



# Investigating the impact of building facades and finishing materials on the sustainable architectural identity of housing

## A case study of Kabul

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### ABSTRACT

The architectural identities of a city and its surroundings are crucial for maintaining its quality and preserving its unique features. The cities of Afghanistan have undergone significant changes in their identities due to various internal and external factors. These factors have altered or destroyed the identity of the city, leading to the loss of architectural identity and increased confusion in numerous cities in Afghanistan. Throughout history, the city of Kabul, the largest city, has struggled to maintain an identifiable architectural style due to the rapid growth of informal settlements. Recently, large glass and synthetic material facades have become prominent features of Kabul's urban landscape. These structures represent a new era of modernity, in contrast to the traditional mud-colored buildings that have long dominated the city's architecture style. The purpose of this research is to explore the influence of building facades and finishing materials on Kabul's sustainable architectural identity, with the goal of studying the relationship between residential building design features and the city's cultural, social, and historical environment. The study utilizes a mixed-methods approach, which involves conducting a comprehensive literature analysis and a field study that involves collecting data through observations, interviews, and questionnaires to achieve its objectives. The findings indicate that the selection of building facades and finishing materials has a significant impact on the sustainable architectural identity of Kabul. This study offers valuable insights for policymakers, architects, urban planners, and other stakeholders involved in shaping a sustainable built environment for Kabul and other similar cities in Afghanistan.

### Keywords

- Architectural identity
- Sustainable
- Building façade
- Finishing materials
- Informal settlements

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## 1. Introduction

The history of a nation shapes its identity, which is transmitted from generation to generation [1]. Nonetheless, the development of buildings that represent a nation's cultural heritage at any given moment shapes its architectural identity. Building design and construction not only reflect the culture and civilization that generated them but also influence the individuals who inhabit them. In other words, the physical structures that we constructed have a considerable impact on our conduct, sentiments, and general state of health. In 1943, Winston Churchill delivered a speech to the House of Commons where he expressed the idea that our buildings have a significant impact on us. He famously stated, "We shape our buildings, and therefore they shape us" [2]. Unfortunately, in Afghanistan, the construction process has not been properly executed, resulting in houses being built by individuals without proper expertise in architecture. Since 1978, informal settlements have become the primary form of housing expansion in Kabul owing to strong urbanization and unstable political conditions. This occurred despite the city's master and detailed plans being disregarded [3]. In the setting of Kabul, where informal settlements (referring to dwellings that have been constructed on land that have not been acquired through government processes and do not

conform to regulations [4]) occupy most of the residential areas, there is a significant need for regulations, policies, and usage manuals regarding housing facades and finishing materials to represent Kabul's architectural identity. The identity of a city, in terms of both its urban and architectural aspects, is influenced by a multitude of factors. These factors include the design of buildings as well as the materials used in their construction. The appearance of housing in Kabul plays a crucial role in defining the city's visual identity and overall environment. This is largely due to the facades and finishing materials used in construction. Therefore, this study aimed to investigate how building facades and finishing materials impact the urban and architectural identity of Kabul. The objective of this research is to explore the impact of building facades and finishing materials on the identity of Kabul City and its distinctive sense of place.

### 1.2. Identity and sustainable architecture

Architecture and identity are complementary because architecture can create an identity that preserves its value for future generations. Identity has many dimensions and a variety of meanings and explanations across diverse

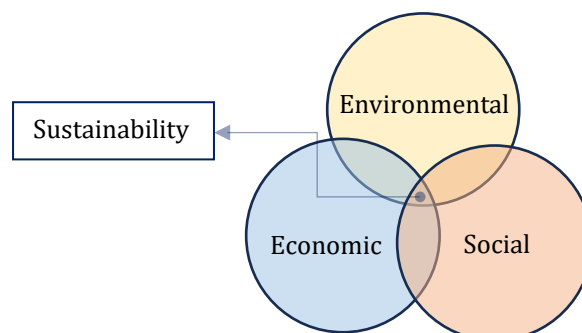


fields of study. To analyze an environmental image effectively, it can be broken down into three components: identity, structure, and meaning [5]. To differentiate between cities, it is necessary to identify certain characteristics that set them apart from one another. The act of identification is crucial for human perception as well as for any living creature, and allows us to recognize and comprehend phenomena, enabling us to interact with them effectively [6]. The first step in creating a functional image is to identify an object, which involves distinguishing it from other objects and recognizing it as a distinct entity, this is called identity in the sense of individuality or unity [5]. Consequently, identity is a combination of attitudes, features, uniqueness, and originality, which distinguishes one thing from another.

Architecture is an integral part of a society's identity, conveying messages, features, and ideas unique to that culture, and is influenced by a variety of factors, including geography, traditions, customs, history, and the collective knowledge of the society in which it emerged [7,8]. Architecture plays a significant role in our daily lives, both in terms of practical functions and experiences, while our surroundings greatly influence our lives, aspirations, and dreams. Therefore, high-quality architecture plays a key role in creating favorable conditions for everyday living. Architecture is part of the identity phenomenon; therefore the impacts of changes in surroundings and places on communities are critical to maintaining identity [9]. The architecture of a building, including its façade, structures, and interior spaces, is a prominent reflection of the culture of a nation [7]. According to Lynch (1960), unique façade characteristics play a crucial role in defining the identity of a path. In addition, architecture generates value and identity by designing a building, which this identity may create by variety of variables in defining history, memory, culture, and environment. By planning and designing effectively and utilizing architecture as a tool for improving the quality of life, we can generate identity for both individuals and society [10]. Architecture holds a unique ability to establish an identity that can serve as a symbol for a city or country for many years. Therefore, it is crucial that we take great care in preserving and promoting the architectural identity.

