material innovation, but equally as a history of political strategy, institutional negotiation, and the transfer of knowledge.

Ultimately, the Iranian–Scandinavian architectural encounter demonstrates that the built environment can function as a powerful instrument of cultural diplomacy and geopolitical signalling. By selecting partners outside the conventional circles of imperial power, the Iranian state used architecture to navigate a complex international landscape while leaving a durable imprint on the country's administrative structures

and physical territory. This perspective opens further avenues for understanding the globalisation of architecture in local contexts, the role of international actors in shaping the built environment, and the redefinition of space itself as a cultural and political product.

Author contributions

The authors confirm the study conception and design: first author; data collection: second author; analysis and interpretation of results: first and second authors; draft manuscript preparation: first and second authors. The results were evaluated by all authors, and the final version of the manuscript was approved.

Acknowledgments

The authors acknowledge that this research was carried out as part of the second author's master's studies under the supervision of the first author.

Conflict of Interest

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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