

Contents available at Iraqi Academic Scientific Journals

Iraqi Journal of Architecture and Planning

المجلة العراقية لهندسة العمارة والتخطيط

Journal homepage: <https://iqjap.uotechnology.edu.iq>

The Impact of Modernism on Contemporary Erbil Architecture

تأثير الحداثة على عمارة أربيل المعاصرة

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Submitted: 06/12/2023

Accepted: 06/06/2024

Published: 11/07/2024

KEYWORDS

Modern, Architecture,
Urban, Erbil City, Citadel

ABSTRACT

This study focuses on the impact of Modernism on contemporary architecture in Erbil, a city with a history dating back to the fifth millennium B.C. Emphasizing the historical significance of the central ancient citadel and its ties to the third family of the Sumerian empire and transformative Assyrian conquests, the research intricately navigates the discourse surrounding modernist architecture and its effects on Erbil's identity. Using an evaluative lens, it discerns how contemporary architectural trends have influenced the city's historical buildings, urban planning, and local environment. Through a descriptive and interpretive methodology, the study unveils the intricacies of Erbil's architectural transition, drawing insights from diverse sources such as maps, visuals, and legislative texts. This paper makes a significant contribution to the ongoing dialogue about the evolution of contemporary architecture in Erbil, illustrating vividly how modern architecture, characterized by its departure from tradition, gradually replaced conventional building practices from the early 20th century until the 1980s, leaving a lasting imprint on Erbil's traditional organizational planning identity.

الكلمات المفتاحية

الحديثة، العمارة، الحضرية، مدينة
أربيل، القلعة.

الملخص

تركز هذه الدراسة على تأثير الحداثة عن العمارة المعاصرة في أربيل، المدينة ذات التاريخ يعود إلى الألفية الخامسة قبل الميلاد. من خلال التأكيد على الأهمية التاريخية لمركز القلعة القديمة وعلاقاتها بالعائلة الثالثة للإمبراطورية السومرية والفتوحات الآشورية التحويلية، يتنقل البحث في الخطاب المحيط بالعمارة الحديثة وتأثيراتها على هوية أربيل. باستخدام البعد التقييمي، فإنه يميز كيف أثرت الاتجاهات المعمارية المعاصرة على المباني التاريخية في المدينة، والتخطيط الحضري، والبيئة المحلية. ومن خلال المنهج الوصفي - التفسيري، تكشف الدراسة عن تعقيدات المفصلية في التحول المعماري في أربيل، مستمدة الرؤى من المصادر المتنوعة مثل الخرائط والمرئيات والنصوص التشريعية. تقدم هذه الورقة مساهمة كبيرة في الحوار الجاري حول تطور العمارة المعاصرة في أربيل، وتوضح بوضوح كيف أن الهندسة المعمارية الحديثة، التي تتميز بابتعادها عن التقاليد، حلت تدريجياً محل ممارسات البناء التقليدية من أوائل القرن العشرين حتى الثمانينات، تاركة أثر بصمة دائمة على هوية التخطيط التنظيمي التقليدية في أربيل.

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1. Introduction

The advent of Modernism in the early 19th century marked a pivotal response to challenges, instigating a revival of historical forms. Around the mid-18th century, this transformative period saw a departure from Renaissance traditions, creating a void that spurred unpredictable modifications and the recombination of architectural elements. The objective was to rediscover authentic architectural trajectories aligned with the needs of modern industrial societies, crafting images that epitomized the essence of the supposed "modern age" (Curtis, 1996, p.617).

Post-1920, modern architecture ushered in a new era by adopting steel and concrete as foundational, simplistic physical forms (Curtis, 1996, p.617-567). This paradigm shift rejected traditional and contemporary architectural norms, notably ornamental elements, becoming a hallmark of modern architectural principles. The exploration of aesthetic properties across various cultures in modern architecture is detailed in Table (1), where common indicators spanning the modern East, Russia, and the Western world are identified (Hariry, 2017, p.56-66).

Table 1: Aesthetic characteristics of diverse cultures in modern architecture, Source: (Hariry, 2017)

Modern Aesthetic Indicators			
Eastern	Russia	Western	Common
Symmetry	Hierarchy	Inspired by form	Symmetry
Local architecture ignored	Cosmology	Simplicity in form and design	Vertical emphasis
Imitation of western	Steel and glass structure	Nothing to hide	Simplicity in form
proportionality	Regular layout	Windows as design	Industrial materials (concrete& steel)
Inspired by writings shape of Quraan	skyscrapers	Creative, open floor plans	
		Post and beam architecture	
		Recycled steel materials	
		No ornament	

The historical trajectory of Modernism in architecture, as outlined in the literature, demonstrates a response to challenges through the revival of historical forms in the early 19th century. The rejection of traditional and contemporary norms, particularly ornamental elements, became a defining feature of modern architecture post-1920. Globally, diverse artistic movements, particularly in pre-revolutionary Russia, played a crucial role in shaping the evolution of modern architecture, initially evidenced in the construction of skyscrapers.

Transitioning to the specific context of Iraq, the emergence of Modernism in 1921 marked a distinct entity in the East, characterized by a centralized decision-making process in Baghdad. This influenced city plans and development strategies, assigning a pivotal role to the "government engineer" overseeing city construction during the 1920s. The consolidation of significant building design and oversight under the Public Labor Department in Turkey marked a juncture where influential architects became catalysts for the initiation of modern architecture in Iraq.

The subsequent section introduces the architectural metamorphosis of Erbil following Iraq's liberation in 2003. This transformation reflects intricate layers of rapid political, economic, and cultural changes, unfortunately neglecting the distinctive local structure of Kurdistan. This oversight has reverberated in education, hindering the development of a distinct modern Kurdish architectural style.

