

Article

Can Architectural Identity Be Measured?

Salahaddin Yasin Baper 

Department of Architecture, College of Engineering, Salahaddin University, Erbil 44002, Iraq;
salahaddin.baper@su.edu.krd

Abstract: The sustainable breadth of architectural identity is a remarkable phenomenon with many dimensions. These dimensions are melded together to produce an architectural form. Form as the final architectural product is shaped by the visual cues that produce symbols as a powerful tool in identifying a specific architectural trend. This study aims to construct a theoretical framework for the permanence of local identities to answer the main assumption, which is the following: Can identity be measured? It endeavors to clarify the main effective parameters that affect the permanency of architectural identity. It assesses the measurement variables of architectural identity based on multiple architectural perspectives and different points of view. The methodology of this study contains two broad approaches: a checklist and a questionnaire. The results provide a new model that includes three significant poles of architectural identity (mental images, originality, and building regulation). The findings enhanced the sustainability concept of architectural identity, which forecasts the permanency of architectural identity.

Keywords: architectural identity; mental images; originality; building regulation



Citation: Baper, S.Y. Can Architectural Identity Be Measured? *Buildings* **2024**, *14*, 1379. <https://doi.org/10.3390/buildings14051379>

Academic Editor: John C. Bringham

Received: 30 March 2024

Revised: 30 April 2024

Accepted: 9 May 2024

Published: 11 May 2024



Copyright: © 2024 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Recently, the concept of sustainability has emerged as a creative approach to combine the ordinary solutions of previous generations with an integrated, holistic approach that positively impacts a building's life cycle through the combination of architectural identity parameters and their impact on sustainable permanency. Sustainability in architecture is an important approach that has developed over time by applying available materials and technologies in different settings. It is a process to create a relationship between humans and their surroundings [1]. In general, architectural permanency means “enduring presence or existence, continuance in the same condition or place” [2]. It means to remain, endure, and continue as a sustainable approach in the community.

The idea of sustainability in architecture can be defined by two broad concepts. The first is to preserve natural resources, while the second is related to the safeguarding of place identity [3]. Therefore, sustainability refers to the maintenance of environmental resources as well as the permanence of local identities.

Façades play an important role in creating the identity of a place. The arrangement of façade elements and their distinctive features generate symbols and signs that improve the cultural value of the place. Therefore, the physical image of identity would take variable frameworks across time and space, but understanding the meaning of identity is related to our perception of the architectural forms. Architectural identity does not only rely on the material composition and form of the building but is also linked to the concept of meaning, which represents a significant interaction of human values with spatial characteristics. The aesthetic value of façades is the seed of architectural identity towards new horizons in the built environment [4,5].

Researchers in the field of architectural identity have proposed several models to identify the main parameters that measure architectural identity; each study focuses on a direction of architectural identity through the proposition of some dimensions.

Relph, in his study *Place and Placelessness*, clarifies that place identity can be achieved through a model of three pillars, which are ‘physical setting’, ‘activities’, and ‘meanings’ [6]. In this regard, Baper formulates a comprehensive framework, including the most effective properties of architectural identity, which are vocation of place, authenticity, symbolic function, process of continuity, privacy, diversity, and climate considerations [7] (see Figure 1).

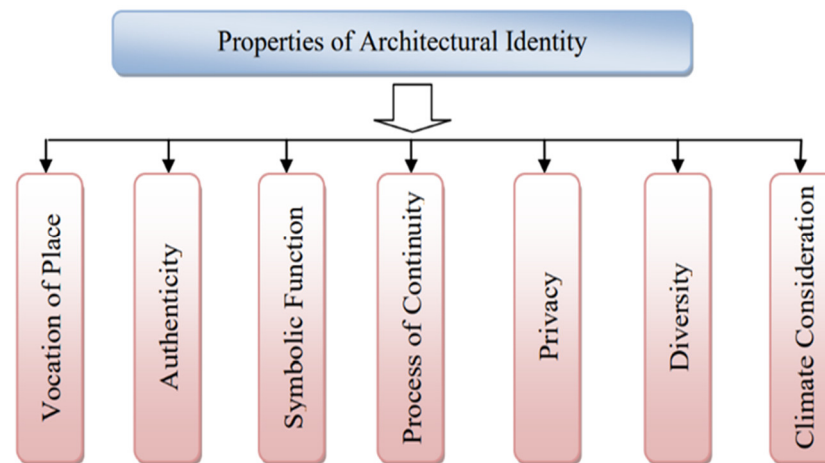


Figure 1. Theoretical model of house façade modernity versus continuity of architectural identity [7].

For Mahdaveinejad and Saadatjoo [8], the most effective factors can be crystallized through essential architectural characteristics and physical concepts (see Figure 2). These features can be classified as structural design ideas, building technology and materials, and relationships with the surroundings. The study illustrated the following issues as the most effective factors in shaping architectural identity:

- The role of the design concept in forming contemporary identity.
- The shape and form.
- The construction technology.
- The building materials as a path to contemporary architecture.
- The relationship with the surroundings.

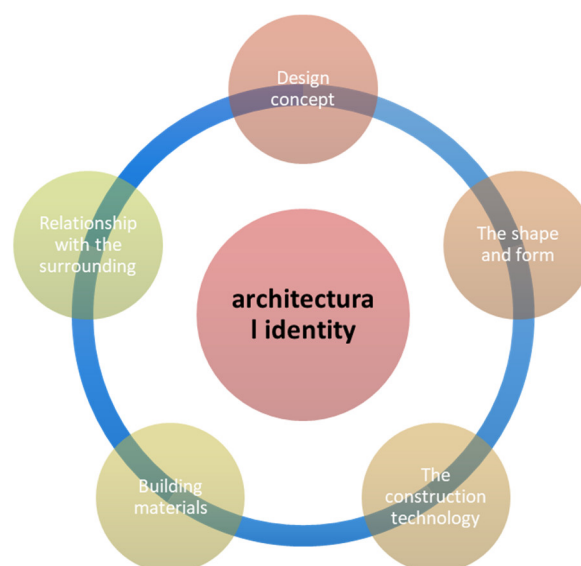


Figure 2. The refined model is crystallized through essential architectural characteristics and physical concepts [8].

While Torabi and Brahman [9] applied effective factors in shaping the identity of architecture, they suggested a model that included another parameter, which is the relationship with context, in addition to the shape and form of the building, the design principles, the materials, the temporal organization, the semantic organization, and the spatial organization (see Figure 3). In parallel, Lambe and Dongre [10] added context as an effective parameter for detecting architectural identity. Context refers to the tangible and intangible attributes of the surroundings that produce architectural cues. Hence, it is important to note that identities are situational expressions of impulsive procedures that play a significant role in creating architectural vocabulary. Hence, it is interesting to note that architectural identity has a comprehensive nature, referring to a set of unique and essential qualities that characterize an entity, whether physical or moral.



Figure 3. Model of effective factors in shaping the identity of architecture [9].

From another standpoint, Gloaguen [11] explains that architectural identity covers formal appearance (the human way of thinking) as a way of identifying architectural originality plus the creative process (a building's way of design) (see Figure 4). The combination of these parameters will create an architectural identity.

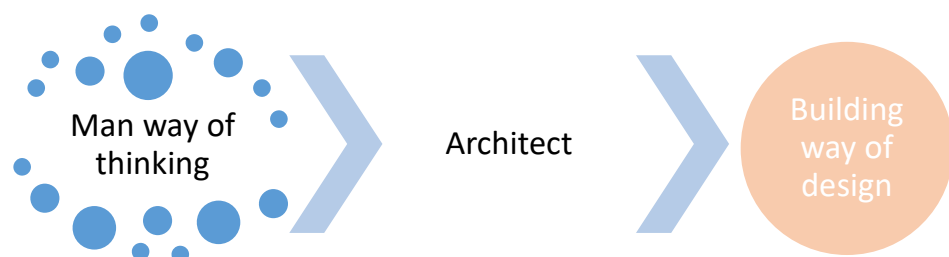


Figure 4. A Model of human way of thinking + building's way of design [11].

On the other hand, Ali et al. [12] focused on measurable elements of place identity. Their study proposed the fundamental components of a place that affect identity through three parameters, which are the environment, people, and the interaction between them. The collection of these parameters will guide toward a sense of identity in the place. Hence, it is important to note that interactions of various socio-political, socio-economic, and socio-cultural characteristics (that arise over time) will create different traditions, values, and norms within each community.

For AL-Zahrani and Abou Leila [13], many influencing variables impact character, which is split into two categories: natural causes such as “temperature and the basic shape of the site” and “civilized” human factors such as religion, politics, and social factors (see Figure 5).

