

CRITICAL ATTITUDE TOWARD THE FOOTSTEP OF GOOGIE ARCHITECTURE ON PARAMETRIC ARCHITECTURE

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Abstract. Advent of machinery age, altering in human needs and lifestyle has changed the pattern of architecture. This pattern is in close relation with different environmental, contextual, behavioral and theoretical aspects of dwellers. With a glance to the history of design, in 1940s the new style of architecture came up which was called Googie architecture. It was a movement of modern architecture, a subdivision of futurist architecture influenced by car culture and the Space Age. This style was alive up to mid-1960s but in its short life, it put a big impact on the appearance of the cities and buildings. Furthermore, in recent years the new style of architecture named Parametricism has started to take shape and accordingly the formal appearance is very close to Googie architecture. Also parametric architecture is out birth of technology and the idea of communication and futurism. The research is questioning the characteristics of parametric and Googie architecture with scrutinizing the origins and main gestures of these styles in society and culture of the period that they exist in. the research tries to figure out failures of Googie style in its own period and parallel to this, it give suggestions to implement and transform qualitative parameters in the design process by means of adapting pattern language in design process, applying parametric design thinking and simplicity in design systems.

1. Introduction

It was the 1950s. America was a superpower, and the Los Angeles area was the center of it. The space race was on. A car culture was emerging. Businesses needed ways to get families out of their automobiles and into coffee shops, bowling alleys, gas stations and motels. They needed bright signs and designs showing that the future was now. They needed colour and new ideas. This concept of attraction and making communicative societies was the main issue of architecture styles from the beginning. And it has renovated in different shapes and appearances in diverse periods. Googie architecture was the style of communication in mid-nineties which was not responsive enough for dweller`s needs and desires, so it was rejected in 20 years.

In recent era there is a global convergence in architecture that justifies the enunciation of a new style: *Parametricism*. The style is rooted in digital computational techniques. Its latest refinements are based on advanced parametric design systems and scripting techniques. This

style has been developed over the last 15 years and is now claiming control within avant-garde architecture (Schumacher, 2010b). Both of these styles that mentioned have a futuristic perspective toward human needs and desires. Googie architecture faced failure to answer this issue with futuristic perspective and now Parametricism is trying to do it. Parametric architecture is trying to change the interpretation of style into a system of style which means more connection and transformation of existing and futuristic element.

2. Methodology

The research is questioning the characteristics of parametric and Googie architecture with scrutinizing the origins and main gestures of these styles in society and culture of the period that they exist in. The research is organized in qualitative style by comparing and introducing focal points, overlaps and clashes of both Googie and Parametricism. Moreover, it has organized with the objective and aim of putting a question mark by defining a question marks on the future of parametric architecture by inquiring whether parametric architecture will shape a new style for 21th century and will be flourishing for commencing era or not.

Moreover, deep literature review was done on the characteristics and features of both styles and tried to put key factors and principles in contrast with each other to compare and measure the capabilities and effectiveness of factors in their own periods with formal consideration. The main key factors and overlap that will be discussed are communication, stylistic gestures, futuristic perceptions and principles of both Googie and Parametricism. In addition, 3 proposals are recommended to prevent parametric design from losing its acceptance in practical architecture: *adaption of pattern language into parametric design, parametric design thinking, and application of simplicity in design systems.*

3. The Overview on Googie Architecture

3.1. THE FOUNDATION AND DERIVATION

Googie architecture, in its beginning was a form of modern architecture, a subdivision of futurist architecture influenced by car culture, the Space Age, and the Atomic Age (Friedlander, 2008). Originating in Southern California during the late 1940s and continuing approximately into the mid-1960s and later became widely known as part of the Mid-Century modern style. Googie-themed architecture was popular among motels, coffee houses and stations.

Some examples of this short period style of architecture have been preserved, such as LAX Theme Building with its unusual gesture, space age look grew out of the mid-century modern style (Figure1) and the other one, and Cinerama Dome by Welton Becket architects (Figure2).

This new trend required owners and architects to develop a visual imagery so customers would recognize it from the road. This modern consumer architecture was based on communication (Hess, 2004). In order to manifest this kind of architecture, there was necessity to make buildings more eye catching and fancy with some unconscious instincts toward futuristic trends of the dwellers.

3.2. FUTURISTIC PERCEPTION

According to Hess, commercial architecture was influenced by the desires of the mass audience. The public was captivated by rocket ships and nuclear energy and in order to draw their attention, architects used these as motifs in their work. Buildings had been used to catch the attention of motorists since the invention of the car, but during the 1950s the style became more widespread.

