Decoding the Post-Analysis Stage in Design Process: Proposing a Framework of Form Synthesis Strategies

Mohammed Gismallah Elkhider Babiker

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Assoc. Prof. Dr. Ali Hakan Ulusoy
Acting Director

I certify that this thesis satisfies the requirements as a thesis for the degree of Master of Science in Architecture.

Prof. Dr. Naciye Doratlı
Chair, Department of Architecture

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science in Architecture.

Asst. Prof. Dr. Badiossadat Hassanpour
Supervisor

Examining Committee

1. Prof. Dr. Resmiye Alpar _____

2. Asst. Prof. Dr. Makbule Oktay _____

3. Asst. Prof. Dr. Badiossadat Hassanpour _____

ABSTRACT

Despite the diversity of methodologies and approaches in architectural design process, there are a shared agreement on the inevitable existence of the stages "analysis" and "synthesis" as norms sequences during the process**.** Synthesis is looking for an invention of embodiment to the data from analysis, and generating design ideas. Surprisingly, this stage is remained with a very scare studies and least discussions, although it is "the most crucial and most difficult aspect of designing, and indeed the most intimidating to a fledgling designer". Leaving the stage to the free well of designer intuition and personal creativity. This tendency has engendered two conflicts, firstly the intuitive creativity is unreliable and far from satisfy the elementary demand of methodical approach. Secondly, the freedom margin turns to a place of incompetence and confusion leads to random actions to synthesize the intended form, which put the product under the suspicions. Decoding the post analysis stage becomes an argent appeal, thus the main aim drawn for this research is to synthesis an explanatory framework exhibits set of shared and accepted form synthesis strategies, to become as normative map for designers that can broaden their conceptual capacity and inform their decisions during the post analysis stage in design process**.** Creating such inclusive framework acquired to unify all the form design theories in one plateau and connected them by appointing a formulation criteria dissolving the theories to their basic design ingredients. The Logical argumentation research method basic condition tends to pick a group of previously unappreciated disparate factors, then reconnected them to reveal a unified framework. The literature survey on the area of descriptive form design theories that take the mold of framework, revealed a 45 form design theory distributed in 9 different frameworks. The classifying of the previous findings

established among the different texts, resulted 34 form design theories, 4 among them were addressed in the same name by different authors, while the other 30 showed differences on terms and descriptions. Correlating the fragmented theories together by affiliating the conceptual descriptions obtained by them, enclose the 34 form design theory into 9 inclusive form design theories. After the relabeling process the result are: Theory of Deep Structure Transformations, Theory of Layering Meaning, Theory of Deformation, Theory of Form Performance, Theory of Information, Theory of Metaphor as Generator, Theory of Pattern Language, Theory of Transformation of Specific Type, and Theory of Space as Generator. The design theories dissolved by an analytical device developed from Salama's Design Ingredients Theory. The result unfolded the design ingredients for each Form design theory as Strategy, Technique and Tool. Finally, the proposed framework was synthesized and presented in a diagrammatic organization, exhibited verified and accepted theories among the authors, thus they can reach the extent of being norms for form synthesis. The framework holds of the ability to provide a conceptual clarity via offering multiple start points, which broadening Designer's conceptual capacity to answer the demands subjected from the variety of design tasks. Not to forget the reason of adoption that attached to each strategy allows Designer to place himself exactly in the right selection to tackle the task.

Keywords: Form synthesis process; Form generation process; Design methods; Design theories.

ÖZ

Mimari tasarım sürecinde metodolojilerin ve yaklaşımların çeşitliliğine rağmen, süreç boyunca norm dizileri olarak "analiz" ve "sentez" aşamalarının kaçınılmaz varlığı konusunda ortak bir mutabakat vardır. Sentez, analiz verilerinden somutlastirmaya yönelik bir icat ve tasarim fikirleri üretme cabasindadir. Şaşırtıcı bir şekilde, bu aşama çok korkutucu çalışmalar ve en az tartışmalarla kalırken, "tasarımın en önemli ve en zoru parcasi olan ve ayni zamanda ilk olarak, yeni başlayacak bir tasarımci icin en korkutucu yön". Sahneyi, tasarımcının sezgilerine ve kişisel yaratıcılığına bırakmak. Bu eğilim iki anlasmazlik ortaya çıkardı, ilk olarak, sezgisel yaratıcılıgin güvenilmez olmasi ve metodik yaklaşımın temel talebini tatmin etmekten uzak olmasi. İkincisi, özgürlük marjı yetersizlik olmaya dönüşüyor ve karışıklık, ürünün kuşkuya düştüğü şekli sentezlemek için rasgele eylemlere yol açar. Son analiz aşamasının kodunun çözülmesi argenti bir itiraz haline gelir, bu nedenle bu araştırma için çizilen asıl amaç, tasarımcıların kavramsal kapasitelerini genişletebilecekleri normatif harita haline gelmek için ortak ve kabul edilmiş form sentez stratejileri seti sergileyen açıklayıcı bir çerçeveyi sentezlemektir. Tasarım sürecinde son analiz aşamasında alınan kararlar. Yazılı analiz aşamasının çözülmesi argüman çağrısı haline gelmektedir, bu nedenle bu araştırmanın ana amacı, tasarım aşamasında analiz sonrası aşamada kavramsal kapasitelerini genişletip kararlarını açıklayabilecek, tasarımcılar için normatif harita haline gelmek için açık ve paylaşılmış form sentez stratejileri seti sergileyen açıklayıcı bir çerçeveyi sentezlemektir. Tüm form tasarım teorilerini bir platoda birleştirecek şekilde kapsayan, bu kapsayıcı çerçeveyi oluşturmak ve teorileri temel tasarım bileşenlerine eriten bir formülasyon kriteri atayarak bunları birbirine bağlamak. Mantıksal argümantasyon araştırma yönteminin temel şartı, daha önce kabul

edilmeyen farklı faktörlerden oluşan bir grup seçme eğilimi gösterir, sonra birleşmiş bir çerçeve ortaya çıkarmak için onları yeniden kurmaktir. Çerçeve kalıp olan tanimlayici form tasarım teorileri alanıyla ilgili literatür araştırması, 9 farklı ana baslik içinde dağıtılan 45 form tasarım teorisini ortaya koymuştur. Farklı metinler arasında kurulan daha önceki bulguların sınıflandırılması, 34 form tasarım kuramı ile sonuçlandı; bunların 4 tanesi farkli yazarlar tarafindan aynı isim ile sonuclandirilirken, diğer 30 tanesi terim ve tanımlarda farklılıklar gösterdi. Parçalanmış teorileri, kendilerince elde edilen kavramsal tanımlamaları birleştirerek birbiriyle ilişkilendirerek 34 form tasarım teorisini, 9lu kapsayan form tasarım teorisine dahil edildi. Yeniden isimlendirmeden sonra sonuç: Ic Form Dönüşümleri Teorisi, Katman Anlam Teorisi, Deformasyon Teorisi, Bicim Performans Teorisi, Bilgi Teorisi, Uretken gibi Olarak Metafor Teorisi, Kalip Dili Teorisi, Spesifik Model Dönüşüm Teorisi, Ve Uretken Olarak Uzay Teorisi. Tasarım teorileri, Salama'nın Tasarım Malzemeleri Teorisi'nden geliştirilen analitik bir arac ile çözülmüştür. Sonuç olarak, her Bicim tasarıminin teorisi tasarım unsurlarını Strateji, Teknik ve Araç olarak ortaya çıkardı. Son olarak, önerilen diyagram sentezlenip diyagramatik bir organizasyonda icerisinde sunuldu, yazarlar arasında doğrulanmış ve kabul edilmiş olan bu teoriler sergilendi, bu sayede form sentezi için norm olma boyutuna ulaşilabildi. Olusturulan diyagram, tasarımcıların çeşitli tasarım görevlerinden kaynaklanan taleplerini karşılama konsept kapasitesini genişleten çoklu başlangıç noktaları sunarak, tasarimcilarin kavramsal bir netlik sağlama yeteneğine sahip olmalarina yardimci olmaktadir. Her stratejiye eklenen uyumun sebebi unutulmamalidirki, tasarimci nin görevi üstlenmek için tam olarak doğru seçim yapmasina katki sağlar.

Anahtar kelimeler: Bicim sentezleme süreci; Bicim oluşturma süreci; Tasarım

yöntemleri; Tasarım teorileri.

DEDICATION

To MAZIN

Whom his soul warbling in heavens……

To my dear family, my parents my universe, my sisters my moon stars, words are not enough to thank you for what you have given me throughout my entire life ….

Love you all.

Finally as the candy, to my soul mate and eternal heart partner

To my sun shine

To Maha

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PREFACE

"Work on a good piece of writing proceeds on three levels: a musical one, where it is composed; an architectural one, where it is constructed; and finally, a textile one, where it is woven"

Walter Benjamin

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Chapter 1

INTRODUCTION

1.1 Research Background:

The word "Design" conveys multiple meanings and roles. As a noun it refers to the final Designed product. As a verb it refers to the act of design itself. As a "mental activity", it seeks to make certain decisions in the face of uncertainty (Lawson, 2006). As a process, it activates series of actions and events aimed to simulate the final product to test certain solutions until reach the satisfaction level (Salama, 2016). As specified architectural creation, it is a process of bringing a physical entity to existence that embodied a new material form, manifest a new order and organization responding to a specific function (Alexander, 1964).

Aside with the uncertainty coincides with the multiplicity of the word design definitions and meanings. Add the inexistence of any formula neither predetermined steps as guides to fulfil the task. Also, taking into account the accumulating overburdened demands that were constantly thrown on the shoulders of designer to satisfy the demands of time. Altogether, make "design" a constant subject under the lens of many researches, in order to grasp its nature, and to define methods , being as maps leading the stray designer (Terzidis, 1992), (Agkathidis, 2015).

Methodizing of design reached the boom during the 1950 until 1970, the influence of scientific methods arisen at that time, left a print on how the process of design works

and derived. Design steps explicitly verified and controlled aiming to systemize, scientize, and illuminate the exhausting matter of trial and error (Voordet, 2005). The scientific stain engenders the so-called Cartesian view of designing that required decomposing the problems into smaller parts and independently solve each one, after then carry on the synthesis. Bridges (1986) summarized the tendency of problems decomposition in several methods. Firstly, the "Design elements" method as was theorized by Asimow (1962), then the method of "design factors" as was theorized by Jones (1963), and the method of "misfit variables" as was theorized by Alexander (1963). All shared the same concern of simplifying the ascending complexity of design problems.

The second generation of design methodologist as Cross (1993) put it, devoid themselves from tracking of "wicked problems", intending towards identified "satisfactory solutions". In example, Simon (1969) notions of participatory design process, which collaborate with users (community) as an active partner in design decisions, aim to achieve high satisfied solutions at the end. The 1970 was the testimony of death of the design methodologist by the hands of the early pioneers, such as the rejection of Alexander (1971), and Jones (1977). But then Cross (1993) claimed for the reviving of design methodologies until the ninetieth classifying it to five main streams: Systematic Methods, Management of Design Process, Structure of Design Problems, The Nature of Design Activity and The Philosophy of Design Method.

However, despite the diversity of methodologist, there were a shared agreement on the inevitable existence of the stages "analysis" and "synthesis" as norms sequences in design process (Archer, 1965; Luckman, 1967; Broadbent and Ward, 1969; Cross, 1984; Lawson, 1997; Voordet,2005). Analysis is looking after assembling data,

defining problems, and articulation of requirements. Synthesizes is looking for an invention of embodiment to the data from analysis (Bridge, 1986), generating design ideas (Mahmoodi, 2001). But Hamel (1990) confined the definition of synthesis into offering solutions for each piece of design problems, as well as for the whole design problem. While addressed the process of "solutions shape giving" as "design" stage.

The stage of analysis is considered as "rationale and analytic", according to Salaama (2014), contrastingly the synthesis stage compelling for a creative and intuitive forces to carry on the process. On one hand, analysis is "ponderous statements of the blindingly obvious", synthesis on the other, is far from obviousness, incapacitates designer, required a sudden creative leap. The undefined creative leap makes this stage as a "black box" acquired magical jumps and creative insights stem from the intuitive gut of designer (Bridge, 1986).

1.2 Problem Formulation:

It seems that the methodologist studies on design, as systematic methods (Ross, 1988), as a managing of process such as the model of argumentative process (McCall, 1986), as analytical models of design problems (Schon, 1988); (Oxman, 1990), as a thinking activity (Schon, 1984); (Talbot, 1987), are ample and appreciated (Cross, 1984).

However, the real shortfall of studies appears in the post-analytic process, meant here the synthesis stage. This stage is surprisingly remained with a very scare studies and least discussions, as (Brawne, 2003) claimed. Although it is "the most crucial and most difficult aspect of designing and, indeed, the most intimidating to a fledgling designer" (Fawcett, 2007).

Synthesis process was left to the designer intuition and creativity, which are unreliable

sources. As can be citing with Voordt (2005) claim, the intuitive creativity is unreliable, inexplicable, uncontrollable, and relies on luck. Thus it is far from satisfy the elementary demand of methodical approach. This is where the research problem starts, the creativity and intuitive margins instead of being a place for freedom and stretching of creative muscles ability, it turns to a place of incompetence and confusion for designer, since there is no guidance in how to embody the data generated from the analysis process into a physical forms. This intricacy further increased in quality in case of any historical, social or philosophical aspects compelled the desired object.

The problem is also touched by the author himself, since he has been involving in several design studios as teaching assistant for six years, in different levels from the preliminary studios to the graduated ones, in two different schools of design in Sudan and Cyprus. Also, through his practical experience in the different design firms in Sudan. Therefore, the problem of research was examined via close unplanned observation in design studios, whether in academia or practice.

What has been noticed is that, the inability of confused designer in the synthesis phase, especially the fledgling one, push him to resort to random forms and organizations, and then after a long process of trial and error ,a spatial organization resulted from the response to program nothing else may be reached. Then, the following form generation phase would stem from the core of designer's intuition. That is why, even after reaching an architectural object, it would subjected under suspicions as a product that reflects the quality of the architecture.

Decoding the post analysis stage becomes an argent requirement to cope with recent time design problems that have become more acute after the increasing complex

demands imposed on the architectural object. Where, the basic manifestation of program accommodation is not the ultimate goal of the building as reveled earlier by Schulz (1965); and approved later by Costanzo (2012), but there are communicative- historical, social, political- roles posed on the architectural object and must be *inscribed* on it, otherwise it may be judged to fail (Sculz,1965; Venturi, 1968; Brown, 2003; Costanzo, 2012).

Yet, it can be pointed out the severe need for a synthesis paradigm that convey different approaches imply a methodical - based on explicit sequence of actions as Voordet (2005) revealed the primary conditions of methodical based design- sense to free this stage from the intuitive and subjective interventions.

1.3 Contribution to Knowledge

The question of methodizing the process of form synthesis/ design/ generation is not a new invention, but it has been opened many times since the 1960s for many reasons. It has been put under the lenses of many authors among them Alexander (1962) as form synthesis. Eisenman (1976; 1999), Jenks (1997), Kipnis (1993), Lynn (1993) ,to name a few, as a form generation. Venturi (1969); Rossi (1976), as a form design. Each obtain his own belief and motif that resulted an independent polemics on design theory. The result was numerous of form design theories that adopt a particular point of view to the production of architectural form, it may be social, philosophical, functional or historical. Despite this variety and richness of descriptive literature, nevertheless, the area of form synthesis remains slippery and unsecured as highlighted by (Brawne, 2003; Fawcett, 2007; Fakhara, 2012).

The research then is decided to make a comprehensive study upon the theories of form

synthesis/design/ generation. Targeting to restructure the conceptual core of these theories then reintroduce them in a new mold, as explanatory framework. Thus it is believed that the research is attempting to extend the design theory by critically reformulating them. Transforming the polemic theoretical descriptions to applicable prescriptive guidance.

Further, the resultant framework from this study, is expected to be placed as a mediator between designer and the object to be designed, which bringing the certain advantages of:

- Avoiding the arbitrary formal decisions that resulted from the cognitive deficits.

- Turning the black-box of subjective decisions to a glass-box of objective ones.

- Allow the designer to work with reliable and proven basis, which consequently guarantee the architectural quality of generated object.

- Provides easy and simple access to set of strategies and methods, how to apply them, the reason to apply them, and the contextual conditions that can materialized through them.

- Armed designers with a strong backup suitable for different projects ingredients and various contextual conditions.

1.4 Aim & Objectives

- The research main aim is to synthesis an explanatory framework exhibits a set of form synthesis strategies, techniques and tools, to become as normative map

for designers. Refining their conceptual clarity then informing their decisions through the post analysis stage in design process.

Then, the set objectives are:

- To identify the fragmented literature of polemic form design theories, with paying more attention to the ones that based on explicit systematic basis and also the ones possess the name of method or strategy.

- To reorganize the literature of polemical form design theories by establish a series of conceptual affiliations among the theories.

- To appoint Salama's prescriptive theory of "Design Ingredients" as analytical device to dissolve the particular design theory into its basic ingredients.

- To redefine the conceptual structure of the form design polemical theories by extract the basic design ingredients –Strategy, Technique, and Tool for each.

- To analyze the emergence conditions for the above mentioned strategies via analyzing the socio-political and architectural conditions coincided with the invention of the specific form design polemical theory.

- To present the resulted data in an appropriate diagrammatic figuration as an illustration of the intended framework.

1.4 Methodology of the Research

The methodology of this research was set on four main phases, in each, a specific method and tactic was implemented until the intended aim and objectives were

achieved.

The first phase was operated on surveying the literature of design theory texts that address the issue, targeting the keywords: form synthesis, form generation, form production, also design method, and design strategy. The result exhibited fragmented texts looking from different lenses. The existence of the sense of framework was the basic criteria that allowed to select texts for reviewing, either an implicit existence or explicit one. Where the framework on this case means an established structure of set of form design theories concepts.

The second stage was the analysis of literature findings from the upper step. Firstly, a classification was established among the different texts in order to group out the shared form design polemical theories, via a qualitative tactic of correlation process. The theories appeared once are excluded, likewise the ones rely on the subjective unpredictable decisions -meant the non-methodized ones- are excluded. Mind that the correlations occurred in how each author described the form design theory. Secondly, reorganize the literature of design theories. Where the resultant theories from the upper step are affiliated to each other according to the conceptual similarities obtained by them. A qualitative analysis tactic allowed to make this conceptual comparisons, and group the similar theories under one umbrella. The same method also allows to readdress the grouped theories and giving them a new label according to the logic by which they synthesize/ generate forms.

The third stage was the application of Logical Argumentation Strategy to dissolve the form design theories. Where the conceptual structure of each theory was reformulated, via extracting the basic design ingredients to as a Strategy, Technique and Tool. On

this, the prescriptive design theory of "Design ingredients" introduced by Ashraf Salaama acted as an analytical device on which each theory was exposed. A qualitative interpretation tactic allowed to resolve the polemical design theories in accordance to the given definition of each design ingredient.

The fourth stage came to present the results as a Framework that indicate all the (strategies/ techniques/tools) supported by a recipe to describe (how, why) to apply them. The question how was answered by exhibiting the basic design ingredients. The question why was answered by stating the reasons of adoption for each strategy, which analyzed form the conditions of emergence for each polemical theory.

