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Research Paper

Monumentality and dominance in Louis Kahn's architecture

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ABSTRACT

Dominance in architecture is defined as the superiority and predominance of an element or group of elements over the rest in the composition, which causes its attractiveness to the recipient/viewer. The dominant elements often include the basic idea of the architectural work and carry a set of design characteristics. The research assumes that the monumentality in the works of the architect (Louis Kahn) is achieved through the realization of certain values in the characteristics of dominance. Thus, the aim was to reveal the presence of these characteristics in some of his selected projects practically and through the relationship extracted from the literature that the presence of dominance characteristics in designs is a reason for their monumentality. The research adopted a descriptive approach by using a questionnaire for architects. The results showed the presence of dominance on both whole and partial levels of design in his projects due to the types of basic shapes, because of their constant presence in the mind and their large size. At the partial level, the dominance was achieved by the complete repetition of the elements and their important functions.

1. Introduction

Attracting and grabbing the attention of the recipient is a major requirement in the design of buildings [1]. Research attributes this attraction to activating the principle of dominance in design, which the research defined as the phenomenon of superiority and predominance of a part or a group of parts, distinguishing it from the rest of the architectural composition. [2] The presence of dominance in design is often the ideal solution for integration, In order to deal with conflicting contradictions or competing harmonies [3, 4], the research classifies the emergence of the principle of dominance in the design of buildings into two levels. The first (the macro level), which is the level of the building within the urban context, as monumental buildings must be unique in their location within the urban context, such as being in a central location, and in an uncrowded spot in order to act as an attractive element within the city's sky line [5] , it must be unique in its composition compared to its neighbors, dominance can be achieved also by the presence of differences in buildings shape, orientation and size, or by all of them together [6, 7], with the presence of the dominant concept, which is the central and pivotal idea that is evident in architectural forms with visual attraction that embody these ideas and bringing them into tangible reality with visually and sensory-dominant structures, because the dominance of forms in architecture is a reflection of a dominant concept in mind [8]. The second level is (the micro level), which is the level of the elements within the building's composition, independently from the adjacencies. The research has identified a group of main reasons based on previous studies, which were: location, size, texture, elements, shape, movement, space/mass, direction, repetition, color, also a group of secondary reasons within the previous reasons. On the other hand, monumental buildings are defined as buildings that have a visual impact on the viewer and carry symbolic, intellectual, and historical values, and linked to the human being and his most important ideas, bringing them to the tangible reality with formations that are associated with these ideas and express each of them [8, 9]. The research concluded from the literature that monumentality is achieved through dominance. The research aims to reveal the applied values used in dominance that achieve monumentality in the works of Louis Kahn, as mentioned by many theorists [10, 11], by using a questionnaire to get the opinions of the recipients/architects, to state the design characteristics that cause dominance.

2. Literature review

2.1 Studies that addressed dominance in architecture

Graves defined the principle of dominance as confirmation of one thing, the control of one thing, superiority, or sovereignty, He described it as the principle of integration or synthesis, through which conflicts can be resolved and the revealed the principle of dominance in design and the main motives for implementing it, and shaded light on methods of achieving it by making one of the contradictory or compatible things stronger and more severe, through controlling design elements such as the dominance of one of the colors by increasing its value or purity, as well as the dominance of one type of lines or shapes or direction or texture. Dominance can also be achieved through repetition. He also indicated that the goal of dominance is to achieve the desired unity in the design, and the need for achieving dominance overlaps with other principles in design, such as unity, repetition, contradiction, and compatibility. These are conceptual principles that are present even in the psychological and social systems of human behavior [4]. Smithies' concept of dominance is the visual power of the element from its neighbors, which makes it overcome [12] Scott called dominance the attractiveness of the form, which causes the recipient's attention to be drawn to it from the rest of what is present in the design and he highlighted the important of generating attractive appearance and attention of the recipient by dominance, and hence evaluating any design. He also presented many characteristics related to attraction, including space, location, movement, loss of balance, or critical balance. Also pointed out the possibility of having more than one characteristic in a single element, which strengthens the intensity of its attraction [13].

