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Factors Affecting the Continuity of Architectural Identity

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ABSTRACT

The architectural literatures propose various factors in determining the continuity of architectural identity. In terms of visual appearance, these factors are grouped in five different areas namely: Mass and Articulation, Openings, Architectural Detail, Materials and Principles of façade arrangements. In spite of the diversity of the subject in the field of research, the mutual influence of factors on one another still uncovered. Approach: This study aims to examine the significant correlation between factors affecting the continuity of architectural identity in Erbil City. A proper questionnaire has been adapted to be used as measuring scale. Results: The Pearson product-moment coefficient correlation results show that all factors are correlated positively with continuity of architectural identity with the exception of (principles of façade arrangements) factor. Conclusion: Based on the hypotheses testing, this study reveals a positive association between house façade modernization factors and the continuity of architectural identity. The results conclusively prove that (mass and articulation, openings, architectural detail, materials) factors have a crucial impact on the continuity of architectural identity.

1. Introduction

Façades are the public face of architecture. It is the exterior face of a building that provides comfortable enclosure (Knaack *et al*., 2007). It's the most significant part of building's exterior image that shape its cultural identity (Schulz 1971, Rapoport 1969). In other words, Facades are the physical evidences for aesthetic evolution of the city as well as the effective aspects of architectural transformation (Elshahed, 2007). Generally, house facade contains three main zones: a base that connects the building with the ground; a middle zone with its openings; and the roof zone which connects the building to the sky by silhouette (Moughtin *et al*., 1999)

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Based on the findings of Gromlich (1989), house facade incorporates various features that produced from the arrangement of roof, openings, materials, and finishes. This study revealed that main factors affecting the façade design are related to the composition, shape, texture, and color of its components. Consequently, the analysis of house facade formal structure provides relevant information to understand its identity as the socio-cultural performance of façades is the indicator of its architectural value (Pellitteri, 1997).

2. Factors affecting the visual aspects of house façade

Scholars in this field of visual analysis studies factors affecting the design of house facade in different ways due to the variation of appearance and arrangement of façade elements in urban environments. This section will review the relevant literature to identify fundamental house facade factors in term of architectural identity visual aspects. Generally, house is a cultural phenomenon; its form is influenced by the climatic forces, site features, materials and construction techniques therefore, the formation of the house is affected by the socio-cultural and socio-economic structure of a society which contains many cultural traces of the past (Rapoport, 1969). The effect of culture on the formation of house design appears to be an important factor is shaping its façade (Sari *et al*., 2011).

From different point of view, the powerful factor influencing building facades is the sensory value of ornaments as architectural details (Salingaros, 2003; Akalin *et al*., 2009). Scholars concluded that ornament and decoration subdivide building façades on many different scales and influenced directly the visual appearance of facades (Stamps III, 1999; Salingaros, 2003; Akalin *et al*., 2009). For Moughtin *et al.,* (1999) the contrast of elements and the number of elements within the building facade are the fundamental factors in measuring the visual richness of building facades. In this regards, (Rapoport 1990) pointed out that the measurable tool for visual complexity depends upon the perceived number of elements within the facade, and the degree of change for its components. The study concludes that Visual complexity relates to the rate of change of the noticeable differences.

(a) (b)

Figure 1: (a & b) Different House Façades in Dream City Project inside Erbil City.

Others clarify that the influence of building elements orderliness within house facades is an effective factor in determining the complexity of architectural form (Nasar, 1983; Meiss, 1990; Niezabitowski, 2009). They pointed out that the repetition, similarity; common enclosure, symmetry, and orientation of the building elements play a part in formulating building facades.

From different point of view, the characteristic proportions of the windows, their positions in the wall, and their relationships with the solid areas tend to give a sense of coherence in architecture (Figure 1) therefore, common scales, materials, textures, and openings are considered to be the effective parameters in shaping the architectural facades (Whang, 1998). In parallel, Askari & Dola (2009) explains that architectural style, shape, decoration, and material were respectively the most important visual elements in presenting building facades while the effect of Color and texture were less important.