According to the World Commission on Environment and Development (WCED), sustainability is the concept of meeting the current needs and desires without threatening the ability to fulfill them in the future [11]. Sustainable architecture, also referred to as green architecture or environmentally friendly architecture, involves the design and construction of buildings with the goal of minimizing their negative impact on the environment while prioritizing the well-being of occupants. The most crucial aspect of sustainable architecture is to minimize the negative impacts on the environment and enhance the quality of life by considering specific factors that influence people's well-being [12]. According to Robert Goodland [13], sustainable development (SD) should incorporate the principles of social, environmental, and economic sustainability

in order to achieve long-term sustainable development. Hence, the concepts of identity, architecture, and sustainability are closely intertwined, and it is crucial to consider environmental concerns when designing buildings. Three key elements of sustainability are represented graphically in Figure 1.



**Figure 1.** The concept of sustainability, the triple bottom line, adopted from [14].

Due to the fact that the majority of houses in Kabul city are constructed by individuals without professional expertise, the incorporation of sustainability objectives and the utilization of sustainable materials in buildings are rarely observed. Furthermore, the lack of awareness among individuals involved in the construction process regarding sustainable goals has resulted in the neglect of this crucial aspect in the majority of houses.

### 1.3. Building façades and finishing materials

In architecture, a building façade refers to the exterior-facing side or frontage of a building, usually facing the street or public space. It is part of a building that is visible from the outside and often represents the building's character and style. Building facades are an integrated system that captures people's imaginations and elicits emotional responses via the logic of utility and surrealism of beauty (Bechtel and Churchman, 2003, as cited in [15]). The outward appearance of a building, much like clothing, plays a crucial role in expressing and defining its identity. In particular, the facade serves as a noteworthy aspect of a building's external identity and holds significant value in this regard.

The façade, as the external surface of a building, plays a crucial role in human interaction with the built environment. It not only showcases the architectural style of a specific area but also communicates the unique cultural, social, climatic, political, and economic characteristics that are inherent to the local context (Askari and Dola, 2009, as cited in [15]). The building facade has several components and factors that are considered during the design process. These components shown in Figure 2 include form, shape, color, material, and structure [16]. Moreover, the architectural concept of a specific area is influenced by numerous factors that can be grouped into environmental, historical, cultural, social, technical, aesthetic, economic, and political categories [15]. These factors, together with other

considerations, collectively shape the identity of every urban area, and changes in any of these factors directly impact building facades and finishing materials, which play a significant role in shaping a nation's identity.

Finishing materials are the numerous materials used to cover, beautify, and protect the internal and external surfaces of a building, such as walls, floors, ceilings, and roofs. The selection of building materials is essential for various reasons, including creating a balance between structural stability and visual quality, choosing the appropriate construction technique, giving the building its distinctive character and visual appeal, indicating the building's period of construction, following the development of construction techniques, incorporating both aesthetic and practical elements, and determining the budget for building projects [17]. The specifications of these materials play an important role in creating a building's architectural character because they can improve or detract from the overall appearance and functioning of the space.

The characteristics of an object, including qualities such as hardness, softness, and flexibility, can often be understood through physical observation and tactile exploration of the materials involved, which possess unique properties that contribute to their overall behavior [8]. Different types of building materials have been used in different historical periods, which reflect the architectural capabilities, beliefs, culture, and civilization of that era. In addition to their functions and decorative purposes, building materials also have symbolic values and meanings that convey concepts and ideas [8]. In reality, the material determines the form of the façade and conveys the overall architectural purpose [18], and the visual appearance and structural stability of a building are interlinked through the relationship between the type of material used and the resulting type and form of the structure [17]. Therefore, the choice of building material can be a powerful tool for communicating cultural, social, and political messages from different historical periods. As a result, the goal of this research is to identify the most frequently used building façades and finishing materials in Kabul residential construction and explore how these materials impact the visual and architectural aspects of the city.

#### 1.4. Problem statement

Kabul is a city that boasts a rich and extensive history. The city has experienced rapid urban growth since the early 1900s. Between 1970 and 2001, the development of the city was slow because of political instability and wars. Since 2001, following the fall of the Taliban regime, both

the government and citizens have been diligently working toward the reconstruction of Kabul. Additionally, international donors are contributing to the rehabilitation and reconstruction efforts of the capital city. Regrettably, the growth and expansion of the city took place without a shared vision, proper urban planning, or clear direction for reconstruction and future development. Therefore, during decades of development and progress in Kabul, there has been a trend of destroying valuable historical buildings. Many people are demolishing historical houses and replacing them with modern buildings that do not align with ancient Kabuli architecture.

Furthermore, new housing in Kabul lacks architectural design elements. It incorporates foreign architectural elements on the façade, utilizes manufactured materials, and does not establish a connection with the history and culture of the city. The citizens constructed their own houses without seeking guidance from an architect or any other expert. This creates disorder within the city and causes it to lose its architectural identity. Architectural identity is an ongoing phenomenon that can change and evolve over time, creating connections between the past, present, and future. Based on the issue statement, the major assumption of this study is the function of building façade and finishing materials in defining architectural identity in terms of façade components.