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Nomenclature

AUC	Arts United Center	*RMRL*	Richards Medical Research Laboratories
BNPH	Bangladesh National Parliament	*SIBS*	Salk Institute for Biological Studies
PEAL	Phillips Exeter Academy Library	*YCBA*	Yale Center for British Art

Mfon defined dominance in building design as imposing visual presence within the surroundings [14]. Shirzad described dominance as the relationship of superiority and preference (preponderance) of one particular thing over another, she dealt with the principle of dominance in presenting the rules and laws that govern design elements. It also described the negative state when similar elements compete or discordant elements conflict in design. She also shed light on the types of dominance within artistic paintings [3]. Ching considered dominance as an evaluation system through which the relative importance of a thing can be measured by the extent of its emphasis and emphasized the relationship between the dominant part and its functional and symbolic importance in the building, thus making it unique and visible in design. It gave strategies for this uniqueness and prominence, which are: emphasis and dominance in size, shape, and location and he said that in any organization, it is possible to find one or more dominant elements, and in the case of multiple centers of attraction, they must be graded between primary and secondary centers, where the primary must have a greater value of attraction than the secondary [15]. Robertson distinguished dominance as a phenomenon that clearly reveals central or pivotal ideas, he defined the group dominance as the multiplicity of centers of attraction which includes a group of elements of different sizes, and indicates the absence of what determines the number of these elements, by assembling in an ordered manner that ensures becoming a point of dominance or focus attracting the eye [16]. Al-Hailey presented a type of visual attraction, which is attraction with the dominance of one direction and its dominance at the level of details and at the level of the overall composition of the building [2]. Al-Botany and Al-Anee alluded to a distinctive method of domination, which is attraction by architectural elements, because of their function and because of their repetition. However, this study did not specialize in the subject of domination, but rather referred to it in the context of its presentation of the set of principles on which rhythm depends [17]. Al-Khafaji and Ridah classified factors affecting dominance in design to the design itself and the relationships between its elements, which are determined by the designer himself [18] Al-Yousif mentioned that there are also factors affecting dominance in design related to the perception and the recipient himself, as the factors related to the perception include: the distance between the viewer and the building, the length of time period it takes for the recipient to comprehended, the time of viewing and the angle of view of the recipient. Also, the age, gender, culture, and psychological readiness of the recipient himself [19]. Ozimek defined the dominant element as an object that has the greatest visual impact on the surroundings and is intuitively perceived. When it is clear, free from any ambiguity, has a strong shape, and is distinguished by its height, dimensions, color, texture, and variety of details. The result is its visual contrast with the surroundings [20].

