

Inspirations and their modelling in architecture

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ABSTRACT: Architectural designs are based on spatial, functional and technological ideas. Often buildings and technical solutions used in them emulate other constructions in single or multiple aspects. An affinity between structures is usually the result of inspirations by architects. It may be an artefact or natural object which is the origin of an architectural idea. Seemingly, such inspirations might seem easy to incorporate into architecture. But, the task of successful implementation of such inspired ideas in the case of complicated structures like buildings involve many potential pitfalls. A cautious approach to such a procedure seems to be rational. In order to avoid unexpected problems and disillusion, being the result of direct borrowing from the sources of inspiration, some preventive measures should be taken. This concerns both practising architects and students in architecture. Therefore, a special teaching method has been devised and implemented.

INTRODUCTION

Inspiration can be an ambiguous concept that is used in many disciplines, but has a special role in art and architecture. In analysing the term, inspiration, it is crucial to define it in a broadly acceptable way. A good definition of inspiration is offered by the *Merriam-Webster Dictionary* as *...something that makes someone want to do something or that gives someone an idea about what to do or create: a force or influence that inspires someone* [1].

Areas of inspiration include buildings, works of art and artefacts. Artworks visibly and directly inspired by other works usually do not create negative emotions and criticism. But, the situation with buildings seems to be different. An obvious close affinity of a building with another can suggest the direct copying of spatial or aesthetic ideas, and as a result can seem to infringe the rights of the author of the copied building.

This is much more subject to litigation than in the case of works of art. Thus, precise emulation is a risky way of dealing with creative ideas in architecture.

Architectural inspirations can concern:

- spatial configuration of urban elements;
- forms of buildings;
- façade treatment;
- materials;
- technical systems.

In this article, the focus will be on forms of buildings, colours, façades and materials. These features are the most frequently recognised as being inspired by artificial or natural sources.

Often, there are numerous similarities between two or more buildings or their parts. Chains of inspiration can be detected where a building takes its form from another, and subsequently, a third building is inspired by the second. It is, then, difficult to find out which one was the original source of inspiration. A good example of such a situation is the series of buildings shown in Figure 5.

Architectural creation marked by visible inspiration is worthy of analysis. A problem emerges when there is an evident and indisputable close affinity of one product of art or architecture to another. Accusations are then raised as to the theft of creative ideas. A very useful assessment tool would be one that determines the degree of affinity of compared

buildings or their parts. Discussion on the subject could be initiated at an early stage of architectural education. This could prevent prospective architects from legal pitfalls.

SOURCES OF INSPIRATION

Robert Venturi, a well-known American architect, has divided buildings into two categories: *decorated sheds* and *ducks* [2]. The first group comprises all rectangular buildings based on abstract geometrical forms and decorated depending on a style. The second group relates to buildings patterned after specific and usually irregular items.

The following examples are dominated by *ducks*, which are more distinct than the *decorated sheds* and more clearly illustrate discernible inspirational creativity. It is in this stylistic group where the problem of direct inspiration is most obvious. The most frequently found inspirations for buildings are based on plants, other natural structures and architectural or non-architectural man-made structures.

Natural Items as Sources of Inspiration

Among natural elements attractive to architects as possible sources of inspiration, are diverse plants. Tree fruits, such as chestnuts and more exotic ones, such as durian can be sources of inspiration for buildings. Figure 1 shows the Underwood Pavilion for a local art fair, which was inspired by a chestnut fruit. Figure 2 shows the Esplanade Building in Singapore inspired by a durian fruit.

Probably the most frequently used plant in this regard in recent years is the cucumber. For modern architecture this vegetable has turned out to be the most promising source of inspiration (see Figure 5). Several buildings inspired by the cucumber will be analysed later.



Figure 1: The Underwood Pavilion for a local art fair inspired by a chestnut fruit. Constructed by students of Ball State University, Muncie, Indiana. Source: chestnut fruit [3], structure [4].



Figure 2: Esplanade Building in Singapore inspired by a durian fruit. Source: durian fruit [5]. Building photograph by the author.

Man-made Items as Sources of Inspiration

Interestingly enough, some man-made items repeatedly have been sources of inspiration. A good example in this regard is the form of a ship. See Figure 3 for some examples.



Figure 3: Naval inspiration clearly identifiable in three buildings (Photographs by the author).

Figure 3 demonstrates different approaches to similarity and testifies to endeavours to make the direct emulations less obvious, but still make the source of inspiration legible. The limitations of this readability are very difficult to define. Even much-less poetic man-made items, such as bathtubs get attention and sometimes their exemplification is found in the cases of highly venerated functions, as has happened in a museum building in Amsterdam (Figure 4).



Figure 4: Bathtub as a source of inspiration for the extension of a museum building in Amsterdam (Photograph by the author).

The illustrations presented above show just some of the most frequently used sources of inspiration for building forms from a multitude of other used to achieve compelling spatial outcomes.

CASE STUDY

Figure 5 shows a series of buildings that have been inspired by a vegetable. These buildings are not only well known in architectural circles, but are also discussed by the broader public. Critics agree that all have been patterned on the form of a gherkin. The best-known example is the Swiss Re office building in London nicknamed *the Gherkin*. Shortly after its construction a series of buildings emulating its characteristic shape have appeared in various cities.