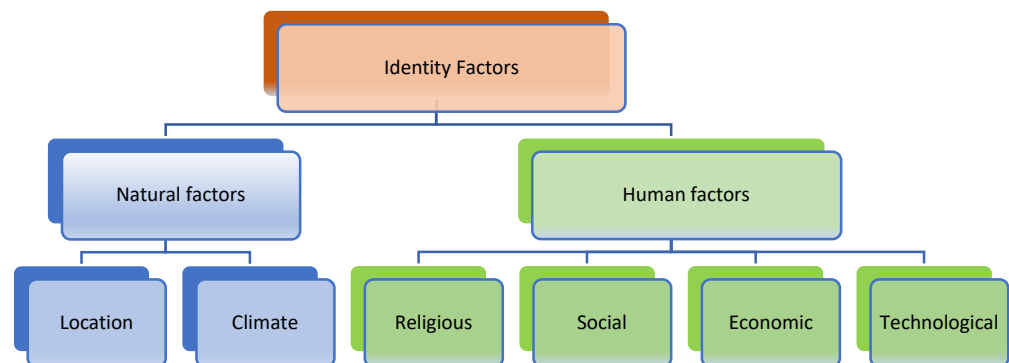


Figure 5. An assessment of the impact of laws and regulations [13].

In parallel, Khaznadar and Baper [14] suggested a model that defines identity as a continuous process by combining two opposite perspectives (see Figure 6). The first declares that architectural identity is inherited through generations, while the second approach believes that architectural identity can be constructed due to new technologies and scientific sightings. The two attitudes have two conflicting associations, in which each approach is affected by different factors and dimensions. The suggested model reveals that time and location within the geographical context are the two main factors in the development of the identity formula.

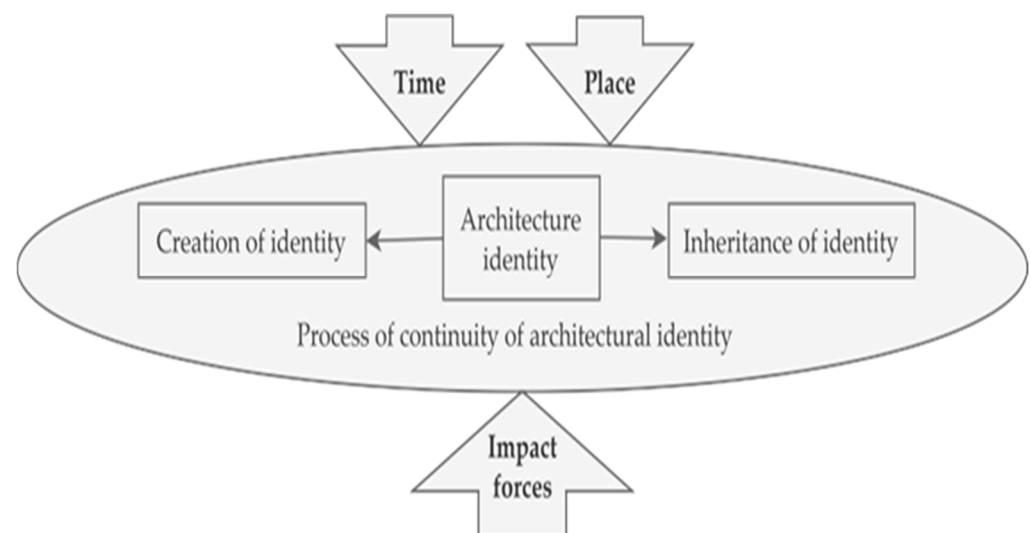


Figure 6. A model of two opposite perspectives of architectural identity [14].

In conclusion, the suggested parameters in previous models can be conceptualized in a new framework that recognizes identities as situational expressions of the cultural process. The model includes two attitudes: the first sheds light on the differences between groups, while the second searches for similarities among them (see Table S1).

2. Architectural Identity Parameters

2.1. Formal Appearance Parameter (Physical Settings)

Formal appearance is one of the features that differentiate a building from its surroundings. The building’s façade generates the permanency of building frontages and

provides enclosure through its elements [15,16]. Formal appearance is delivered through the distinctive features of the architectural form that come through the arrangement of visual elements [17]. However, Hekkert [18] explains that formal appearance has an objective effect on applying the imaginative view to the observer through the visual experience.

Hence, formal appearance plays a significant role in contributing to the amenity and attractiveness of an area through the following sub-factors: simplicity of building proportion, symbolic features, human scale, mass regularity, vernacular architectural details, trends towards inside openings, use of local material, use of traditional techniques, and harmony with the surroundings. These properties make a positive contribution to the public field of architecture. They create the building's three-dimensional form, which includes the building's external shapes and configurations of these shapes, the voids between them, and their combined relationship with other buildings.

2.2. Moral Meaning Dimension

Meaning is a mental event that deals, first and foremost, with images, ideas, concepts, thoughts, and feelings. It is effectively connected with the moral aspects of identity construction. Identities are the source of meaning, as argued by Castells [19], who states that "Identity is people's source of meaning and experience". In this regard, architects have increasingly recognized the importance of symbolism and meaning in architecture, especially in building their local identity. In parallel, Robert Venturi defines architecture as a meaningful, buildable, and usable shelter. Shelter and symbolism are explicit elements of architecture that include signs, references, and representations. The richness of meaning over clarity of meaning is the fundamental reason for their complexity [13,20]. While Jencks emphasizes the role of architectural element relationships in the generation of meaning, he argues that the differences between adjacent elements create a fundamental basis for meaning formulation [21].

It is interesting to note that the ability to communicate effectively through design will guide visual communication. The process of visual communication will produce meaning [22]. In this regard, Park [23] explains that the main duty of design is to act and communicate through social, cultural, moral, ethical, and civic impacts. Design can be engaged in presenting possibilities for better conditions of life. Based on the above, seven main meaning dimensions tie together ethical, social, and political issues in a society.

2.3. Originality

Originality in architecture can be defined as a kind of brilliant thinking toward creating new models. These models are a combination of old and new ideas brought together to create a new formula. The most significant characteristics of these models are newness and usability. In other words, originality is made by melding the useful parts of old ideas and applying innovative and creative things. In this regard, Mondal argues that originality is the most significant feature of innovation and creativity, and not every innovation can be marked as original [24]. Innovation is making an original idea utilizable. A multifaceted process is needed for an original idea to be introduced as an invention. The idea, which will develop into a product with many elements and, thus, produce an invention, is tested during this process; it eventually becomes an entity. The possible value of these factors can be classified as intellectual changes and new philosophical propositions, human needs for change and development, scientific advancement, technological evolution, and a convoy of developments in other fields of knowledge.

Most great buildings have original ideas at their core, but the present condition demands that the architect dream up every good idea he uses as an input for the design of a building. Since this is very difficult in the field of architecture, the tendency to be unprecedented leads to producing a spirit of false pseudo-originality [25,26].

2.4. Creative New Expression Languages

Creative expression languages in architecture are related to a specific set of elements. These elements will create a formula for its identity that does not only depend on its physical form but is linked to the concept of meaning in a larger sense [27]. Architectural language can be classified into pattern language and form language. The first type is related to how human beings interact with the built environment, while the second is related to geometrical rules and visual images [28].

2.5. Building Regulations

The physical form of buildings is considered to be the outcome of building regulations. It has an impact on modeling architectural identity. Building regulations impact not only the façades of buildings but also the overall architectural form. Based on AL Abdullatif's study, building regulations are a crucial factor in shaping architectural identity. These regulations have been established as a consequence of many planning experiments. They are a part of norms that relate to standards and rules within the structure and functioning of buildings [29]. The role of building codes in the formation of the urban fabric and architectural identity is related to addressing different models and patterns of buildings in the city [30]. Architecture is a part of identity. It conveys a message to society through buildings' façades. Hence, architecture creates a visible manifestation of culture under the umbrella of building regulations. These rules will prevent a building from hurting its urban surroundings [13].

2.6. Mental Images

Another parameter of architectural identity is related to visual imagery. Mental images are the ability to make mental representations of things, people, and places that are absent from an individual's visual field [31]. Based on Lynch's basic idea of legibility in imageability, the term 'legible' is a visual quality that can be understood by studying mental images as a result of people's memories and meanings [32]. A visual image can be considered a simple component or a façade element that enters the eyes, but a mental image is more complex, being related to spatial character. Objects in an image seem to be in a spatial relation.

Legibility and imageability mean the visual quality of a view [33,34]. A legible space gives emotional trust and increases potential density in experience. The possibility of creating meaning for a building can be realized by 'reading' its codes. This can generate and provide resources for the processes of identity formation [35].

2.7. Site Context

Site context is another parameter that contributes positively to constructing architectural identity via physical/natural elements and socio-cultural elements. The integration of these elements will produce building surroundings that exist or occur due to several environmental factors. In this regard, context refers to the conditions that surround a particular project. The combination of buildings and site context will make up a built environment that links these features to create a defined place. Context means the surroundings in which a building is situated. Traditional context signifies the traditional identity that acts as a base for society, which refers to the background of its existence [10]. Hence, context in architecture is an active element that generates architectural identity. It is a standpoint that reflects cultural, social, historical, and physical aspects of architectural identity and affects architectural design [36]. Nature and artificial environments are the main references of contextual architecture. It is extremely important to consider the topography of the site on the one hand and the surrounding buildings on the other hand to create communication.