2.2 Studies that dealt with monumentalism in architecture

Al-Maliki and others discussed the motives that led to the appearance of monumental features in buildings. And discovered the existence of a dominant idea prevailing considering intellectual contradictions, which is reflected in the design of the monumental features, including the monumental scale and elements. The study also identified two levels for the appearance of these features: the first on the level of the building individually, represented by the monumental scale and elements, and the second at the planning level of the urban fabric, represented by the exceptional location [7]. Hussein mentioned that the monumental buildings represent symbolic, aesthetic, cultural, and historical values, and derive their strength from their distinction [9]. Al-Wafai discussed the common characteristics for buildings to become icons, indicating that iconic buildings are sort of monumental buildings. When buildings turn into symbols that indicate an implicit meaning that is rooted in the collective subconscious of people, then they become an icon. And by enhancing the attractiveness of characteristics so that it could be recognizable by the largest number of people, and become a common slogan. The most important of these characteristics are the simplicity or originality of its form, the proportional dimensions, and the huge scale, because it gives the building a sense of prestige and immortality. The use of new materials in a new way may be one of these characteristics. At the planning level, the building must occupy a distinguished position in its skyline [5]. Messeidy mentioned that the monumental or distinctive building is like a magnet that attracts viewers, including investors and tourists. It must carry a message that expresses the identity and importance of cities [21]. Elhagla and et al. confirmed that a monumental building is a building that is distinguished by its visual attraction due to the presence of features group of, which verify the unique design, the large scale, the towering height, the strange shape, and also its inclusion of a symbolic message that it indicates [22]. Al-Dabbagh pointed out the reasons that make the building unique as a sculpture. She classified it on three levels, form, texture, and elements. Uniqueness at the level of form is difference from the expected, at the level of texture it is the presence of difference too and the appearance of sudden holes, openings and cracks, as for the element level, may be distinguished by their large scale, and changing its familiar context and appearance with unfamiliar one [23]. Kelly talked about the monumentality in the works of architect Louis Kahn and mentioned that he was well known as a supporter of monumentality in architecture. He presented an article in about its meaning, purposes, and the importance of monumentality in architecture, bringing it to the center of architectural discourse. Thus, the architect (Louis Kahn) designed buildings that were described as monumental, with ideal character, accompanied by description texts [24]. Coulter indicated that the most important elements causing monumentality in Louis Kahn's works are: manipulation of shadow and light, he was interested in achieving social spaces inside and outside the building, and conveying the feeling of its eternity [11]. Lutolli mentioned that the most important characteristic of Louis Kahn's works is reliance on modern materials, emphasis on centrality, formal simplicity by relying on pure forms, and also the absolute rhythm that expresses the event, combining contradictions and oppositions in a compatible and harmonious form, which is considered a clear indicator of dominance [25]. Previous studies revealed many aspects related to the issue of dominance in architecture and monumentality in architecture, which allowed for the extraction of the knowledge gap and the identification of the research problem and the aim of the study.

3. Research problem

Although the literature mentioned that Louis Kahn sought to achieve monumentality in his works and researchers described it as such [10, 11, 24, 25]. The knowledge gap concerned the evidence about the relationship between achieving monumentality through achieving dominance. Thus, the aim of the study will be to reveal this evidence practically.

4. The theoretical framework of dominance in monumental buildings

The visual attraction of a building is manifested on two levels mainly: The first level (macro level) is the building level within the urban context The research did not address this aspect, and it may be addressed in later studies. At this level, the influence of the historical and cultural context on the design of the building and its visual appeal often appears, making it an eye-catching monument. This is done through different strategies, including: using traditional building materials and techniques in the neighborhoods, as well as finding an echo of the historical forms and architectural heritage that the city is unique in in the design. This creates an integration of the design with the local character of the surroundings, and thus a feeling of continuity and non-disconnection from the past. This in turn creates a feeling of grandeur, eternity, and distinction, which are the most important characteristics of monumental architecture [26].

4.1 The (micro level) is the level of elements within the building's composition in a way that is independent of the neighborhoods

The monumental architecture is also unique as a result of the presence and activation of the visual dominance, caused by some aspects in relation to others within its composition alone, these aspects include the following:

4.1.1 Location

Many studies showed that there are specific locations that cause the attraction of the elements, such as the central location for a symmetrical organization, the point of focus or attraction for a radial or central organization, and the lateral location above or below the organization [15].

4.1.2 Size

A design, whether space or mass, can dominate when it is clearly larger or clearly smaller than the rest of the elements in the design [15, 24]. Many architects believe that monumentality is achieved when buildings are exaggerated in their volume when designing them [27]. As massive size and imposing mass

(a) Bangladesh National Parliament House , 1982, Dhaka, Bangladesh. https://mosqpedia.org

(b) Phillips Exeter Academy Library, 1982, New Hampshire. https://archeyes.com

(c) Richards Medical Research Laboratories, 1965, Pennsylvania, United State. http://architecture-history.org

(d) Salk Institute for Biological Studies, 1965, San Diego, United State. https://www.archdaily.com.