Figure 5: The gherkin as an inspiration for four office buildings (Photographs by the author).

Their characteristic and easily defined form is their main, common feature. This is why they are a good subject for analysis of the transfer of formal patterns and their application in architecture. The degree of similarity of these forms is clearly visible. If this seems obvious to their critics, it is not always so to their architects. Norman Foster, the architect for the Gherkin tower in London, claimed to be inspired by the form of a fir cone. Jean Nouvel, the architect for the Torre Agbar (Torre Glòries), claimed to be inspired by a geyser, and the architect for the Pearl Tower in Bangkok sees his building as a *South Sea Pearl*. But for the public, the association is to a gherkin or cucumber. The buildings are formally differentiated, but their affinity with the gherkin or cucumber is obvious. Their resemblance to the source being undeniable, the comparisons that differentiate them should be made in a way based on an optimised reliable method. In this article is proposed an analytic tool for this purpose usable by practising architects and students of architecture.

MODEL FOR THE ASSESSMENT OF AFFINITY

As opined above, the set of five buildings illustrated in Figure 5 are easily and clearly describable and identifiable with a recognisable source of inspiration. They, therefore, provide a good example for the practical application of an analytic

tool concerning the formal description and comparison of similar building forms. This can reveal interesting creative aspects of inspiration-based architectural ideas. In order to illustrate the method of assessment of disclosed similarities, a graphic model has been developed.

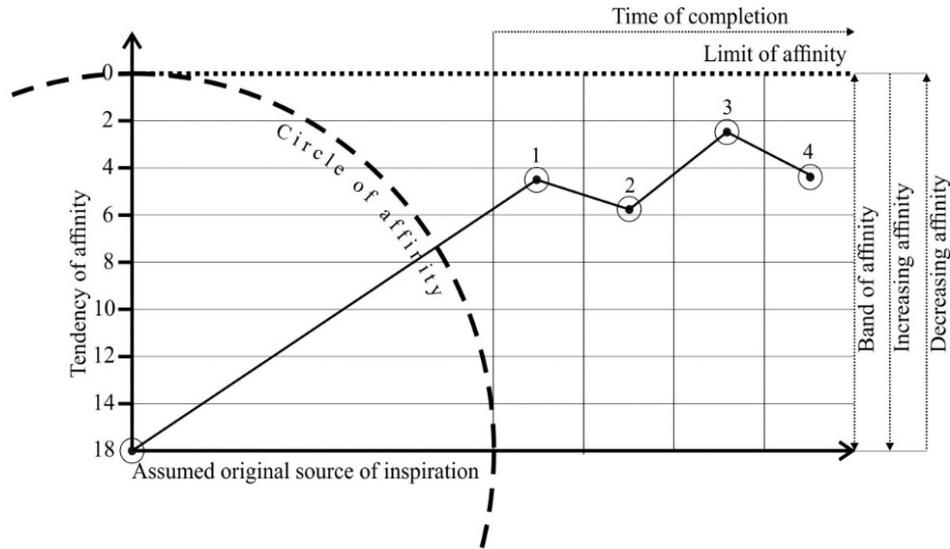


Figure 6: Analytic diagram for inspiration-related assessment of four office buildings (Drawn by the author).

The diagram in Figure 6 specifies temporal and combined formal singular relationships with the source of inspiration. A theoretical affinity zone around the source (a gherkin) has been symbolically circled. Every building form with no recognisable affinity with the source would be placed outside the affinity circle, the diameter of which determines the size of an *affinity band*. The forms of the four buildings presented above can be placed in this band depending on their degree of affinity. The more the building's form deviates from the source, the more peripheral is its position within the affinity band. A hardly recognisable formal similarity would place a building on the outskirts of the affinity band.

The first two of the four structures emulating the original source (a gherkin) were built in 2004, i.e. the Gherkin Tower (30 St Mary Axe, London, and previously known as the Swiss Re Building); and Torre Agbar (Torre Glòries). These were later followed by the other two buildings.

An important question then arises whether the source of inspiration for the last two was a gherkin or the Gherkin Tower (or Torre Agbar); i.e. copying an original pattern may be direct or indirect. If the latter, architects use as a source of inspiration another building, which was patterned on an original source; this is a second iteration of the original. By extension, architects could use it as a source of inspiration for a building, which was patterned on yet another building, which was patterned on the original source; this is a third iteration of the original ... and so on. The analysed set of high rise structures provides an illustrative example of such a chain of occurrences where the creative ideas used in the process of finding a form have been ultimately inspired by a gherkin.

Where a source of inspiration for a number of buildings has been found, the construction dates should be analysed and compared in order to establish a potential affinity chain. On many occasions the subsequent inspired structures that are part of an affinity chain become less and less associated with the original source of inspiration due to modifications in consecutive buildings. Every later similar building makes the analysis less objective and more difficult. This process of dilution of the original close-to-source formal idea resembles the phenomenon of entropy, where gradual deviation and disorder comes into play within the affinity band. Comparisons of two, three or more similar buildings can identify the differences among them and from the source of inspiration.