Despite Erbil being one of Iraq's oldest cities, it preserves its historical charm with houses reflecting a resilient design that has endured for thousands of years. Erbil Castle, perched atop a 32-meter hill, is a striking visual focal point embodying tradition and modernity. Established in 1923, Erbil Governorate is a guardian of this rich heritage.

The study is dedicated to discerning the most effective architectural approach for forthcoming buildings in Erbil, exploring differences between traditional and modern structures. The analysis focuses on essential elements such as form, orientation, layout, windows, ventilation, shading, greenery, and urban fabric, aiming to derive insights for a culturally attuned design strategy for the city's evolving skyline.

This research focuses on determining the most suitable architectural approach for future buildings in Erbil, considering the rapid architectural changes observed post-Iraq's liberation in 2003. Concerns about

the neglect of Kurdistan's unique local structure and its potential impact on developing a distinct modern Kurdish architectural style are addressed. To address this, a comprehensive analysis of traditional and modern structures in Erbil is being undertaken, focusing on examining key architectural elements. Various sources, including maps, visuals, legislative texts, and scholarly works, are used to understand Erbil's architectural evolution.

The motivation behind this research lies in understanding the post-liberation transformation, preserving cultural heritage, and unravelling the historical context of Erbil's resilient design principles. By deriving insights, the aim is to guide the formulation of a culturally attuned design strategy for Erbil's evolving skyline. This research intends to inform key stakeholders in urban development and architectural practices.

2. Research Methodology

This research aims to identify the most effective architectural approach for forthcoming buildings in Erbil, focusing on addressing concerns stemming from the swift architectural evolution post-Iraq's liberation. Underlying assumptions include the significance of understanding historical influences, urban planning dynamics, and prevailing architectural trends specific to Erbil. The methodology integrates a comprehensive approach, encompassing information gathering, library document analysis, and interactive technologies.

The process is organized into four sections: Historical Influences on Contemporary Architecture in Erbil, Conducted through literature review, archival exploration, and document analysis; this section aims to establish foundational insights into historical influences. Urban Planning Dynamics Specific to Erbil: Combines on-site observations and interactive technologies to gather data on Erbil's urban planning dynamics. Examining Prevailing Architectural Trends in Erbil: Involves site visits, interviews, and interactive technologies to analyze current architectural trends.

Qualitative analysis is applied to examine patterns and relationships in historical influences, urban planning dynamics, and current architectural trends. Comparative analysis provides insights into an effective architectural approach for Erbil's future buildings. This methodology ensures a nuanced exploration of Erbil's architectural evolution, grounded in historical context, urban dynamics, and current trends, utilizing the past tense to convey completed research actions.

3. Site Background

The investigation into the historical influences shaping contemporary architecture in Erbil is grounded in a comprehensive and multi-faceted methodology. This approach, spanning over 6000 years of Erbil Citadel's diverse historical epochs, integrates a nuanced blend of literature review, archival exploration, and detailed document analysis. The overarching goal is to establish foundational insights into the myriad factors that have marked the evolution of Erbil's architectural landscape through each significant period.

The initial step involves an exhaustive literature review that spans from the Prehistoric Ubaid period (4000–3500 BC), Sumerian period (2900–2350 BC), Akkadian period (2350–2159 BC), Assyrian period (2000–612 BC), Median and Achaemenid periods (612–331 BC), Hellenistic and Parthian periods (331 BC–AD 226), Sassanian period (AD 226–637), Early Islamic, Umayyad, and Abbasid period (AD 661–1258), Mongols and the Safavid Period (AD 1340–1534), Ottoman Period (AD 1534–1918), The Contemporary Iraqi State (A.D. 1918–2018), Capital of the Kurdistan Region (2005), and to the present-day status of Erbil as the Capital of the Kurdistan Region (2005). This literature review encompasses various scholarly works, historical documents, and archival materials, providing a robust theoretical framework for understanding the historical contexts influencing Erbil's architectural trajectory.

Erbil Citadel and Baghdad share a historical and architectural connection within the context of Iraq. Both cities have played pivotal roles in the nation's history, and their architectural traits may reflect common design principles influenced by broader regional factors. The expression "Its form resonates with the design ethos found in Baghdad" indicates that Erbil Citadel exhibits architectural similarities or design principles reminiscent of Baghdad's architectural style. This suggests a potential connection in terms of design philosophy, urban planning, or shared historical influences that have shaped the architectural heritage of both locations.

A critical methodology component is an in-depth exploration of archival materials, including historical manuscripts, city plans, and official records. This archival investigation aims to extract nuanced details and authentic insights, leveraging primary sources to enhance the accuracy and depth of the research. The chronological exploration spans from the earliest epochs to contemporary times, capturing the essence of Erbil's architectural journey.

Detailed document analysis is a central aspect, encompassing a variety of visual artefacts that serve as pivotal elements in understanding Erbil's architectural evolution. Figure (1), depicting the urban settlement of Erbil before 1930, provides a chronological snapshot of the Pre-Modern Period. Figure (2), showcasing the master reconstruction plan in 1944, offers insights into spatial changes during the Modification Period (1930-1980). These visual elements contribute to the chronological narrative, offering tangible representations of architectural shifts.



Figure 1: A city of Erbil urban settlement before 1930,
Source: (Kaariim, 2015).



Figure 2: Master reconstruction plan of Erbil city 1944,
Source: (Al Jaff et al., 2017).