#### 1.5. Study aims

The external appearance of a building, including its facade and materials, is crucial for creating its identity. Therefore, the aim of this research is to investigate how building facades contribute to the architectural identity of Kabul. This study aimed to achieve the following main objectives.

- To determine the most commonly used building facades and finishing materials in residential construction within the city. Particularly, historical houses, formal, informal, and hillside dwellings.
- To analyze how these materials affect the city's overall visual appearance and architectural identity.
- To examine the influence of cultural, historical, social, and economic factors on the utilization of these materials in housing construction and their connection to the urban identity of the city.
- To offer guidance to urban planners and architects on how to enhance the urban identity of Kabul City by utilizing building facades and finishing materials in a cohesive and authentic manner.

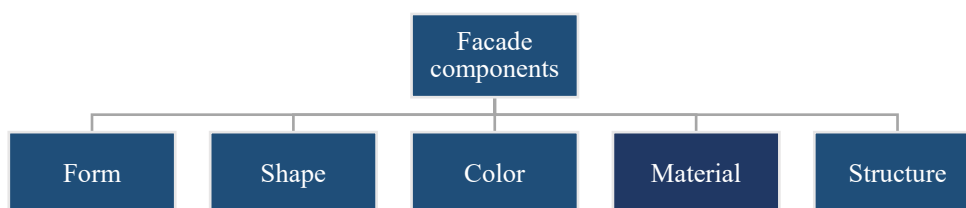


Figure 2. Façade components.

### 1.6. Review of the literature

Several studies have been conducted on Kabul, focusing on various topics. Issa and Kohistani [19] examined Kabul's urban identity from the perspective of socio-political development. According to the study, urban development in Kabul today represents a wide range of opinions and ideas, as well as the knowledge engaged in the rebuilding process. According to the findings, Kabul is today a big city with a diversity of urban identities that reflect various socioeconomic and political dimensions of growth. In 2017, Kazimee and Najimi conducted a study that focused on the historical conservation process in Kabul since 2001 [20]. The study examined urban regeneration and the preservation of architectural heritage. The study showed that a restored historic city will stimulate the economy and develop a family sense of place where people take pride in their built environment and live with dignity. Ayoobi and Demirkol [21] conducted a study to evaluate architectural monuments in Kabul, the capital city of Afghanistan. The aim of the study was to examine the architectural evolution of Kabul city by taking into account the impact of different civilizations throughout history. The study clarified that the architectural revolution in Kabul signifies a crucial milestone in history, marking the transition from pre-Islamic to Islamic eras, which encompassed various architectural styles. Sarwari and Ono [22] carried out an analysis of urban ethnic segmentation in Kabul. The study investigated the presence of ethnic communities in Kabul and their significance to the city's inhabitants. According to the findings, individuals reside together due to a shared sense of community identity referred to as *Qawm*. So far, no research has been conducted to investigate the impact of building façade and finishing materials on the architectural identity of Kabul. Thus, the importance of this study is to restore the urban and architectural identities that have been lost due to various issues affecting the image of Kabul. These issues have had a significant impact on the city's visual identity, both historically and in current urban patterns.

## 2. Methodology

A literature review, case study, interviews, surveys and questionnaires, visual analysis, data analysis, and recommended strategies for future development were all part of the methodology used in this study. The literature review thoroughly examined the relevant literature regarding the historical, cultural, social, and economic contexts of Kabul. Furthermore, the review examined the present condition of building facades and finishing materials in urban settings and their impact on the architectural character of Kabul. A questionnaire was developed to collect data from local architects and residents for the purpose of data collection. Subsequently, case studies were conducted on historical, modern, and hillside houses using photographs, field notes, and sketches. The data for this research were collected through literature reviews, case studies, and interviews, and were analyzed using both qualitative and

quantitative methods. Furthermore, a visual analysis was conducted on the photographs collected during the site surveys to identify the impact of building façade and finishing materials on the visual character and architectural identity of Kabul. Based on the findings, proposed strategies have been developed to promote cohesive and authentic architectural identity through the use of building facades and finishing materials. These strategies were intended to assist architects, developers, and planners. The research methodology used in this study is shown in Figure 3.

The research was carried out in Kabul, Afghanistan's capital and the largest city, in January 2023. Figure 4 displays the geographical location of Kabul on the map of Afghanistan, which has 22 districts. In this research, the questionnaire survey included a total of 106 participants from Kabul University, Polytechnic University, and Kabul municipality. The participants involved in the study included individuals with expertise in architecture, such as architects, students enrolled in architecture programs, and professors specializing in the field of architecture. The study included participants from diverse groups based on gender, age, occupation, and educational level. In this study, 41.5% of the participants were female architects from Kabul University's architecture department. The majority of participants in this research were between the ages of 18 and 24, with a bachelor's degree. 67% of the participants had lived in Kabul for more than ten years, indicating that they were familiar with the city's architectural conditions. Table 1. shows the personal information of the participants. In order to validate the results of the questionnaire, we conducted a survey of various types of buildings including historical houses, formal and informal dwellings, and hillside residences. The purpose of this survey was to assess the current state of these buildings in terms of their architectural design, as well as to identify the different types of building facades and finishing materials used concept of smart cities emerged in the nineties as a solution to the challenges faced by the growing urbanization of the cities.