The model can be extended and enhanced with some additional assessment categories, such as more precise formal or technical parameters. This gives it an open character, subject to modification depending on emerging needs. The intention of this method is to make it easier for the analysts to proceed in a systemic way in carrying out their study of the similarity of structures and mechanisms of inspiration.

In order to verify the method, a group of five students working on their diploma projects analysed the four gherkin-like buildings to assess their resemblance to a gherkin. The students had been instructed how to proceed and what aspects should be taken into account in their assessments. A questionnaire was completed by each of them in which they filled in boxes assigning points in three categories: form, colour and surface treatment (as an effect of technical solutions) of the building. The higher the affinity, the higher the point. The questionnaire was intended to provide answers to questions related to mechanisms of inspiration and their comprehension. The results are shown in Table 1; *size* is not recorded since it was irrelevant for this particular study. This exercise is an illustration of the practical implementation of the affinity method.

Table 1: Affinity assessment of the buildings in Figure 5.

Building number	1					2					3					4				
Student	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Criteria of affinity																				
Size																				
Mean value																				
Form	3	2	2	2	2	3	3	4	4	2	1	1	1	3	1	2	2	3	3	3
Mean value	2.5					3.2					1.4					2.6				
Colour	0	1	0	0	1	1	2	3	3	3	0	1	0	1	1	0	1	0	1	3
Mean value	0.4					2.4					0.6					1.0				
Technical solutions (structure, details)	1	1	2	3	3	3	2	3	0	3	0	0	1	3	1	1	1	2	3	3
Mean value	2.0					2.2					0.8					2.0				
Final score	4.6					7.8					2.8					5.6				

DISCUSSION

The proposed model should be especially valuable for students of architecture many of whom demonstrate poor abstract thinking in creative activities. The ability to analyse forms that result from creative inspiration should be an attractive tool for the students. For academic teachers, such a convincing and usable tool would be of assistance during their discussions of students' designs. Using the model at an early conceptual stage, and later through the subsequent phases of design would make the teacher's remarks more comprehensible for students during deliberations concerning form and elements of building design.

It should be noted, however, that a *direct* resemblance of a building with its source of inspiration is widely considered unsuitable and a major fault. The spatial and aesthetic values of buildings, as well as of all works of art, depend on non-evident and non-obvious ideas based on inspiration; the inspiration should only gradually be discovered. Direct and obvious inspirations are somehow contradictory to this thinking. This is why the issue of unconscious inspiration in architecture is controversial.

The survey showed a differentiated perception of the buildings by responding students with regard to all three analysed criteria: form, colour and surface treatment (technical solutions). As the size was obviously irrelevant in this case (the source - gherkin - was out of proportion to the buildings), it was not subject to consideration and assessment. The variation of responses underlines the worth of the research in determining the mechanisms of inspiration in architecture and validates the presented affinity method.

In the case study analysed, a series of interesting results were noticed. The surface treatment was the feature with the greatest variation in the assessments. The biggest difference in assessment was for building 2 and was related to colour and surface treatment (the mean values within these criteria are maximum 2.4 and 2.2, respectively, as opposed to minimum 0.4 and 0.8). Clearly, the lack of uniformity of colours led to variations in the assessment. The form of building 2 was found to be most similar to a gherkin (3.2 points), and the form of building 3 the least similar (1.4 points). But, the high perception of building 1 as a gherkin (2.5 points), raises serious doubts; the students' opinions most probably were biased by the building having a very suggestive popular nickname, i.e. *the gherkin*.

Noticeable discrepancies in the assessment of buildings by students call for a deeper analysis of all building features and elements to identify the bases of similarity. This indicates that the participation and intervention of tutors in the pre-assessment procedure is advisable and the use of the presented affinity method can play a significant role.

CONCLUSIONS

The proposed model should help students to take an analytic approach to inspiration in architecture. Its mathematical nature should enable prospective architects to make a rational assessment of their design choices. Analyses of buildings inspired by particular sources would make students and architects aware of the necessity of a careful approach to avoid thoughtless direct inspiration. Simple emulation of an item and its transposition to an architectural application can lead to a possible negative perception of the designed building. To avoid this failure, a study of the interrelation of the assumed source and a building structure is strongly advised.

The question of the degree of similarity is usually subjective, but its rationalisation and optimisation can be carried out using the presented analytic model. It has been found on many occasions that problems with inspirations in architectural design appear during the teaching process not only with students, but also their teachers. The use of the presented tool

has been very promising for groups of students working on a project in the concept phase. Their deliberations could be substantially enhanced by this method.

A question can be raised as to the practicality of the model in a real office environment. It can be used where applicable in everyday practice, but it should be emphasised that it is particularly useful in architectural teaching. Having acquired the capacity to deal with the problem of architectural inspirations at school, practising architects would be better in their creative work even without recourse to this analytic method. However, using it would permit architects to easily correct their designs in terms of the sensitive question of direct and sometimes legally doubtful borrowing of formal ideas, which could happen through the manipulation of criteria within the model.

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