A comparative analysis is derived from studies by Al-Shwani (2011) and Hariry and Zh. (2017), utilizing Tables (2) to facilitate a detailed comparison of architectural elements such as facade solidity and window size across the extensive timeline. This comparative approach highlights the nuanced evolution of Erbil's architecture from ancient periods to contemporary times. The methodology delves into the socio-cultural and political contexts that have shaped Erbil's architecture across different historical periods. This includes an examination of colonial dominance during the Modification Period (1930-1980), the influence of industrial capitalism, and the challenges faced during Transitional Modernism (1981-2003), such as the emergence of illegal settlements and slums (AL-SHWANI, 2011, p.151-155).

Table 2: House façade solidity in different periods and window size in different periods of Erbil city evolution, Source: (AL-SHWANI, S. Y. B. 2011).

Traditional Period (Before 1930)	Modernity Period (1930-1980)	Transitional M. Period (1980-2003)	Advanced Modernity Period (after 2003)
			

Contemporary residences and structures are meticulously examined, documenting departures from traditional architectural norms. The analysis incorporates modern features like planned streets, external windows, flooring tiles, doors, and plaster designs. Changes in architectural trends, including the shift from inner courtyards to front gardens, are scrutinized, reflecting the impact of Western cultural influences on the evolving built environment.

Efforts to address housing needs are explored throughout Erbil's history, focusing on initiatives since 1996. The examination includes financial incentives, housing schemes, and access to low-cost building materials provided to residents. It also highlights the functional yet visually simplistic facades, showcasing the city's imperative to accommodate low-income residents while considering its historical background (Hariry, 2017, p.56-66).

In Erbil, the deliberate contrast between the smaller built-up area and the expansive space exemplifies the coexistence of traditional and modern architecture. This intentional interplay is succinctly summarized in Table (3), extracted from Hariry and Zh.'s 2017 study, which outlines key distinctions between Erbil's traditional and modern architectural elements. The table serves as a concise reference point, encapsulating the dynamic relationship between heritage and modernity in the city's architectural buildings.

Table 3: Comparison between traditional and modern architecture in Erbil, Source: (Hariry, Zh. 2017).

In Term of	Traditional Architecture	Modern Architecture
Form	The shape of the plot influenced the size, shape and layout of the building.	Costs are the most influential determinant of the size, shape and layout of the building.
	Buildings are built with a specific function in mind, such as privacy.	Function is not usually necessary, but strong emphasis is placed on beauty or attractiveness.
Environment	Buildings were not more than three floors, and the basement was important due to the hot climate.	Vertical expansion is used to save space and enhance the beauty or attractiveness of the building.
	Windows were used for ventilation.	Windows were used as part of the design process.
Materials	Traditional building materials like clay bricks.	Using foreign materials like concrete.
	Building designs were made of paintings and colours to enhance the appearance of the buildings.	The appearance of the buildings is enhanced by the nature of the design, such as the materials used, such as glass, alucobond, etc.

In conclusion, this detailed and comprehensive methodology is designed to uncover the intricate layers of historical influences on contemporary architecture in Erbil across all significant epochs. By combining rigorous literature review, archival exploration, document analysis, and contextual examination, the research aims to provide a holistic and detailed understanding of how Erbil's architecture has evolved over the extensive timeline, encompassing over 6000 years of urban civilization.

4. The Town Planning of Erbil

The exploration of Erbil's urban planning dynamics unfolds through a meticulous fusion of on-site observations and the strategic application of interactive technologies. Beginning in the southern part, adjacent to the southern gate, the city's organic growth is discerned through on-site examinations, meticulously capturing the gradual expansion that filled gaps in the external wall. This methodical progression, observable over a defined historical timeframe, reveals the spatial evolution of individual settlements enclosed by their external walls—a practice deeply rooted in the city's history dating back to the 18th century.

The majestic Erbil Citadel, a focal point of this exploration, is scrutinized through immersive on-site experiences. The 19th-century uninterrupted façade, characterized by its Ottoman-era charm, is a resilient testament to the city's endurance over generations. These tangible observations are seamlessly woven into the historical tapestry uncovered through extensive archaeological excavations, enriching our understanding of Erbil's historical depth.

Delving beneath the surface, the integration of interactive technologies becomes instrumental in unravelling the concealed remnants of multiple strata from former settlements. This comprehensive excavation effort, complemented by the scrutiny of rich historical records, establishes a narrative that traces

Erbil's historical continuity, connecting it to the influential centre of Arbila. The persistent appearance of the city's name in various forms, traceable back to Sumerian sources, attests to its enduring significance.