When Google architecture was first started, it was all about the future, and now that more time has passed, Google architecture has lost a lot of its popularity.

They are often seen as too flashy or gaudy in our modern society, and many people don't think they are worth preserving. Opponents may say that Google style buildings are important parts of our history, and they play a role in the growth of suburbia and the car culture.

Alan Hess (2004) believes that after the Second World War, a lot of promise was actually fulfilled not only in the buildings but also the automobiles that the average American used during that time. It did not only capture the future, but it brought a meaningful way to people. And now, this interest is irresistible in these futuristic ideas not only in architecture or car design but in all interdisciplinary discourses and fields. Certainly this interest, this intrigue, this appeal of living in the future just went all across the culture and our lifestyle.

3.3. THE INFLUENCES AND INSPIRATIONS OF SPACE AGE

America's interest in spaceflight had a significant influence on the unique style of Google architecture. During the 1950s, space travel became a reality for the first time in history. Google style signs usually deny sharp and bold angles, which suggest the aerodynamic features of a rocket



Figure 1.a: LAX Theme Building 1961 by architect James Langenheim



Figure 1.b: Cinerama Dome 1963 by Welton Becket architects

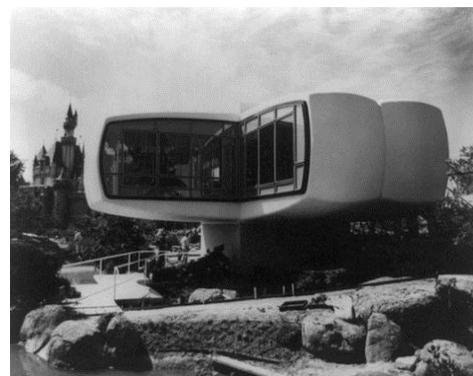


Figure 2: Disneyland's Monsanto House of the Future (1957)

ship. Also, at the time, the unique architecture was a form of architectural expressionism, as rockets were technological novelties at the time. One famous example of Googie's legacy is the Space Needle in Seattle, Washington and the other one is Disneyland's Monsanto house of the future (Figure3). The pioneer concept and image of these buildings manifest the movement and the detachment of the building from the ground to touch space and notice the ubiquity.

3.4. CHARACTERISTICS AND FAILURES

Because of the increase in mass production and travel during the 1930s, Googie architecture became popular due to the high energy silhouettes its smooth designs created. These buildings featured rounded edges and large pylons were all symbolizing, the invisible forces of speed and energy, that reflect the influx of mobility that cars, locomotives and zeppelins brought (Hess, 2004). Main characteristics and features that generally distinguish Googie from other forms of architecture include:

- Upswept Roofs, that made many buildings look as though they were about to take off and fly
- Large Domes and smooth surfaces that often made of concrete
- Large Sheet Glass Windows, making roofs appear to float
- Boomerang Shape, impressing the idea of an arrow shape pointing the way to progress
- Atomic Models, represented the unlimited power that would make our future utopia possible

These stylistic conventions represented American society's fascination with differentiating themes and making emphasis on futuristic designs. As with the Art Deco style of the 1930s, Googie became less valued as time passed, and many buildings in this style have been destroyed.

Editor Douglas Haskell described the abstract Googie style, saying that "If it looks like a bird, this must be a geometric bird" (Hess, 2004). Also, the buildings must appear to defy gravity, as Haskell noted: "...whenever possible, the building must hang from the sky." Haskell's third tenet for Googie was that it has more than one theme, more than one structural system. Because of its need to be noticed since moving automobiles along the commercial strip, Googie was not a style noted for its subtlety.

4. Parametric Architecture in Detail

4.1. THE ORIGINS AND BEGINNING

Parametricism is a term for a new what call epochal global style of architecture and all the design disciplines including urbanism interior furniture and product design graphic design and even fashion design. Firs launch the term in 2008 in Venice biennial but after these all years now it's a global movement. Furthermore, during the past fifteen years digital media in architecture were used in different ways and influenced the whole field of construction and design. At the beginning digital media were applied only as a representational tool. With emerging digital technology architecture has found a new tool for conceptual design in digital media (Schnabel, 2007). Though Parametricism has its roots in the digital animation techniques of the mid-1990s, it has only fully emerged in recent years with the development

of advanced parametric design systems. Parametricism has become the dominant, single style for avant-garde practice today (Schumacher, 2008a).