The typology of residential structures in Kabul encompasses various categories, including historical, formal, informal, and hillside houses. In order to validate the results of the questionnaire, we conducted a survey of various types of buildings including historical houses, formal and informal dwellings, and hillside residences. These specific houses were chosen due to historical significance, architectural styles, geographic location, usage of building materials, and social context. The purpose of this survey was to assess the current state of these buildings in terms of their architectural design, as well as to identify the different types of building facades and finishing materials used. Moreover, to investigate diverse instances of architectural styles across several localities, we carefully selected distinct growth zones inside Kabul and these areas are renowned for their high concentration of residential structures and contain various examples of residential house.

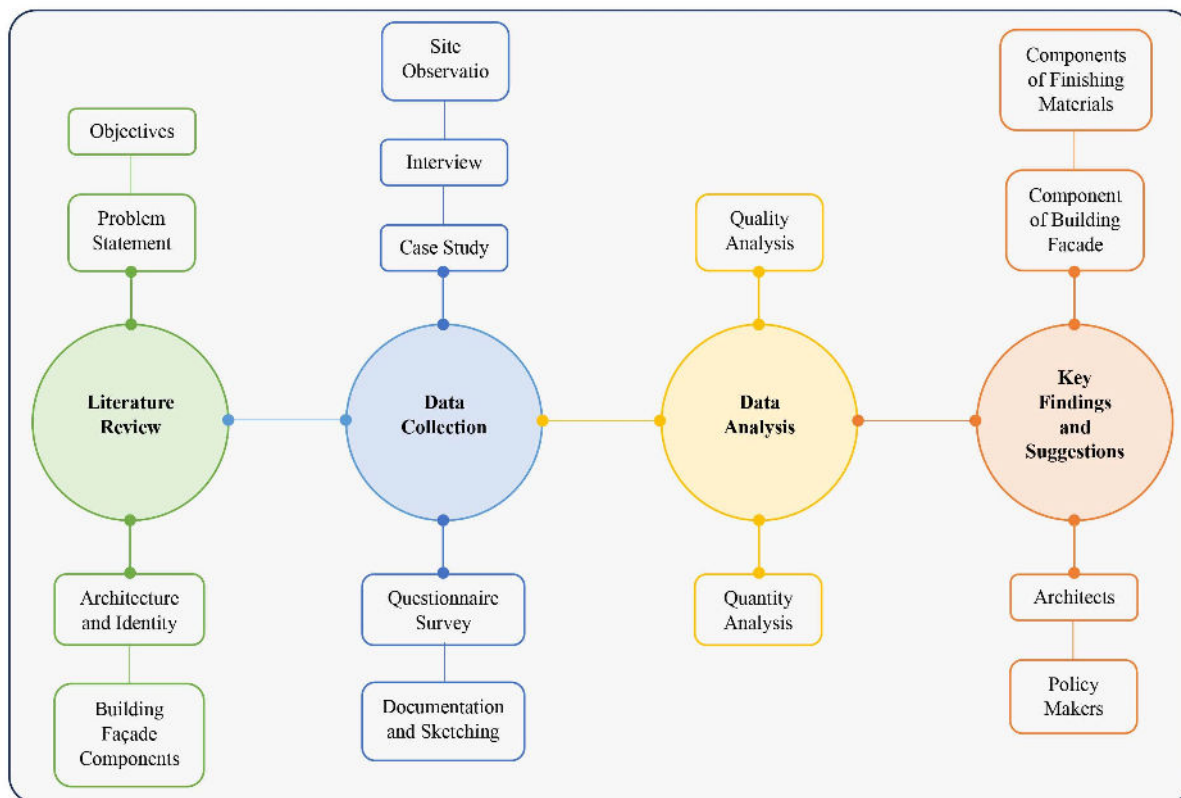


Figure 3. Research methodology diagram.

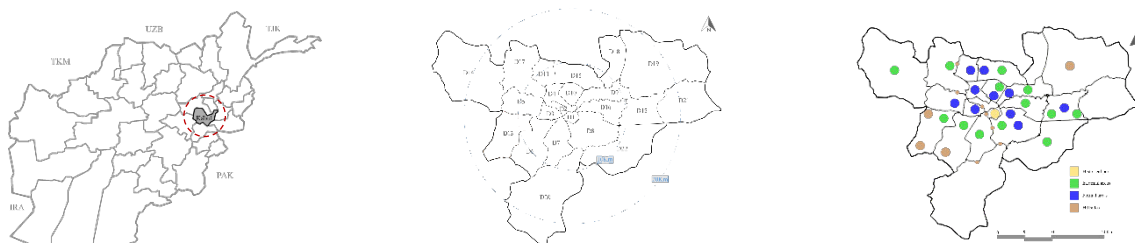


Figure 4. Location of Kabul in Afghanistan’s map, 22 districts of Kabul, and study areas.

Table 1: General information of the participants.