(e) Arts United Center, 1973, Fort Wayne, Indiana, https://www.e-architect.com

(f) Yale Center for British Art, 1966, New Haven, United Kingdom. https://www.archdaily.com/

Figure 1**.** Groups the prevailing modernism and its intolerance of history.

are inherent expressions of power and closely linked to it, they are the physical embodiments of the relationship of domination and subordination [28].

4.1.3 Texture

The difference in the visual appearance of the attractive surface from neighboring surfaces [3], and the appearance of sudden holes, openings, and cracks [23].

4.1.4 Features

Features dominate due to their functional type. Such as the gates and entrances, niches and iwans, and minarets in Islamic architecture [8]. Features also dominate due to change their familiar locations and appearance in unfamiliar locations [23], and one of the mechanisms of attracting elements is repetition, Such as the repetition of arches and openings in the facades of Islamic architecture in various styles [17].

4.1.5 Shape

There are shapes that are more attractive than others. For example, circles are easier to perceive because they are made up of dynamic curved lines that are more attractive than static shapes [18]. Shape also dominates because it differs from the surroundings and the prevailing shapes in design [15]. Finally it dominates because of its simplicity or originality, and its proportional dimensions [5].

4.1.6 Movement

The dynamic value of the blocks that include kinetic formations increases the attraction and the possibility of distinction. The presence of movement or its effect in the design attracts the recipient by eye-catching. Movement can also be generated by making the composition loses the quality of balance, or what is called critical balance. For example, when the top of a pyramid faces downward is more attractive than one resting on a wide base [3, 13].

4.1.7 Space/mass

It is the dominance of masses over spaces or vice versa, it may be called solving the problem of solid and void, or the problem of fenestration or fencing [16].

4.1.8 Direction

It is the focus on one direction [3], which may be horizontal, vertical, inclined, or a direction toward the center [3, 16]. For example, the dominance of the horizontal direction in Islamic architecture [17] and the dominance of the vertical direction of Gothic architecture [2].

4.1.9 Repetition

Everything in nature has rhythmic cycles that are repeated forever, and repetition can be either complete (if the unit is repeated explicitly without any change), or incomplete (if any change occurs to the recurring unit to break the monotony), and it contains many details in real [3, 4]. For example, the repetition of arches and openings in the facades of Islamic architecture in

various styles [17].

4.1.10 Colour

Dominance is achieved by highlighting the color of the element from its background color, or due to its strangeness [3, 14], or dominance by the clarity of the color, which is related to color value. For example, the black color dominates in its clarity over the white color [3]. Only contrast and strangeness will be analyzed because dominance in clarity requires independent studies related to other color characteristics. After reviewing these aforementioned aspects, they were classified in Table 1 to provide a theoretical framework for revealing the reasons that increase dominance in monumental architecture.

Table 1. A theoretical framework for revealing the reasons that increase dominance in monumental architecture.

No.	Variables	Possible values
1	Dominance due to location	Central location for symmetrical organization. The focus or attraction point of a radial or central organization. Side signature above or below the organization.
2	Dominance due to size	Large size relative to the rest of the design. Small size relative to the rest of the design.
3	Dominance due to texture	The visual appearance of the attractive. Surface differs from neighbouring surfaces. The appearance of sudden holes, openings, and cracks.
4	dominance of the features	The feature's function (entrance, gate, column, ...). Differing their familiar locations. Repeating features.
5	Dominance due to shape	Shape types. Shapes differs from the surroundings and the prevailing shapes in design. Simplicity, originality, and proportional dimensions.
6	Dominance due to movement	Dynamic forms. Critical balance
7	Space/mass dominance	Space dominance. Mass dominance
8	Direction dominance	Horizontal direction. Vertical direction. Central direction. Inclined direction.
9	Dominance due to repetition	Complete repetition. Incomplete repetition.
10	Dominance due to colour	The colour of the item to be highlighted differs from the colour of the floor. Strange colour