The term ‘Parametricism’ implies that all elements of architecture are becoming parametrically malleable and thus adaptive to each other and to the context. Instead of aggregating a few platonic solids (cubes, cylinders etc.) into simple compositions - like all other architectural styles did for 5000 years – Parametricism is now working with inherently variable, adaptive forms that aggregate into continuously differentiated fields or systems. Multiple systems are correlated with each other and with the environment. All spaces should resonate with each other because within contemporary society, all activities need to be networked and stay in continuous communication with each other.

Parametricism is the most potent movement and avant-garde style in architecture today. It has been maturing and accumulating contributors globally for over 10 years. This convergence also starts to draw in the other design disciplines. Indeed, this movement needs a name in order to make the next logical step: to make a real impact and transform the appearance of the global built environment in the 21st century just as Modernism did during the 20th century, to continue the succession of the great epochal styles of the past: Gothic, Renaissance, Baroque, Historicism, and Modernism. The category of style is the only architectural category that means something in society at large. Only the emergence of a new style can be important, impacting news coming out of architecture. It would inform all future clients about the availability of a new aesthetic and global best practice (Schumacher, 2010a).

4.2. MODERNISM VS. PARAMETRICISM

As Google architecture can be categorized as one of the movements of modern architecture in mid-nineties, the main clashes of Modernism and Parametricism is discussed. Modernism is based on standardization and repetition while Parametricism produces continuous variation. Modernism and Parametricism differ with respect to the basic elements or “primitives” that underlie the design: Modernism, like classicism, works with simple geometric figures like rectangles, squares, triangles, and circles. These figures are rigid and hermetic, incapable of adaptation. In contrast, the primitives of Parametricism are inherently malleable and adaptive: blobs, nurb-surfaces and parametric components. The best way to clarify the essential characteristics of Parametricism is to define it in terms of its empirical principles. This definition clarifies the difference between Modernism and Parametricism.

Parametric architecture avoids rigid geometric primitives such as squares, triangles and circles; avoid simple repetition of elements, avoid juxtaposition of unrelated elements or systems (Table 1). The key point is that Parametricism demands that any element or subsystem that enters the evolving composition is engaging in intensive, adaptive relations with what is there already. Nothing remains pure. Everything is responsive. The density of visible internal and external relations is a key criterion of a successful parametric composition.¹ Parametric design is a method that can, in whole or in part, defines the design process. Parametric models allow the user to set up a hierarchy of relationships that can be defined rules, in which the whole adjusts and changes when a rule is modified. If we analyze Google architecture according to its form, we can also find same notion and realm on it.

¹ Schumacher, Patrik (2009) Interview, Questions presented by Feng Xu, Published in: WA (World Architecture), Parametric Design issue, Beijing

Sometimes in parametric architecture the main concern is to create a form which is obeying the principles with implementation of environmental or contextual parameters but the question is that all of these systems and subsystems are curving an image on the sculpture of form and the project becomes far from social, economic or psychological parameters.

Table 1: Principles of Parametricism (Schumacher, 2011)

<i>tools of criticism and project development/enhancement</i>	
Negative Principles	No rigid form
	No simple repetition
	No collage of isolated, unrelated elements
Positive Principles	All forms soft (intelligent: deformation=information)
	All systems differentiated
	All systems correlated

4.3. THE STYLISTIC GESTURE OF PARAMETRIC DESIGN

Innovation in architecture proceeds via the progression of styles. This implies the alternation between periods of cumulative advancement within a style and revolutionary periods of transition between styles (Schumacher, 2008b). In the recent years by the eagerness of human to progress with futuristic perspective the necessity for new styles is questionable. Parametricism as a recent design style only applies to architecture, Urbanism and the other design disciplines. It is not assumed that there could be a parametric politics, economics or science. Since the 1920s art and architecture are distinct autopoietic systems of communications. For instance, there was no movement in architecture that could be regarded to be the equivalent of surrealism or informal abstract expressionism. Neither was an art movement that paralleled functionalism, metabolism or high tech architecture, so Parametricism manifest itself as a respectful style for 21 century architecture (Schumacher, 2010a).