Information	Category	Frequency (n=106)	%
Gender	Male	62	58.5
	Female	44	41.5
Age	18-24	60	56.6
	25-34	42	39.6
	35-44	4	3.8
Education level	High school diploma	19	17.9
	Bachelor’s degree	73	68.9
	Master’s degree	13	12.3
	Doctoral degree	1	0.9
Occupation	Student	30	28.3
	Architect	52	49.1
	Urban planner	16	15.1
	University professor	8	7.5
Living period	1-10 years	35	33.0
	More than 10 years	71	67.0

### 3. Findings and Results

After the fall of the Taliban and the establishment of a new government in 2001, a new era of reconstruction began. The residents of the area were hopeful that they would rebuild their homes. Due to population growth and inadequate urban planning, many individuals whose homes were destroyed decided to rebuild them in a traditional manner, without giving much consideration to quality or architectural design. This research involved asking participants a series of questions about the factors that influenced the architectural identity of Kabul. These factors included rapid urbanization, population growth, wars, limited awareness about architecture, and inadequate implementation of architectural regulations. A significant proportion of the participants indicated that wars and conflicts had a transformative impact on the overarching architectural identity of houses in Kabul. The wars have resulted in the destruction of houses and the loss of

historical values, significantly impacting the revival of houses during the reconstruction process. As a consequence of the war's impact, the inhabitants were compelled to construct a shelter for their own protection. This process transpired expeditiously, leading to a sudden alteration in the architectural character of the city. Consequently, the urban landscape underwent an unplanned and irregular expansion, resulting in the proliferation of inadequate housing that deviated from established architectural design principles. However, there was a significant lack of knowledge among people regarding architecture, and professionals in this field were rarely found. The general assessment of Kabul's architectural identity shown in Table 2.

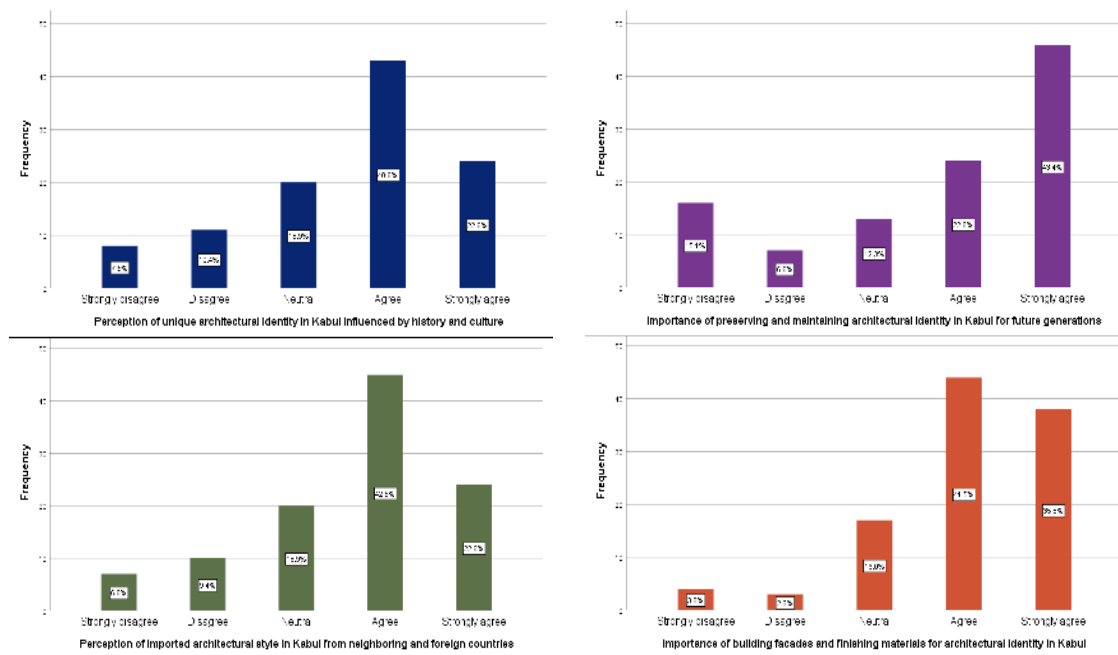
**Table 2:** General assessment of architectural identity of Kabul.

Information	Category	Frequency (n=106)	%
Rapid urbanization and development affected Kabul's architectural identity	Yes	96	90.6
	No	10	9.4
Wars and conflicts changed the architectural identity of Kabul	Yes	100	94.3
	No	6	5.7
Lack of architectural regulations and enforcement affected Kabul's identity	Yes	92	86.8
	No	14	13.2
Lack of architectural awareness and education affected the overall identity of Kabul	Yes	95	89.6
	No	11	10.4

Figure 5 illustrates how various factors and elements contribute to the formation of architectural identity. The majority of participants agreed that the unique architectural identity of Kabul was influenced by its history and culture.

Historical houses in Kabul possess a distinct definition and serve as a representation of a nation's identity, characterized by their unique elements and their harmonious integration with the surrounding environment and culture. Therefore, it is crucial for architects, urban planners, and policymakers to consider this significant aspect of architectural identity when it comes to preserving and maintaining it for future generations and developments. In this study, it was found that 43.4% of the participants strongly agreed and 22.6% agreed with the idea of preserving the historical identity of Kabul. During the era of reconstruction, many houses in Kabul were constructed under the influence of foreign cultures brought in through migration from neighboring countries. The houses lacked any connection to Kabul's climate, history, and memory, thus reflecting a foreign identity.