5. Methodology

5.1 Applying the theoretical framework

The application of the theoretical framework will be through conducting a questionnaire on selected projects of the architect Louis Kahn. The aim of the application is to examine the existence of dominance, and then examine the strength, level of the existence of dominance and its causes. The application was at the (partial level) or at the (whole level). The application will be on implemented building designed by the architect (Louis Kahn). To verify the activation of the reasons of dominance in order to achieve monumentality, and then reveal Louis Kahn's method and specificity in achieving it.The questionnaire was distributed to the teaching staff in the department of architectural engineering - University of Mosul. Because they have advanced experience and capability to reply as objectively as possible and thay are local recipients separated from the cultural and historical context of the case studies, as the influence of these factors was eliminated and the research objective was determined, which is to discover the reasons for dominance at the micro level only, after presenting the photos of the selected projects using (The Data Show, and the photos were displayed for an equal period of time, and at an equal distance to all respondents, who have nearly similar scientific background and in the same age group.) The questionnaires that were distributed were (35), and the returns were (32), and the data was processed using the Excel program, by extracting percentages, enabling to state sequence of importance and their impact on creating dominance in the design.

5.2 Selection of case studies

In order to apply the aspects of the theoretical framework, six projects of the architect Louis Kahn, an architect with a special philosophy and ideas in design. He was one of the pioneers of the Beaux-Arts movement, which called for a return to previous architectural works. His works emerged as a mixture of modernity and authenticity. His architectural formations were described as massive, heavy, and expressive of the building materials used [29]. He also created the theory of silence and light, and called for monumentality, which he considered the material expression of the eternal and unlimited in time and place. He linked this concept to the origins of forms, He is one of the most prominent and influential architects of the twentieth century [29]. Louis Kahn was chosen because he was well known as a supporter of monumentality in architecture, and he presented an article in which he talked about its meaning, purposes, and the importance of monumentality in architecture, bringing it to the center of architectural discourse. Thus, the architect (Louis Kahn) designed buildings that were described as monumental, with ideal character, accompanied by descriptive texts [10]. Coulter indicated that the most important elements causing this monumentality are: manipulation of shadow and light [11], reliance on modern building materials, emphasis on centrality, formal simplicity by relying on pure forms, and also the absolute rhythm that expresses the event [30], he was interested in achieving social spaces inside and outside the building, and conveying the feeling of its eternity [11], combining contradictions and oppositions in a compatible and harmonious form, which is considered a clear indicator of dominance [31]. The six projects that were selected according to a specific criterion, they were described as monumental by one of the authors.

1. Bangladesh National Parliament House (BNPH): Dhaka, Bangladesh /1982, Carolina mentioned that its monumentality was achieved by the magnitude and was motivated by different ideologies and principles that could be what the building itself should represent and, it stands as a permanent means of communication representing a symbol of a nation or a principle [32]

2. Phillips Exeter Academy Library (PEAL): New Hampshire, United States, 1982, Coulter mentioned that it was a dazzling monument, as Louis Kahn appreciated contradiction and considered it the perfect key to the monumentality of this building, as approaching the library makes us encounter an external appearance that does not at all pave the way to what is inside [11].

3. Richards Medical Research Laboratories (RMRL): Pennsylvania, United States/ 1965, Coulter noticed that the monumentality of this building lies in the shape of its towers, which Louis Kahn were inspired by the ancient columns at Karnak and the columns of medieval cities [11].

4. Salk Institute for Biological Studies (SIBS): San Diego, United State/ 1965, Coulter mentioned that Louis Kahn built a special monument for contemplation, and this is evident in the central square section, which expressed that time is not only the duration of the completion, but it may also be the silence that prevails over that place. Here, the architecture merges with the Pacific coast and becomes the monument to that silent space that he created [11].