Below, are diagrammed the methodology followed to fulfil the current study, Figure (1.1):

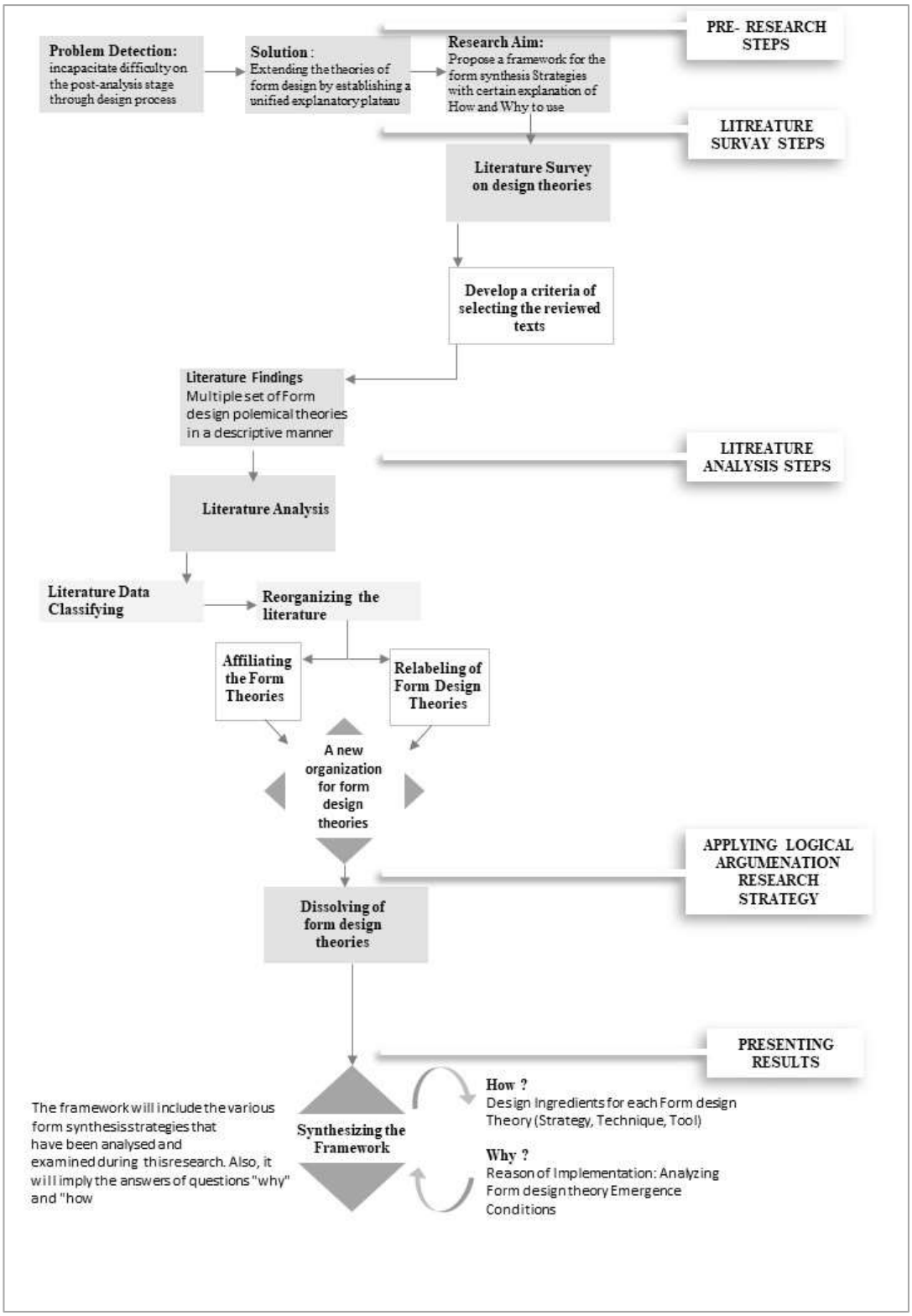


Figure 1.1: Flow chart illustrates the methodology of the research (Created by the author).

1.6 Scope of the Research

The drawn boundary to define the scope and limits of this research are in the listed pin

points:

- This research is an explanatory research takes a narrative manner on the ways forms are synthesized/ generated in architecture, analyzing them in a qualitative manner by making the possible correlations and interpretations whenever needed.

- The intention is too far from any attempts to propose a new theory of design.

- The research is not trying to prefer a form design theory upon the other, or to define a right one among the other. Rather it draws a conceptual map for those theories.

- Any form design theory relies on the exploitation of computer self-generating programs -meant here any algorithmic or parametric mechanisms , are entirely excluded from this research (that puts in the list: the Calculus based programs, The Grasshopper, Rhino, and any other program that use the same principle). But the exploitation of computer programs as drafting machines to apply the free well of designer is not out of the scope.

- The methods of design that meant by the analytical phase are excluded from this research. This put in the list the polemic of Alexander (1963) "Notes on Form Synthesis". Although his thesis concerned about the form synthesis, but Alexander direct the focus to the "problems analysis" as mentioned by (Cross, 1993) and others.

- The empirical application of the resulted framework of this research to test its

validity is out of the scope of this research. Due to the time limitations required by such experiments, where the action research types acquire many cyclical loops and feedbacks in order to verify the real outcome, which it offers.

1.7 Thesis Overview

This research is structured upon five chapters, each chapter conveys information regarding a particular part of the research, and all are organized sequential manner.

The first chapter is comprehensive prelude to the study delivers a general description for the research backgrounds and its context. This followed by the formulation of the problem that motivated the establishment of this research. Then, is introduced the importance of the research and how it is expected to contribute to knowledge, especially to solve the dedicated problem. The main aim and sub objectives then are stated followed by step by step methodology describes in detail how the aim and objectives are going to be realized. In advance, the scope of research is appointed to define the boundary of research coverage.

The second chapter looks firstly after the area on which area the research operates. Secondly, the chapter exhibits the two types of professional literature usually connected to the domain of design. The criteria of selecting the reviewed literature texts is discussed, then the chapter sinks in the various theories of form synthesis/ design / generation polemical theories that were applied in the realm of descriptive design theories. Finally, the chapter introduce briefly the notion of prescriptive theory as a prelude to the coming employment of this type as an analytical device.

The third chapter discusses in the first place the suitable type of research that supposed to be adopted, and explains it, then clarifies its specific characteristics.

After then, the research design steps are revealed, starting form selecting the appropriate research method and tactics to analyse and recompose the data. Which imply the analytic device that selected by the author to reread the form design theories.

The fourth chapter discusses serious of processes, for which the raw findings of literature are subjected. The first one classifies the raw findings from literature survey results, the second process establishes a correlations and interconnections between form design theories. The third one, redefine the conceptual structure of the descriptive theories engendering the design ingredients for each. The last process connects the form design theories to their contextual conditions of emergence seeking to provide the reasons of why designer can claim to adopt the specific strategy. Ultimately, the framework is synthesized and presented in an inclusive diagrams consisting the explanation of strategies, how to use and why to borrow.

Chapter 2

REVIEWING THE FORM DESIGN POLEMICAL THEORIES AS FRAMEWORKS

2.1 Introduction

This chapter looks to the question of how forms were synthesized/generated. Seeking the answer on the literature of design polemic theories invented by the seminal architects, who enrich the domain of architecture through time.

Through this chapter, firstly the area of research will be defined by investigating different types of architecture theory. Then, will be revealed the two types of design theories the research will operate on. The criteria of selecting the texts to be reviewed in literature, will be discussed. After then, the descriptive design theories meant by the scope of synthesizing/generating form will be exhibited in a chronological sense. This will enable to recognize the expanding attitude of those theories through time. Finally, the prescriptive design theories will be introduced as a prelude to appoint one of them as analytical device in Chapter Three.

2.2 Defining the area of research:

Under this heading the different levels of architecture theory is going to be examined in order to identify the particular type of theory the research dealt with. The terms architecture theory, theory of design and polemical design theories, design method and design methodology, each one of them is different from the other in terms of defining and judging.

Theory of architecture is a mediating practice, tends to analyze the produced relations between what architecture is manifesting in forms and their sociological ground in certain contexts. In such way that was appoint architecture as an autonomous force that distort, negate, repress and produce the context through a critical lens (Hays, 2000).

Theory of architecture is a broad scope embraces any conception of "what a building ought to be like", for "who build and who evaluate" (Herarn, 2003). The use of term theory is not an antidote to practice, but it is "the talk" of practice, the consultant reference of practitioners that feed them with correct performance. The correctness departing them from their biases, preconceptions and personal tests. On that sense, theory was appointed as the discourse that portrait the practice of how architecture is produced and pinpoint challenging conditions to it. Feeding the practice by alternative solutions and verified paradigms resulted from the critical observation lens of the theory (Xhambazi, 2016).

Theory of design on other hand, concerns by the discourses on the procedures and methods, strategies, and analysis of the practice of design (Hearn, 2003). Hearn's definition was confirmed by Brown (2003), who described design theory as a descriptive explanation for how design process is operated.

Since design theories in their essence are a practical application of design, the extent of their spread depends on the ability of the inventor (designer) of the specific theory to convince the audience by the efficiency of his theory. In this context, a more precise term was founded by Groat (2013) , which is design polemic theory that is defined as the "designer’ s ability first to express a conviction for his/her own designs, but

ultimately in the adherence to the designer’ s point of view by a large audience".

Design Methods are the systemized procedures to be followed in order to engender the object form (Hearn, 2003). Design Methodology is believed to be the specific operations that help designer in the sequence of designing, in instance, brainstorming and matrix charts (Brown, 2003).

The research yet is going to investigate the particular area of polemical design theories that be systemized and methodized. These type of design theories as affirmed by Brown (2003) can be appoint as norms to guide other designers.

2.3 Types of Design Theory

Voordet (2005), asserted a generalized taxonomy of two types of theories and researches, which have been activated in the "professional literature" discussing the domain of design: the Descriptive Design Theory and the Prescriptive ones.

The Descriptive , concerns by the "question of how design processes works", seeking answers by implementing empirical researches, through them the logical structure are analyzed in order to understand the structure of practicing design process. This type is dealing with facts in the practice ending up with description of reality.

The Prescriptive, concerns by "the question of how to go about design process", in order to make it efficient and effective. This type is normative dealing with conceptions ending up with guiding of reality "what reality should be".

2.4 Descriptive Form Design Theories

Clear enough now the targeted literature is in the area of design polemical theories that

reach an extent of acceptance and systemization to be deserved addressed as method or strategy. These strategies exist in the descriptive literature, since its main aim according to Vermaas (2014) "include describing design practices that are regularly taken as design" and" arrives at understanding, explanation and prediction of and about them". In advance, the survey focuses on the descriptive polemical form synthesis/ generation theories.

The question on the table now, which texts among the wide literature are going to be selected as a reviewing literature for this research? So, it is necessary to develop a criteria of text selection.

2.4.1 Criteria of Selecting Texts to Be Reviewed

The criteria of selecting texts to be reviewed based upon two considerations, one concerns to set a specific time, while other assigns specific condition on the text itself.

In terms of the set time, the 1960s were appointed to be as a start point of selecting reviewed texts, and this extends until today texts. The selection of sixtieth is not arbitrary, rather it relies on its assign as "marking the beginning of contemporary architecture theory ", as Hays (1998) put it. Dedicating this to the change in the history of philosophy coincided with the political theory and practice at that era. Supported also, by Jormakka (2014) registration of the sixtieth as the witness for a revolution on design methods. In terms of specific condition, the text should imply the sense of the framework in the way it describes the design polemical theories. Since the framework definition is the basic structure underlying a system or concept. Consequently, any text attempts to draw a framework to include a systematic set of form design polemical theories, are under the concern of this chapter.

The search includes the keywords: Form synthesis, form generation, design methods, design strategies. The presented results can be categorized into one of two situations, either texts authorized by the architect who invent the polemical design theory himself, or texts that collect set of polemical design theories. The shared factor among them is the implicit presence of the property of framework in all. In Table (2.1) below the results are listed:

Table 2.1: Tabulating the result appeared from searching upon the keywords

Texts authorized by the architect who invent the polemical design theory	**texts that collect a set of polemical design theories**	**Description of how the author addressed the design theory**
(Broadbent, 1975)		Modes of thinking toward form generation.
(Eisenman, 1976)		Tendencies of form evolution
	(Attoe, 1987)	Analogical models of architecture design
(Kipinis, 1993)		Strategies of form generation
(Jenks, 1997)		Complexity models of generating form
	(Brown, 2003)	Theories of design
	(Hearn, 2003)	Ideas that shaped the buildings
	(Vander voort& Van Wegan, 2005)	Design methods
	(K. Jormakka, 2014).	Design methods

As it can be observed from the table above, the way of how the authors addressed the form design theories are multiple, likewise the state of form making act obtains different addresses.

To guarantee that the content of selected texts is never omitted any form design theory, a collective texts of theory, like Hays's "Theory of Architecture since 1968"; Mallgrave "An introduction to architectural theory: 1968 to the present"; Jencks's "Theories and

manifestoes of contemporary architecture"; Gelernter's " Sources of architectural form: a critical history of Western design theory", have been scanned to insure the existence for the must of design theories on this research.

2.4.2 An Overview on the Descriptive Theories of Form Design:

The texts appeared in table (1) will be reviewed in a chronological order to allow the reader to construct a clear image of how those theories expands, weaved and overlapped.

2.4.2.1 Geoffrey Broadbent Framework: Modes of Thinking

Professor Broadbent is one among the most famous authors on the design theory. He authored many books like "Sign, Symbol and Architecture"; "Design in Architecture: Architecture and the Human Sciences", to name a few.

Broadbent (1975) stemmed his theory through observing designers behavior and the way in which they have been fulfilling the task of form generation throughout history. Broadbent (1975) implicitly draw his framework, stating that: " anyone in the act of generating architectural form can (and will) utilize these modes of thinking", which are:

I) Pragmatic design mode, in which the form emerges due to a trial-and-error process of material usage, in other words the form is determined by the available resources. Broadbent stressed the validity of implementing that mode on the cases of new materials usage, as indicated in the suspension structure and plastic air houses.

II) Iconic design mode, it is a matter of shared cultural values leads to a fixed mental image to the final image of design. Frequently, this mode spreads in the primitive cultures by tradition or legend, or by the convention of craftsmanship. The legitimated

signs might open the doors to the imitation due to its domination among both designers and users, as Broadbent exemplified the Bunshaft's Lever House in New York that dominate the image of office building design for at least a decade. Indeed user participation is a potent influence push to the imitation of icons. Later on, Broadbent replaced the term "Iconic" by " Typologic" , then the mode became consist of a pre-established form types, repeated by designers once more.

III) Analogical design mode, simply it is a visual drawings of analogy to solve the design problem. Analogical design - the drawing of analogies - usually visual - into the solution of one's design problems. This mode is based on the mechanism of drawing as mediator to translate the original into the designed form. The mode of Analogy used by the most of 20th centuries architects, whom imitated paints and sculptures, as example not for a limitation, De Stijl, Le Corbusier machine analogy, Wright organic principles, etc.

IIII) Canonic design mode, which was extrapolated form the rules of the ancient buildings forms, by adopting the underlying systems of proportions. This mood received a significant boost from Greeks geometry, Platonic shapes. The canonic mode has been feeding architecture by inexhaustible resources, the Gothic architecture in instance was underlie by the platonic triangles, and the modern architecture presented the modular systems, prefabricated systems.

Later, Broadbent replaced the term Canonic by Syntactic, which became the establishment of rules based design fostering by the New York Five and particularly by Eisenman in front of them. Eisenman inspired by Chomsky's syntactic structures for sentences in grammar, and apply the same formula to analyze and generate forms

transformed from the internal properties (Mahmoodi, 2000).

2.4.2.2 Eisenman Framework: Tendencies of Form Evolution

Eisenman is an American architect, theorist and educator, considered as one of the foremost theorist in the recent decades. A member in the New York Five architects, he designed many significant projects among them the Houses series, Wexner Centre for the Arts, The City of Culture of Galicia. Authored many books among them "Diagram Diaries", "House X", and "Written into the Void".

Eisenman (1976) in his polemic "Post Functionalism ", argued for a new shift offered by the modern theory, which suggests "a displacement of man away from the center of his world". Man is no longer considered as an originating agent. This new vision is a revision for the previous Humanist theory that view the man as the center of the world. Under this new circumstances the object redefine itself to become an independent idea departed from the man. Further, the man became a discursive function, as a part of the complicated system of language. Man role is shifted from a constituter (as he was during the humanism) to a witness. This displacement of man give rise to new design ideology, firstly the duality of form function relation of humanism was entirely challenged, secondly the rise of post humanist concepts of atemporal , atonality and the abstract mediation to redefine the relation between man and his physical environment consisted of pre-existent sign systems (Eisenman, 1976).

Within this new theoretical base, the formula of design could no more sustain to the balance of form/ function, hence it presupposes a new dialectic relationship inherited in the *process of form evolution* and took two new tendencies:

I) First Tendency, the form is a result of series of transformations that start from a

pre-existent geometry merely a platonic solid. In this case, form conceived as a series of registrations.

II) Second Tendency, form is seen "in an atemporal, decompositional mode, as something simplifies from some pre-existent set of nonspecific spatial entities". On that case, form can be conceived as "a series of fragmented signs" that stripped from meaning, reference to represent more basic condition.

This two tendencies can reflect the implicit framework of how Eisenman drew the essence of the new dialectic of the true modern project. Where the nature of object is showing a high capacity to represent itself by itself.

2.4.2.3 Wayne Attoe Framework: Analogical Models

Attoe is an author and educator stressed the value of the historic buildings and neighborhoods. He authored several books, like "American Urban Architecture", "Architecture and the Critical Imagination" and others.

Attoe (1979) used the term "analogies" as the way of how theorist prefer to see architecture in order to identify its properties. Where, the adoption of specific analogy in architecture eases the way of grasping the notion of it. Examples like "Organic architecture", "Linguistic analogy", and "Machine alike" are not far from touching any architect ears. Analogies offer a sense of secure frame for the architect to organize his priorities and to define the hierarchy of decision making through the journey of design. Consequently what should be solved first, and what could be delayed, becomes clear for designer.

The analogies models (implicit framework) of "recurrent time", as Attoe (1979) stated,

can be listed as below:

I) Mathematical Analogy: In this Model the numbers and geometry are fundamentals that guide the decision making during form making process. The pure forms and the symbolic numbers in buildings are believed to be a way of tuning with universal order. The golden section, the proportion that prevailed antique architecture is a great example of the mathematical analogy, the pure forms, cubes, pyramids, cylinders, cones, and spheres are appointed the most preferred well-known primary forms in architecture.

II) Biological Analogy: In this Model, building is seen as a biological process rather than an aesthetical one. This tendency pays more attention to the relationships between the building and its settings and then between the parts of the buildings in themselves. This ideology was advocated by Frank Wright, who addressed it as "Organic Architecture".