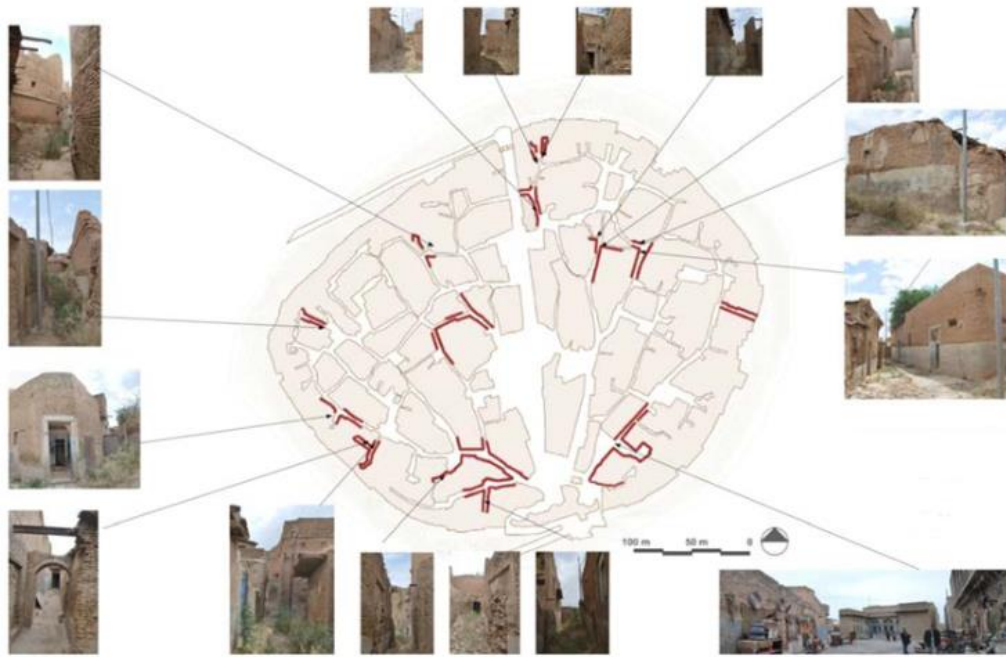


Figure 3: Documentation of House Façades in Urban Fabric Alleyways, Source: (AL-SHWANI, 2011).

Documenting house façades in urban fabric alleyways, Figure (3) is a visual testimony to the architectural influences shaping Erbil Citadel. This on-site capture provides a nuanced understanding of the distinctive courtyards within narrow alleys. The intentional design of these passageways, originating organically from the main gate and radiating in all directions, reflects a logical and functional response to circulation challenges—an insight derived directly from on-site exploration (AL-SHWANI, 2011, p.158).

Expanding the narrative, Figure (4), a vector map of the Erbil Citadel in 2005, emerges as a dynamic tool, providing a comprehensive visual representation of the city's layout. This interactive mapping highlights the deliberate clustering of buildings and showcases the strategic balance between street width and building height. The resulting sheltered areas foster a comfortable walking environment, illustrating the city's astute environmental site planning, as further evidenced by the optimal solar radiation and natural daylight for each residential unit (Housarova et al., 2019).

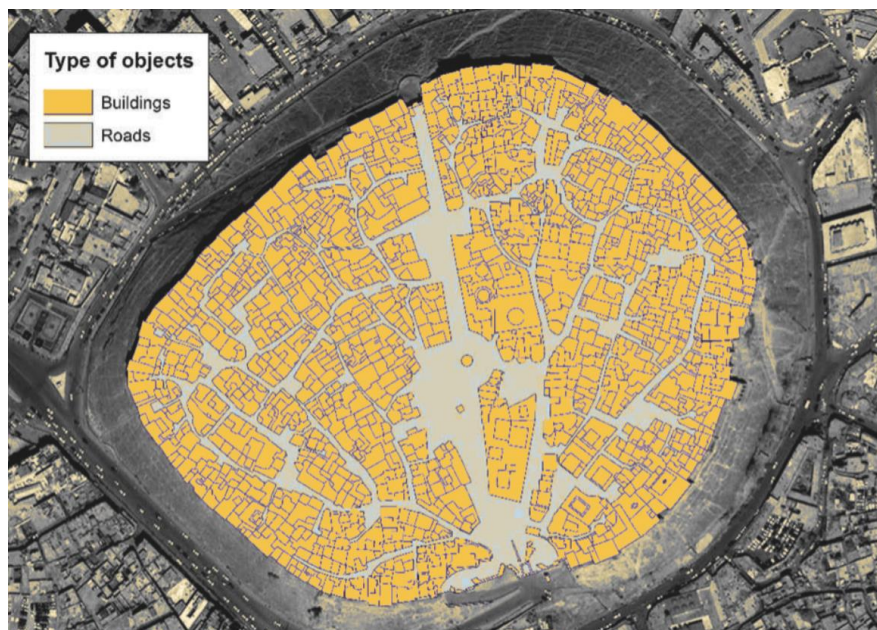


Figure 4: Vector map of the Erbil Citadel, 2005, Source: (Housarova et al., 2019).

On-site observations highlight the historical contrast in the northern sector's urban development. Residences from the 1930s and 1940s, characterized by specific architectural elements, materialize as tangible artefacts of a more modern character. The documented channel encircling the hill, observed by a French tourist in 1795, adds a layer of historical richness, revealing adaptive urban planning strategies that have shaped Erbil over the centuries.

In summary, integrating on-site observations with interactive technologies crafts a detailed, nuanced narrative of Erbil's urban planning dynamics. It reveals the city's historical layers, architectural influences, and the thoughtful environmental considerations that collectively contribute to its distinctive and enduring character.

4.1. Vernacular Architecture in Erbil

"Folk construction, born out of genuine needs and seamlessly integrated into the local environment by individuals guided by an innate understanding, is a testament to the authenticity of vernacular architecture. As Paul Oliver eloquently stated in his book, 'Dwellings,' 'people's architecture,' which was generated for practical purposes by professional architects, often falls outside the compass of the vernacular.

Traditional architecture unfolds as a rich tapestry, weaving classical and local forms together. Local architecture, derived from folk traditions, emerges as a method that embraces the essence of 'natural architecture.' This approach is characterized by a nuanced understanding of regional weather patterns, cultural nuances, and locally available materials.

Examining Erbil's vernacular architectural features through the lens of sustainability unveils the manifold benefits of indigenous design. These features align with climate adaptation and demonstrate a capacity to transition into modern design paradigms seamlessly. This adaptability is rooted in the design elements found in various regional buildings, harmoniously blending vernacular aesthetics with contemporary functionality (Morad et al., 2017, p.320-329).

When viewed through a sustainability lens, Erbil's vernacular architecture underscores the advantages of utilizing local materials. Renewable and environmentally friendly resources contribute to a more eco-conscious approach. Erbil has successfully embraced this ethos by adhering to prescribed methods, integrating eco-friendly factors, and minimizing heat loss, ultimately contributing to a sustainable and culturally resonant architectural landscape (Jackson, 2016, p.375-417).