3. Research Problem

The issue of architectural identity is a complicated phenomenon. Researchers in the field of architecture indicate two opposite perspectives regarding the concept of archi-

tectural identity: one inherited from previous cultures as part of the continuity process and one generated due to new-age necessities. Based on the above, researchers proposed several parameters for measuring architectural identity. The lack of an inclusive study to collect all these parameters in a comprehensive theoretical model is the main issue of this study. Based on the above, the research questions can be articulated as follows:

- Can architectural identity be measured?
- What are the measurement parameters of architectural identity?
- Which factor has the most influence on creating architectural identity?

4. Research Methodology

Due to the complexity of the topic, this study adopted a mixed methodology in which checklist factors are combined with a cross-sectional survey questionnaire. The checklist factor technique is the first step in dealing with research questions. Checklist factors are an assessment tool that lists the specific criteria for measuring identity parameters. It is a form that is used for recording data that are usually easy to extract in a useful manner and effective at registering identity parameters. On the other hand, qualitative questionnaires are a structured research methodology used to gain in-depth information about architectural identity. The ultimate goal is to develop a theoretical framework that includes the most effective factors in shaping architectural identity. Each parameter includes several sub-factors, which are assigned via a range of pertinent values to clarify the significant influence on the permanency of architectural identity.

Based on the evolution of Erbil City over different periods, three types of neighborhoods have been selected. The first category is related to the old town neighborhood, represented by cases in the Arab district–buffer zone of Erbil City; the second category is related to the regular neighborhood (Rasty district), which represents most of the ordinary neighborhood in Erbil City; and the third category is related to the new investment neighborhood (mostly constructed after 2003) with special characteristics of the investment sector neighborhood. A stratified method of sampling is selected for this study. This method is used when representatives from each subgroup are effectively embodied within the whole sample population (21 cases in each neighborhood). The rationale behind selecting three different neighborhoods is to explain the physical features of house façades over different periods of the city's evolution as well as to ensure that a suitable range of city neighborhoods is tested.

For the data collection, three different neighborhoods (an old town neighborhood, a regular neighborhood, and an investment sector neighborhood) were selected using the qualitative case study method to provide an in-depth analysis of case studies from traditional to modern investment projects. In parallel, a structured questionnaire survey was applied after testing it through a pilot study on a group of 20 architects. The rationale behind the pilot study was to predict the response patterns of participants and make any required changes to our study. The survey was a self-administered questionnaire with multiple-choice questions in a Google Forms pattern distributed among a group of respondents. A total of 140 survey forms were distributed via Google Forms questionnaires (web-based questionnaires). A total of 76 filled-in questionnaires were returned and used for statistical analysis. The advances in technological online surveys support the idea of developing user-friendly web-based questionnaires.

The study area is linked to one of the oldest continuously inhabited cities in the world (Erbil City neighborhoods). The idea behind conducting quantitative research is to enhance research assumptions related to architectural identity phenomena. In this study, three types of analysis are applied: descriptive analysis, correlation analysis, and multi-regression analysis. Correlation and regression are used to describe the relationship between a study's independent and dependent variables (correlation is used to measure association, while regression is used for prediction). In this study, quantitative research is conducted to test the study assumptions regarding the main effective parameters that affect the permanency of architectural identity.

The combination of two research methods (checklist factors and research questionnaires) increases the validity of our research and enhances the reliability of the analysis. It establishes a rational basis for developing the study's core model of architectural identity. It is interesting to note that the theoretical framework is derived from previous architectural models and enhanced by a relevant literature review of the variables involved.

5. Results

After applying the checklist factors to local cases, the results indicate that each case has its own distinctive features. The old town neighborhood, the regular neighborhood, and the investment sector neighborhood are connected in terms of the permanency of architectural identity.

The multi-dimensional model consists of seven parameters, which are formal appearance–physical setting, meaning dimensions, originality, architectural language, building regulations, mental images, and site context. The model creates a sense of structure to measure the permanency of architectural identity.

5.1. Checklist Factors

5.1.1. Formal Appearance–Physical Settings

In terms of simplicity of building proportion, the observation and photographic documentation results show that simple proportion between the parts was the dominant feature in the old-town cases at a rate of 85.7%. Meanwhile, the moderate proportion within the human scale registered only three cases in the old town, eight cases in the Rasty district, and four cases in the Royal Villas neighborhood. It is worth mentioning that the complicated proportion feature was the dominant characteristic of most of the cases in both the Rasty district and the Royal Villas neighborhood, as clarified in Table 1.

Table 1. Simplicity of building proportions in different neighborhoods.

Sub-Factors	Possible Values	Old Town	Rasty Neighborhood	Royal Villas	Total
Simplicity of building proportion	Simple proportion between the parts	18	2	3	23
	Moderate proportion within the human scale	3	8	4	15
	Complicated proportion	0	11	14	25
Total Cases		21	21	21	63

However, the results shown in Table 2 indicate that the symbolic feature sub-factor is distributed among three possible values (low, medium, and high symbolic rates). The majority of cases in the old town have high symbolic rates (81%), followed by the Royal Villas (67%) (see Figure 7). Despite differences in the three main neighborhoods in terms of period, quality, and unit sizes, symbolic values are recorded in the majority of cases. These results indicate that house façades in Erbil City focus on symbolic values despite the plurality of styles.

Table 2. Symbolic features in different neighborhoods (Erbil City).

Sub-Factors	Possible Values (Rates)	Old Town	Rasty Neighborhood	Royal Villas Investment	Total
Symbolic Features	Low symbolic	1	7	2	10
	Medium symbolic	3	6	10	19
	High symbolic	17	8	9	34
Total		21	21	21	63

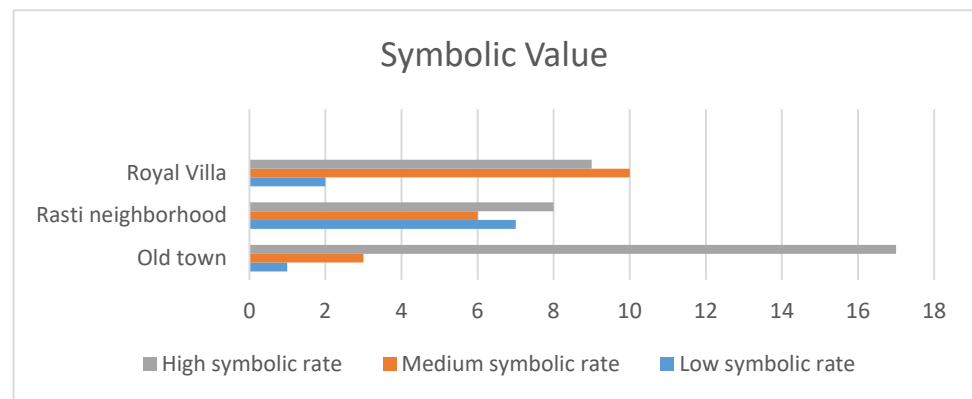


Figure 7. Comparison results of symbolic value in different neighborhoods (Erbil City).

In terms of human scale, this study formulated three possible values for measuring this parameter, as follows: smaller than human scale, fit with human scale, and larger than human scale (see Figure 8). Our study revealed that human scale as an elementary character is a common feature of most cases in Erbil City. Despite the differences between the three neighborhood zones, the fit-with-human-scale parameter recorded 71.4% of overall cases.

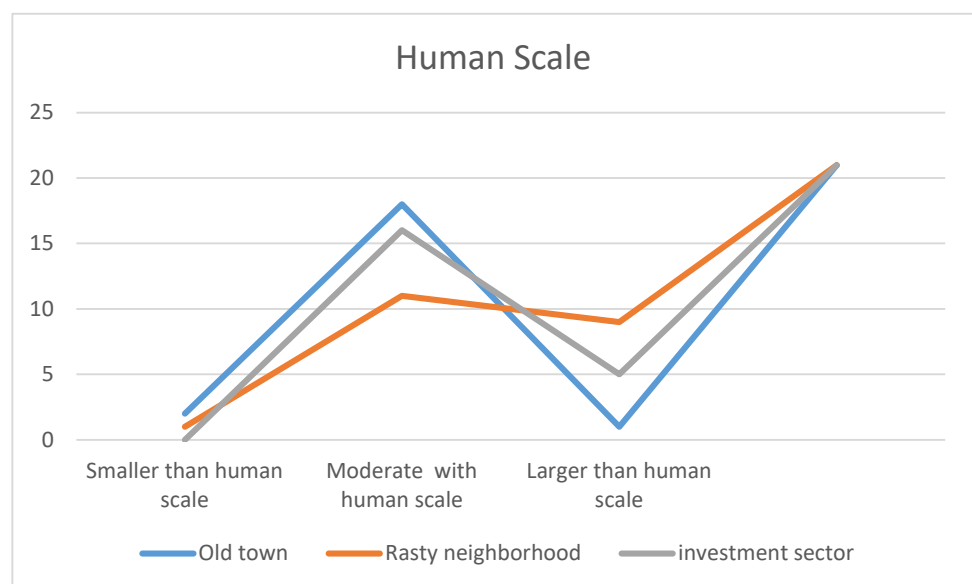


Figure 8. Comparison of human scale values in different neighborhoods (Erbil City).