5. Arts United Center (AUC): Fort Wayne, Indiana /1973 In this building, Kahn relied on a principle that includes returning to the essence of the forms, or what he called (zero size), as the ideal way to strengthen ideas and gain monumentality. He believes that any change in the essence of the forms is a distortion of them, which made him constantly review and rethink, trying to integrate the changing activities and needs to finally present the composition in its pure form [33].

6. Yale Center for British Art (YCBA): New Haven, United Kingdom 1966, Marvin notes that this building was a symbol of flexibility in dealing with the past, and its installation came from symbolic meanings generated by the fact that the new building designed by Louis Kahn with the architect Rudolph was an artscenter for Yale University, which had an old structure dating back to the Middle Ages. Its message was the necessity of preserving the architectural coherence between the shapes, scale, and materials of the buildings, while at the same time transforming the outer shell into new, bold spaces and huge groups, in contrast to the prevailing modernism and its intolerance of history [34] as shown in Fig. 1a, b, c, d, e, and f.

6. Results and discussion

6.1 The presence of dominance

The results showed that the principle of dominance is clearly present in the design of the six projects. It is present in (BNPH) and (PEAL) at a rate of 94%, and in (RMRL) and (SIBS) at a rate of 75%, while it appears in (AUC) at a rate of 88% and in (YCBA) at a rate of 66%, as shown in Table 2.

Table 2. Presence, Degree, Level of dominance for projects.

Dominance	Possible values	BNPH		PEAL		RMRL		SIBS		AUC		YCBA	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Presence of dominance	There is dominance	30	%94	30	%94	24	%75	24	%75	28	%88	21	%66
	There is no dominance	02	%06	02	%06	08	%25	08	%25	04	%12	11	%34
Degree of dominance	Completely dominant	08	%25	01	%03	03	%09	03	%09	02	%06	04	%12
	Strongly dominant	14	%44	12	%38	05	%16	06	%19	10	%31	08	%25
	Moderately dominant	06	%19	16	%50	11	%34	10	%31	12	%38	08	%25
	Slightly dominant	01	%03	02	%06	12	%38	09	%28	03	%09	06	%19
	Very little dominant	03	%09	01	%03	01	%03	04	%13	05	%16	06	%19
Level of dominance	At the partial level	07	%22	07	%22	21	%66	17	%53	21	%66	12	%38
	At the whole level	25	%78	25	%78	11	%34	15	%47	11	%34	20	%62

Table 3. Show the most influential main reason for the dominance of the six projects at the whole level.

No.	Types of Dominance	The project 1	2	3	4	5	6
1	Dominance due to location						
2	Dominance due to size						
3	Dominance due to texture						■
4	Dominance of the features						
5	Dominance due to shape	■				■	
6	Dominance due to movement						
7	Space/mass dominance						
8	direction dominance						
9	Dominance due to repetition			■			
10	Dominance due to colour						

Table 4. Show the most influential sub-reasons of dominance at the partial level.

No.	Types of dominance	The sub-reason of each main reason	The project 1	2	3	4	5	6
1	Dominance due to location	Central location forsymmetrical organization The focus or attraction point of a radial or central organization Side signature above or below the organization						
2	Dominance due to size	Large size in relation to the rest of the design Small size relative to the rest of the design	■	■				
3	Dominance due to texture	The visual appearance of the attractive surface differs from neighboring surfaces The appearance of sudden holes, openings and cracks						
4	Dominance due to features	Because of the function of the feature (entrance, gate, column,.....) Losing them from their familiar locations and appearing in unfamiliar locations Repeat features					■	
5	Dominance due to shape	Shape type. Difference shape the surrounding and prevailing shapes. Simplicity, originality and proportional dimensions.						
6	Dominance due to movement	Mass involves movement. Critical balance.						
7	Space/mass dominance	Space dominance Mass dominance						
8	Direction dominance	Horizontal direction Vertical direction Central direction Sloping direction						
9	Dominance due to repetition	Complete repetition Incomplete repetition						
10	Dominance due to colour	The color of the item to be highlighted differs from the color of the floor Strange color			■	■		■

6.2 Degree of dominance

The degree of dominance ranges from strongly dominant to moderately dominant, as shown in Table 2.