3. Methodology

In this paper, Quantitative method is carried out to examine the significant correlation between factors affecting the continuity of architectural identity in Erbil city. This method attempts to measure the degree of continuity in house facade physical elements. Therefore, the measurements will provide the essential connection between practical observation and statistical expression of quantitative relationships. For the purpose of the study, a structured questionnaire survey is conducted to generate statistics and separate variable to be counted and modeled statistically. Hence, Self-administered questionnaire with multiple choices of questions is organized.

This study chose the probability sampling design using a simple random sampling process as it seeks representativeness of the wider population, have less risk of bias and offers the generalizations (Cohen *et al*., 2000; Sekaran, 2003). The population for this survey is distributed into two groups: The first group includes upper level studio students (3rd, 4th, 5th year and post graduate) students in Architectural Department /Salahaddin University while the second group includes architects who registered in Kurdistan Engineers Union (KEU) and currently working inside Erbil city. Accordingly, a total of 273 completed questionnaires collected.

4. Data analyses

For the purpose of quantitative data analysis the SPSS (Statistical Package for the Social Sciences) software was used to provide statistical analysis of data and give details for in-depth data access and preparation, analytical reporting, graphics and modeling. The quantitative data was analyzed in two directions as follow:

Correlation analysis was used to explore the relationships among the variables (Every independent variable will be correlated to a dependent variable). The role of correlation is to capture the similarity or difference between the variables. It measures the degree of association between the values of related variables given in the data set. Then, the mutual influence of variables on one another will be traced.

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Regression analysis: The general purpose of multiple regressions is to make a prediction about the dependent variable based on its covariance with all the concerned independent variables. Accordingly, an equation will represent the best prediction of the continuity of architectural Identity from several independent variables.

5. Results

The objective of this study is to examine the relationships of house façade modernity factors (Mass & Articulation, Opening, Architectural Details, Architectural Material and House façade Arrangement Principles) and continuity of architectural identity in Erbil city. The aim is to determine the significant correlation between the factors that affect the continuity of architectural identity and to test hypothesis. Thus, correlation analysis (Pearson Product Moment Correlation Coefficient Test) was used to explore the relationships among the variables as well as to describe the strength and direction of the liner relationship between variables. Every independent variable is correlated to a dependent variable. In this regards, Kumar *et al.* (2005) explains that the degrees of correlation can be positive or negative. Correlation coefficients can range from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation while a value of +1.00 represents a perfect positive correlation. A value of 0.00 represents a lack of correlation.

The two–tailed test of statistical significant from 0.01-0.05 was the main procedure of the correlation analysis. Table 1 and Table 2 present the outcomes of correlation analyses. In general, the house façade modernity has a significant positive correlation with the continuity of architectural identity. The correlation coefficient range 0.504 at $p < 0.01$.

Table 1: Pearson Correlation between All Variables.

		M. & A	Openings	A. Details	Materials	Arrangement p.
Mass & Articulation	Pearson Correlation					
	Sig.(2-tailed)					
Openings	Pearson Correlation	.397(**)				
	Sig. (2-tailed)	.000				
A. Details	Pearson Correlation	.334(**)	.350(**)			
	Sig. (2-tailed)	.000	.000			
Materials	Pearson Correlation	.295(**)	.305(**)	.309(**)		
	Sig. (2-tailed)	.000	.000	.000		
Arrangement Principles	Pearson Correlation	.130(*)	.177(**)	.093	.185(**)	
	Sig. (2-tailed)	.031	.003	.125	.002	
Identity	Pearson Correlation	.307(**)	.252(**)	.276(**)	.236(**)	.095
	Sig. (2-tailed)	.000	.000	.000	.000	.119

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
a Listwise N=273

In order to determine the significant correlation between the independent variables (House

Façade Modernity Factors) and the dependent variable (The Continuity of Architectural Identity) following hypothesis were formulated.

H 1: There is a positive relation between Mass & Articulation and the continuity of architectural identity.

H 2: There is a positive relation between House façade Openings and the continuity of architectural identity.

H 3: There is a positive relation between House façade Architectural Details and the continuity of architectural identity.

H 4: There is a positive relation between House façade Architectural Materials and the continuity of architectural identity.

H 5: There is a positive relation between House Façade Arrangement Principles and the continuity of architectural identity.