In the design of building facades, there has been a significant issue with the excessive use of shading devices without proper calculation, decorative elements that lack both purpose and coherence, and an overreliance on glass, Alukoband, and other manufactured materials. As a result, the overall appearance of the city's building facades has become disordered and lacking in harmony. The participants in this research agreed that the elements in the façade of new buildings are influenced by migration from neighboring countries. The participants emphasized the significant role of building facade and finishing materials in defining the architectural identity of Kabul. Approximately 41.5% of the participants agreed with this idea, whereas 35.8% strongly agreed. As a result, Kabul's architectural identity is influenced by various factors, including its history, climate, environment, economy, and social aspects.



**Figure 5.** Influence of history and culture, imported identity, preserving and maintaining identity, and the importance of building façade and finishing materials in shaping architectural identity of Kabul.

### 3.1. Building façade





Individuals identified by their name, social position, and profession, can also be recognized by their clothing, which serves as an external representation of their identity. The facade of a building also serves as its external identity, and it is important to carefully consider the form, shape, color, and materials used in its design. This is because the facade plays a crucial role in establishing and defining the building's identity. As shown in Table 3, in this study, we conducted an analysis of the building façade in the studied areas, focusing on its various components. In the following section, we provide explanations and examine each component, relating them to the areas of study.

- **Form:** According to Yilmaz (1999), form in architecture is not solely connected to space and the activities taking place within it. The form also serves as a means of conveying meaning or acting as a sign [23]. It refers to the components of a structure that establish its general attributes and features. Forms can maintain their regularity even when they undergo dimensional transformations or when elements are added or subtracted [24]. Forms can exhibit regularity or irregularity, with irregular forms typically displaying asymmetry and greater dynamism compared to regular forms [25]. Hence, the architectural form of a building has the potential to imbue significance, recollection, distinctiveness, renown, and enhanced significance for its residents. In this research, we examined four types of houses and identified various building forms. In older houses, we observed that the houses were designed in a courtyard shape. However, in modern houses, we did not find consistent uniformity in the form and facades of the buildings.
- **Shape:** In architecture, shapes have an important part in the design and appearance of the building. Yilmaz

(1999) defines shape as the distinct outline of a two-dimensional figure or the surface configuration of a three-dimensional form. The shape and layout of a building can constitute a significant element of its comprehensive visual identity. Most old houses were designed with a courtyard at their center, typically in a rectangular shape. The rooms were strategically arranged around this central courtyard. In both formal and informal housing, we encounter a wide range of building shapes and layouts. These shapes are primarily derived from the distribution of layouts determined by the municipality or local experts at each specific location. The houses on the hillside had a simple shape, lacking any clear concept or definition. Additionally, the designs did not take into account the natural shape of the ground.

- **Color:** Color similar to shape and texture, is an intrinsic visual characteristic of all forms and is frequently present in our surrounding environmental contexts [24]. Color is more persistent in the mind; whereas the form and texture of anything that passes quickly by may be forgotten but its color typically stays in the memory [26]. The light that illuminates and discloses shape and space is the source of the colors we give to things since color cannot exist without light [24]. The houses in Kabul typically have dusty mud-brown structures, which contribute to the creation of a natural color façade for residential buildings. Nevertheless, the local government of Kabul is applying vibrant paint to numerous dwellings situated on hillsides, with the intention of uplifting the morale of its inhabitants through the use of cheerful colors such as blue, yellow, green, and pink. Figure 6 shows hillside houses painted by the Kabul municipality in various districts of Kabul.

**Table 3:** Analysis of building façade components in four types of houses in Kabul.

Types	House images	Category
Traditional houses		Form (Courtyard house), Shape (Uniform), Color (Mud-brown), Structure (Stone, wood)
Formal houses		Form (Courtyard, detached, and apartment houses), Shape (Irregular), Color (Various types), Structure (Concrete)
Informal houses		Form (Courtyard, detached, and apartment houses), Shape (Irregular), Color (Various types), Structure (Concrete, stone, brick)
Hillside houses		Form (Detached houses), Shape (Irregular), Color (Various types), Structure (Stone, brick, concrete)



**Figure 6.** Painted hillside houses located in various districts of Kabul.

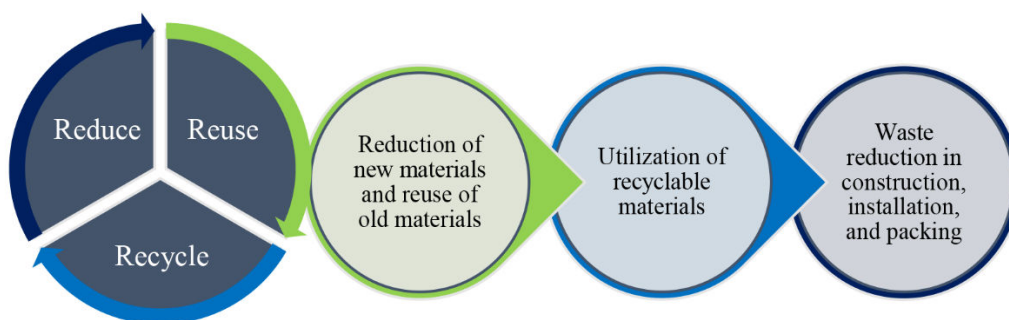
The paintings were of poor quality and over time, the colors disappeared. The majority of participants agreed that the architectural identity of Kabul can be positively influenced by house painting, provided that it is executed with a high level of craftsmanship and adheres to a well-defined concept and plan. In general, the selection of the facade color for buildings in Kabul is performed on an individual basis, with a majority of them opting for bright colors. Conversely, the colors of most buildings are primarily influenced by the finishing materials employed in their construction.