6.3 Level of dominance

The results showed that 50% of the selected projects were dominated at the whole level and 50% were at the partial level. Also, the whole level of dominance was stronger in proportion: 78% dominance at the whole level BNPH and PEAL, 66% dominance at the partial level RMRL, 53% for dominance at the partial level SIBS, 66% for dominance at the partial level AUC, and 62% for dominance at the whole level YCBA, as shown in Table 2.

6.4 The main reasons for domination

The results showed that dominance at the whole level was generated due to shape (81%) (72%) and then size (78%) (69%), dominance at the whole level was generated due to texture (47%), then repetition (28%). Thus, dominance at the whole level was generated mostly due to shape and size sequentially, which is formal and volumetric dominance. While the results showed that dominance at the partial level is generated due to repetition (75%) (63%), while dominance at the partial level is generated due to form (66%), and thus dominance is generated at the partial level are mostly due to repetition. Table 3. shows the most influential reasons for the dominance in the six projects at the whole level.

6.5 Sub-reasons of reasons dominance

The results showed that when the dominance at the whole level is caused by form, the sub-reasons could be the basic shapes which are easy to perceive, at a ratio of (69%) and (44%). And when the dominance caused by size, the sub-reasons could be the larger size, at a ratio of (78%) (62%) BNPH and YCBA, while YCBA dominance caused by texture, because of contrast in texture from neighboring surfaces (41%), and when the dominance caused by repetition, the sub- reasons could be the complete repetition (34%), strangeness of color as sub-reason (59%) is the most influential sub- reasons when color as the main cause for dominance. Thus, the sub-reasons for the shape chosen in the design being one of the main shapes that is easy to recognize/perceive, as well as the dominance of the sizes due to their large size, are the most influential sub-reasons for the dominance at the whole level. While for dominance at the micro level, for RMRL, when the dominance is caused by repetition, the sub-reasons could be the complete repetition (53%), then when the dominance is caused by elements, the sub-reasons could be the function of these elements (41%). The strangeness of the color as a sub-reason (81%), when color is the main reason for dominance. As for SIBS, the choice of the main reason, repetition, was a result of the sub-reason, complete repetition, with a percentage of 53% as well. The second main reason for dominance is direction, caused by horizontal direction (31%), while the results of AUC were as follows: The main reason is the shape, caused by its the difference from the surrounding shapes (38%), the second main reason for dominance are the elements caused by its function (69%) Thus, the complete repetition and the function of the elements are the most influential sub- reasons of dominance at the partial level, as shown in Table 4.

7. Conclusions

The principle of dominance is clearly achieved in the six selected projects. This reinforces the research hypothesis, which confirms that activating the principle of dominance in designing projects generates monumentality by enhancing the attractiveness, giving visual power to the form. Louis Kahn's peculiarity in achieving dominance was revealed, which was the reason for giving a monumental character to his works as follows:

- Louis Kahn applies the principle of dominance at the whole level, where there are multiple centers of attraction, and they are graduated between primary and secondary centers, which causes a state of tension for the composition as a whole.
- Louis Kahn also applies the method of dominance at the partial level in designing his projects.
- Louis Kahn relies on shape as the first main reason for generating dominance at the whole level of design, given that the shapes he chooses are among the basic, pure Platonic shapes that are easy to perceive. This supports what studies have confirmed in that he chooses those shapes until they give an ideal superior character.
- Louis Kahn relies on size as the second main reason for generating dominance at the macro level, by using the large sizes of the attracting elements compared to the sizes of the neighbouring elements.
- Louis Kahn relies on complete repetition as the first reason for generating dominance at the micro level.
- Louis Kahn relies on the elements and their function as the second reason for generating dominance at the micro level.

Authors' contribution

All authors contributed equally to the preparation of this article.

Declaration of competing interest

The authors declare no conflicts of interest.

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Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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