Erbil is a custodian of its architectural legacy, encompassing diverse heritage structures ranging from traditional Kurdish houses to indigenous buildings and mosques. The city's design, particularly in the context of sustainability, reflects a meticulous consideration of sunlight, embraced through contour layouts and strategically positioned windows. This not only contributes to the visual appeal but also aligns with sustainable architectural principles, fostering reliable and comfortable living conditions for inhabitants across diverse areas and structures (Almukhtar, 2020, p.121-136), (Al Jaff et al., 2017, p.224), and (Housarova et al., 2019).

The architectural fabric of traditional buildings in Erbil is characterized by high walls enclosing open courtyards, each meticulously designed to optimize sunlight and ventilation. Windows are thoughtfully arranged to enhance both aesthetic and functional aspects. Notably, specific architectural features facilitate ventilation in response to the city's warm and dry climate. Most houses adhere to a two-floor structure, as shown in Figure (5), with the basement ingeniously positioned 1 to 1.5 meters below the courtyard, easily accessible, and featuring vaulted ceilings. These lower floors, often adorned with Shanashel, serve a dual purpose: they contribute to cooling and act as an architectural embellishment, exemplifying the integration of function and aesthetics in Erbil's traditional construction practices (Khoshnaw, 2019, p.178-185).



Figure 5: A traditional design of Erbil's buildings, Source: (Khoshnaw, 2018).

These traditional designs in Erbil are crafted with a keen understanding of airflow dynamics, with a dual purpose of moderating indoor temperatures and ensuring privacy. The architectural ingenuity extends to the first floor, featuring a rectangular courtyard enveloped by rooms, while the second floor embraces interconnected rooms designed to optimize ventilation through carefully placed openings.

The construction materials employed in these designs reflect a harmonious integration with the local environment, with clay and gypsum being predominant choices due to their accessibility. Additionally, the use of fire bricks attests to a deliberate effort to mitigate the impact of the region's intense heat, showcasing a thoughtful approach to environmental adaptation in building practices (Akram et al., 2016, p.102-106), (Hariry, 2017, p.66), and (Morad et al., 2017, p.320-329).

4.2. Erbil's downtown (lower city) planning

The region, specifically the city of Erbil, has experienced substantial growth and transformation since 2003. A pivotal moment in this evolution was formulating the city's initial master plan from 2006 to 2009 (Sabr, 2014, p.325-340). This comprehensive plan encompassed the city centre shown in Figure (6), delineated guidelines for the buffer zone around the citadels, established the groundwork for the first green belt and catalyzed significant changes in the urban fabric.

The issuance of the Kurdistan Investment Law No. 4 in 2006 by the Parliament further fueled the city's development, paving the way for the construction of numerous residential complexes. This legislative move prompted a notable shift in the urban landscape, with individual residential areas systematically allocated and subsequently developed by the residents. The construction adhered to building permit regulations set by the municipality. While some residential areas were government and public sector initiatives, others were governed by municipal exemptions and regulations.

This wave of urban development saw the inception of new houses and structures in the lower city, characterized by a contemporary and distinctive form that marked a substantial departure from traditional architectural norms.

The city's downtown area is systematically categorized into distinctive zones based on urban planning and road infrastructure. The first zone encompasses the region within a 30-meter wide ring road, exemplified by integrated planning models observed in districts like Tahjil and Al-Arab. In the second zone, between the 30-meter wide ring road and the 60-meter wide bell road, urban conditions reflect a grid model influenced predominantly by modern Western architectural ideas. This zone, including districts like Setakan, Tairawa, and Saidawa, showcases the palpable impact of Western colonialism, evident in the straightforward manifestation of Western dominance (Khoshnaw, 2019, p.178-185).

Moving to the third zone, between the 60-meter wide ring road and the Peshwa-Qazi ring road, the urban fabric comprises typical residential blocks constructed in a grid pattern, predominantly emerging

after 1980. Districts such as Shorsh, Nawroz, Mufti, Rapareen, Azady, Romany, and Rasti exemplify the architectural characteristics of this zone. The fourth zone, positioned between the Peshwa-Qazi 100-meter wide ring road and the 120-meter wide bell road, existed post-2003. Districts like Kuran Ankawa, Zanko, Dream City, Karezan, Havalan, and Bakhtyary (AL-SHWANI, 2011, p.103-105) exemplify the urban landscape of this evolving zone. Lastly, the fifth zone encompasses regions built beyond the 120-meter-wide ring road. Districts such as Zheyen, Galawezh, Zeelan City, Zaiton City, and Roshanbiry, among others, constitute this zone, representing the ongoing expansion and development of the city beyond its established urban core.

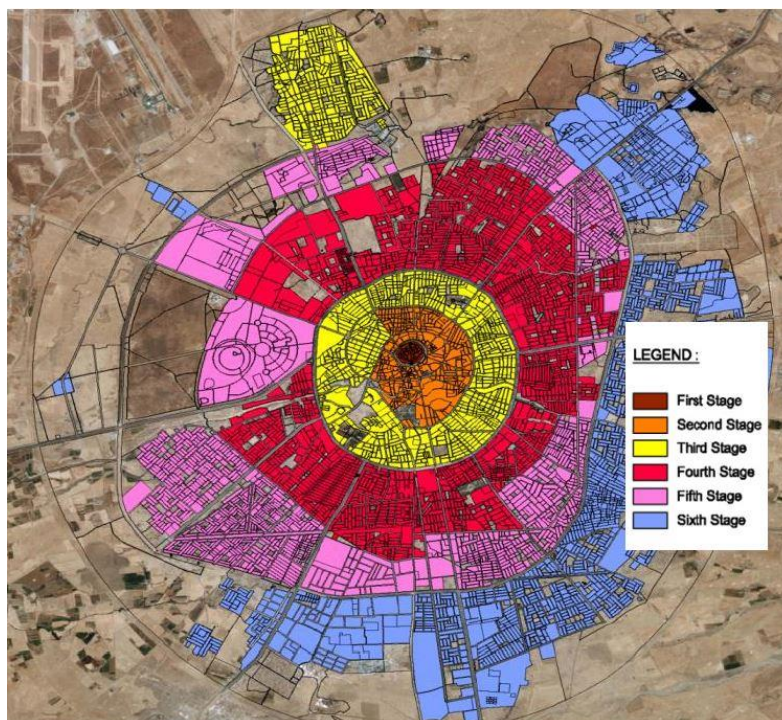


Figure 6: Historical Development of Erbil City, Source: (Baper et al., 2013).