In parallel, the results explain that mass regularity has changed in the old neighborhood (as recorded in 90.4% of its cases) by using irregular mass, while most cases in the Rasty neighborhood were noted as having neutral mass and two-thirds of cases in the Royal Villas were recorded as having regular mass (see Figure 9). These results indicate that the regularity of house façades has changed from irregular mass (as characteristic of traditional districts) toward regular house façades as a translation of Western style.

The observation and photographic documentation results indicate that the ratio of solid to void in façades has changed from mostly solid indoor-looking with small openings as a distinctive feature of traditional houses to large transparent openings (Western style) in new neighborhoods. It is interesting to note that these changes match new discoveries in material inventions, especially glass panel technologies as well as large-span openings.

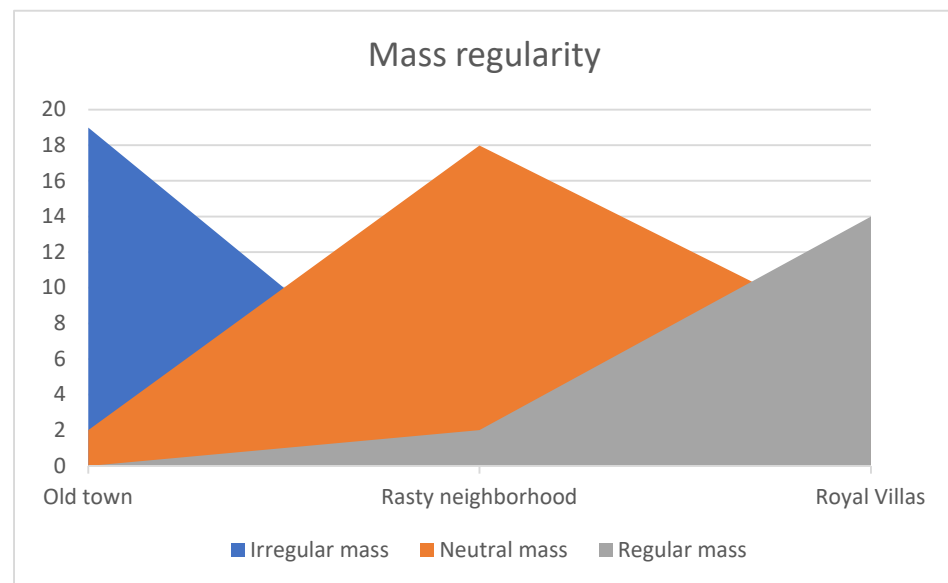


Figure 9. Mass regularity in different neighborhoods (Erbil City).

In terms of architectural detail in façade design, our study reveals three imaginable values related to cultural, historical, and environmental contexts. The results indicate that most of the cases in the old town are related to historical context at a rate of 85.7%, while environmental context is the controlling factor in most cases in both the Rasty and Royal Villas districts. Hence, it is quite clear that environmental context affects the positivity of architectural detail in façade design.

The final sub-factor of the first parameter is related to the materiality of house façades. It includes three values, as follows: using traditional materials, using modern materials, and mixing traditional and modern materials. Recently, due to the importation of new cladding materials, a trend of mixing traditional materials (stone and brick) with new modern materials (Boardex, composite panels, and foam boards) has created a sense of material mixture. This mixture affects the appearance of house façades in the city. Our results indicate that more than two-thirds of house façades in both the Rasty and Royal Villas neighborhoods are now using new material mixtures which reflecting the mood of modernity.

5.1.2. Meaning Dimensions

Our study reveals that the meaning dimension is distributed into two categories. In traditional zones of the city, most of the cases in the old town emphasize social meaning, which refers to the cultural and social factors that influence the interpretation of architectural language. The old town examples (at a rate of 71.4%) contain a range of characteristics, such as social norms and cultural values. These values come from the arrangement of elements to produce architectural form, which is essential for effective communication. Therefore, social meanings categorize the cultural and social hints that affect the interpretation of architectural language. In parallel, the second category is related to conceptual meaning, which was recorded in both the Rasty and Royal Villas neighborhoods at a rate of 80.9% and 71.4%, respectively (see Figure 10).

The second category is related to conceptual meaning (straightforward, literal, and clear meaning), which means that there are no hidden meaning dimensions to avoid any misunderstandings of the façade detail. The element is formed and defined using its constituent nature for a specific meaning. This type of meaning is observed in both the Rasty neighborhood (at a rate of 80.9%) and the Royal Villas neighborhood (at a rate of 71.4%).

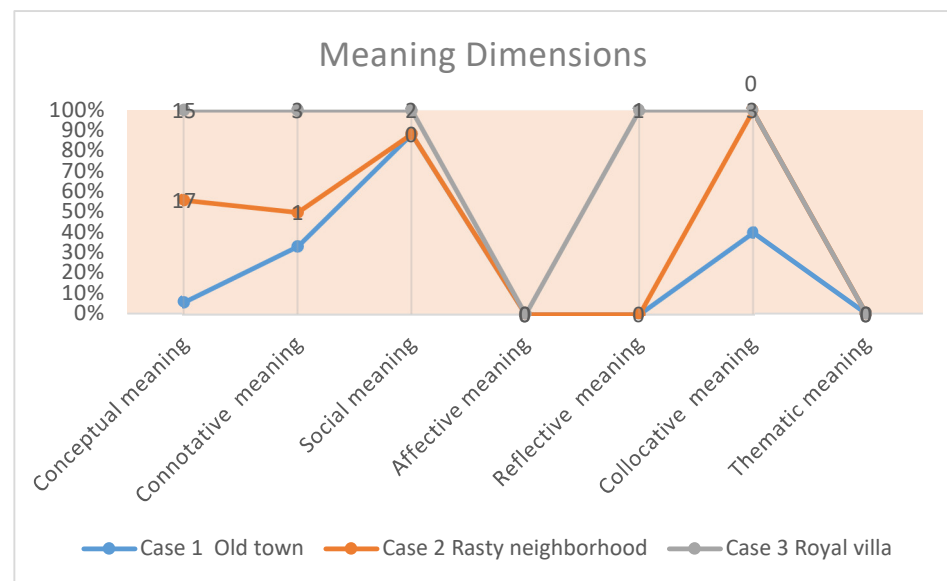


Figure 10. Meaning dimensions in different neighborhoods (Erbil City).

5.1.3. Originality

The third parameter deals with three sub-factors, which are essence, form, and function. The results indicate that the originality of the old town is mostly related to essence through human needs for change and development, while form and function control most cases in the Rasty and Royal Villas neighborhoods. These results are an indicator that the concept of originality in the modern era is connected with form and function more than with essence, whereas the cases in the old town strongly relate to essence as the base of their originality (see Figure 11).

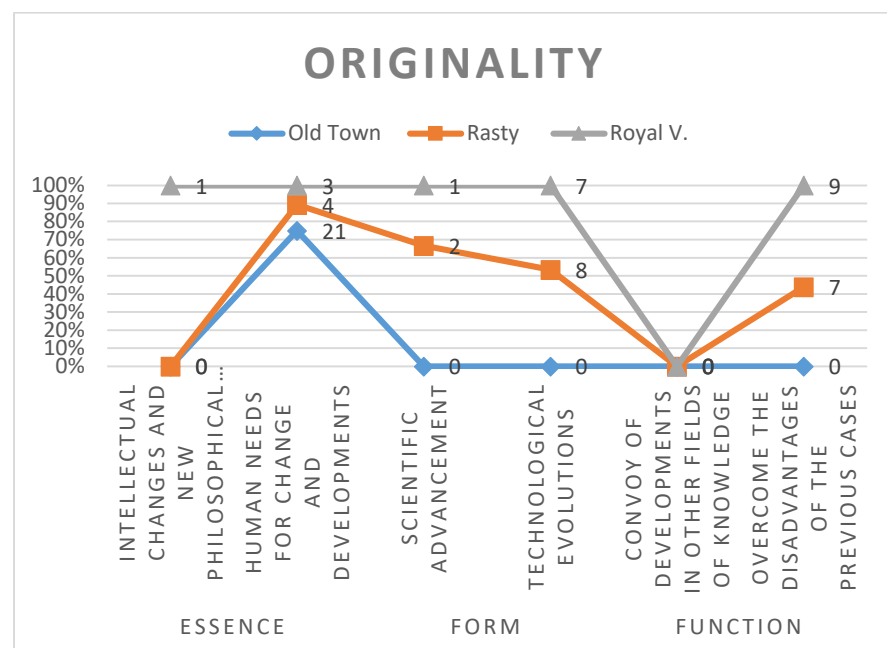


Figure 11. Originality in different neighborhoods (Erbil City).