Organic Architecture consist of conditional principles that ought to be realized in order to achieve the organic form notion. First, It growth outward from within, harmonizing with its being condition. Second, organic as a term in architecture refereed to part- to – whole as whole- to- part, consequently the elements relation are integral. Third, the construction applied the nature of material- do not treat the materials, stones used as stone in example. Fourth, harmonize with the site, time and environment.

An advanced type of this analogy is termed "Biomorphic Architecture", whereby the processes of organism growth and movement through time is adopted and reflected as a dynamic growth of forms. This tendency gained currency in 1960s, exemplified in

projects like Stinco's Travelling Hall, Ron Herron's Walking City (Figure 2.1.1), and Fisher and Conolly's Multi-Celled Pneumatic Structure. The common attribute among them are the capacity to grow and change via regeneration, division and expansion in order to captivate with inner demands or outer influences.

III) Romantic Analogy: This model of architecture is evocative, tackles the emotions of the beholder to unleash a particular response. The evocation can be realized in two ways, either through exaggeration or through calling up associations.

The former is an exaggeration of formal devices in a specific manner to intimidated awed or frightened feelings, via unfamiliar scales, excessive contrast and bizarre forms. The expressionist ideology in the early twentieth in Europe is an example for this tendency. The latter is an employment of natural references like decay, exotic places, past and childhood memories. The housing at Yale University designed by Eero Saarinen in a medieval sense, by applying an earthy and monolithic masonry to give a sense of strength and simplicity, refer to Figure (2.1.2).

Figure 2.1: Exemplifying the analogical models of architecture (Combined by the author) 1. Walking City by Herron, based on the biological analogy model of creation, (Herron, 1961) 2. The housing at Yale University designed in a medieval sense, by applying an earthy and monolithic masonry, (Attoe, 1979) 3. The two types of signs in architecture as claimed by Venturi "Duck and Decorated Shed". ducks are buildings that express explicitly the housed activity by all parts and organization , while decorated shed is the building that confined the expression of sign in the façade, (Brown,1968)

IIII) Linguistic Analogy: This type is focusing in the communicative aspect of the building, insisting to send messages to beholders via reloading building by particular information. This ideology takes one of these three models, Grammatical, Expressional and semiotic.

The Grammatical model presupposes rules (syntax and grammar) that govern the relations among the elements of architecture in general and elements of buildings in particular "words".

The Expressional model presupposes the building as a channel of expression, in which many comments can be expressed, comments about site, about inner activities, about reasons of their built, .etc.

The Semiotic model presupposes building as conventional signs about what it is and what it does. This model branched into two : "Ducks" and " Decorated shed", Ducks are buildings that express explicitly the housed activity by all parts and organization , while Decorated Shed is the building that confined the expression of sign in the façade that attached to the building and can be detached as well, as Figure (2.1.3) indicates.

V) Mechanical Analogy: In this type the building is seen as a machine in terms of functioning, stripping from the irrelevant parts and unnecessary decorations. Building "must be true to itself, logically transparent and virginal of lies", as a machine. Beautiful objects are explain simply what they do and what they are, straightforward promise of function, like ships, automobiles and airplanes.

VI) Problem- Solving Analogy: In this type the reasoning and factual knowledge are

preferred than the inspiration. It is more systematic approach of thinking, view demands of buildings as problems that can receive appropriate solution after the proper analysis. Design becomes a step by step process based on the solid information. The processing of problems pass through analysis, synthesis and evaluation.

VII) Adhocist Analogy: In this type design is respond to immediate need, forms composed of available and immediate materials without any attempts to create an ideal. Then, architect primary role to create the best ideal from the existent conditions and resources, by operating a "lively and fumigated eclecticism". Charles Eames's house in Los Angeles is a case study full of adhocism ideas, the house is a catalogue of elements that were selected the most readily and cheaply building elements available.

H) Pattern Language Analogy: In this type architecture of the specific culture is seen as the shared and conventional language within the specific culture. Where the patterns of needs are identified and agreed upon, same as the form that would satisfy those needs. The patterns then, describe the problem that occurred again and again in the given environment, and describe the approved solution for that problem. The complete form is composed through the accumulation of patterns that are placed by the designer to satisfy the needs of the specific project in the specific conditions.

I) Dramatugical analogy: in this type the buildings are considered as the stage for the human activities, whereby people play roles. This type of analogy takes two ways, from the playwriter view, and from the actors point view.

2.4.2.4 Jeff Kipnis Framework: Information and Deformation Strategies

Kipnis is an architect, critic, designer, and theorist. Teaching in several U.S

universities, like Ohio State University, Princeton University, and the Southern California Institute of Architecture, and others. And authored several publication like, "In the Manor of Nietzsche ", " Chora L Works: Jacques Derrida and Peter Eisenman", and others.

Information and Deformation as a polemic design theories were discussed by Jeff Kipnis, the American critic, theorist, urban designer and academician in his polemic "Towards a New Architecture". Where, he instilled the seeds for a new architecture from his insights to the exhibition of MOMA for the works of Eisenman, Libeskind, Tschumi and others. These works for him offers a new framework for a new ideas in architecture, "one that promises both formal vitality and political relevance" as he stated.

Kipnis introduce a post Postmodern Architecture avoiding in it the Modernism mistakes of erasing the past and starting from a tabula rasa on one hand, and embracing the Postmodern notion of celebrating differences and continuing the past, on the other. The new architecture develop the recombination logic of Postmodernism, engender heterogeneity and searching for new forms.

Kipnis exhibits five principle that define the generalized spatial/formal criteria of the new architecture as a: 1) Vastness: negotiate a middle condition between the homogeneous, universal space and the fixed hierarchical of traditional articulated space. Design implication: free plan that bear the discontinuity and disjunctions, extending the notion of free plan to "free section", using the resultant of "residual spaces". 2) Blankness: surpass the references and semiotics in form by erasing the ornaments, and tend to formal abstractions. Engage in semiotic affiliation and

unexpected forms. Design implications: the notion of free massing replacing the notion of free façade. 3) Incongruity: the ability to maintain the relieved data. Design Implication: repeat design postulates of proportion and harmony among system conditions, structure, i.e. between detail and formal organization. 4) Pointing: building must have a point, must be projective, reflecting social arrangements or political context.5) Intensive coherence: in a monolithic arrangements that bear multiplicity and contradictory of relations.

The two camps emerges from this new architecture are the deformation and information camps, who in common the shifted their attention towards the "geometry, topology, space, and events".

I) Deformation Strategy: aims to generate forms that nevertheless resist into stable alignments. The resultant forms are grafted abstract topologies, which can never decomposed, simplified or analyzed by the conventional architectural language.

Deformation emphasized the visual effects of the engenderment of new spatial forms, derived by event spaces generated from new geometries. The forms to be generated are in most monolithic, to achieve the desired blankness condition. The Deformation strategy used by Bahram Shirdel in Nara Convention Hall. At Nara, Shirdle generated a monolith form, box- in- box section, the collecting graft is shaped by folding a three-bar parti with tow geometries. The complex folded form resulted many residual spaces –that can be realized in section- accommodated the major spaces of the project, consequently, the theatres and their lobbies are floated on those residuals, Figure (2.2)

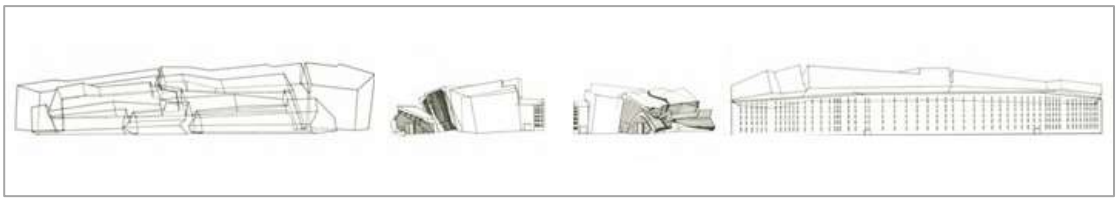


Figure 2.2: A diagrammatic illustration exhibits different orthogonal sides for the spatially folded Shirdel's Nara Convention Hall (https://www.pinterest.com/pin/495396027738569499/)

II) Information Strategy: aims to generate forms by collecting grafts, via injecting different mixture of programmatic and formal elements to a neutral modernist monolith. The resultant residual spaces of that combination activated by technological effects, events, programmatic innovation. Information strategies ignore the aesthetics of forms and emphasized the role of programmatic events inserted to spaces. The forms are the same modernism orthogonal language, monotonous and simple. Which realized the *blankness* condition that suggested before, even further that blankness was emphasized when the forms surfaces had been exploited as screens for projecting images.

The Information Strategy is exemplified by Tschumi's design for the National Centre of Contemporary Arts at Le Fresony, where the project was supposedly established upon the historical buildings of Le Fresony. Yet , the historical quality of them prevent any erasure and replacement possibilities, also Tscumi escapes any restoration approaches that can end up with a collaging of elements in the new proposal. Then, he entirely enveloped the whole complex by a monolithic roof to create a cohesive collection of fragments, that what Kipnis was termed as "Graft". The resulted form was a blank, monolithic unity (Figure 2.3), the residual spaces interconnected with a system of catwalks and staircases, visually interlaced with ribbon windows, partial enclosures, and large transparencies. This system is perceived by the beholder as a

disjointed views from inside or outside. The residual spaces were activated either, by inserting certain programs as programmatic events, i.e. the historical roofs were treated as mezzanines. Or activated by technology as material/events, i.e. the unusable residuals were exploited as screens for projecting videos on them as part of the exhibition.

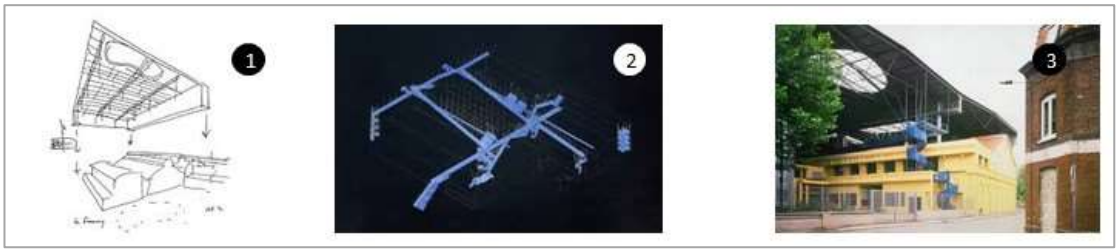


Figure 2.3: Tschumi's design for the National Centre of Contemporary Arts at Le Fresnoy. 1. The monolithic envelope superimposition 2. Diagramming the movement vectors to activate residual spaces 3. Picture for the built project shows the superimposed systems. (http://www.tschumi.com/projects/14/)

2.4.2.5 Charles Jenks Framework: Complexity Generative Formal Language

Jencks is a cultural theorist, architectural historian and landscape designer, he authored over thirty books among them, "Language of Postmodern Architecture"," Adhocism"," The Iconic Building".

The influence of complexity theory on architecture and design was fostered by Charles, in his polemic" The Architecture of the Jumping Universe: A Polemic: How Complexity Science is Changing Architecture and Culture ".

Firstly, Jenks (1997), defined complexity science and theory, the revolutionary discipline of complexity theory is a new scientific perspective directed to explain the dynamicity of real life phenomena. Changing the classical linear world view, and challenging Newtonian physics of cause-and effect. Complexity can be seen as theory that explains the probability of organizations emergence as a result of components

interaction after the loss of equilibrium between them due to overflow of energy, matter, or information, the resulted organization would oscillate between chaos and order. The system creatively interacts in a new unpredictable non-linear manner, creating a process of self-organization sustained by the constant input of energy and feedback.

Secondly, he discussed that how architecture also begins to raise up its own complexity. Citing by Jane Jacobs (2016) where she refuted the pure zones of modernism urban ideas, especially Le Corbusier's ones in American cities that brought the death and destroy to cities. Jane ended the book by a clear description for the problem of the city, a city is not a matter of pure functional zones, or the clear five divisions- Le Corbusierian five sectors: living, working, governing, recreating, circulating- rather it is a matter of " organized complexity", a group of diverted functions in type and scale interlink to create a living organism (Jacobs, 1961).

Then, he discussed the case of Robert Venturi, and how he made a premier realization to the axiomatic attachment of complexity to architecture in "Complexity and contradiction in Architecture". Venturi (1977) harshly criticized the modernism tendency of simplifying the conditions of the problem to engender a simple pure forms, by clearly refuting them revealing that the problem in itself is tremendous complex and that automatically resulted an intricate conditions in the form to absorb it. Furthermore, the superficial simplicity adopted by the modernism is only due to their sanctification to the idea of the language of simplicity nothing else. From that sense, the book contains ideas and phrases refer to complexity and contradiction such as "double functioning", "juxtaposing contradictions"…etc. ultimately, Venturi intention was to reflect complex conditions through collage of pre-existing, familiar solutions,

and the eclectic manipulation of various languages that surround the object on the urban level.

Jenks argued for the effect of the new scientific perspective towards universe as a dynamic creative entity on architecture discipline. He revealed the new appealing that loomed in the horizon demanding to enrich architecture via questioning the style and content. Ultimately, he declared that architecture must transcend to become a microcosm for the universe, acting in the same behavior as a process of energetic growth and sudden leaps, and catastrophes, a beautiful waves, twists and curls.

In other words Jenks seeks to generate form through reflecting universe processes and generative systems, with grammar of elegant wave forms, smooth folds, variations and fractals. Under the question of:" In which language shall we built?", Jenks introduced his framework for the complex form design theories:

I) Self-Similar Fractal's Language: This language based on the concept of fractals, the exemplary fractal object shows a high sameness attitude, where the resemblance extends from the parts to each other to the part and whole. The self-similarity is nor a direct repetition for the system of units either it is transformational similitude.

In virtual sense, the fractals implementation in design can be referred to the advocates of organic architecture from both the classicists and modernist, even though their employment for the self-similar concepts was in unconscious sense. In fact, they adopted the organic unity which refers to unity but with variety, that implied the same concept of fractals.

The application of fractals also accompanied with other concept that is the strange attractor. It is the force field to organize the chaotic movement of the self-similar parts around maxima or minima turning the absolute chaos to ordered one, e.g. turbulence in the water flow that collecting behind tree leaves, at the beginning they chaotically float around but after a while they will attracted to the core from one orbit to another never in the same place.

Fractals concept appeared as a repeated but varied formal system in several scales, as the flowers several foci. A clear exemplary for this respect is Bruce Goff the pupil of Frank Wright and one of the influential protagonist of organic architecture, although he applied the concept of fractals before it has been affirmed, but he was extrapolating the grammar of natural forms. In his Price House the self-similar trihexes, hexagons and triangles organize the whole form in macro and micro scales. The conversation of sixty degree angle, in all sorts of subdivision and multiplicity, with the set of hexagons compose the spatial organization and the masses in the three dimensional form, besides the inner details of the ceiling decoration within the music room, refer to Figure (2.4).

Another dialectic of fractals but this time with the concept of strange attractors, exhibited in Goff's Bavinger House. The strange attractor embodied as a central route in a spiral manner, which attract visual direction and motion of the pods -self-similar circular spaces housed bed room, withdraw room, and study room- in a differentiated sense depends on the ascent and descent. The spiral rule act as a deterministic for the chaotic pods by attract them around his orbit. The strange attractor force absorbs a very bizarre mixture of materials: stainless steel cables, Walnut trees pieces, rocks, glass, fish net, a mast of oil rig, a disposed bomber's blister for features of light. All create a tremendous heterogeneous language (Jenks, 1997), Figure (2.5).

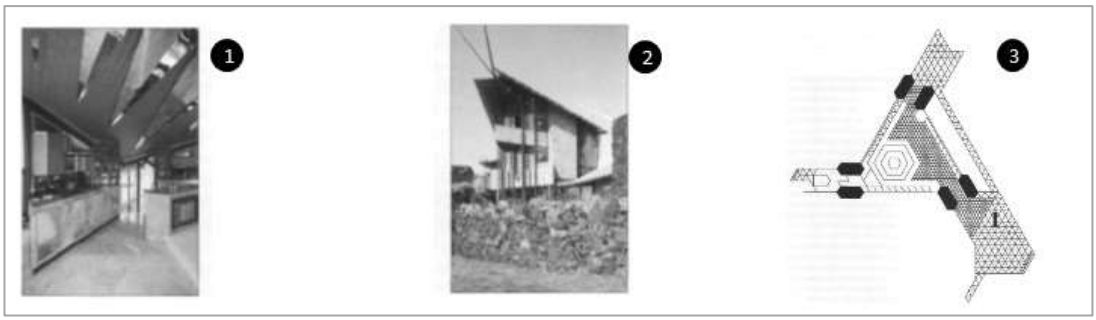


Figure 2.4: 1 & 2. Price House after completion interior and exterior views, shows the fractals shapes forming the interior and exterior spaces. 3. Joe Price Studio plan generated via using fractals, a set of self-similar triangles, hexagons, trihexes organized in different angels and scales, designed by Bruce Goff. (Jenks, 1997)

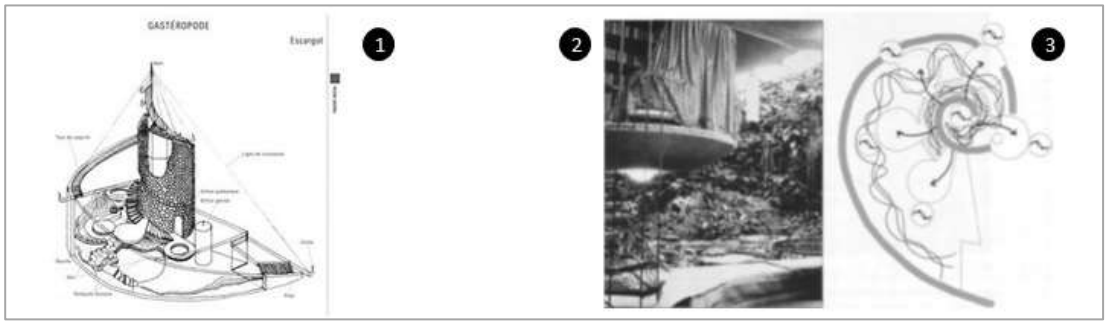


Figure 2.5: 1. Bavinger House 3D diagram, shows the general spatial organization around the central strange attractor. (http://www.archdaily.com/171574/ad-classics-bavinger-house-bruce-goff). 2. Inner view shows the floated spaces enveloped by a hunting net.3. Bavinger plan, the strange attractor organized the chaotic motion of the fractals. (Jenks, 1997)

II) Catastrophes and Continuity (Folding Language): This language based on the Catastrophe theory of Rene Thorn, which concerns by the dramatic response that occurred under a small amount of stress, when the system pushed from its equilibrium point under the influence of any force then suddenly the catastrophe happens. Thorn built his theory on seven levels, but the first level that describes the so-called "Cusp Catastrophe", was the one attracted architects to adopt as was asserted by Jenks.

The Cusp catastrophe can represented by a gently folded piece of paper, it arises in the case of "a probability goes bimodal", when the two modes reach the maxima. An exemplary for that is the Aggression scene of dogs, the conflict between fear and rage. Here a two dogs approach towards each other barking madly, the point between fight

or flight/ rage or fear, is the moment of the fold, catastrophe, and the moment of turning from order to chaos, Figure (2.6).