The population surge and urban development demands have primarily influenced residential units' typology and spatial expansion across varying scales. Consequently, residential towns with expansive gardens have been developed to cater to the need for spacious living environments. Urban planning initiatives aimed at mitigating density disparities among different areas, increasing the percentage of built-up lands for housing, and accommodating household growth have collectively contributed to creating larger, more populous households (Morad et al., 2017, p.320-329).

The period spanning the 1960s to 2003 witnessed Kurdish families migrating to different countries due to various circumstances, prompting the establishment of new developments and neighbourhoods. Some of these initiatives were undertaken by individuals who received financial support from abroad, particularly from overseas relatives. Although U.N. agencies, notably HABITAT, initiated the construction of public housing areas, their impact was relatively limited, resulting in complexes characterized by typical single-story houses (Morad et al., 2017, p.320-329).

Concurrently, the influx of regional and international companies in the region necessitated office spaces, influencing shifts in building types. Residential areas developed by private companies often operated outside traditional urban management regulations, leading to the establishment of informal settlements. Governments and organizations have adopted various policies to address and manage these evolving urban phenomena.

The construction of two houses on a 200 m² area, each occupying 100 m² with a 5-meter width, has occasionally resulted in social issues, particularly when these structures share common walls with neighbours (Morad et al., 2017, p.320-329). Additionally, the design of modern single-family homes spanning three floors, as shown in Figure (7), sometimes presents challenges, as these structures can appear asymmetrical, with spaces arranged linearly and distanced from the central area in these layouts.



Figure 7: Two symmetric houses each have 100 m² with a 5 m width on one 200 m², Source: (Sabr, 2014).

The emergence of former two- or three-story houses, as shown in Figure (8), adhered to legal limits while reflecting a prevalent tradition. These structures often feature a dominant front garden and showcase a modern courtyard style.

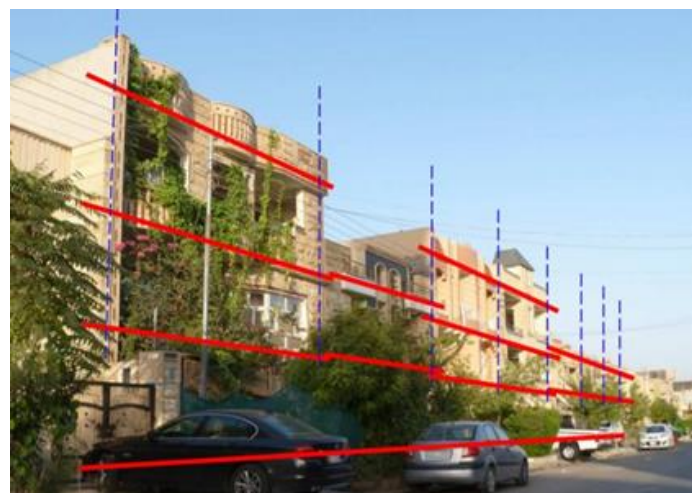


Figure 8: Attached houses with two and three floors in one block, Source: (Sabr, 2014).

4.3. Contemporary Architecture in Erbil

In the wake of the events of 2003 and the subsequent advent of the Advanced Modernity Period, the architectural landscape of Erbil experienced a profound metamorphosis fueled by the rapid surge in economic development following Iraq's liberation. Beginning around 2004, this era can be aptly described as the golden age of city development, ushering in an era of peace, proportional growth, and the flourishing of democracy in the region (Almukhtar, 2020, pp.121-136).

This transformative period saw the realization of numerous development projects, marking the zenith of urbanization. The swift expansion of the construction and housing sector led to many architectural forms. However, juxtaposing multi-story buildings and detached houses on the same expansive streets created a visually striking contrast, particularly along some main street axes. Landowners, enjoying the flexibility to construct detached houses, multi-story structures, and towering commercial buildings, were enticed by the economic prospects of high-rises, contributing not only to economic vitality but also imbuing the community with aesthetic and social values (Almukhtar, 2020, pp.121-136).

Modern building designs in Erbil exhibit various forms, sizes, and heights facilitated by contemporary building materials. The advent of modern windows, integral to the building design, has supplanted traditional ventilation-oriented approaches. Creative floor designs, shaped by escalating spatial demands, reflect individual preferences in space utilization. Contemporary architectural ideas grapple with privacy and private space concepts, often resulting in nuanced distinctions from other spatial considerations. The bold roofline emerges as a distinctive feature in modern architecture, defining Erbil's contemporary era as one characterized by post-beam architecture and a pronounced emphasis on non-local materials (Khoshnaw, 2019, p.178-185).

Many housing development projects in Erbil have been shaped by Western concepts, often superseding local traditions. As highlighted by research (Khoshnaw, 2019, p.178-185), this trend has sparked architectural identity confusion. It delves into urban-style arrangements, revealing the impact of imported modern projects on existing urban structures, which, in numerous cases, results in a loss of identity. The research emphasizes that urbanization processes should be cognizant of climate, physical, and environmental impacts, necessitating adaptive measures tailored to the region's unique needs.