5.1.4. Creative New Expression Languages

The measurement of the fourth parameter is related to four sub-factors: building element codes, symbolic behavior, imitation models, and cultural boundaries (see Figure 12). In terms of building element codes, the observation and photographic documentation

results indicate that most of the traditional cases in the old town are related to the vernacular code at an average of 95.2%, whereas the modern code is the distinctive feature of most cases in both Rasty and the Royal Villas.

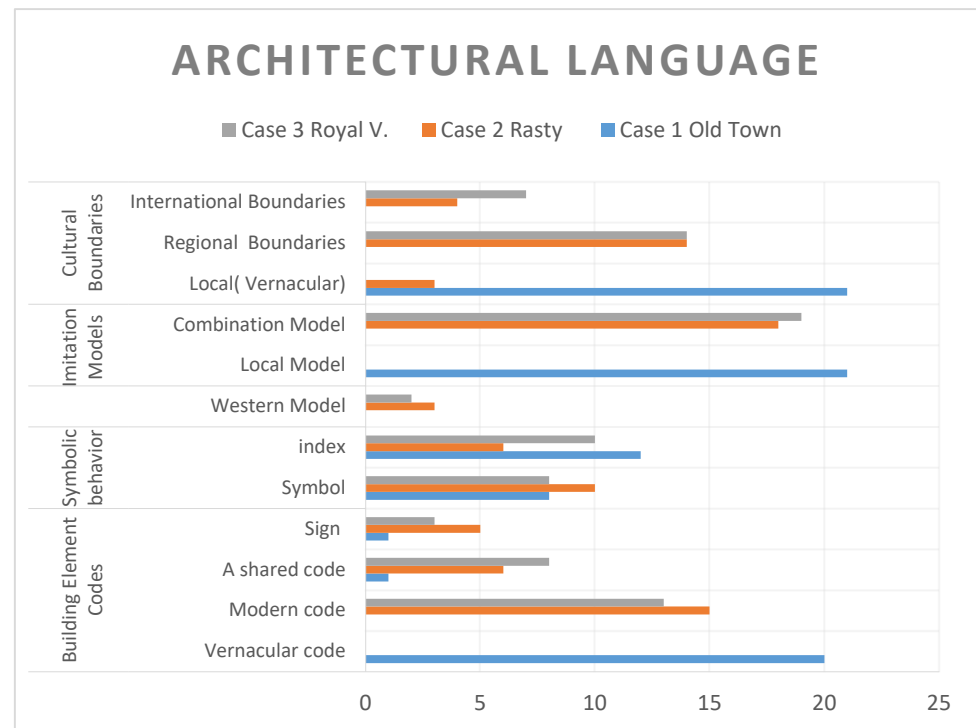


Figure 12. Architectural language in different neighborhoods (Erbil City).

It is interesting to note that the expression language (categorization of signs) is distributed in three groups. Generally, signs are repeated in only 8 cases, while symbols are repeated in 26 cases, and indexes are repeated in 28 cases. This is a clear indication that the architectural language in the city has symbolic features in most cases.

5.1.5. Building Regulations

Another effective parameter is related to building regulations through four sub-factors: health and environmental protection, consistency and quality assurance, urban planning and development control, and safety and structural integrity (see Figure 13). Our study reveals that open spaces in house layouts rarely reach 30% of the plot area; only four cases are recorded in the Royal Villas. This is an extraordinary consequence in terms of health and environmental protection. However, the regularity of building height as a factor of consistency and quality assurance shows that most cases in Rasty and the Royal Villas comply with building height regulations. It is worth mentioning that setback regulations are applied properly in all cases. This result is an obvious hint that building regulations are properly applied in new neighborhoods and totally neglected in old districts due to the lack of strict building regulations during that period.

5.1.6. Mental Images

Mental images play an operative role in measuring architectural identity since the main function of mental imagery is to represent and manipulate visual information through visual codes and cues. In this regard, mental images can be measured through the following sub-factors (see Figure 14): building element codes and symbolic behavior, imitation models, and cultural boundaries. Our results show that building element codes and symbolic behavior in the old town are mostly related to vernacular codes at a rate of 95.2%,

while mixed codes are the most frequent feature in the Rasty district at a rate of 57.1%, and modern codes and mixed codes control most cases in the Royal Villas.

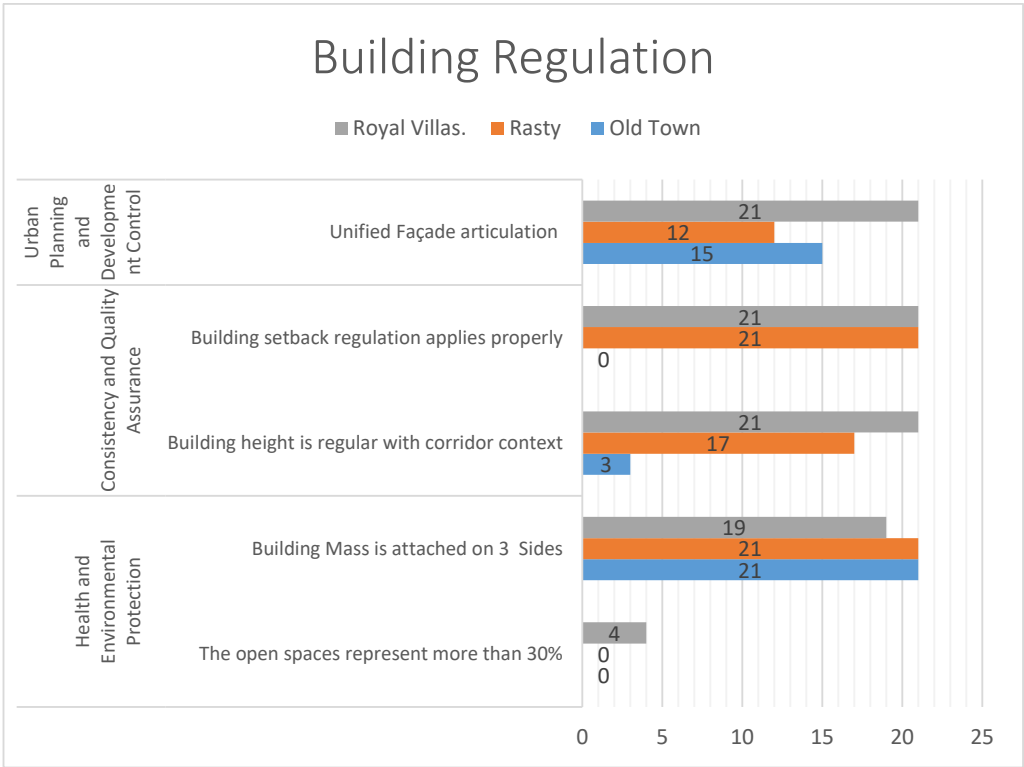


Figure 13. Building regulations in different neighborhoods (Erbil City).

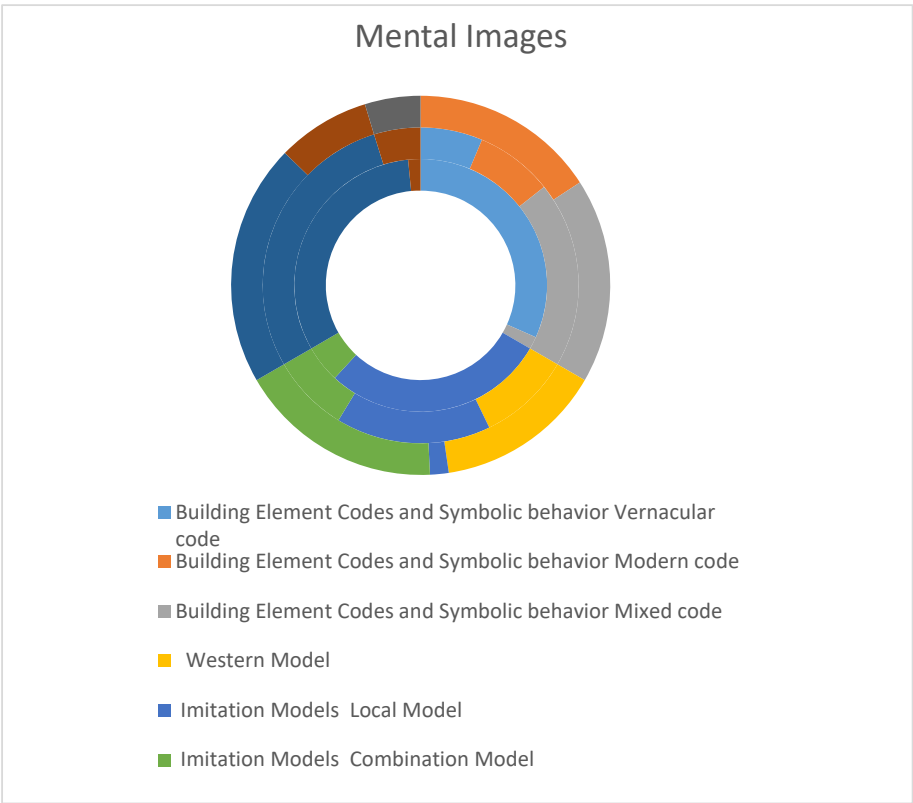


Figure 14. Mental images in different neighborhoods (Erbil City).