Jenks then, stressed the role of fold in offering an alternate strategy for the differences and heterogeneous mixture. Departed from the previous strategy of collage and violent fragmentation used by both Postmodernism and Deconstructivism, the fold offers a smooth transitions, inclusive unity of reconstruction.

The catastrophic fold was implemented by Eisenman in Rebstock Park in Frankfurt. The catastrophe tool allow Eisenman to create an abrupt changes in form, from figure to ground, from commercial to housing, from urban to rural, via agency of unseen complex folds. The moment of the unseen folds settled in an in-between moment, nor the old neither the new, neither figure nor ground (Eisenman, 1992). Jenks explained the folding process: The site was an arena for a combination between two urban systems, one is the linear Siedlung Block of modernist practice, and other is the traditional housing. Then the whole site subjected to a gentle folding process revealed a hybrid mixture of interwoven two types, and also generate a unitary between whole and parts, Figure (2.7).

II) Superimposition Language: Superimposition invites a complex visual qualities by presenting numerous layers simultaneously, blurring the contrasts, and adjacent the categories together while preserving their ingredients (Jenks, 1997).

In the competition of Parc de La Villette project in Paris, the birth of superimposition, Tschumi the young architect at that time decided to infract the prevailing design strategies and ignore all the precedents ideologies (Tschumi, 1996). The point of

departure for the project was a topological configuration- grid- that consisted of three autonomous abstracted systems: points, lines, and surfaces. Each system obtain its independent logic.

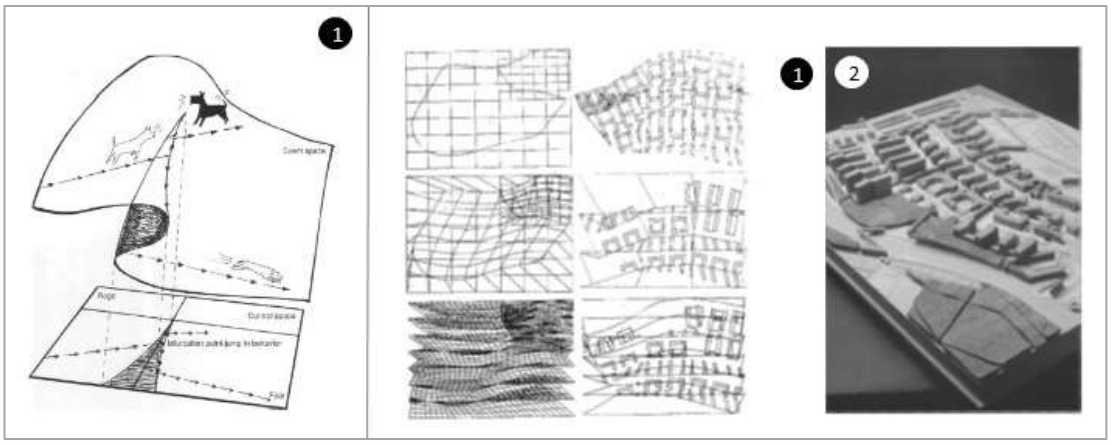


Figure 2.6: 1. Cusp-Catastrophe diagram exemplified by the behavior of indigenous dog, to the left, follows a linear behavior, suddenly breaked at the moment of the fold resulting a catastrophic effect on the behavior end up with flight or fight (Jenks, 1997)

Figure 2.7: 1. Organizational series of gentle folds diagram erase the notion of figure and ground, Eisenman's Rebstock Park Housing 2. Model photo for the same project, shows how the buildings details affected by the wavy fold. (Jenks, 1997)

The independency of the systems allows to preserve the identity of the park, when the foreign circumstantial logics intervenes with their own independent scenarios (Tschumi 1996). Firstly, the grid offers a mediator for the spatial organization by defining the potential points, the grid provide a neutral plateau lacking hierarchy and centricity (Tshumi, 1996). Secondly, the points-or le Folies- are hosted heterogeneous selection of programs varied from cafes to a guard room, each point is constructed by superimposing tow texts, one from the literature of (James Joyce book) and other is the architectural text. Thus it embraced two conflicting logics stemmed from varied systems (Tshumi, 1996), Figure (2.8).

Thirdly, the system of lines act as the circulation paths through the park. The system

of surfaces accommodate large pieces of landscape, the spirit of the park itself, which become as an infill between the other two structures (Tshumi, 1996). The three structures superimposed on top of each other allow the each system to exhibits its own attributes, which gives a high programmatic freedom distribution, as if it is self-organized process, where each system provide the suitable conditions to settle-down (Tshumi, 1996), Figure (2.9).

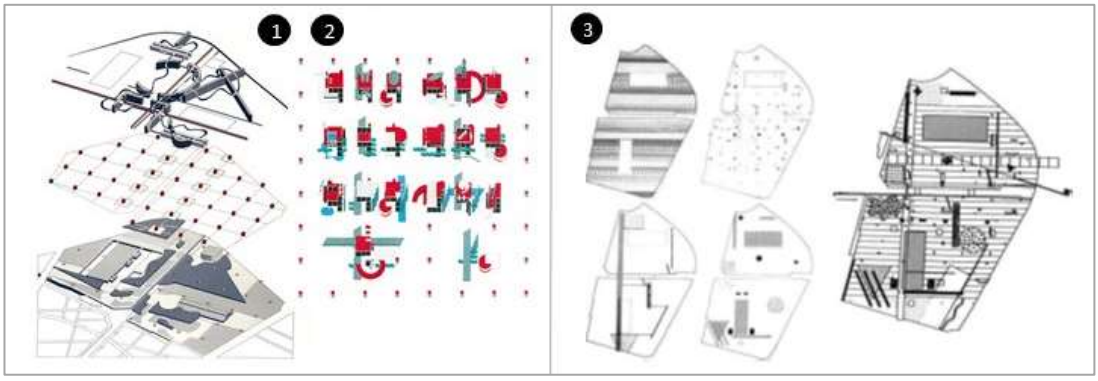


Figure 2.8: 1. Bernards Tschumi's Parc de le Villete superimposition diagram, the three systems of points, lines and planes. 2. le Folles projection diagrams, embraced two conflicting logics stemmed from varied systems (http://arsalive.blogspot.com.cy/2013/01/paysage-folies-tschumi.html/)
Figure 2.9: Rem Koolhaas, Pare de la Villette, a rich congestion diagram resulted from superimposition of various systems Various organizational types, (Jenks, 1997)

In the same competition of Parc de la Villete, Rem Kolhaas once again showed a similar design ideology as Tschumi. Kolhaas brought different systems and superimposed them as separated layers, which are: 1- Activity and planting bands 2- Confetti, a randomized sprinkling small elements 3- Existing programmatic elements in the site 4- Circulation and connecting layers. Kolhaas did not allow himself to interrupt the process from as a without force, rather he became an audient and let the ingredients to self-organize themselves from within resulting a very complex order (Jenks, 1997), Figure (2.9).

2.4.2.6 Fil Hrearn Framework: Ideas that Shaped the Buildings

Fill Hearn- the historian, theorist, and professor in University of Pittsburgh. In his book "Ideas that Shaped the Building". Hearn brought those ideas and introduced them as analyzed design methods with clear examples for each method. The methods were exhibited in a chronological sense and as following:

I) Theory before 1800: Classical Design method, II) Theory from 1800 to 1965: Rational design methods, Generative planning as the basis of design, III) Theory since 1965: Rationales beyond Rationalism methods.

I) Theory before 1800- Classical Design Method: The term classical refers to the ancient times returning to Vitruvius's "Ten Books in Architecture", the first theoretical text in architecture. Vitruvius registered many prescriptions for buildings and building types, but "the heart and soul" of these writings established a prescription for the "explication of the orders" in the most architectural ideal on the eyes of Vitruvius the Peripteral Temple. Which has become a benchmark for other building types in terms of the inevitability of its ordering reference, either by direct adoption of planning schema or by employing part of the structure and décor (Hearn, 2003).

The desired imitation of ideal image of the temple formulate design to become an Outside-in approach starts by justifying and designing the desired general image of the building schema, after then the suggested program requirements would accommodate in. From that, adjusting the appropriate proportions was corner stone for Vitruvius's design process. Firstly, achieving the eurhythmy by adjusting the local proportions of the order itself, e.g. define and adjust proportions of the parts of the Iconic order the base, the capital and the entablature, then picked the ratios of columns

width and height with the account of intercolumniation. Secondly, applying the symmetry for the whole by set the modules number at the temple front, which are varied according to the number of columns and desired intercolumniation. The length of the module is specified by the by column shaft thickness, and this thickness is the main derivation of all eurythmic proportions, e.g. the shaft of the column in Doric façade might be tow modules, from it all the whole dimensions are derived either as multiplicity or fractions (Hearn, 2003).

Vitruvius enthusiastic pursuit to define a formal prescriptions to achieve the quality of ideal image architecture continued by his successors from the Renaissance theorists. Who accepted the necessity of the orders for beautiful buildings design, and appoint the orders as doctrine should be obtained by any accomplished architect. The Roman's ruins in Italy served as inspiring sources of beauty and their embedded orders are employed in different building types as prototype for the formal composition. One of those sources is the Colosseum exterior-the multistory façade with the superposed orders- that became a suitable prototype for the multistory façade (Figure 2.10.1). The other prototype model that adopted as a grandeur front is the triumphal arch and particularly the one of Constantine (Figure 2.11.1). Alberti borrowed the tow systems in tow projects, in his Palazzo Rucellai façade he applied the stacks of orders (Fig 2.10.2), and in church of Sant' Andrea he applied the triumphal arch (Hearn, 2003), Figure (2.11.2).

Symmetry as substantial principle of design preserved its role for Renaissance architects , but in different manner, nor the Vitruvian notion of harmonious relationship between part to part and all to whole, either it is turned to Albertian notion of identical balance of parts that organized with reference to a central axis. This notion

has endured until our current time on the written theory of architecture as" the mirror-image arrangement of parts along a central axis" (Hearn, 2003).

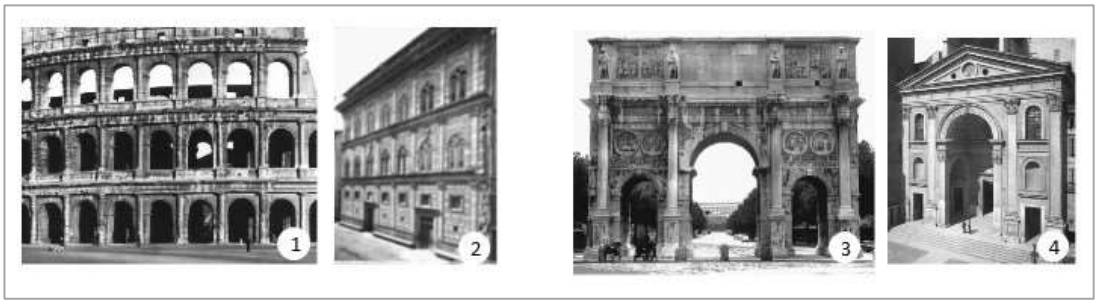


Figure 2.10: 1.The paradigm of superimposed orders: Colosseum, Rome
2. Renaissance superimposed orders: Palazzo Rucellai, Florence, by Alberti. (Hearn, 2003)

Figure 2.11: 1.The paradigm of the triumphal arch: Arch of Constantine, Rome
2. Renaissance triumphal arch-cum-temple front: Sant'Andrea, Mantua, by Alberti. (Hearn, 2003)

Palladio, in turn, had a hand in developing the systematic thought of design during the Renaissance, in his villas design, which has been subjected to many architectural analysis through history, almost establish a new direction in form designing in architecture. Likewise his contemporaries Palladio extended the approach of ideal image architecture but not through the direct borrowing of elements rather through subjecting the process under the pursuit of beauty. This appear in the way in which he arranged the villa spaces seeking the formal coherence rather obeying to functional rules, besides the measures of spaces were controlled according to a specific proportions formula borrowed from Alberti , as can be seen in Figure (2.12),(Hearn, 2003).

Classical architecture was continuing in feeding architecture with the ideal forms of Alberti and Palladio for three centuries later, underlying these forms was still Alberti's bilateral symmetry. Until the arrival of 19th century then formal ideals and bilateral symmetry became disfavored.

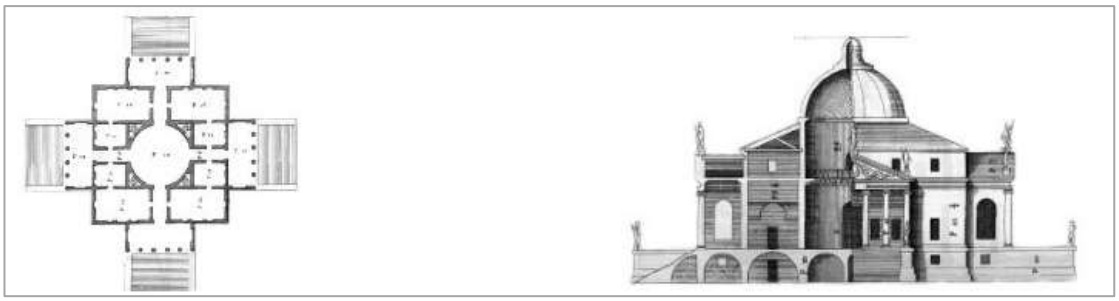


Figure 2.12: Palladio's Villa Rotonda, the plan generated via harmonies proportional system, and then the ideal images inserted in the elevation. (Hearn,2003)

II) Theory from 1800 to 1965-Rational Design Methods: The term "Rationality" in architecture design world referred to the propulsion of the process as a problem solving mode. Rationalizing design is a notion began to originate since the revolutionary architectural ideologies established in France by the hands of Durand, followed by Guadet and their contemporaries (Picon, A, 2000). The shift from the classical temples to the Gothic cathedrals as ideal type was a turning point in the theory of design. Design then turned to a matter of problem solving rather adherence to prescription of tradition, design turns into rationalism rather than scholasticism. The method of designing the cathedrals owe much to the reasoning, the complexity of spaces composing was back to the multiplicity of accommodated functions, the assembly of structural elements was resulted duo to the building stability, and the assign of building materials was governed by seeking an optimal budget (Hearn, 2003).

Jean Necolas Durand the French architect showed a rational attitude by obeying building elements under conditions of utility that complies with social conventions. Thus the elements forms are hollowed by the usage. And there, is the differentiation between them and proportions, one is resulted from the materials nature, while the other took their necessity only from the irrational habits -he meant the orders spread as a dogma ought to be followed. The new simple elements replaced the traditional complex one that reflected on the simplifying of the invention process to establish a

new post-revolutionary orders. The orders appeared in Précis were a result of mixing, simplifying and regenerating operations for the traditional order to fit the utility. Such operations were occurred for the first time as an eclectic technique to define a repository that offer vital recipes to answer the true social demands.

Generation of plan took several stages, as shown in Figure (2.13), begins by an initial analysis for the purpose of intended building, that guide to a primary formation for the project: either the project would be in one piece or divided; either the parts should be identical or distinguished. This formula crystalized by a set of primary and secondary axes, which owes their primacy to the concern of geometrical regularity. The elements starts to be placed respectively, walls followed the axes, columns settled inside the walls perimeter; the other elements ought to be accommodated in the plan view, from which section and elevation is generated (Picon, A, 2000).

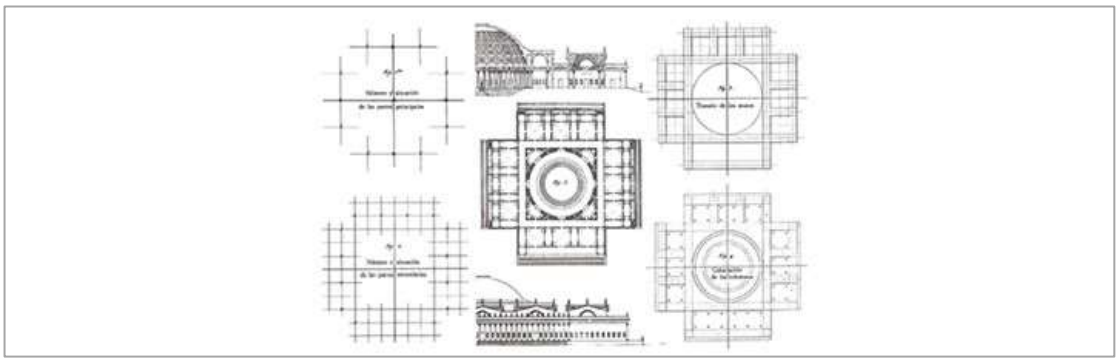


Figure 2.13: Jean-Nicolas-Louis Durand, the composition process sequence as a model for any project compositional sequence (Picon, 2000)

Viollet le Duc the prominent French architect and theoretician showed an intensive tendency to invite the rationality in to the design process, evidently, in his articulation of an inclusive theory of design method. The role of Durand's theory of composition to influence Viollet's method is obvious, nonetheless, it was him who developed it more coherently and in detail. His theoretical framework introduces in his "Histoire

d’une maison "(Hearn, 2003). The theory articulated a "step-by-step" approach for evolving design from the scratch. The print of the rationality revealed since the first premise of the process that the form of the building is not a free futility of the architect, rather it is a direct transformation for the "patron needs", his spatial needs and requirements.

The starting point is then the designer might study the site soil and make a test to stand on the capability of it to bear the intended (building) s loads. The designer must consider the building regulation laws that obligate his design choices, e.g. the predetermined zoning for his building type, the allowed height, setback from the front street, and the density of built area. Then, designer must analyses the site conditions to allocate the building in the appropriate location, that study include the prevailing wind direction, the view, the best approach to the site, the appropriate place for the services spaces accompany with a service access, and after that the topography and natural features should be kept in considerations to be exploit later.

Secondly, then and only then, designer can start to develop the plan schema by an intensive review to building program that was developed under the consultation of the patron. The most important space should locate in a desirable, well-oriented location at the site, then followed by the less important spaces in a hierarchal sense. The honorific program parts occupy the proper locations, while servant spaces be in more obscure locations. The similar activities take place adjacent to each other, the different activities spaced out by a high consideration for a direct clear link with them. At the end the plan can be seen as a series of adjoining or disjoining of program spaces based upon the exposure to light and view. A sensible dimensions should be imposed for the spaces considering the feasibility of different functions. The dimensioning must

secured the walls width. The circulation area and paths should be added to the schema before it turned to working plan.

Thirdly, the spaces covering phase by applying a roof, Viollete proposed to project a section from the building plan, in order to understand the heights variation of the building spaces, besides helping to decide the appropriate number of structural elements for the roof, and finally it helps to visualize the roof shape in conjunction with plan. The selection among different types of structure and materials is most likely determined by the budget.

Fourthly, the elevation design, which resulted from the functional and structural organization, after projecting the layout of spaces. Any geometric regularity or any bilateral symmetry are completely eliminated, unless in the case of functions duplication, the openings placement and proportions are adjusted in accordance to spatial need, likewise the entrance allocation choose the best spot fitted the spaces. The inconsistency and variations resulting from the compliance to the rational method will be unpleasant for the consistent rules of irrational formal squad as asserted by Viollet. The visual look of the elevation will owed a significant impact to the assigned materials and appointed structural system. Decoration that emanates from the handling of structure as a sufficient solution for structural problem is appropriate for architecture, unless it is over need (Hearn, 2003), Figure (2.14).