Parametricism emerges from the creative exploitation of parametric design systems in view of articulating increasingly complex social processes and institutions. The parametric design tools themselves cannot account for this profound shift in style from modernism to Parametricism. This is evidenced by the fact that late modernist architects are employing parametric tools in ways which result in the maintenance of a modernist aesthetics, i.e. using parametric modelling to quietly absorb complexity (Schumacher, 2007). Moreover, there are some overlaps on the periods between late modernism and Parametricism in using the same tools and technologies but the concept which parametric architecture is putting on the table is 'communication' which was one of the main concepts of Googie architecture too, but the point is that communication in this era is much more complex and virtualized, that needs new language in the shape of style to be defined.

5. The Focal Discussions on Googie and Parametric Architecture

5.1. ICONIC INTERPRETATION OF GOOGISM AND PARAMETRICISM

With the passage of time, the Googie style has become as much a symbol of the fifties. Cultural expression is one important role of architecture but the building design also worked

well by other measures of architecture: they solved the functional problems of car-oriented architecture imaginatively; they expertly used scale and form to create a successful suburban architecture; and their complex interior geometries reflected an understanding of the modern special concept. Though they were not the kind of building usually given attention in the architectural journals, they helped to shape the appearance of cities nationwide. They did not simply mimic high-art design; the commercial strip itself generated a fresh, appropriate architecture that spoke the common design language of the public street, understood by the wide cross-section of the population. They were modern architecture but they were also widely popular, a rare combination in the history of modernism, where critics and architects were often suspicious of commerce and popular taste. On the other hand, parametric architecture which is the abstract of technology and digital age rather than culture, tries to succeed modernism as a new long wave of systematic innovation. The style finally closes the transitional period of uncertainty that was engendered by the crisis of modernism and that was marked by a series of short lived episodes including Postmodernism, Deconstructivism, and Minimalism. The new style claims relevance on all scales from architecture and interior design to large scale urban design. The larger the scale of the project the more pronounced is parametricism's superior capacity to articulate programmatic complexity.

Parametric architecture has a different perspective to the concept of style and communication, which was missed in Google architecture. Google architecture only has postured view on the future and the design of future but Parametricism had originated from the abstract of today's lifestyle which is in close relation to virtual, digital, animated, algorithmic networked connections. Designing future seems to be challenging but designing future according to contemporary progresses and innovations seems not to be inaccessible. On the other hand sometimes parametric architecture seems to mimic the same attitude of Google architecture by means of considering only quantitative parameters and paying less attention on qualitative parameters which can make the building more and more familiar for the dwellers and give the sense of place and sense of space or more comfortable and tangible zones in the built environment. In order to reach this point there are some suggestions which are going to be discussed below.

6. Discussion

6.1. ADAPTATION OF PATTERN LANGUAGE INTO PARAMETRIC DESIGN

Architectural patterns of Christopher Alexander as published in *A Pattern Language* (Alexander, 1977). Although introduced into architecture more than thirty five years ago, their true significance and implication has been appreciated by only a few practitioners. Patterns are a powerful tool for controlling complex processes, but because of misunderstandings, they have not played a wide role in architectural design. Instead, patterns have found unexpected success in computer science (Salingaros, 2000). In practice, it is very cumbersome to work from a complete catalogue of discovered patterns to create a product. A simplified connective list can drastically improve the utility of any pattern language. A procedure for generating such a map is based on the conceptual "chunking" of information (Miller, 1956).

In order to bring pattern language into parametric design we have to illustrate some key aspects of pattern languages: how patterns combine to form higher-level patterns containing

new information; how linked patterns exist on different levels; how to find patterns in a new language; and how a pattern language is validated through its connective structure independently of each individual pattern's validity. A major concern is how a pattern language is damaged through the imposition of arbitrary stylistic rules and anti-patterns, which are often mistaken for patterns during architecture design.

6.2. PARAMETRIC DESIGN THINKING

More recently, parametrics has become a slogan as its being used to design structures that respond to their environment and other site conditions. While parametrics can be a powerful tool, we rarely see it leave the realm of the design process and venture into the physical applied parametric modelling techniques (Malmstrom, 2011). As the living world becomes more and more complex by the time goes on, the question comes up that how to take the complexities of a design in different parameters and reduce it down to a physical prototype? This is where a shift in thinking is necessary (Collins, 2013, Howe, 2011)

In computer science, reductive thinking is often used to break down complexities, and make them more meaningful and tangible. This reductive process defines the complex problem and reduces it to its simpler parts until each part can be dealt with given knowledge at hand. Architecture, as a process to present the abstraction into the reality, deals with sophisticated complex parameters from the beginning of design process up to physique itself to the real world. In other words, architectural design is not a simple process of drawing lines, it needs more complex tools to decode this complexity and purify it to be presented in built environment. Parametric design thinking is a common heuristic (exploratory) system used by designers in practice. Heuristics used here are in the sense referred to thinking relying on the use of intuition, human feeling, experience and rules. Parametric thinking is a way of relating tangible and intangible systems into a design proposal removed from digital tool specificity and establishes relationships between properties within a system.