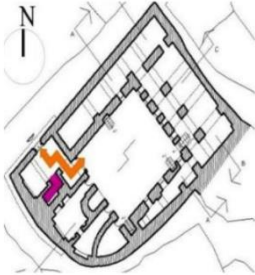
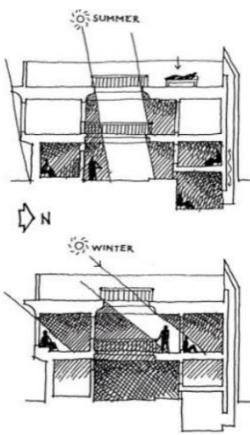
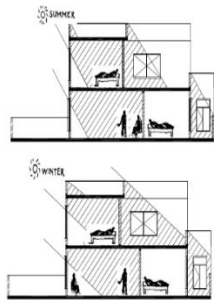
The era of rapid economic growth has ushered in a new way of life, significantly influencing building construction due to evolving functional requirements. Buildings have transformed styles and designs, as shown in Table (4), which the Kurds devised to align with their needs, tastes, and preferences. Evaluating traditional and contemporary houses in Erbil, particularly regarding climate response strategies and thermal comfort, underscores the diversity in construction sizes, shapes, and materials. Ultimately, the process of continuity stands out as one of the most robust characteristics in architectural evolution, attempting to bridge the gap between the past (local ideas) and the present (contemporary concepts) (Khoshnaw, 2019, p.178-185).

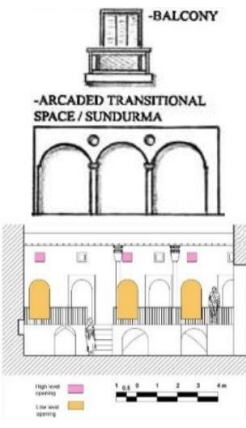
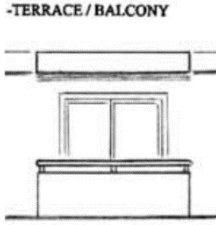
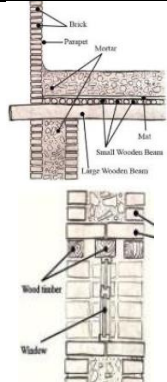
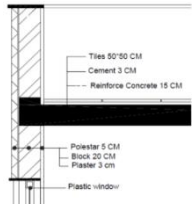
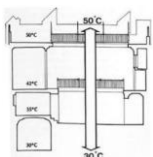
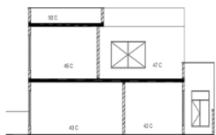
The subdivision of land emerges as a primary factor contributing to the reduction of park areas. Observations indicate a diminishing presence of front gardens in houses, with a notable trend towards homes without gardens. Particularly in the row house pattern, front gardens play a crucial role, forming a collective green belt that reinforces the concept of green infrastructure within the urban landscape (Baper et al., 2013, p.7-13).

The evolution of construction structures has witnessed a significant shift from simple organizational plans to more diverse interfaces, incorporating a wide range of shapes, sizes, and heights. The innovative use of modern building materials facilitates this diversification. In contemporary architecture, windows serve not only as functional elements but also as integral components of design, a departure from traditional structures where their primary role was ventilation (Khoshnaw, 2019, p.178-185).

Land plans in modern buildings showcase high creativity, allowing for varied spatial utilization based on individual preferences. This adaptability is particularly noteworthy in response to limited space constraints driven by escalating demands and costs in the contemporary urban environment.

Table 4: Evolution and Comparison between Traditional and Contemporary Houses, Source: (Morad, D. H., & Ismail, S. K. 2017).

Architectural design strategies			Traditional houses		Contemporary houses	
	Urban fabric	Urban layout	- Houses in towns were grouped close together to shade each other. - Houses oriented according to sun access and prevailing wind.		- Houses in towns have large open spaces with less shade, building each other and passengers. - Houses are oriented randomly according to the urban planning code (regulation).	
		Street network	Narrow and irregular streets.		Wide and regular network streets.	
	Form and Orientation	Comparison	- Inward-looking with courtyard. - Simple plan form square and rectangular with cubic courtyard, ground and 1st floor equal. - Neighborhood houses surround one external elevation and three other sides.		- Outward looking to garden or street. - Different plan form, ground and 1st floor not equal. - Most houses have two elevations or more.	
		Evaluation	The courtyard and simple plan form achieved thermal comfort by cooling the spaces day and night by minimizing the surface exposure to the sun and the climate factor in summer.		The garden cannot be an alternative solution to the courtyard for achieving thermal comfort for spaces. At the same time, the plan form and two elevations or more led to a large surface area that was exposed to the sun and climate factors.	
	Occupancy migration, Plan arrangement	Comparison	- One or two floors with a small basement. - Plot area according to family size and economic status. - Changed in residential buildings. - Compact planning with courtyard. - Floors height change.		- One or two floors or Multi-story blocks. - Plot area classified according to urban planning regulation (no consideration for family size and economics). - Unchanged in residential buildings. - Incompact planning. No courtyard. - The floor's height is the same.	
		Evaluation	- Using the ground floor on summer days and 1st floor at night and winter to achieve thermal comfort and a benefit for a small basement on a hot day in summer.		- There is a zone problem because of restrictions of modern houses; therefore, electric devices such as (Air condition units) need to achieve thermal comfort. - Lost in spaces.	