- **Structure:** The characterization of a building is significantly influenced by its structural system and constituent elements. Sakharam (1966) states that the primary purpose of a structure is to offer protection and accommodation for diverse human endeavours, with the specific nature of the structure reflecting the intended use of the building [27]. In Kabul, the housing structures vary, with historical houses primarily made of stone, brick, and wood materials. However, modern houses predominantly feature a main structure composed of concrete and fired brick. The structure that encloses the space should be firm, stable, statically logical, and each structural element should effectively perform its function [27,28]. Regrettably, the majority of houses in Kabul were constructed without proper calculations, rendering them vulnerable to powerful earthquakes. If a powerful earthquake struck the city of Kabul, it could possibly result in a significant disaster due to the weak structural integrity of buildings in the face of earthquakes and other disasters. Architecture should not only be

aesthetically pleasing, but also possess strength, durability, and efficiency; it should effectively fulfil all the practical purposes for which it is constructed [27].

**3.2. Finishing material**

Finish materials can be an essential element of the architectural components that define an interior space, or they can be applied as a layer or coating to the room's built walls, ceiling, and floor [24]. In the majority of historical, formal, informal, and hillside houses in Kabul, a variety of construction materials are frequently used. Kahgel, a type of mud plaster made by combining straw and mud in specific proportions, is commonly used as a finishing layer on roofs and walls of historical, hillside, and informal houses. In both formal and informal houses built after the reconstruction process, cement, chips, and ceramic tiles are mostly used for roofing purposes, while stone, stucco, ceramic, Kahgel, glass, and metal are often used for the facade and finishing elements of housing. Materials have a significant impact on various aspects of a building, including its overall structure, form, aesthetics, cost, method of construction, and ability to withstand internal and external environments [29]. The use of traditional native materials in modern houses in Kabul is currently lacking, as they have been replaced by manufactured materials that do not connect well with the surrounding environment and climate of Kabul. The majority of new buildings are primarily constructed using concrete due to its durability. However, it is important to note that concrete is not a recyclable material. Figure 7 illustrates the criteria for sustainable design materials, which prioritize the principles of reuse, recycling, and minimizing environmental impact.



**Figure 7.** Material's sustainable design criteria, adopted from [24].



**Table 4:** Analysis of finishing materials in four types of houses in Kabul.

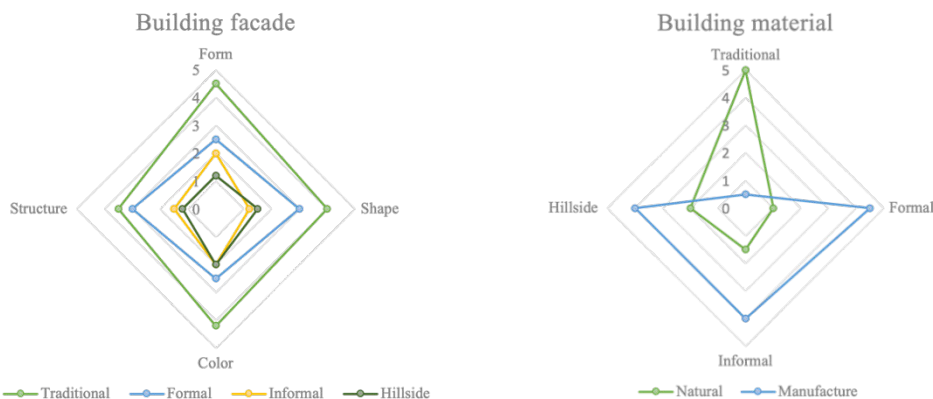
Information	House images	Category
Traditional houses		Materials: Roof (Wood), Wall (Brick and mud plaster), Openings (Wood), Foundation (Stone)
Formal houses		Materials: Roof (Concrete), Wall (Brick and cement plaster), Openings (PVC), Foundation (Concrete)
Informal houses		Materials: Roof (Concrete), Wall (Brick), Openings (Wood and PVC), Foundation (Concrete)
Hillside houses		Materials: Roof (Brick and mud), Wall (Brick), Openings (Wood, Iron), Foundation (Stone)

Most new houses have PVC openings, which is a plastic production. Nevertheless, PVC is not an environmentally friendly material, and the recycling and burning of chlorides is a major environmental concern. Table 4 presents a breakdown of material usage in four different types of houses, specifically focusing on the roof, walls, openings, and foundation of each building. In traditional houses, there has been a significant use of natural materials. On the other hand, other types of housing have introduced a variety of materials, which represent different identities for building facades and in contrast with traditional part and mud-brown landscape of Kabul.