Table 2: Pearson Correlation between Dependant and Independent Variables.

		Modernity	Identity
Modernity	Pearson Correlation	1	.504(**)
	Sig. (2-tailed)		.000
Identity	Pearson Correlation	.504(**)	1
	Sig. (2-tailed)	.000	

** Correlation is significant at the 0.01 level (2-tailed).
a Listwise N=273

5.1 The Relationship between House Façade Mass & Articulation and the Continuity of Architectural Identity:

The result of correlation analysis for the relationship between Mass & Articulation and the continuity of architectural identity (Table 1) show that the correlation coefficient is $r = 0.307$ at $p < 0.01$. This result is an indication of a significant positive relationship between Mass & Articulation and the continuity of Architectural Identity. It can be deduced that Mass & Articulation play a part in determining the continuity of architectural identity.

5.2 The Relationship between House Façade Openings and the Continuity of Architectural Identity

The Pearson product–moment linear correlation was used to determine the existence of the above relationships, the correlation coefficient was $r = 0.252$ at $p < 0.01$. As a consequence, there is significant positive relationship between House Façade Openings and the continuity of Architectural Identity. Therefore, the design of openings in house facades has a direct impact on the continuity of architectural identity.

5.3 The Relationship between House Façade Architectural Details and the Continuity of Architectural Identity

As indicated in Table 3, the correlation coefficient was ($r = 0.276$ at $p < 0.01$). This means the availability of significant positive relationship between House Façade Openings and the continuity of Architectural Identity. Therefore, the house façade architectural details have an

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impact on the continuity of architectural identity.

5.4 The Relationship between House Façade Materials and the Continuity of Architectural Identity

In order to determine the correlation between House Façade Materials and Continuity of Architectural Identity, the Pearson product–moment linear correlation was conducted. Table 3 presents the outcome of correlation coefficient for the above variables ($r = 0.236$ at $p < 0.01$). This result implies that house façade materials have direct influence on the continuity of architectural identity.

5.5 The Relationship between House Façade Arrangement Principles and the Continuity of Architectural Identity

As demonstrated in Table 3, the correlation analysis for the relationship between house facade arrangement principles and the continuity of architectural Identity produced following facts ($r = 0.095$ at $p = 0.119$). This result refers directly to a very weak relation between mentioned variables. However, it was not statistically significant. The lack of relation or very weak relationship between house façade arrangement principles and the continuity of architectural identity is an indication that house façade arrangement principles have less influence than the other variables.

Table 3: Summary of Correlation Analyses between Dependant and Independent Variables.

S	Hypothesis	r	P	Result
11	There is a positive relation between mass & articulation and the continuity of architectural identity.	0.307	$p < 0.01$	Significant
H 2	There is a positive relation between house façade openings and the continuity of architectural identity.	0.252	$p < 0.01$	Significant
H 3	There is a positive relation between house façade architectural details and the continuity of architectural identity.	0.276	$p < 0.01$	Significant
H 4	There is a positive relation between house façade architectural materials and the continuity of architectural identity.	0.236	$p < 0.01$	Significant
H 5	There is a positive relation between house façade arrangement principles and the continuity of architectural identity.	0.095	P=0.119	Insignificant

Based on correlation analyses in Table 3, the overall influence positively correlates to the most of independent variables, namely: Mass and Articulation, Openings, Architectural Detail and Materials with the continuity of architectural identity. With the exception of house façade arrangement principles that correlates in a very weak relation to the study's main dependant variable. The Pearson product-moment coefficient correlation results reveal that the strongest association is related to the first parameter (Mass and Articulation) with (r) value of 0.307, followed by Architectural detail (r) = 0.276, then Openings (r) = 0.252, and finally House façade materials (r) = 0.236. These results conclusively prove that house façade modernity factors have a crucial impact on the continuity of architectural identity.

After identifying the overall influence and correlations between the variables, a multiple regression analysis was conducted to test the relationship further, make a prediction about the dependent variable based on its covariance with all the concerned independent variables and formulate an equation that represent the best prediction of the continuity of architectural Identity from several independent variables.