Indeed, the rational thinking of form designing freed architecture from the past prescriptive formal ideals, but on the other hand it suffers from the lack of artistic spurs. Viollete le Duc himself admitted this failure on his own rational method to arm designer with the splash of artistic vision. Consequently, he appointed metaphor to be

the spur of designer imagination that to complete the journey of design (Hearn, 2003).

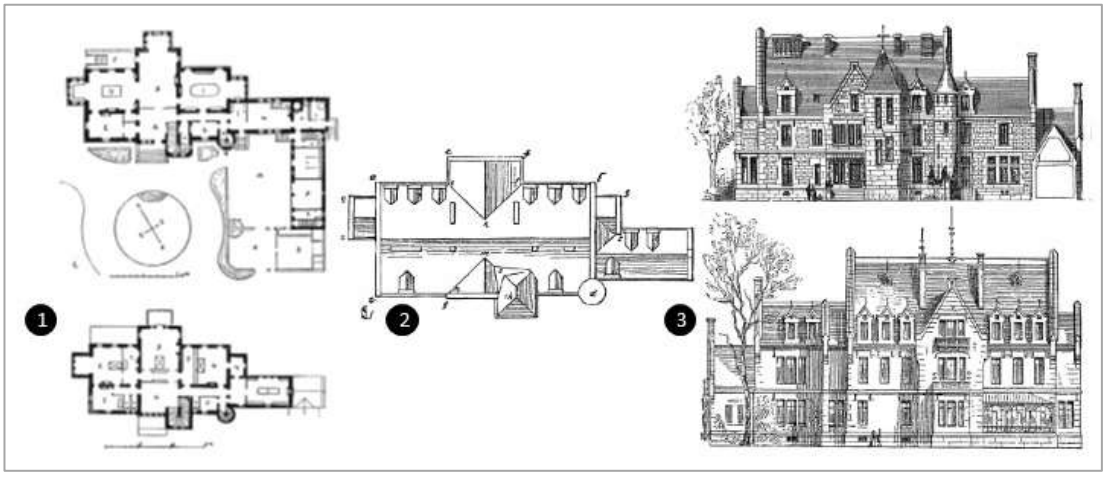


Figure 2.14: Violete le Duc design process evolvement (Heran, 2003) 1. Organizing the spaces duo to importancy and environmental forces 2. Selecting appropriate roof type then placing the suitable structure 3. Projecting elevations and make openings wherever needed.

The modes of metaphorical adoptions were cleverly exploited by the pioneers of modern movement. Starting by Frank Wright the prophet of organic architecture, nature as metaphor, but must mid that the metaphor nor a naïve imitation of shapes in nature, in contrast it is a very intelligent integration and adoption of the growth system. This can exemplified in Alvaro Aalto's apartments in Bremen, the organization and ordering form yields to the inner spatial needs for light from south, like the growth of sunflowers, as shown in Figure (2.15), (Mardazo, 1995).

Wright in his "In the Cause of Architecture" reflected must of organic architecture principles. The first premise discussed the heart issue of design that is form, which must be arisen from the true conditions, that is the true form; since the conditions of society are changeable and the individuals are celebrating their variety, thus architecture must do the same (Wright, 1975).

The second premise came from observing nature with her perfect forms; the attribute of individuality of parts rarely sacrificed, rather it is perfectly deformed or mutated. Likewise Architecture, if the building is rightly assembled in real organic sense with considering the right proportions the picturesque sourly take care of itself (Wright, 1975).

The third premise called for expressing each building by its' own form, the elements of each form inherited from one basic idea control elements scale and character. Fourth one, about integration with nature, building must easily grows from site and harmonizes with its natural context, if it is not within a natural one, it must not speaks loudly. The boundary between inside spaces and outside must be blurred by using windows, which considered as transparent portions of the walls nor as holes. The fifth premise described applied materials and assigned colors, materials must address their natural characteristic, applied exposed untreated. Colors are required to fit with the natural forms, stem from tones the fields, wood, autumn leaves and optimistic colors of earth (Wright, 1975).

All the premises of organic architecture can be tracked in the waterfall villa of Frank Wright (Figure 2.16), the harmonization between the building and the very natural site, the allocation and integration of the building over the water fall. The smooth dialectic between the levelled volumetric cantilevers and the strata of waterfall rocks. The fluidity and interrelation among inner spaces, inner spaces and terraces by exposing high amount of walls portion, and terraces with the natural context. The assigned materials exactly duplicated the tones in the natural scene in the background.

In terms of plan organization (Figure 2.17), Wright employed a hidden underlying grid

provide rules of rhythm and modular variation. The features of the plan was placed directly on the grid lines with the intended pattern adopted by designer. The shapes of grid were different and that pointed to the variation and richness of nature with forms. The grid also provide a structural segregation between the bays housed a main functions and those housed the secondary ones (Hearn, 2003).

Likewise Organic metaphor of Wright, Le Corbusier the other modernist pioneer appoint his own metaphoric guidance that is the machine. "House is the machine", in its' providence to the whole means of living. Machines are alike the organisms abide to similar evolutionary rules and tending to a pure functioning. The lesson of machine lies in the perfect realization of a probably stated problem. Therefore, Le Corbusier made an intensive research to list all the problems related to house, then he figured out a manual of modern dwelling demands to satisfy the modern user (Corbusier, 1931). Machine is consisted from a standard parts misemploy any unnecessary parts.

Likewise architecture must be based on standards, a logical solutions based in a minute analysis of well stated problems, as he refer to the Parthenon as a standardized parts product. The standard establishment comprises to exhaustion testing for every reasonable and practical possibility, then extrapolating a type satisfying their functions, with a highest benefit and a lowest consumption of materials, workmanships and forms. The resulted standard is thus a rational element or group of elements, the rationally generated form nor preconceived but a result of rational combination of standards. Corbusier obsession of machines and particularly ships led him to adapt some of the formal features and applied them in his building forms (Corbusier, 1931).

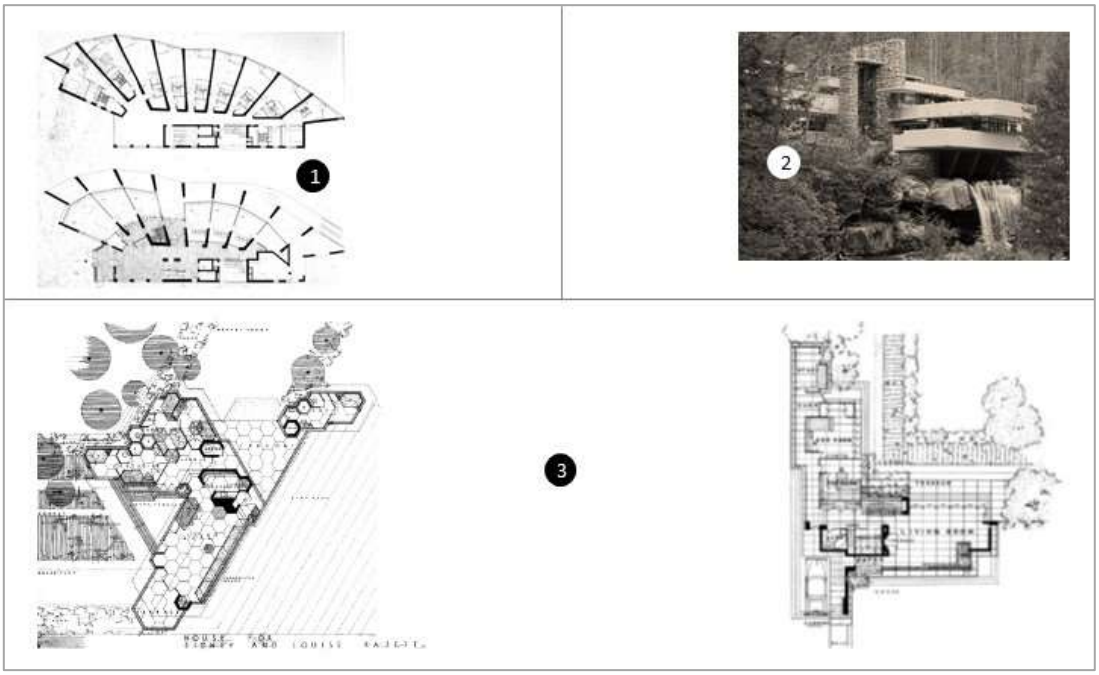


Figure 2.15: 1. Plans of Torre de Apartamentos Neue Vahr", Bremen. Alvar Aalto, the flats open like a sun flower toward south (Madrazo, 1995)
Figure 2.16: 2. Picture of Wright's Waterfall Villa, the integration of building with the surrounding (www.dezeen.com)
Figure 2.17: 3. Wright's varied underlayment grid to guide the plan generation (Hearn, 2003)

Another design method is planning in terms of space. This method of form designing was fostered by the Modernism of Germany and Netherlands. They believe that architecture is first and foremost about space was the fundamental motif to adopt this method of designing. This idea was associated with Mies Van der Rohe with the doctrine of universal space. The universal space or unified space is a free space with no any separations, to suit all the users' activities. The space is adherent to the temporal needs of users, who able to reformulate the inner space by a movable partitions, Figure (2.18.1).

Parallel to this conceptions, In America Luis Khan fostered another design method, the servant/served space, which is a different formal manifestation between the working spaces and those need for technical support and for circulation, Figure (

2.18.2).

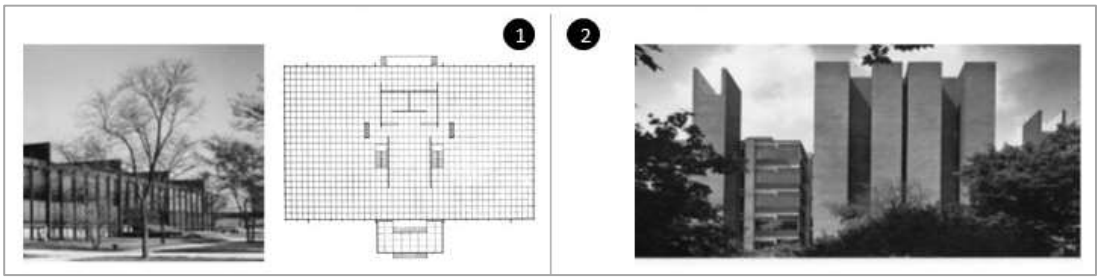


Figure 2.18: 1. Mies van der Rohe, Crown Hall, Architecture & Design Faculty Building 2. Louis I. Kahn, Richards Medical Research Laboratories, University (Hearn, 2003)

Another method of design was "Honest structure as the framework of design". The honesty of structure as a rational expression for the aesthetics of form was fostered by Laugier in the eighteenth century. Laugier saw in the Gothic cathedrals structural rationality the ideal model that can be adopted as a formal paradigm. Then, this new vision supported by theorist like Ruskin, Violete le Duc and Pugin.

Violete le Duc with his rationalist ideology appoint the stability of structure as the excellence of architecture. Alike a machine that do not consist of unnecessary parts, the structure should not consist of any element that do not handled any stability and function. Structure presence should not be implicit, the evidence of its assembly must be visible and clear. The beauty of structural forms are not necessary, paradoxically the building cannot be beautiful unless it consisted of rationally designed structure. Violete introduced a hypnotical proposals for his rational structures, among them is the proposal for a scheme of a great hall covered by heavy medieval masonry vaults that stabled by modern iron structural elements. The main invention was in the ability of responding to the movement of the building-because of wind or shifting earth- by adding hinged parts to the structural system (Figure 2.19.1). The structural parts are fulfilling this response in a successful way, each piece has a specific task on

transferring the loads like the members of an organic body, further the assemblage way is analogous to organism, Figure (2.19.2).

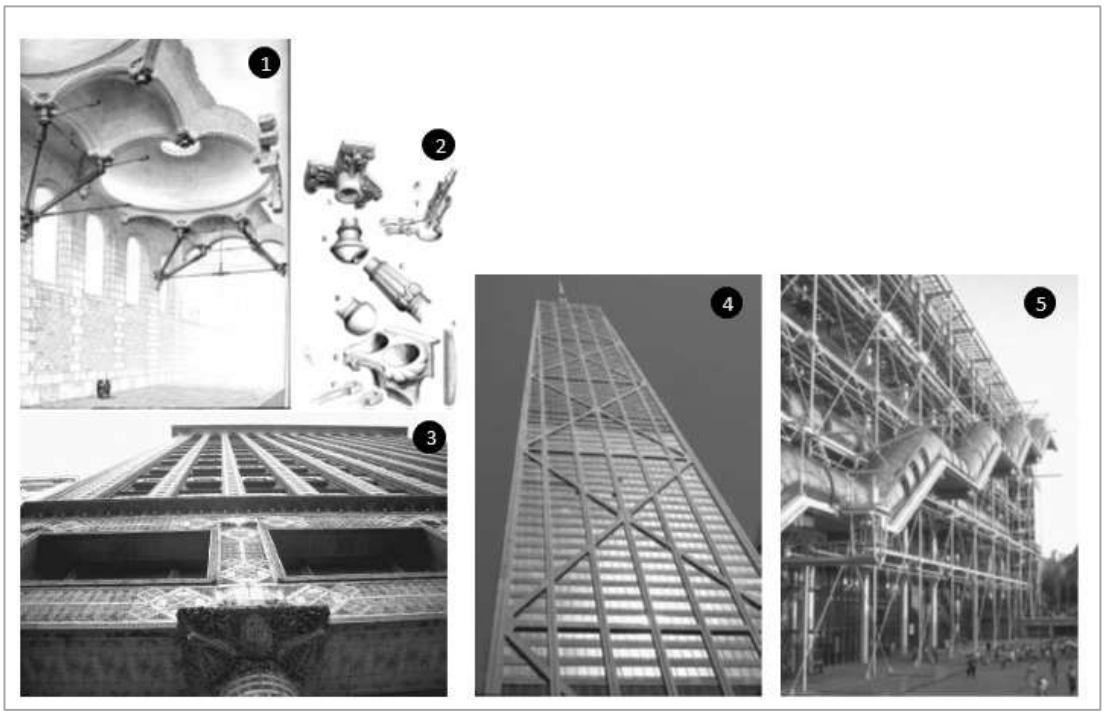


Figure 2.19: The very form of the buildings is the nude honest structure 1. Hybrid systems structure elements exposed to create the form of hypothetical great hall: Viollet-le-Duc 2. Details and joints among the structure elements are mimicking the organisms 3. The form is expressed by the diagonal structural frame on John Hancock Center, Chicago 4. Sullivan's skyscraper formal manifestation via exposing the structural elements 5. High tech structure is the form of Pompidou Centre (Hearn, 2003)

The manifestation of honest structure also released the early modern architects from the problem of finding artistic form for the new emergent type at that time, which was the skyscraper. The skeletal cage of steel framing the skyscraper was the first conceived component within the building. In Sullivan's skyscrapers the vertical manifestation of rising columns from the base to cornice, give clear dominance to the vertical articulation, Figure (2.19.3).

The steel cage technologies evolved in the means of bearing the vertical and horizontal loads, then the elements of structure placed on the basis of calculations, i.e. John

Hankok skyscraper cage frame, Figure (2.19.4).

The manifestation of structure as a formal articulation extended further by the high tech advocators Buckminster Fuller, Norman Foster, Richard Rogers and others. The technology replaced the honesty of structure in representing form. A single technological factor is employed as a dominant feature to visually striking the general form outlook, i.e. structure, mechanical system.

Pompidou Centre is a forerunner in this high tech architecture, the structure of the building was exposed on the façade as a main feature, the technical services of the building were celebrated. Although the intention of designers was to free the inner spaces from any impurities, but the formal manifestation was considered as a primary concern, Figure (2.19.5).

III) Theory since 1965(Meaning Layering in Design): The eraser manner of traditional historical references that rationalist designers followed adherent to Viollet le Duc ideology, engender buildings disconnected from context and culture. Because they ignore the given contextual conditions that point to the cultural aspects of their design, replacing them by the interest of function, i.e. Viollete saw the Gothic cathedral as a source of rational functioning, nor as a symbol of faith.

This attitude was criticized by the ones who came after the rationalism, by the leading of Robert Venturi. They insisted to endow the form with cultural meaning, and they believed that would go beyond the rational methods of designing. Satisfying the patron's cultural expression motifs calls for a more flexible design method to realize all the diverse demands, and that was what Venturi strived for. Venturi addressed

"complexity, contradiction, ambiguity, and accommodation" in his analytical categories from the historical buildings. Although he did not reach an explicit recommendations, but at least his attempt guided to general belief upon the postmodernist that the best source for architecture of today is architecture of the past.

Venturi seeked inspiration from the historical forms as long as they nourished his outlook. His borrowings were literal and direct, taking out of their context and attached to the new circumstances, which broke the rules that were attached to those elements. The ultimate expressive impact is recognizable and restore a sense of cultural belonging, because the borrowed elements convey a meaning. In Venturi's Vanna house, the incongruous elements appeared clearly, the general out look of the façade is through back to the sixteenth century Italian houses. But the sudden recesses, aside to the asymmetrical ordering of façade, and breaking the axial organizing of the building, all is a breaking for the rules of convention, Figure (2.20.1).

The incongruent application of classical elements became the prevailing form designing method for the postmodernist. The incongruence is occurred as a result of deforming the elements or using them in a foreign context. The deformation of classical orders can be depicted in the distorted orders in John Qutram's storm water station, whereby the Corinthian parts were boldly distorted, Figure (2.20.2).

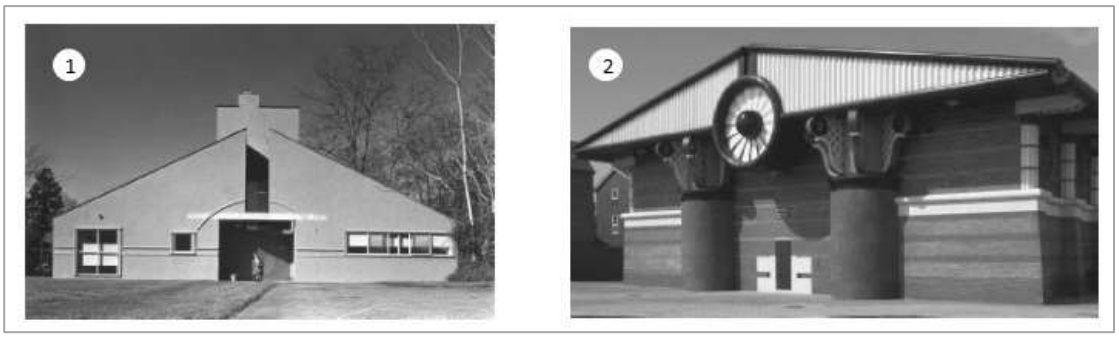


Figure 2.20: Layering meaning in forms. 1. Breaking the roles of form design via assembling an incongruous elements, Vanna Venturi House. 2. Distorting of classical elements in several ways, Outram's storm water pumping station,le of Dogs, London. (Hearn, 2003)

2.4.2.7 Michael Brawne Framework: Theories of Design

Brawne is an architect, writer and teacher in Cambridge University and then Bath University. Authored several writings, like "From Idea to Form"," Architectural Thought", and others.