#### 4. Discussion

The design of a building façade holds significant importance, as it serves as the outward representation of a city, establishing a connection between the external and internal environments. It embodies the identity of the building, reflecting its architectural style and historical context. Consequently, careful consideration must be given to its design. Since the start of the reconstruction in 2002, Kabul has attracted significant attention due to the extensive new construction taking place. Various groups with different ideologies and perspectives are involved in this process, including local, regional, and western perceptions [20]. The study found that the architectural design of the house and its façade are closely connected to the

economic and social circumstances of the residents. In Kabul, the majority of residents whose houses were destroyed during the war were chosen to rebuild them in the traditional manner, utilizing affordable raw materials such as stone, mud, and wood. Due to the high demand for housing in the capital city, residents paid little attention to architectural design elements. Additionally, the government did not adequately regulate or plan the rehabilitation process. As a result, the image of Kabul from the perspective of old housing has changed due to a simple design that defines the openings, shading devices, color, and finishing materials. A typical house in Kabul is a one- or two-story building with a courtyard. It is surrounded by rooms and has a high mud wall that provides privacy for the family and creates an inward-looking atmosphere. In modern houses built after 2002, various types of façade and design elements can be found. It has been observed that builders and local masons who construct houses have been influenced by foreign cultures and lifestyles. The façade of the new housing featured several main elements. These included decorative patterns that served no functional purpose, shading devices that lacked proper calculation and placement, coloring that was not specified and did not match the surrounding area, and the use of Alukoband as finishing material without considering its impact on the environment and climate of Kabul. In Picture 8, we analyzed the overall building façade and finishing material of different types of housing in Kabul.



**Figure 8.** The final analysis of building facades and finishing materials in the construction of housing in Kabul.

In this analysis, the façade of traditional houses received the highest score due to its unique definition and specific criteria. In addition, traditional houses typically incorporate native materials that blend harmoniously with their surroundings. In contrast, modern houses often utilize manufactured materials that create a stark contrast with the surrounding environment. This study found that modern houses commonly feature various building facades and finishing materials. The use of materials such as concrete, steel, glass, and Alukoband is on the rise, whereas the usage of traditional materials like mud, wood, and bricks is decreasing. The shift in materials is a result of global trends and a lack of awareness regarding the environmental and cultural advantages of using locally sourced and traditional materials. The study found that the use of building facades and finishing materials is greatly influenced by cultural and historical factors. For instance, the choice to use mud plaster demonstrates a historical inclination towards utilizing natural materials. Similarly, the incorporation of geometric patterns on the façade is influenced by Islamic traditions. The unique architectural identity of Kabul is shaped by a variety of historical and cultural influences. The study also examined the social and economic factors that impact the choice of building facades and finishing materials in housing construction. Developers and homeowners frequently place a higher emphasis on artificial aesthetics, decoration, and inexpensive materials rather than prioritizing sustainability, durability, and affordability.

### 5. Conclusions

This research aims to provide insight into the various comprehensive factors that influence the architectural identity of Kabul during its reconstruction phase. The city's architectural character has been significantly affected by wars and conflicts, resulting in the destruction of historical houses and the loss of cultural values. The rapid need for shelter among the inhabitants led to an unplanned and irregular expansion, which deviated from established architectural principles. Preserving the historical and cultural identity of Kabul's architecture is crucial for ensuring the well-being of future generations and

promoting sustainable development. Architects, urban planners, and policymakers should carefully consider the nation's identity with respect to the unique elements and harmonious integration of historical houses. The incorporation of foreign cultural influences into building facades has resulted in a lack of coherence and harmony in the overall appearance of the city. Table 5 presents a set of recommendations for policymakers, architects, and planners to effectively promote Kabul's architectural identity.

The architectural identity of Kabul can be greatly enhanced by employing thoughtful forms, shapes, colors, and materials, resulting in a unique and visually striking representation. Nevertheless, there are certain challenges that need to be addressed. One such challenge is the lack of sufficient knowledge about architecture among the general population. Additionally, there is a scarcity of professionals in the field, which further compounds the issue. By addressing these challenges and promoting the use of sustainable and native materials, we can help preserve Kabul's architectural identity and enhance the city's cultural heritage. By acknowledging and appreciating these factors, Kabul can work towards establishing a unique architectural identity that embodies its history, culture, and identity, while ensuring a sustainable and resilient future.

The study findings suggest that traditional houses in Kabul play a significant role in defining the city's architectural identity when compared to modern architecture. However, modern architecture is lacking in the diverse elements of façade and finishing materials that contribute to its architectural identity, which calls for fundamental changes. To restore these lost components and identities, it is essential that city planners, architects, policymakers, and residents collaborate. Together, they can work towards establishing a city that truly embodies a unique architectural identity. This study aims to support urban planners, architects, and government agencies by helping them identify the distinctive façade and finishing material elements for future development and research in Kabul, with the goal of creating a unique, sustainable, and recognizable façade identity for the city of Kabul.

**Table 5:** Suggestions for promoting Kabul's identity.

Polymakers	Architects and Planners
Promote and develop regulations and standards for the future development of building facades	To develop architectural design of façade with relationship to the history, climate, and culture
Public participation in decision-making for creating policy	Involve traditional design elements into modern design
Increase public awareness about architectural policy and emphasize its significance in establishing a distinct local identity	Creating and defining a proper building façade that represents a city's identity
Developing an effective policy for housing façade development and ensuring its proper implementation on the site	Propose and encourage the use of sustainable and local materials for housing facades among homeowners

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