The collective effect of the independent variables formulates the mathematical formula of the study. Hence, the multiple regression analysis was employed to determine the variance of each component of house façade modernization factors. Five parameters were used as independent variables, and the continuity of architectural identity was set as the dependent variable. The recommended model was performed by determining the collective effect of the independent variables namely, (1) Mass and Articulation, (2) Openings, (3) Architectural details, (4) Materials and (5) House façade arrangement principles towards the overall perceived of the continuity of architectural identity. In the light of the above, a regression model was developed in settling the relationships between variables. The model is as follows.

$$\text{Continuity} = \beta + \beta 1\ \text{Mass \& Articulation} + \beta 2\ \text{Openings} + \beta 3\ \text{Architectural Details} + \beta 4\ \text{Materials} + \beta 5\ \text{Arrangement Principles} + \varepsilon$$

Where,

Continuity = the Continuity of Architectural Identity

β = constant

ε = standard error

The model summary is showed in Table 4 and the summary of multiple regression analysis is presented in Table 5. Therefore, the R2 for this model is 0.254 (Adjusted R2= 0.251), indicating that the house façade modernity factors explained 25.4% of the variation towards the continuity of architectural Identity.

Table 4: Model Summary of Multiple Regression Analyses between Dependant and Independent Variables.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.504(a)	.254	.251	.29819

Predictors: (Constant), Modernity

Dependent Variable: Identity

In terms of importance, the "Mass & Articulation" parameter (β =0.192, p= 0.003) and the "Architectural details" parameter (β =0.108, p=0.020) have significant positive associations with continuity of architectural Identity. These results reveal that "Mass & Articulation" parameter

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is the most influential in interpreting the continuity of architectural Identity, because every unit of change in this parameter is associated with a 0.192 change in the continuity of architectural Identity. Every unit of change in the "Architectural Details" parameter is related to a 0.108 change in continuity of architectural Identity. Interestingly, although not significant, "Openings" (β =0.086, p=0.167), "Materials" (β =0.105, p=0.097), and House façade arrangement principles (β =0.080, p=0.715) have positive relationships with the continuity of architectural identity.

Table 5: Summery of Multiple Regressions Analysis.

	β	Std. Error	Standardized β	t	p
(Constant)	1.819	0.299		6.074	0.000
Mass and Articulation	0.192	0.065	0.189	2.952	0.003
Openings	0.086	0.062	0.090	1.385	0.167
Architectural details	0.108	0.046	0.148	2.340	0.020
Materials	0.105	0.063	0.104	1.666	0.097
Arrangement Principles	0.030	0.083	0.021	0.365	0.715

R^2=0.254 Adjusted R^2=0.251
F=0.002 Significance F=.000*
*Significance at the 0.05 level

Table 5 highlights the results from the multiple regression analysis. The beta values represent the unique contribution of each variable and formulate the final equation of the model which is as follow:

Continuity =1.819 + 0.192 Mass & Articulation + 0.086 Openings + 0.108 Architectural Details + 0.105 Materials + 0.030 Arrangement Principles + 0.299.

6. Conclusions

This paper reveals the positive association between the house façade modernization factors and the continuity of architectural identity in Erbil city. The Pearson product-moment coefficient correlation results showed that the (Mass and Articulation, Openings, Architectural Detail and Materials) factors are positively correlated with the continuity of architectural identity. With the exception of house façade (Arrangement Principles) factor that correlates in a very weak relation to the study's main dependant variable. The correlation results revealed that the strongest associations in proper sequence were as follow: firstly Mass and Articulation factor, followed by Architectural detail factor, then Openings factor, and finally Material factor. These findings conclusively proved that the house façade modernity factors have a crucial impact on the continuity of architectural identity.

On the other hand, the multiple regressions results indicate that the proposed model is proven statistically. It represented the prediction of the continuity of architectural identity from house façade modernity factors. In terms of importance, the house façade modernity factors explained more than quarter of the variation towards the continuity of architectural Identity. The multiple regressions analysis results revealed that the "Mass & Articulation" factor and "Architectural

details" factor are the most influential in interpreting the continuity of architectural Identity, because every unit of change in these factors is associated with significant positive changes in the continuity of architectural Identity. Accordingly, these factors could significantly predict the continuity of architectural Identity.

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