On the other hand, the imitation models in the old town focused on the local model at a rate of 85.7%, while the Western model recorded 42.8%, followed by 52.3% for the combined models in the Royal Villas neighborhood. It is interesting to note that most cases in the three neighborhood districts concentrated on local frontiers as the best scenario for cultural boundaries.

5.1.7. Site Context

The last parameter for measuring architectural identity is related to the site context through two factors: the relation between site context and building form and site context strategies. Our results show that site context dominates the form of buildings in all cases in the old town neighborhoods (see Figure 15), while partial integration between form and context is the dominant feature in the Rasty neighborhood at a rate of 80.9%, followed by a rate of 85.7% in the Royal Villas. However, site context strategies achieved a full rate of response to context in the old town, and a response to building form at a rate of 76.2% in the Rasty neighborhood and 66.7% in the Royal Villas neighborhood.

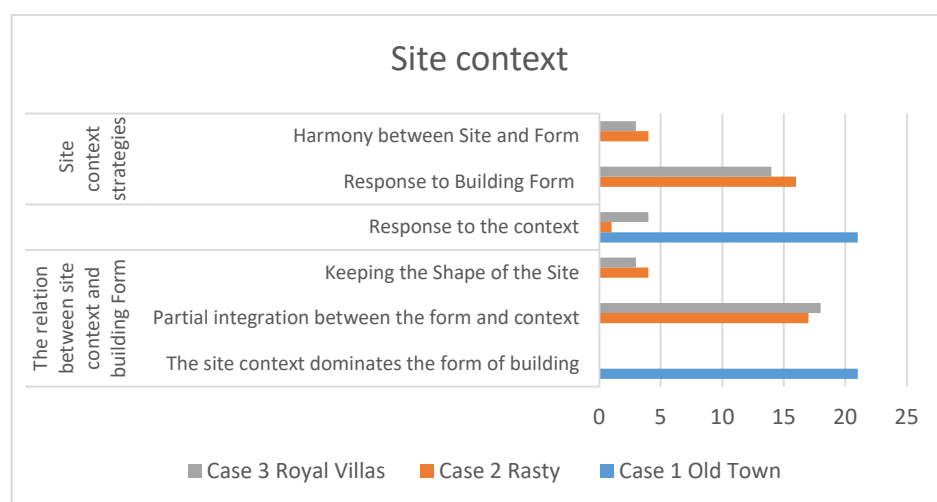


Figure 15. Site context in different neighborhoods (Erbil City).

5.2. Quantitative Analysis

The second part of this analysis will focus on the questionnaire results. It aims to measure the impact of effective parameters on the permanency of architectural identity. Accordingly, the following analysis has been applied:

5.2.1. Descriptive Analysis

The results from the statistical analysis depicted in (Figure 16), show that most of the respondents agree that formal appearance has a direct impact on architectural identity at a rate of 77.55%; however, 80% of respondents believe that the moral meaning dimension is a sentimental factor in shaping the permanency of architectural identity. They believe that architectural Form should make its function possible and transfer its meaning to the users.

House Façade (Formal Appearance–Physical Setting)

Based on the results shown in (Figure 16), most of the respondents agree that formal appearance has a direct impact on architectural identity at a rate of 77.55%, while 73.88% of respondents believe that the locations of architectural forms within the plot of land have a positive impact on identity belonging to the place. In the same context, 71.43% agree that formal appearance legibility will guide toward clear patterns of architectural identity.

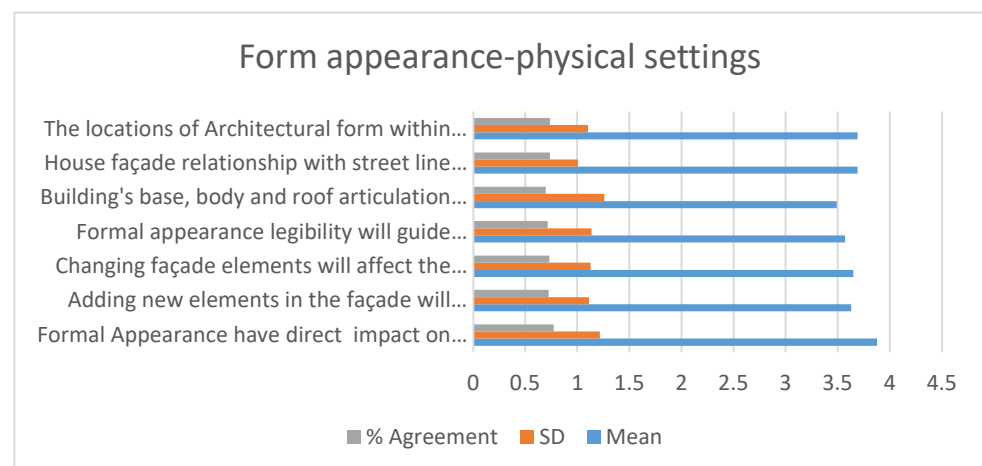


Figure 16. Formal appearance–physical setting in different neighborhoods (Erbil City).

Moral Meaning Dimension

The results show that 80% of respondents agree that architectural form should transfer its meanings. While only 73.06% believe that symbols have connotative meanings within architectural identity, 72.24% agree that the conceptual meaning of architectural identity is generated based on cultural–social values, and merely 71.43% of respondents agree that the adaptation of façade elements will affect its meaning dimensions in a cultural context. In light of the above results, the study of this parameter (moral meaning dimensions) matches the respondents' perspective.

Originality

In terms of originality, the results indicate that more than two-quarters (72.24%) agree that using local architectural details in building façades will guide towards originality. In parallel, 71.84% of respondents think that original symbols can represent deeper meanings, and 71.24% assert that using local architectural details in building façades will guide towards originality.

Creative New Expression Languages

The results show that 79.18% of respondents agree that the efficient use of local materials in building house façades will enhance the expression concept of locality, whereas only 76.73% believe that the technological developments experienced in the field of architecture have changed the thought and production of architectural forms, and 74.29% argue that the expression language of architecture is created through the combination of local architecture melded with available technology and is related to traditional representation tools mixed with technological ones.

Building Regulations

The results show that 68.98% of respondents agree that building regulations have a direct impact on architectural identity by reducing the complexity of elements in house façades, whereas 70.20% agree that form solidity regulations have an effect on the symbolic expression of architectural identity, and only 68.98% think that using large transparent elements in house façades will change the solid mass locality of Erbil City's architectural identity. It is interesting to note that there is a common agreement among respondents that applying buffer zone building regulations in the old sectors of the city will enhance the sense of belonging within architectural identity.

Mental Images

Based on the results, approximately three-quarters of respondents agree that traditional language is a vehicle for memory and a generative system that stores experience.

While 72.65% agree that mental images of Erbil’s citadel are spatial images that are transformed by spatial memory, only 71.84% believe that Erbil City’s cultural heritage establishes a three-dimensional language between individuals and the built environment through the old alleys, serving as mental imagery that enables the reactivation and manipulation of internal representations.

Site Context

The quantitative results display that 77.14% of respondents agree that site context characteristics have a direct influence on the permanency of architectural identity, followed by 73.88% who agree that neighboring buildings (as physical elements of site context) have a direct impact on architectural identity. Meanwhile, more than two-thirds of respondents agree that the unified house façade architectural style, the openness of road networks (as physical elements of site context), and the existing patterns of the façade fabric can provide meaning and promote continuity between the building and its local context (Figure 17).