Brawne (2003) in his polemic "Design thinking" made a critical reading and justification for the different prevailing form generation trends. Rowe categorized theories into tow, from Outside architecture and from Inside architecture. From Outside architecture theories are Typology, Functionalism and Pattern language, which generally speaking based on scientific motifs. From Inside architecture theories are Universal space; Served and servant space.

I) Typology (form as type): This tendency had been extended since the Roman temples, form as a fixed type with a very narrow margins for variations. The theoretical underpinnings of this idea took forward in the seventeenth centaury on the hands of J.N. Durand, who established a scientific classification for buildings genres – e.g. theatres, town halls. This classification was stemmed from the scientific revolution at that time, and was parallelized with the biological scientific classification of plants and

animals. Durand rely on the similar morphological attributes that shared among the similar buildings with the same function.

The Theory of Typology revisited once more by Aldo Rossi the Italian architect, but on a new manner, rather on dependency on function, the new type forms are evocation of the traditional European city kind of spaces.

II) Determinism (Form Arises from Function): This tendency of confining the formal generation upon the performative aspect of function was a functionalist guise. The design established by a serious of points stem from the program, which created by client and society. Although both of typology and functional theory were based on the same root that is the use aspect, the tow theories took opposite results, typology offers continuity with precedents, while functionalism offers disjunction plus invention.

III) Behaviourism (Pattern Language): This tendency is based on studying the past architecture way of operation of specific community and in accordance synthesized a grammar for the suitable architecture language on that specific environment. The 253 patterns that invited by Alexander Christopher and his colleagues in "Pattern Language", becomes as "atoms of the environment" operating in multi scales from the urban planning, spatial design, furniture and ornaments design. Each pattern obtains an analyzed problem, the solution for it, and a specific recommendation. The resulted from emerged as accumulated patterns.

IIII) Universal Space: This theory is from within architecture associated with Mies van der Rohe. In contrast to Functionalism, Typology and Pattern language, who acquired a precision on defining the uses of the building in order to determine design. This theory stands on an opposite assumption that the aspects of building use are hard

to be defined, especially the changes occurred on them in future. Thus, the suitable solution is an undifferentiated space to absorb the changeable conditions within it, where many activities can be hosted with slight adjustments. The open floor of Crown Hall designed by Mies is an application for his theory, a free plan with a huge span measures (67 m * 36.5 m), the space can be differentiated by a free standing partitions placed intentionally.

V) Served and Servant Space Theory: This theory was fostered by Luis Khan as a rationale for form generation, the rationale was abetted by the ability to evoke paramount expression, because of the increased important of the services on buildings. This categorization of spaces was seen by Khan as the relevant formal order for architecture at that time. The application of this theory appeared in his project of Richards Medical research building.

2.4.2.8 Van Voordt Framework: Design Methods

Van Voordt is an architect and educator in Delft University. Vander Voordt (2005) classified design methods into three broad categories, under each category emerged a sub categories, as indicated in the below diagram, Figure (2.21):

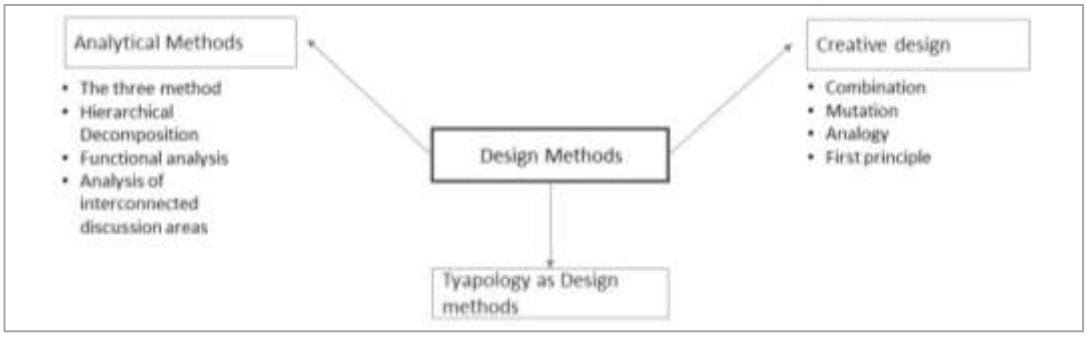


Figure 2.21: The categories and sub categories of Design Methods, as was categorized by Van Vooredt (2005). (Created by the author)

I) Analytical Methods: This category are focused on systemizing treatment for design problems, rooted since the 1960th movement of systematic design that branched to several groups. In common sense, they shared the same passion of "detailed exploration and analysis of the problem". By making the necessary divisions from the task into subtasks, indicating the possible interlaced relations, and synthesis the sub parts until reach the whole.

This category of analytical methods will not discussed in detail in this research since it falls under the stage of analysis, and this makes them beyond the scope of the research.

II) Creative Methods: These methods consist of "Creative Confrontation methods" and " Associative methods". The latter, is "an encouragement of the spontaneous reactions to or associations with particular ideas", under the assumption that as more as increase the associations produced the number of creative ideas increase. The brainstorming is the most well-known method of this category.

The creative confrontation method is a proposed regulations that control the process ideas, i.e. Synectics method creates ideas based on analogies and metaphors. In which, the original problem solved by resort to analogues problem but from foreign context, i.e. solving the problem of aircraft landing mechanism by analogues to the mechanism of grasshopper legs. The creative confrontation methods (Figure 2.22) may take four aspects:

- Combination: merging tow existing concepts thus resulting a totally new configurations.

- Analogy: resort to analogous configurations

- Mutation: deformation of an existing form partially or entirely.

- First principle: defined the first glance feature of the desired form.

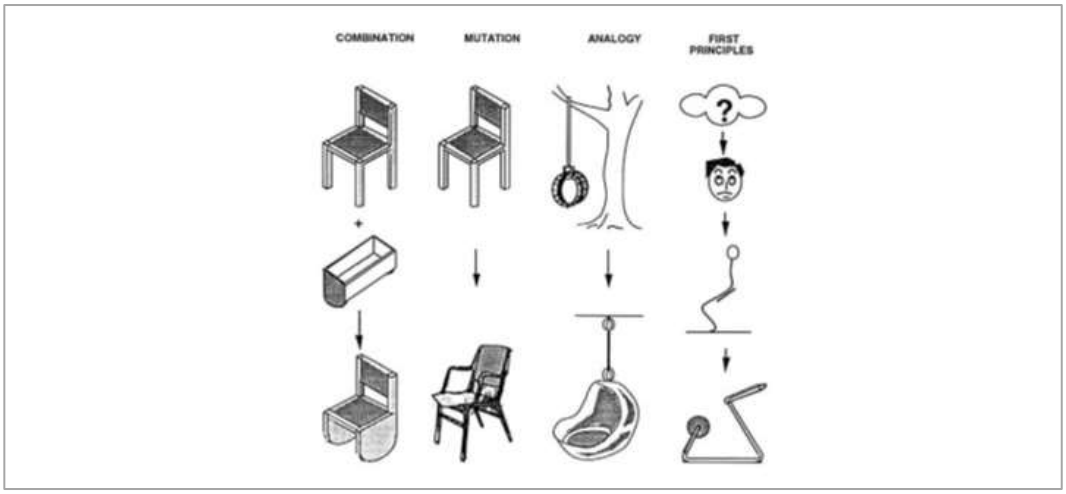


Figure 2.22: How the design of a chair can be developed by the four methods of confrontation. (Van Voordt, 2005)

III) Typology as a design method: Typology consists for a general lessons and principles, because they act as template of ready information and detailed implications. Thus can offer a shortcuts for creating form. Since the typology was mentioned before, and will mention in the coming heading, therefore it would be remained undetailed in this part.

2.4.2.9 Kari Jormakka Framework: Design Methods

Jormakka was an architect, critic, historian and pedagogue. Who authored several writings. Jormakka (2014) in his book " Design Methods", examined different methods to fulfil the design task, and addressed the weakness and strength point for each method. The book classified methods into seven main categories with the probability of subcategories, as shown in the below diagram at Figure (2.23):

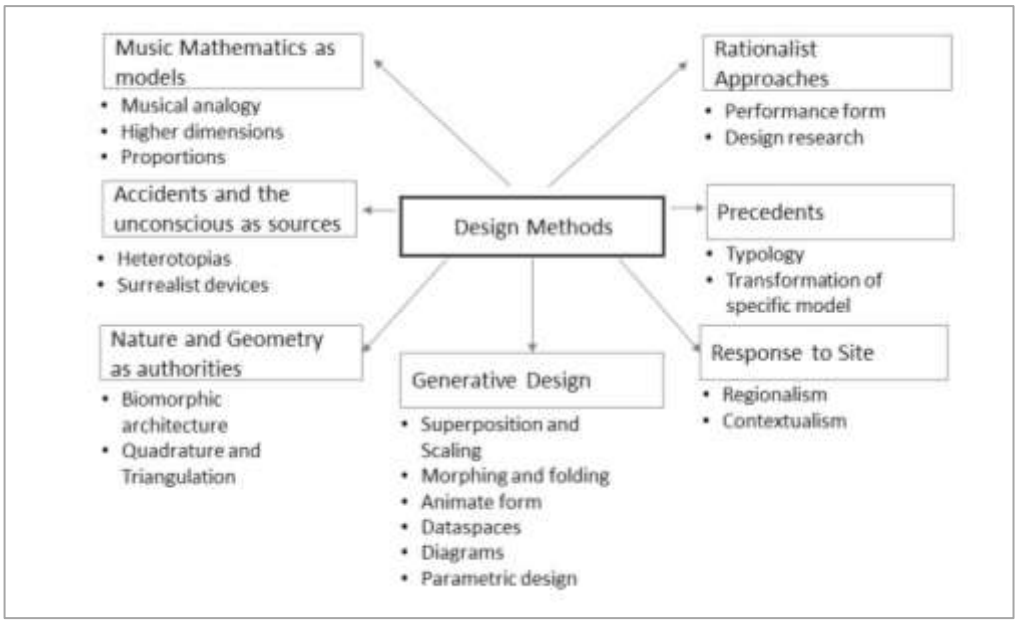


Figure 2.23: Design methods indicated by Kari Jormakka (Created by the author)

I) Music and Mathematics as Models:

Musical Analogies: This analogy is an attempt to translate the musical compositions into architectural forms, realizing the concept of "architecture as a frozen music". This concept can be a direct analogy to the ephemeral sound patterns that were invented by the experiments German Ernst Chaldni (Figure 2.24.1). As suggested by Bragdon, the shapes of these patterns can be directly materialized to reveal forms.

The Bauhaus also showed an interest in these conceptions, Paul Klee and Wassily Kandinsky, who develop a method to trace the melodies length and strength through points drawn in the music note. On the other hand, Klee used a unified grid to trace the notes, where the pitch respond to the height, the duration respond to the length, and the size to the dynamics.

Higher Dimensions: The concept of the higher dimension is associated with the fourth dimension notion, "an invisible archetypal world of four dimensions" that was investigated by Claude Bragdon in his experimental drawings of the four dimensional

hypercube (Fig 2.24.2) .

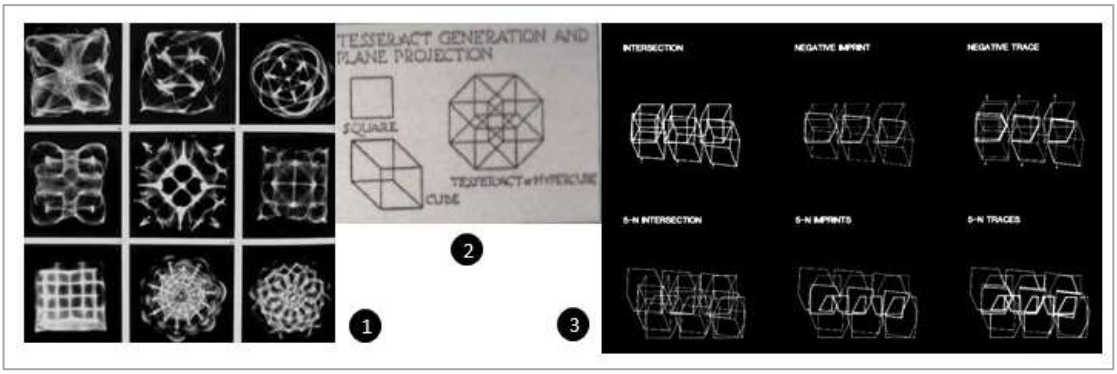


Figure 2.24: Music and Mathematic Models 1. Music patterns form analysis, (WordPress.com) 2. Claude Bragdon in his experimental drawings of the four dimensional hypercube – (Jormaka, 2014) 3. The high dimension used as generative diagrams for designing Carnegie Mellon University, (Eisenman Architects)

The method of higher dimension appeared clearly in the generative diagrams of Peter Eisenman for designing Carnegie Mellon University. The fourth dimensional hyper cubes was subjected to series of Boolean operations that reveal intersected solids and voids and distorted unification of cubes, Figure (2.24.3).

Proportions: The proportional theory postulated that the whole universe is a matter of geometrical specifications in harmony of each other in every scale. Thus the Renaissance architects employed the proportions as an attempt to connect architecture with the order of the universe. The harmonic proportions scheme underling the spatial organization became as a fixed system, guarantee preserving the quality of form, as the analysis of Wittkower for the Palladian villas.

The underlying organizing system keeps its existence even through Le Corbusierian projects, i.e. Stein villa. Le Corbusier himself showed a clear attention to proportions in the regulating lines that were used to generate forms with controlled and consistence dimensions and relations. The design of Atelier building was derived by the method

of regulating lines. In plan the allocation of stairs, definition of the spaces corners, and projection of outer scale. In façade, the allocation and sizes of openings, all are derived from the regulating lines drown upon the irregular site, Figure (2.25).

Figure 2.25: The principle of regulating lines used as a form generator by Le Corbusier in designing Atelier building.(Jormakka, 2014)

Le Corbusier continued his commitment to the notion of proportions by refine the notion of golden ratio in a more subtle way to become suitable with the prefabrication of building parts. The new proportional system addressed by Le Corbusier the modular system , which are ratios follows Fibonacci series (1, 1, 2, 3, 5, 8, …), and finally the modular was fixed on 183 and 226cm cm the ideal height of man with his raised hand.

II) Accident and the Unconscious as Sources:

Heterotopia: This term was addressed to Alvaro Aalto generic order of forms by the theorist Porphyrios, who described Heterotopia as the "no organizing principle that collect the different form together". The absence of the rules allow Alto to use various forms and organizations to celebrate the different functions of his projects, by applying unusual shapes to them. the cultural centre in Wolfsburg (Figure 2.26) witnessed this tendency, the major program elements –the auditoria- were emphasized by a specific shapes like a fan parts also marked by a stripped marble cladding. The less dominant programmatically parts – the offices- were formed in an orthogonal sense with a simple

modernism façade.

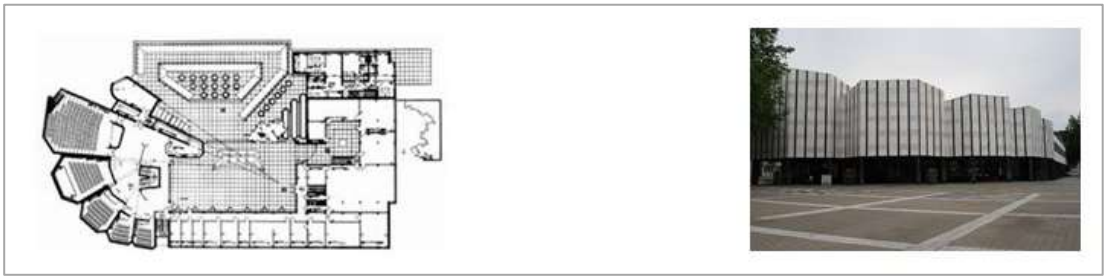


Figure 2.26: The free spatial organization and formal manifestation elaborated by Alvaro Aalto, cultural centre in Wolfsburg, (Jormakka, 2014).

Surrealist Devices: This method relies on accident as a driving force for the process of form designing, the accident force is the probability of involving accidental combination of diverse images. This surrealist method applied by Coop Himmelblau designers in the project in Malibu the Open House, the rough sketch of the house as if it was drawn by a closed eyes , converted to three dimensional form by other designer upon his perceiving of the sketch without evaluation or censorship, Figure (2.27).

Figure 2.27: The form design resulted from an accidental sketch , Coop Himmelblau's Open House project, (Jormakka,2014).

III) Nature and Geometry as Authorities:

Biomorphic Architecture: The original genius of nature turns it to become an inspirational source for architects, who desired to ground a universal, timeless formal language. A shared language understandable for and valid for different societies. This tendency can be originated to ancient times, the classical Corinthian capital decorated

by acanthus leaves, the likewise, ornaments were extracted from plants.

The imitation of natural shapes in some cases took an extreme trend, such as the examples of the so-called "organicism" , including H.P Berlage design chandler in the shape of jelly fish, and also Hector Guimard designed the entrances of Paris metro stations giving them the shapes of flowers and insects, Figure (2.28.1).

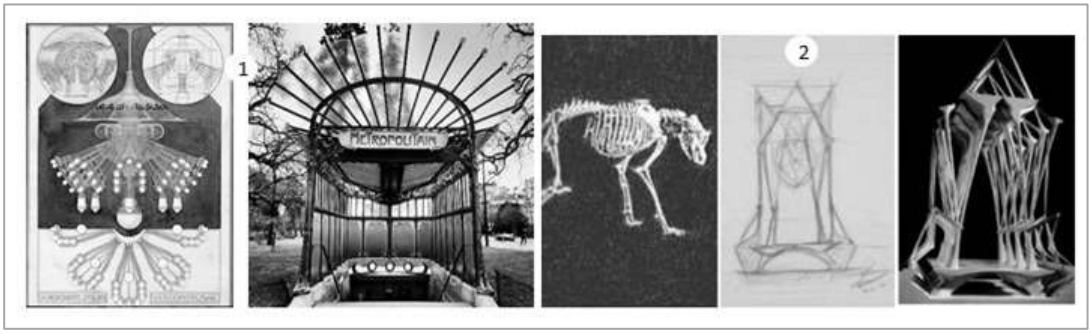


Figure 2.28: Biomorphic forms 1. Imitation of natural shapes, Right: H.P Berlage design chandler in the shape of jelly fish, Left: Hector Guimard, entrance Paris metro Station 2. The adoption of dog skeleton structural stability, Santiago Galatrava , St. John cathedral (Jormakka, 2014).

Apart from this blind imitation for organisms, the shapes in nature can be adopted in an abstract sense, like the adoption of natural proportional system for design. Another abstract adoption is the extrapolated structural optimization from analyzing the relation between shapes and stability in nature. This imitation implemented by Galatrava to design the extension of St. John cathedral in New York. Where he synthesized the form from the skeleton of dog as a very high structural performance, Figure (2.28.2).

Quadrature and Triangulation: These mathematical models adopted as methods to regularize the proportional relations of parts among themselves and to the whole. This models were the "secret of the masons" in the Gothic architecture, which used for a pragmatic reasons, and ultimately lead to their harmonious and coherent proportions.