6.3. APPLICATION OF SIMPLEXITY IN DESIGN SYSTEMS

In different styles the form is the mean to represent the image, which manifests the characteristics of that style, but how the designer reaches to the specific forms is questionable. Design by conception, is it a matter of getting rid of stone to create monumental form as Michael angel wants to point it or perhaps it is about technology and optimization and function?

If form is to follow function how is that function tested, evaluated, validated according to whom and by which criteria. The process of design traditional perspective acts as a process of manufacturing. It means that the same process can be applicable to different projects and the outcome will be the same with minority of differences according to their sudden changes which was the outcome of mass production and Fordism society (Schumacher, 2007). In this kind of process the building is considered as a machine which Le Corbusier states that house is a machine for life and in this conception the process of designing as a machine is the same as manufacturing. In other words, that is the outcome of putting different pieces together to reach the design solution. The discussion in simplex design rejects this kind of design thinking and tries to bring all components and parameters of design which are related with design problem and created a network between them. So the concept of process transforms to

system. Donald Schön (1987) indicates that mass production type of design process generates problems, because most of the available guidelines are not compatible with architects' practice in design process. Architects' design thinking process is complex, dealing with multiple criteria of performance. So, the necessity of a system, which is adaptive to different problems, is not deniable, and this integration creates another opportunity to approve this style in different scales, tastes and disciplines. Also, all of the components of design are working under a system which is not going to separate the functions. In order to reach to simple design following considerations can be applied:

- Highest priority is to satisfy the customer through early and continuous delivery of requirements.
- Complexity must be based on simple rules.
- Welcome changing requirements, even late in development. Simplicity process harness change for the customer's competitive advantage.
- Multidisciplinary team work is necessary to develop a successful project and with maximum performance and quality.
- The most efficient and effective method of conveying information to the built environment is the transformative relation between indoor and outdoor with simple rules in complex systems.

7. Conclusion

The Industrial Revolution laid the objective technical conditions for the emergence of the modernist style. Breakthrough in the development of the industrial manufacturing process industrial manufacturing systems, new building materials, such as the modernist architectural design, from the subject to the classical era artisans craft-based building materials and stone limit objective conditions laid down, so before With the modernist style characterized by the mode of appearance and aesthetic breakthrough. It can be said, the modernism style is the inevitable outcome of the development of the social lifestyle. But now in contemporary lifestyle, Computer digitization and technology development, to create the objective conditions for the rise of a new architectural style. The discourse of parametric architecture is not dealing only with the form of the design, or specific function, aesthetic marks or other elements that are discussed in past styles. Parametric architecture tries to connect and communicate all stages and continents of the project in a way that all become integrated into parametric system and all elements of architecture are becoming parametrically adoptable and thus transform into each other according to the context of the project. In this discussion we use Google architecture as a tool to manifest that if a style puts the only pressure on formal and aesthetic parameters it would face failure, and in order to prevent parametric architecture from this dilemma the proposed solutions in discussion part can be applied. Within the professional context, it is suggested that the cultural communication secures the exchange of experiences, the learning outcome and the innovation in the project, and this is a function, which is strongly de-emphasized in project contexts, both in the literature and in practice (Sidawi, 2012).

Pattern languages, simplicity in design and parametric design thinking can help us to challenge with the complexity of a wide variety of systems ranging from computer software, to buildings and cities in different scales. For instance, each pattern characterizes a rule

governing one working piece of a complex system, and the application of pattern languages can be done systematically. Mainly, the architecture design requests to connect human beings needs to information contained in a pattern language (Salingaros, 2000). In order to bring mentioned magnets together we have to apply following steps:

- First: import pattern languages into the computer, where they can easily be used, exchanged, edited, added to each other as system
- Second: greatly expand the kinds of patterns that can be written, including economics, ecology and other topics and parameters
- Third: create the capacity to handle data and metric calculations, e.g. for sustainability criteria and environmental issues as quantitative parameters plus qualitative ones
- Fourth: return to the built environment, and create parametrically design thinking
- Fifth: design a repository system in which any pattern could in principle be linked up with any other pattern, within a complex system

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