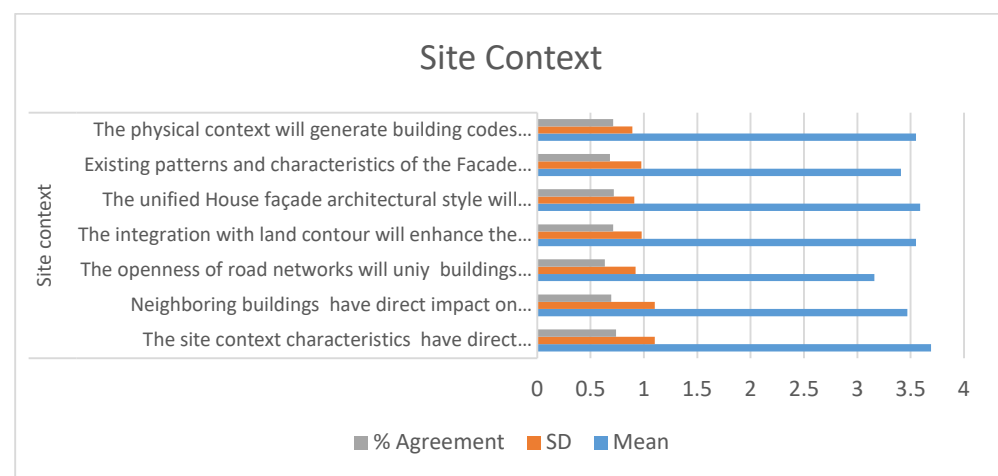


Figure 17. Site context results in different neighborhoods (Erbil City).

5.3. Reliability Statistics

The reliability of the questionnaire is designed to give the same results when repeated several times. Cronbach’s alpha is used to measure the reliability of the questionnaire, and its values are considered statistically acceptable if they are equal to or greater than 0.60. Table 3 shows the value of the reliability coefficient (Cronbach’s alpha) for all items. The value of the Cronbach’s alpha coefficient was high (0.954). This is an indication that the reliability coefficient of the questionnaire is high and acceptable in terms of statistical analysis (see Table 3).

Table 3. Statistic reliability (researcher).

Reliability Statistics		
Domain	No. of Items	Cronbach’s Alpha
Formal appearance–physical settings	7	0.771
Moral meaning dimension	7	0.711
Originality	7	0.710
Creative new expression languages	7	0.739
Building regulations	7	0.758
Mental images	7	0.798
Site context	8	0.769
Permanency of architectural identity	9	0.790
Overall	59	0.954

5.4. Correlation Analysis

After confirming the reliability of the questionnaire, a correlation analysis was applied to recognize the relationships between the independent variables and their impact on the permanency of architectural identity. The Pearson product-moment coefficient correlation results in Table 4 reveal that the strongest relationship is related to the mental images parameter with an (r) value of 0.855 at $p < 0.01$, followed by the building regulation parameter ($r = 0.831$ at $p < 0.01$), then creative new expression languages ($r = 0.759$ at $p < 0.01$), the site context parameter ($r = 0.731$ at $p < 0.01$), moral meaning dimensions ($r = 0.678$ at $p < 0.01$), and, finally, formal appearance ($r = 0.500$ at $p < 0.01$). These results identify the positive correlation between the independent variables and their impact on this study's dependent variable. Hence, the results mentioned above decisively prove that the suggested model factors have a crucial impact on the permanency of architectural identity. This means that the suggested model parameters can easily measure the identity of any specific place and time through theoretical framework dimensions. These dimensions are applied to different façade articulations to generate symbols, which are a powerful tool for identifying a specific architectural tendency (see Table 4).

Table 4. Statistical correlation analysis (researcher).

		Correlations						
		Formal Appearance–Physical Settings	Moral Meaning Dim.	Originality	New Expression Languages	Building Regulations	Mental Images	Site Context
Moral meaning dimension	Pearson correlation	0.596 **	--					
	Sig.	0.000						
Originality	Pearson correlation	0.535 **	0.649 **	--				
	Sig.	0.000	0.000					
Creative new expression languages	Pearson correlation	0.530 **	0.729 **	0.594 **	--			
	Sig.	0.000	0.000	0.000				
Building regulations	Pearson correlation	0.586 **	0.699 **	0.743 **	0.818 **	--		
	Sig.	0.000	0.000	0.000	0.000			
Mental images	Pearson correlation	0.516 **	0.666 **	0.632 **	0.743 **	0.793 **	--	
	Sig.	0.000	0.000	0.000	0.000	0.000		
Site context	Pearson correlation	0.612 **	0.639 **	0.553 **	0.731 **	0.755 **	0.740 **	--
	Sig.	0.000	0.000	0.000	0.000	0.000	0.000	
Permanency of architectural identity	Pearson correlation	0.500 **	0.687 **	0.741 **	0.759 **	0.831 **	0.855 **	0.734 **
	Sig.	0.000	0.000	0.000	0.000	0.000	0.000	0.000

** Correlation is significant at the 0.01 level (2-tailed). b. Listwise N = 49.

5.5. Regression Analysis (Best Model)

Regression analysis is applied to make a prediction about the dependent variable (permanency of architectural identity) based on its covariance with the independent variables. Accordingly, an equation will provide the most accurate prediction of the effective factors that affect the permanency of architectural identity.

The best model is presented for the permanency of architectural identity in Erbil City neighborhoods by determining the combined effect of the independent variables, as follows: (1) mental images, (2) originality, and (3) building regulations, as indicated in Table 5.

Table 5. Regression analysis (best model) (researcher).

Model	Unstandardized Coefficients		Standardized Coefficients	t	p-Value	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	0.235	0.239		0.984	0.330	-	-
Mental images	0.477	0.100	0.501	4.765	0.000 **	0.367	2.726
Originality	0.216	0.091	0.227	2.378	0.022 *	0.443	2.256
Building regulations	0.253	0.116	0.265	2.181	0.034 *	0.274	3.648

Dependent variable: permanency of architectural identity. $F = 67.216$ ($p < 0.001$ **); adjusted R square = 80.5%; Durbin–Watson = 1.925. * Significant at level $p < 0.05$; ** significant at level $p < 0.000$.

Table 5 highlights the results from the multiple regression analysis. The beta values indicate the unique contribution of the three main variables and formulate the final equation of the model, which is as follows:

$$\text{Permanency of Architectural Identity} = 0.235 + 0.477 \text{ Mental Images} + 0.216 \text{ Originality} + 0.253 \text{ Building Regulations}$$

Therefore, the R^2 for this model is 0.805, indicating that mental images, originality, and building regulations explained 80.5% of the variation toward the permanency of architectural identity (see Table 5). These results reveal that the “mental images” parameter is the most influential in interpreting the permanency of architectural identity because every unit of change in this parameter is associated with a 47.7% change in the endurance of architectural identity. It is followed by the building regulation parameter at a rate of 25.3% and the “originality” parameter at 21.6%.

6. Discussion

The measurements of architectural identity are a complicated scenario that requires the articulation of façade elements to produce cues and signals to generate architectural identity. In this regard, scholars have identified numerous models to define the main parameters that affect the creation of architectural identity. Previous related studies identified the most effective features that preserve the continuity of the self. Starting from Relph’s suggestion that identity can be measured through physical settings, activities, and meanings [6], the combination of relevant studies in one framework was the first contribution of this study.

Physical settings and meaning dimensions were the key variables that researchers tried to measure [6–8]. Then, the relationship with context was applied as an additional factor in measuring architectural identity [9,10].

The study results reveal that the proposed framework for measuring architectural identity can be classified as follows:

1. Formal appearance–physical settings [15,18]:
 - Simplicity of building proportion.
 - Symbolic features.
 - Human scale.
 - Mass regularity.
 - Solid-to-void relationship.
 - Vernacular architectural details.
 - Materiality.
2. Meaning dimensions [13,19,23]:
 - Conceptual meaning.
 - Associative meaning.
3. Originality [26,28]:
 - Essence.
 - Form.
 - Function.

4. Architectural language [27,28]:
 - Building element codes.
 - Symbolic behavior.
 - Imitation models.
 - Cultural boundaries.
5. Building regulations [13,29,30]:
 - Health and environmental protection.
 - Consistency and quality assurance.
 - Urban planning and development control.
 - Safety and structural integrity.
6. Mental images [31,35]:
 - Building element codes and symbolic behavior.
 - Imitation models.
 - Cultural boundaries.
7. Site context [10,36]:
 - Relationship between site context and building form.
 - Site context strategies.

After applying the suggested model to be checked by experts in the field of architecture through a detailed questionnaire, a new refined theoretical framework with three parameters (mental images, originality, and building regulation) is generated (see Figure 18). The new framework is another contribution of this study that measures the façade design's characteristics, under the umbrella of architectural identity, towards new horizons in the built environment. The arrangement of façade elements and their distinctive features guide and provide identity to a place. The model creates a sense of structure to measure the permanency of architectural identity.