Sullivan the modern pioneer, applied the quadrature to create his complex ornamental system, starting by a simple intersected square and diagonal ended with a complex geometrical systems.

IIII) Rationalist approach:

Performance Form: This is a rational method to generate form departing from the irrational and random techniques, this tendency fostered by group of architects from the Bauhaus. They refused the subjective expression and intuition and supported the objective scientific knowledge to base the design. The good design is a use of general knowledge, specific information about project, and conditions of site and program.

In a project of community building (1930), Hans Mayer the Bauhaus director applied his scientific method of design, tow diagrams established the process, one depicted the sequence of the functions unfolding, and other depicted the sun projection on the building, its movement and angles. The first provides a hierarchy of users movement, i.e. arrival- change of dress- bathing … The latter diagram provides the organization of spaces according to need of sun, i.e. rooms needs morning sun- living rooms need evening sun , and etc, refer to Figure (2.29).

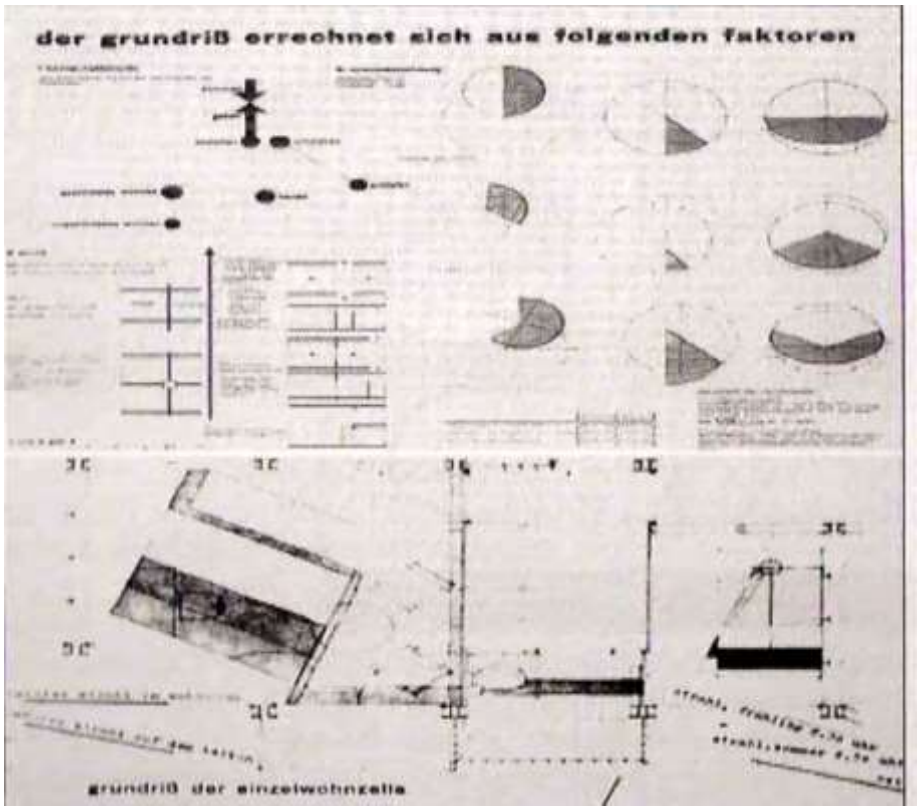


Figure 2.29: Hans Mayer, Scientific derivation of the process of form synthesis (Jormakka, 2014)

V) Pattern Language:

This language developed by Alexander Christopher as a "universally valid formal solutions" to coop with a "pattern events" to produce forms that consist of "the quality without a name" that is common quality "shared by good architecture of any place or time". This quality can realized through 15 conditions, to name a few: deep interlock and ambiguity, strong centers, simplicity and inner calm.

The patterns propose solution for a common problem, considering the different scales relations of the objects with the surroundings, from city to small fixations details.

A cafe for an exhibition in Austria, in which Alexander apply 53 patterns to construct the form of the building.

Pattern *88 "street café" –that offers an orientation to the café toward the main street where people can lie and enjoy the story of the passing world- was the primitive generator of the organization (Figure 2.30.1). But the site of the café didn't provide a main street , therefore, Alexander add more pattern *101 "passage through a building" to turn the internal passage of the long exhibition as a street (Figure 2.30.2).

For the communal space he applied, pattern*163 to partly bounded the space with roofs and walls, pattern *161 to direct the space to the sun , and pattern *176 to provide a green environment for the sitting areas.

For the entrance design were applied the pattern *110 " visible and accessible", *130 "Partly inside of the building and partly outside" to protect from weather conditions.

Figure 2.30: Applied patterns for Linz Café project 1. Pattern *88 "street café" 2. Pattern *101 "passage through a building" (Jormakka, 2014)

VI) Precedents:

Typology: The theory of type proposed by Durand in the 19th century as a classification for predefined buildings type's compositions, and predefined building elements composed in an orthogonal composition. Since then, typology involve a classification for buildings according to functional and formal similarities.

This conception was revised on the 20th century by Aldo Rossi to a sense of environment that embody a collective memory of societies. A conceptual construction nor a physical form either a specific function. Type invaded the forms of Rossi, the Octagonal tower in school, a classic temple front becomes entrance of school, an exhibition case , a tea pot, and a changing cabin in a beach (Figure 2.31).

Another example for the employment of typology but in more critical sense can be derived from James Stirling's design of Neue Staatsgalerie building in Gemany (Figure 2.32.1). The form of the building emerged from merging different basic typologies , for the orthogonal organization the type of Shinkel's Altes museum- a rotunda inserted in a rectangle-was adopted (Figure 2.32.2). The type of Ionic colonnade used by Shinkle brought to the project as a row of tress instilled all through the street. The type of ramps in the temple of Fortune Primigenia in Palestrina were borrowed to become the ramps that connect building with streets (Figure 2.32.3).

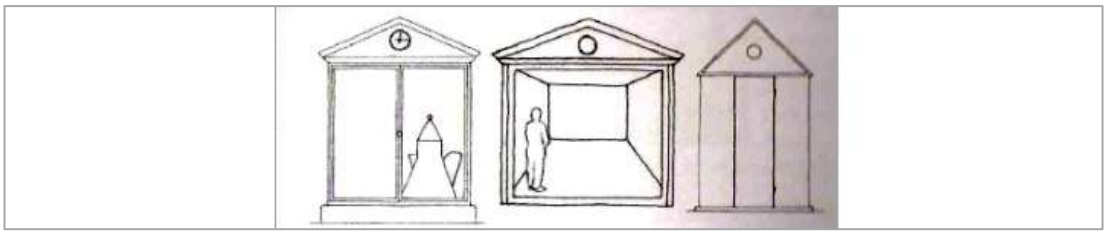


Figure 2.31: Aldo Rossi, Typology forms for different configurations (Jormakka, 2014)

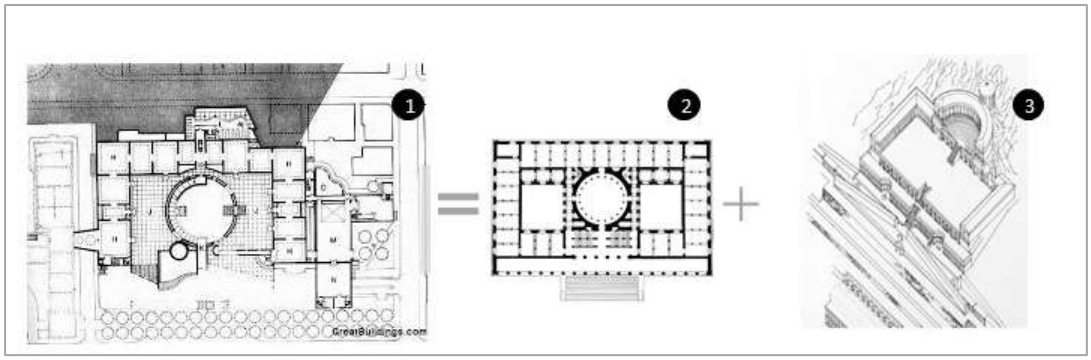


Figure 2.32:1. James Stirling's design of Neue Staatsgalerie building in gemany 2. Shinkel's Altes museum- a rotunda inserted in a rectangle 3. Temple of Fortune Primigenia in Palestrina -ramps that connect building with streets (Developed by the author)

Transformation of a Specific Model: This method adopt a precedent model as a start point then transform it to reveal the new form. Mies adoption for the De Stijl paintings as a start point for Barcelona's German pavilion is a clear example for this method of design. The orthogonal grid the projection of walls, the logic of relations between the abstract planes was a typical resemblance of De stijl paintings. Further, the orthogonal proportions of the pavilion was a proportional repetition to the Parthenon proportions. The walls of the pavilion was coordinate with columns of the temple and vice versa. The location of the woman sculpture in the pavilion was coordinated with the statue of the Parthenon temple (Figure 2.33).

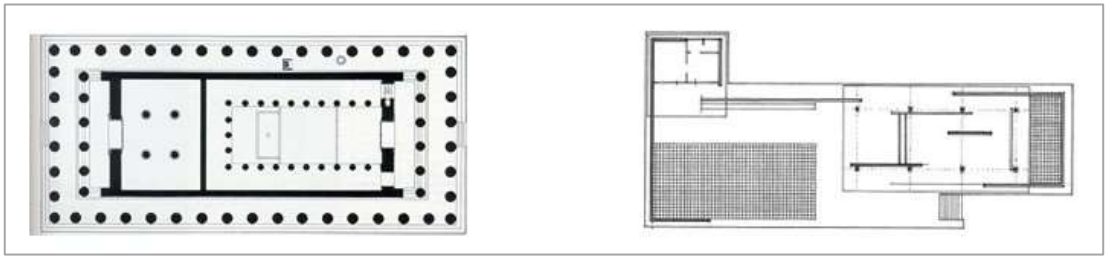


Figure 2.33: Comparative correlation between Mies Barcelona museum and Parthenon Temple (Jormakka, 2014)

VII) Response to Site:

Regionalism: This method proposed to establish a connections between the intended form and the immediate environment or region. The connections merely exceed the formal imprints and reach the level of construction techniques and materials, because they would be tested and verified by tradition, thus suitable for the vernacular climate. Likewise, what Hassan Fathy apply in his design for New Gourna village, he used the vernacular materials –adobe, vernacular layouts- courtyard houses to their potent of passive cooling.

The advanced version of regionalism is the critical regionalism, which offer a development for the specificities of locality from a modern lens. Frampton –the protagonist of critical regionalism- described it as "self-conscious synthesis between universal civilization and world culture".

The houses of Mario Botta designed during the seventieth in Ticino , hold a clear example of this regionalism version. The overall form are abstract pure geometry a typical modernism appearance, but the connections to the vernacular tradition by applying the same outer material patterns- a stripped lines with different materials and colors, Figure (2.34.1).

Contextualism: The contextualism invent their own method for responding to site, but in a more morphological sense this time. The morphological environment of the context is registered in an abstract manner and then it becomes a new point for the new construction.

Hans Hollein's Media tower during the ninetieth exhibits must of the contextualism concepts. The form collages together inhomogeneous mixtures of elements collecting from the surroundings. The outer façade followed the surroundings in terms of proportions, colors, and fenestration. The skin of the building constantly differentiated to harmonize with the surrounding, (Figure 2.34.2).

Figure 2.34: Response to site form design methods 1. Right: Houses of Mario Botta in Ticino- left: the Vernacular version in Ticino 2. Right: Hans Hollein's Media tower, Left: the façade solid and void proportions were traced from the neighbor solid and void proportions. (Developed by the author)

VIII) Generative Processes:

Superposition and scaling: These methods are part of Eisenman's great influence to design theory through his heuristic experiments during his career. Both of Superposition and Scaling are resulted in adherence to Derrida Deconstruction philosophy that in short description claims of the instability of meanings, impurity of systems, any meaning is decidable and any system is disrupted.

Scaling is notion connected to fractal geometry, where the similar form repeated again and again but in different scales. The scaling allow Eisenman to realize the Derridian notion of " no originary scale", the scaling shows the same figure with different scales that disturb the real form the unreal. The superposition on the other hand is overlaying of different layers with different scales on top of each other.

The tow techniques combined together in the project of Biocenter in the eightieth, the complex form is generated by a superposing a repeated figure with different scales in different angels, and then selected figures form the fragments resulted from the superposition , Figure (2.35).

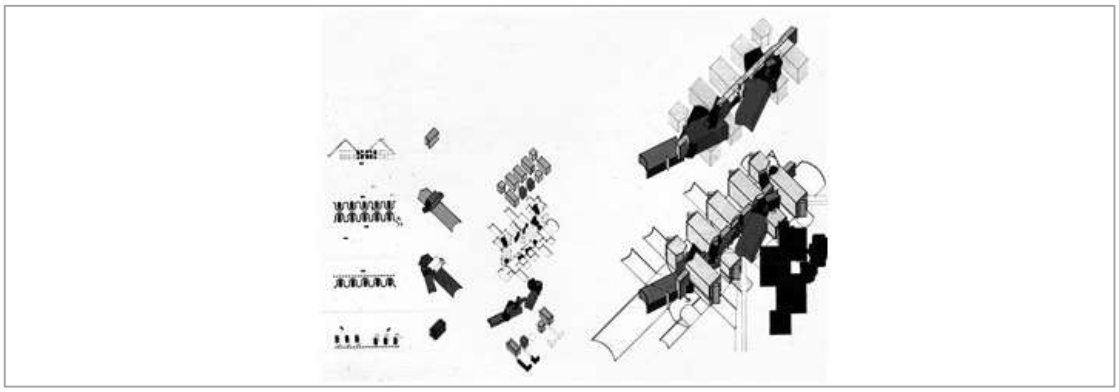


Figure 2.35: Eisenman, Biocenter form generation process, a serious of scaling processes for the DNA symbol then superposing the scaled layers upon each other (Combined by the author)

Folding: The fold conception was borrowed from the catastrophic theory, as mentioned before in this section.

2.5 Prescriptive Design Theories:

Prescriptive design theories "include singling out particular types of design practices and positing favorable properties about these practices", as in the opinion of Vermaas (2014). The selected particular types perhaps are existed already as a regular design practice, or as a new ones not yet exist, come as a proposals to improve the practice.

Prescriptive theories imply predictions as posits, do not assumed for the pre-existed design practice. Rather, they are predicted types of design, which are defined in the theoretical level and yet are not transformed to become part of the world of experience. As Vermaas (2014) claimed, then clearly this type of theory looks after defining neoteric hypothesis of new design types with a presumed properties and attributes for

them. It establishes claims in advance, ‘‘if design practices of the new type were an aspect of the world of experience, then the claim that they have the posited favourable properties is part of the knowledge about that aspect of the world of experience.’’

The attributes of these theories can be used as a rule that govern over descriptive theories. As previously mentioned descriptive theories mean only by description of reality. As will be in the coming chapter of this research, the justification of Ashraf Salaama for "Design Ingredients" will be presented as a prescriptive theory. Also will be used as an analytical device through which the descriptive theories that have been listed previously will be dissolved.

2.6 Summary of the Chapter

The chapter examined the architecture theory different aspects and passed through series of design polemical theories that were theorized by seminal architects in the domain of architecture. The evolvement of design theories were registered since the sixtieth beginning, the era of booming in architecture design. The reviewed texts in literature were organized in a chronological order to allow the tracing of how these theories were expand and weaved. But this is not canceling that there are some old theories that have been just registered in new texts. This confusion should not spoil the continental cause of the chronological order. Where the main purpose is to see the expansion and increasing in quality and quantity of form design theories in architectural design.

The quantitative increase of form design theories is also accompanied by a multiplicity in the type of sources from which these theories derive legitimacy. This include science (Like the case of functionalism, performance form), linguistics (Like the case of

Syntactic, Semantic forms, Expressional models, Metaphors, Pattern Language), and philosophy (Like the case of Deformation strategy).

In general, the literature review revealed multiple form design theories, some were termed as methods or strategies, some termed as models or tendencies. Some appeared repeatedly in the multiple texts, while others appears in differentiated manners. Ultimately, all of these theories indeed fall under the scope of Descriptive design theories, which were based on describing the reality of how forms are designed in practice. The chapter was closed by a detailed description of Prescriptive Design Theories, and how they act like a hypothesis or claims by establishing new propositions to develop a new types of design in practice. Therefore, it seems logical to adopt on of the prescriptive theories about design ingredients and to be used as a criteria to redefine the descriptive design theories. Upon the purpose of shedding more light on the form synthesis area aiming for more explanations and clarifications.

Chapter 3

RELATING THE RESEARCH STRATEGY AND THE ANALYTICAL DEVICE

3.1 Introduction

This study sinks in the realm of design theories aiming to extrapolate an explanatory framework exhibits a set of form synthesis strategies, techniques and tools. The research is not empirical deal with the real, rather it is qualitative deals with the ideal processing in the conceptual manner. Consequently, this chapter is specified to discuss in the first place the suitable type of research that can be used in this particular case, explains it, and then clarifies its specific characteristics. After then, the appropriate research method and tactics for this type will be appointed, this followed by a detailed illustration of how the research process from this point will be derived to achieve the objective of the research.

3.2 Correlating Logical Argumentation and Design Ingredients

Referring to the previous chapter, design theory tow typologies as was established by (Vermaas, 2015) are Descriptive or Prescriptive type. Also was mentioned that, the former concerns by the "question of how design processes work", seeking answers by implementing empirical researches. The later concerns by "the question of how to go about design process", in order to make it efficient and effective, by proposing assumptions. This type is normative dealing with conceptions ending up with "what reality should be".

Since this study intends to create a framework holds set of design strategies guiding designer to go about design process, aiming ultimately to improve designer awareness of how reality should be. Then, the placement of this study result can be fall under the type of Prescriptive Design Theories.

3.2.1 Appointing Appropriate Research Strategy and Tactics

As was agreed above the prescriptive manner of research takes it to the scope of normative researches and conceptions discussions. Still the research is dealing with the polemical design theories area, which is connected by (Groat, 2013) to deal with the Logical argumentation research as a the appropirate research strategy.

Logical argumentation in its basic condition tends to pick a group of previously unappreciated disparate factors, then reconnected them to reveal a unified framework, which rarely might obtain an explanatory power. It may formulate a discourse at paradigmatic level, if the explanatory system succeed to afford a new way of seeing to the facts (Groat, 2013).

The same description can be reflected to this study, where the disparate descriptive design polemical theories are subjected to the formulation criteria of specific prescriptive design theory. This will result a unified framework that implies explanatory system.

According to (Groat , 2013), "in logical argumentation, the goal is to look beyond the specific case of anything toward general patterns of relationships within which the specific case can find a conceptual home". Similarly, this study attempts to surpass the differentiations within each specific form design polemical theory and establish a general plateau of basic ingredients that composed each one of them.

The research is going deeper in form design theories attempting to extend the explanation of their operational way. Subsequently, the *critical analysis tactic* is essential to extrapolate the necessary details about theory and to break it into its smaller ingredients strategy, techniques and tools.

Also, the research correlates between design theories and the socio-political conditions that has been coinciding with them. In here the qualitative interpretation method will be implemented to derive the connections between those conditions and how they cause the emergence of theories.