	Windows, Ventilation and Shading	Comparison	- Clerestory windows. - Covered terraces. - Lighting and natural ventilation by courtyard. - External windows are small, while interior windows are large with small windows on the up. - Windows-oriented to the courtyard according to the climate response. - The wall is shaded by attaching it to the surrounding houses.		- Vast glazed windows. - Not standard balconies or no balconies. - Natural ventilation and lighting by external and interior windows. - External and interior windows are large. - Windows are oriented to the garden, street, or back.	
		Evaluation	- Covered terraces and windows designed to provide suitable shading in summer. - The interior windows are oriented on the 1st floor to the south and the ground floor to the north and west to provide suitable sun radiation and shading in winter and summer. - The External windows and small windows on the outside give privacy.	- Balcony and windows not designed to provide suitable shading in summer. - The large windows' size and orientation cause lots of energy and discomfort because of overheating and underheating in summer and winter and losing privacy. On the other hand, it is suitable for natural lighting and ventilation.		
	Water body and Vegetation	Comparison	A body of water and vegetation in the courtyard. 	Garage and garden are on the front or back sides of the house. 		
		Evaluation	Providing thermal comfort by cooling spaces.	For aesthetic purposes.		
	Building materials	Comparison	- Local materials (wood, mud and stone) found on the site of the houses or brought from a nearby area. - Load-bearing walls. - Wall thick 50-80 cm. 	- Materials are mostly imported or locally made - It has poor qualities (concrete block and reinforced concrete). - Poor or No insulation. - Load-bearing walls and Frame structures. 		
		Evaluation	Thick walls made of mud bricks achieve thermal comfort; they work as thermal insulation in the daytime and store heat at night.	Poor quality and insulation cause energy loss and discomfort caused by heating and cooling loss in summer and winter.		
	Thermal		Satisfactory during both winter and summer and at all times. 	Unsatisfactory during overheating and underheating. 		

Erbil's transformation towards modernity is evident in its architectural landscape, where contemporary structures and skyscrapers stand alongside traditional designs. This shift reflects a departure from historical norms and a commitment to embracing modern architectural principles. The city's skyline showcases a blend of the old and the new, symbolizing its evolution.

The impact of modernity extends beyond aesthetics to encompass advancements in infrastructure and technology. Erbil boasts well-organized road networks, efficient transportation systems, and technological integration, including high-speed internet and smart city initiatives. These developments contribute to enhanced connectivity, urban efficiency, and a commitment to keeping pace with global standards.

Moreover, Erbil's modernization is physical and extends to its social and cultural domains. The city now features contemporary shopping malls, cultural and entertainment hubs, and modern educational institutions. These additions reflect global influences and contribute to the city's vibrant and dynamic character. Erbil's journey into modernity encompasses a holistic approach considering architectural innovation, technological integration, and cultural enrichment.

5. Results and Discussion

When articulated without bias and presented logically, the research findings comprehensively understand Erbil's urban and architectural evolution. The results highlight a profound transformation in the city's identity, characterized by a nuanced design that seamlessly integrates Modernism with historical reverence. The study showcases the city's ability to balance contemporary techniques with vernacular integration, preserving cultural heritage while adapting to dynamic architectural paradigms.

The presentation of findings serves as a lens through which readers can explore the intricate interplay between tradition and modernity in Erbil's architectural narrative. The study confirms or rejects hypotheses and opens avenues for varied perspectives, contributing valuable insights for urban development. Erbil's post-liberation evolution emerges as a captivating tale of adaptation and synthesis, shaped by historical elements and a commitment to cultural preservation.

In conclusion, Erbil's architectural identity is a testament to its adaptive nature, synthesizing influences to shape a dynamic and culturally attuned urban landscape. The research adds depth to the broader discourse on urban dynamics, offering nuanced insights into the city's evolution post-liberation. Articulating the results facilitates a profound understanding of the research problem from within, breaking it into pieces and allowing readers to view Erbil's transformation from various perspectives.

Erbil's architectural evolution, blending tradition and modernity, challenges conventional norms. The city's adaptive resilience, seen in its nuanced design, carries implications for future urban development. The discussion highlights Erbil's unique narrative, offering diverse perspectives and valuable insights for urban studies and architectural dynamics.

6. Conclusion

This journey through Erbil's architectural evolution unveils a cityscape where tradition and modernity create a captivating dance. The city's enduring traditional aesthetic values, resilient against the tide of globalization, add a layer of complexity to its urban narrative. As we conclude, it is apparent that Erbil's transformation is not merely a physical manifestation but a profound interplay of cultural heritage and contemporary dynamism.

A key revelation in this exploration is the need for a renewed focus on the continuous care of Erbil's historical context. This goes beyond conventional preservation efforts, urging a paradigm shift in perceiving historically protected areas as cultural assets and global treasures. This reframing emphasizes the role of Erbil in facilitating meaningful cultural exchanges that safeguard against societal decline.

The study identifies a crucial opportunity in fusing modern and traditional architectural elements. Drawing inspiration from architects like Frank Lloyd Wright and Le Corbusier, the harmonious integration of these approaches emerges as a transformative avenue. By infusing modern strategies with vernacular design concepts, Erbil's architectural landscape gains a richer, more layered identity. This addresses a literature gap, shedding light on the potential for intentionally blending traditional building typologies into contemporary designs.

Looking forward, Erbil's narrative encourages a fresh perspective on urban development in ancient cities. It becomes a case study for envisioning innovative ways to transmit cultural heritage to future

generations. The juxtaposition of historical preservation and modern dynamism in Erbil's architectural identity opens avenues for scholars and planners to explore novel possibilities in shaping urban futures globally. The conclusion, therefore, invites a deeper reflection on how Erbil's story can inspire a reimagining of urban landscapes with a harmonious coexistence of tradition and modernity.

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