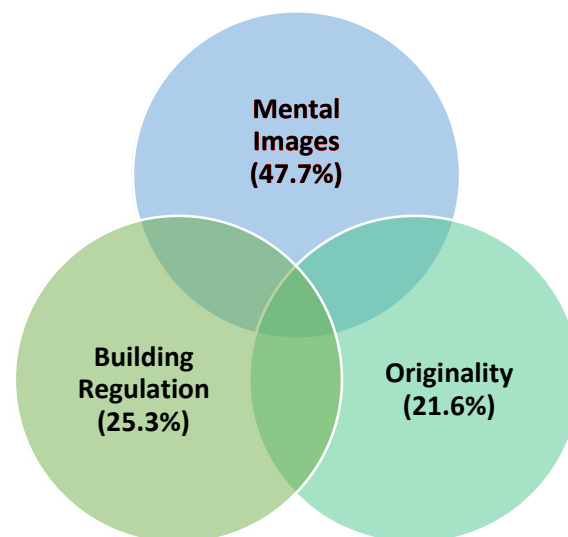


Figure 18. Refined model containing the three key pillars of architectural identity.

7. Conclusions

The literature on architectural identity is filled with a variety of models that apply dissimilar parameters to measure the phenomenon based on the diversity of the subject in the field of research. The contribution of this study is interrelated to the application of a theoretical model in three different neighborhoods within the context of Erbil City. The analytical results reveal three different architectural identities, which is a clear sign that the main assumption of this study (that identity can be measured) is proofed and deep-rooted.

This study developed a new model containing the three key pillars of architectural identity (mental images, originality, and building regulations). The outcomes clarify that architectural identity is a flexible idea and an adaptation process to predict the permanency of architectural identity.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/buildings14051379/s1>, Table S1: Theoretical Framework for Measuring Architectural Identity.

Funding: This research received no external funding.

Data Availability Statement: Data are contained within the article.

Conflicts of Interest: The author declares no conflicts of interest.

References

- Nasir, O.; Kamal, M.A. Vernacular Architecture as a Design Paradigm for Sustainability and Identity: The Case of Ladakh, India. *Am. J. Civ. Eng. Archit.* **2021**, *9*, 219–231. [\[CrossRef\]](#)
- Online Etymology Dictionary. Available online: <https://www.etymonline.com/search?q=permenance> (accessed on 18 February 2024).
- Claudia, M. Sustainability and place identity. *Procedia Eng.* **2011**, *21*, 1104–1109.
- Hamad, N.B.; Baper, S.Y. Habermas model and aesthetic preference evaluation of house facades: Insights from Erbil city. *Archit. Eng.* **2023**, *8*, 34–46. [\[CrossRef\]](#)
- Khudhur, K.A.; Baper, S.Y. The Effect of Climate Considerations in Generating House Façade in Erbil City. *Acta Sci.* **2024**, *25*, 1–3.
- Relph, E. *Place and Placelessness*; Pion: London, UK, 1976; Volume 67.
- Baper, A.-S.S.Y. Influence of Modernity Versus Continuity of Architectural Identity on House Facade in Erbil City, Iraq. Ph.D. Thesis, Universiti Sains Malaysia, Gelugor, Malaysia, 2011.
- Mahdavinejad, M.; Saadatjoo, P. Search for identity in contemporary architecture of Saudi Arabia. *Iran Univ. Sci. Technol.* **2014**, *1*, 57–74.
- Torabi, Z.; Brahman, S. Effective factors in shaping the identity of architecture. *Middle-East. J. Sci. Res.* **2013**, *15*, 106–113.
- Lambe, N.; Dongre, A. Contextualism: An Approach to Achieve Architectural Identity and Continuity. *Int. J. Innov. Res. Adv. Stud. (IJIRAS)* **2016**, *3*, 33–42.
- Gloaguen, Y. Towards a Definition of Antonin Raymond’s “Architectural Identity”—A Study Based on the Architect’s Way of Thinking and Way of Design. Ph.D. Thesis, Kyoto University, Kyoto, Japan, 2008.
- Ali, O.; Mansour, Y.; Elshater, A.; Fareed, A. Assessing the identity of place through its measurable components to achieve sustainable development. *Civ. Eng. Archit.* **2022**, *10*, 137–157. [\[CrossRef\]](#)
- AL-Zahrani, M.; Shawky Abou Leila, M. Strengthening the architectural identity of Makkah Al-Mukarramah’s buildings: An assessment of the impact of laws and regulations. *J. Umm Al-Qura Univ. Eng. Archit.* **2022**, *13*, 37–61. [\[CrossRef\]](#)
- Khaznadar BM, A.; Baper, S.Y. Sustainable Continuity of Cultural Heritage: An Approach for Studying Architectural Identity Using Typo-Morphology Analysis and Perception Survey. *Sustainability* **2023**, *15*, 9050. [\[CrossRef\]](#)
- Baper, S.Y. The role of heritage buildings in constructing the continuity of architectural identity in Erbil city. *Int. Trans. J. Eng. Manag. Appl. Sci. Technol.* **2018**, *9*, 1–12.
- Salman, M. Sustainability and vernacular architecture: Rethinking what identity is. In *Urban and Architectural Heritage Conservation within Sustainability*; IntechOpen: London, UK, 2018.
- Baper, S.Y.; Hassan, A.S. The influence of modernity on Kurdish architectural identity. *Am. J. Eng. Appl. Sci.* **2010**, *3*, 552–559. [\[CrossRef\]](#)
- Hekkert, P. Design Aesthetics: Principles of Pleasure in Design. *Psychol. Sci.* **2006**, *48*, 157–172.
- Castells, M. *The Power of Identity*; John Wiley & Sons: Hoboken, NJ, USA, 2011.
- Laurence, P.L. Contradictions and Complexities: Jane Jacobs’s and Robert Venturi’s Complexity Theories. *J. Archit. Educ.* **2006**, *59*, 49–60. [\[CrossRef\]](#)
- Guermazi, I. An Archeology of Postmodern Architecture: A Reading of Charles Jencks’ Work. Master’s Thesis, University of Washington, Seattle, WA, USA, 2014.
- Wiesing, L. From the Way of Seeing to Visibility. In *The Visibility of the Image: History and Perspectives of Formal Aesthetics*; Bloomsbury Publishing: London, UK, 2016; pp. 107–145.
- Park, J.A.; Kim, Y.S.; Cho, J.Y. Visual Reasoning as a Critical Attribute in Design Creativity. 2006. Available online: <https://www.semanticscholar.org/paper/Visual-Reasoning-as-a-critical-attribute-in-design-Park-Kim/ee33e2584f87f995d6f6e6079425dd0371d25c37> (accessed on 3 March 2024).
- Mondal, J. Differences between Architects ‘and Non-architects’ Visual Perception of Originality of Tower Typology. In Proceedings of the 39th eCAADe Conference—Volume 1, Novi Sad, Serbia, 8–10 September 2021; pp. 65–74.

25. Shareef, V. The meaning of originality in architecture and how can it be measured. *J. Process Manag. New Technol.* **2018**, *6*, 1–12. [CrossRef]
26. Lawrence, A.R. *The Architecture of Influence: The Myth of Originality in the Twentieth Century*; University of Virginia Press: Charlottesville, VA, USA, 2023.
27. Champion, E. Norberg-Schulz: Culture, presence and a sense of virtual place. In *The Phenomenology of Real and Virtual Places*; Routledge: London, UK, 2018; pp. 144–163.
28. Pattern Language vs. Form Language. Available online: <https://www.archdaily.com/488929/a-theory-of-architecture-part-1-pattern-language-vs-form-language> (accessed on 3 March 2024).
29. Alabdullatif, A.A. Architectural Identity in Modern Saudi Cities. Doctoral Dissertation, The University of Arizona, Tucson, AZ, USA, 2021.
30. Samir, N.; El Maksoud, R.A.; Maarof, I. Impact of building regulations on the urban fabric of the city: Case study of Alexandria, Egypt. *WIT Trans. Ecol. Environ.* **2019**, *238*, 581–592.
31. Biqiku, K. Random Individual Facades, Informal Buildings and Aesthetic Chaos: How Can Urban Architecture Help-The Case of Tirana, Albania. *Eur. J. Multidiscip. Stud.* **2023**, *8*, 84–94.
32. Damayanti, R. Extending Kevin Lynch's Theory of Imageability; through an Investigation of Kampung in Surabaya-Indonesia. Doctoral Dissertation, University of Sheffield, Sheffield, UK, 2015.
33. Lynch, K. *The Image of the City*; MIT Press: Cambridge, MA, USA, 1964.
34. Abeynayake, T.; Meethiyagoda, L.; Kankanamge, N.; Mahanama, P.K.S. Imageability and legibility: Cognitive analysis and visibility assessment in Galle heritage city. *J. Archit. Urban.* **2022**, *46*, 126–136. [CrossRef]
35. Healey, P. On creating the city as a collective resource. *Urban Stud.* **2002**, *39*, 1777–1792. [CrossRef]
36. Naghavi, P.; Kiani, M. Explaining the Relationship between Vernacular Architecture & Contextualism. *Maremat Memari-E Iran* **2019**, *9*, 71–90.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.