3.3 Introducing the Analytical Device: Theory of Design Ingredients

To facilitate the synthesis phase in design process, which indeed as was mentioned in the first chapter, is a puzzling problem incapacitates designer. This research assumed that the explanatory power resulting from breaking the descriptive design theory into more prescriptive guidelines, may decode the synthesis phase. This guidelines ought to be as a general pattern that can be applied to explain the whole form design polemical theories discussed in the literature.

The desired general pattern characteristic was found in the prescriptive theory of design ingredients that was manifested by Ashraf Salama (2014). Professor Salama is a cultural heritage specialist, critical pedagogue and research evaluator.

According to Salama (2014), understanding the complex nature of design obligates to understand the nature and definitions of its ingredients, as Salama (2014) pointed out :"‘Ingredients’ play an important role in what is perceived as design; these so-called ingredients represent the process, techniques, and tools that enable the designer to

achieve his/her goal in designing". So far, the definition of each ingredient is an initial requirement.

According to Salama (2014), the terms consisted in design ingredients are used in an interchangeable sense in the context of design, thus he introduce a clear definition to avoid this misinterpretation on one hand, and to ease the grasping of design application, on the other.

The smallest ingredient on the set is the "Design tool". Tool literal definition in dictionary is with which one prepare something. For Salama represents any conceptual or physical instrument that is exploited by the architect to fulfil the design task (Salama, 2014).

The second ingredient is the "Design technique". Technique in dictionary refers to the procedure to complete a task. For Salama represents the way designer achieves his design objective. In other words, the way of applying tools to fulfil design task.

The third ingredient is the "Design method", which is refers to designer's decisions model that governs the way of how he/she decide to elaborate design. For the sake of this research the term method will be replaced by the term strategy, since both of them obtain the same meaning. Where strategy in dictionary is a high level plan, patterned activity, and decision making. As for (Abdullah, 2015), strategy is the plan and process to fulfill the task of design. Ultimately, both are looking to define a decision model that govern the whole process of achieving task. Ultimately, Strategy is merely a decision model that is a set of rules adherent the process of designing.

3.4 The Analysis Process

The research from this point is going to pass through three main phases: Classifying and reorganizing the literature, then applying the analytical devise to dissolving theories, and finally synthesizing the intended framework. The analysis process in indicated in (Fig 3.1).

3.4.1 Classification and reorganization of literature findings

The literature findings are going to be classified via a qualitative method of correlation process, will be established among the different texts in order to group out the shared form design polemical theories together. The theories appeared once will be excluded, likewise the ones rely on the subjective unpredictable decisions-meant the non-methodized ones- are excluded. Mind that the correlations occurred in how each author described the form design theory.

Reorganization of form design polemical theories will be occurred on the resultant theories from the upper step. The reorganization aims to redraw the realm of design theories and reformulate its whole structure. Firstly, the form design theories will be affiliated to each other according to the conceptual similarities obtained by them. A qualitative analysis method allowed to make this conceptual comparisons, and group the similar theories under one umbrella. Secondly, the grouped from design theories will be termed by a new label according to the logic by which they synthesize/ generate forms.

3.4.2 Applying the Analytical Device

After reorganization stage, then the remaining form design theories are ready to be analyzed. The Analytical Device developed in this chapter will be used to dissolving the form design theories. The dissolving will reveal the basic design ingredients -

Strategy, Technique and Tool. The qualitative interpretation tactic will allow to extract the ingredients from the theory according to the conceptual definition for each.

3.4.3 Synthesis the Framework

The last phase will come to Synthesis the Frame work that indicate all the (strategies/ techniques/tools) supported by a recipe to describe (How, Why) to apply them. The question how will be answered by exhibiting the explanation and description for each basic design ingredients. The question why was answered by stating the reasons of adoption for each strategy, which analyzed form the conditions of emergence for each design polemical theory.

These two steps will be presented in a diagrammatic representation in order to ease the conceiving of the set of the form synthesis strategies, techniques and tools.

3.5 Summary of the Chapter

This chapter was dedicated to introduce how this study was designed in order to realize the intended aim. The chapter opened by introducing the area of this study, which is helped to define the characteristics of this kind of studies. Consequently the suitable research strategy was appointed. The logical argumentation strategy imply for a general pattern which allow to redefine the disparate elements. This general pattern was found in Salama's prescriptive design theory of design ingredients. Which was appointed as an analytical device to reformulate the conceptual structure of form design polemical theories. The chapter was closed by revealing the sequential steps (Figure 3.1) via which the Descriptive literature will be analyzed, classified then reformulated.

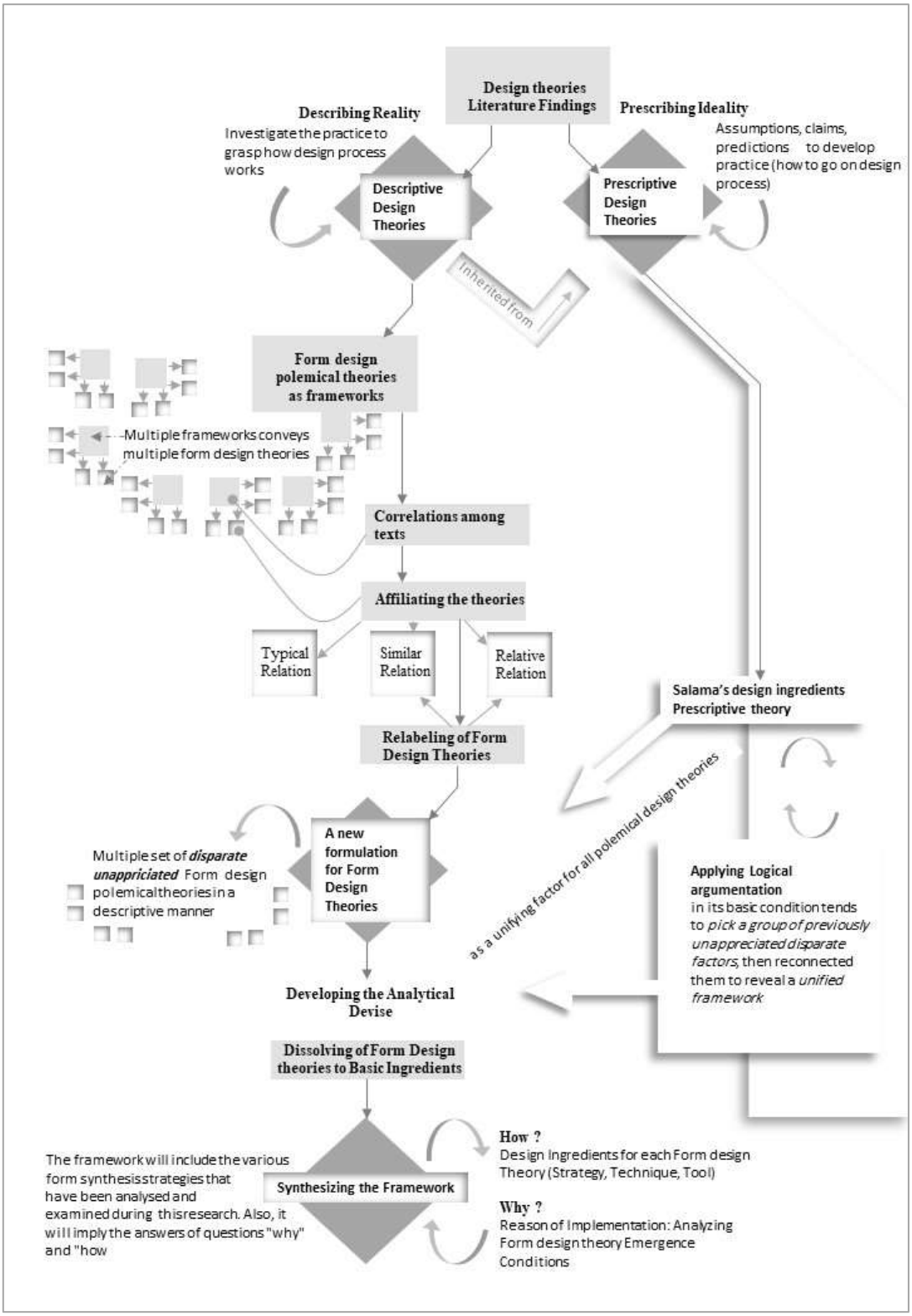


Figure 3.1: Analysis process operates in the literature findings (Created by the author)

Chapter 4

REFORMULATING THE THEORIES OF FORM DESIGN

4.1 Introduction

This study aims to propose an explanatory framework exhibits set of form synthesis strategies, techniques and tools, to become as normative guideline for designers that can inform their decisions during the post analysis stage in design process.

The literature findings revealed numerous descriptive form design polemical theories possess differentiated terms, indicated in different texts as is shown in (Table 3.1) on next heading. Obviously, those strategies are not eligible for the direct application yet, seeing their fragmentary manner on one hand, and their descriptive unexplained nature on the other.

This chapter is going to witness a reformulation process for those theories, which will pass through the coming steps. Firstly, classifying the literature raw findings, in which several correlations between the different texts will be established. Secondly, reorganizing the literature structure, in which the conceptual affiliations among the remaining form design theories from the upper step will be tracked. Then, relabeling the form design theories with a new terms will be followed. Thirdly, will be discussed the dissolving of theories , in which the Design Ingredients will be extracted, then the result will be presented in a diagrammatic manner.

Fourthly, the preparations for the framework will be discussing the emergence conditions of form theories, meant here the socio-political ones in the first place and the architectural ones in the other. Finally, the framework will be synthesized and presented in a diagrammatic organization as key inclusive diagram, then in a detailed partial diagrams.

Discussing the previous items above the research may realize the main aim that derive it from the beginning.

4.2 Exhibiting the row Findings of the Descriptive literature

The findings from reviewing descriptive literature revealed a 45 form design polemical theory distributed among 9 different texts, as is indicated in Table 3.1. In general, the form theories showed a fragmentary manner of different terms and descriptions. In few cases, the theories shared the same term, but the majority were characterized by different terms, although they may refer to the same design polemic theory.

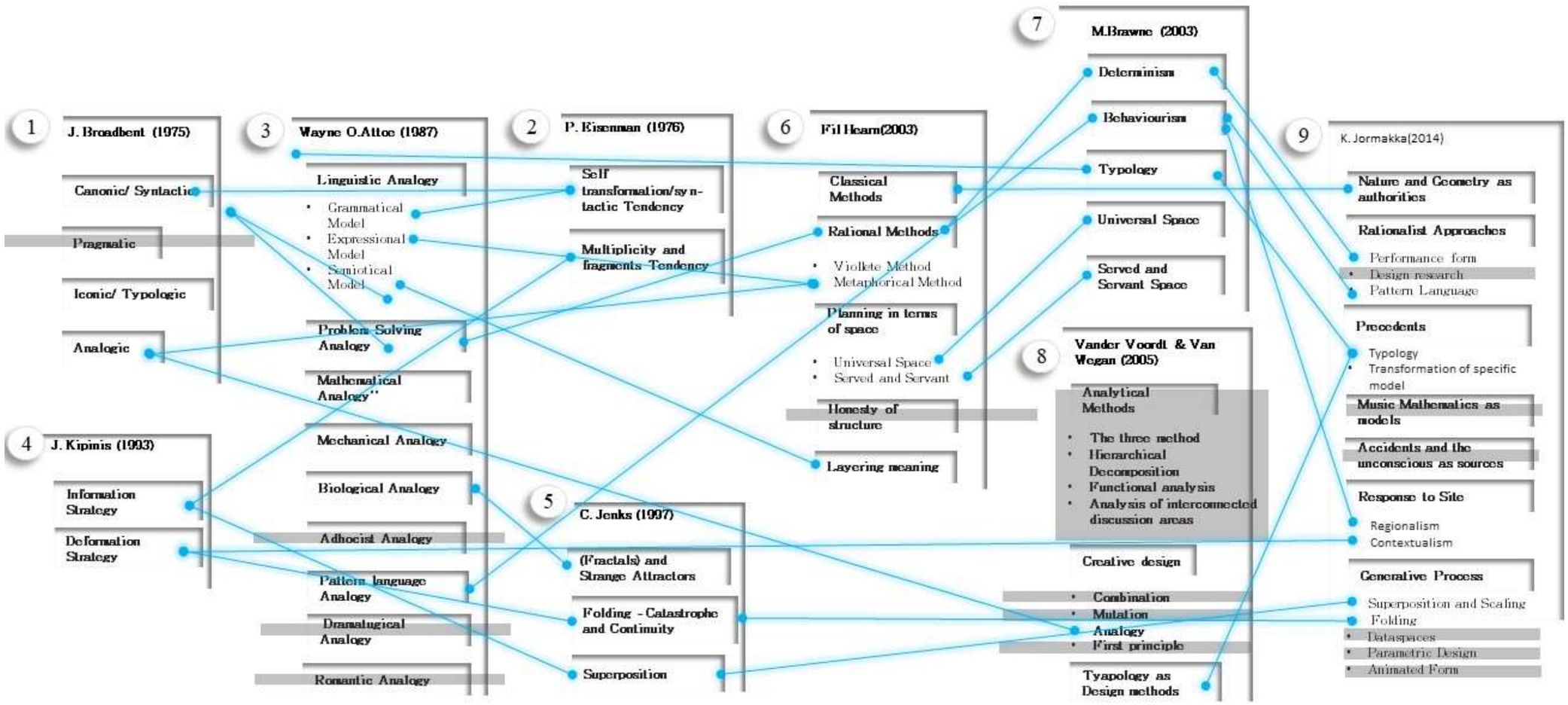
Table 4.1: Tabulation of the raw findings from Descriptive literature

	Author	Proposed Form Design Theory
1	Jeoffery Broadbent (1975)	• Pragmatic • Analogic • Iconic (Syntactic) • Typologic
2	Peter Eisenman (1976)	• Syntactical forms • Multiplied and fragmented forms
3	Wayne. O. Attoe (1976)	• Mathematical analogy (geometry, golden section) • Biological analogy (organic architecture, biomorphic architecture) • Romantic analogy • Linguistic analogy (grammatical model , expressional model , semiotical model) • Mechanical analogy • Problem solving analogy • Adhocist analogy • Pattern language analogy • Dramatugical analogy
4	Jeffery Kipinis (1993)	• Information strategy • Deformation strategy
5	Charles Jenks (1997)	• Fractals and strange attractors • Folding (catastrophe and continuity) • superposition
6	Micheal Brawne (2003)	• Determinist (Functionalist) • Behaviourism(Pattern language) • Typology • Universal space • Served and servant space
7	Fil Hearn (2003)	• Classical methods • Rational methods (Violete le Duc method, Metaphorical method) • Generative planning • Honesty of structure as method • Postmodern method
8	Vander Voordt & Van Wegan (2005)	• Analytical methods (the three method hirerchial decomposition, functional analysis, analysis of interconnected discussion area) • Creative design (combination, mutation, analogy, first principle) • Typology as design method
9	K. Yormaka (2007)	• Nature and Geometry as authorities • (Biomerphic architecture, Quadrature and triangulation) • Music mathematical as models • Accident and the unconscious as sources • (Heterotopias, Surrealist devices) • Rationalist approaches • (Performance form, Design research) • Precedents • (Typology, Transformation of specific model) • Response to site • (Regionalism, Contextualism) • Generative process • (Superposition and scaling, Folding)

4.3 Classifying the Literature Raw Findings: Correlations among Texts

A qualitative correlation process will be established among the different texts in order to group out the similar strategies together. Mind that the strategies appeared once will be excluded, due to their inability to create a great vogue among the authors. Also needing to stress, the exclusion of any strategy relies on a pure creativity and self-inspiration from the research because it cannot be dealt with as a systematic strategy.

The correlation was exhaustedly tracked any chance for a tiny relation between each framework and the other. As can be tracked in Figure (4.1), the matrix showed how each framework linked to the others by connecting the similar form design theories to each other by a line of relation. The reason of each correlation step is explained in the below points, mind that, the numbering in the following narration is in accordance to the numbering in the Figure (4.1).



A qualitative correlation process is established among the different texts in order to group out the similar Theories together. Mind that the Theories appeared once will be excluded, duo to their inability to create a great vogue among the authors. Also needing to stress, the exclusion of any theory relies on a pure creativity and self-inspiration from the research because it cannot be dealt with as a systematic theory.

Figure 4.1: The matrix of relation shows how the qualitative correlating among the different frameworks was elaborated (Created by the author)

1. The first classification of theories that were presented in this section was the polemic introduced by Joffrey Broadbent (1975), in which was appointed only four possibilities of generating physical forms. That are: Pragmatic, Analogic, Iconic, and Typology. These polemic theories as Broadbent (1975) described can be used independently or can be combined. What can be noticed these theories have given very broad outlines and general description of the way forms are generated? Therefore, all the coming theories will be partially fallen under those broad outlines.

2. The other polemic of form evolution was carried on by Eisenman in his visions for a post-functionalism architecture, as he differed between the ideas of modernism and the ideas of functionalism, indicating that the later are not only a distorted understanding of the idea of modernity. Then he developed two tendencies of form generation through which architecture can achieve its singularity:

First, the form is a result of series of transformations that start from a pre-existent geometry merely a platonic solid. In this case, form conceived as a series of registrations.

This concept of this form generation theory was mentioned in (Eisenman, 1970), (Eisenman, 1971), and (Eisenman, 1999). From which, more explanation can be extrapolated. The concept is that, the transformations occurred for the above mentioned platonic geometry were derived from inner rules inherited within the geometry itself. The inner rules are in fact a linguistic concept invented by Noam Chomsky, and can be defined as: “universal rules, which specify an abstract underlying order of elements that makes possible the functioning of transformational rules that map deep structures into surface structures.” (Eisenman, 1971). The inner rules was

termed as deep structure (Eisenman, 1970), and syntactic structure or grammatical rules (Eisenman, 1971).

Second, form is seen as "an atemporal, decompositional mode, as something simplifies from some pre-existent set of nonspecific spatial entities". On that case, form can be conceived as "a series of fragmented signs" that stripped from meaning, reference to represent more basic condition (Eisenman, 1976).

3. Wayne Attoe (1987), through his classification of design theories, he introduced the assumption of "analogies" adoption as way of grasping the nature of architecture. Analogies offer a sense of secure frame for the architect to organize his priorities and to define the hierarchy of decision making through the journey of design.

Attoe mentioned nine categories of analogy that architect can follow to generate form, which are:

Mathematical analogy includes (geometry, golden section), Biological analogy includes (organic architecture, biomorphic architecture), Romantic analogy, Linguistic analogy includes (Grammatical Model , Expressional Model , Semiotical Model) , Mechanical analogy , Problem solving analogy, Adhocist analogy , Pattern language analogy, and Dramaturgical analogy.

In the mathematical analogy numbers and geometry are fundamentals that guide the decision making during form making process. This theory are somehow *conceptually* bears to related with Broadbent (1973) Canonic strategy, both are governed by the authority of geometry and math.

The Biological Analogy changing the conventional consideration of building as an aesthetical process to a biological process. Accordingly, establish a prescriptive principles of how forms should be emerged and developed (as mentioned in second chapter). These principles were adopted form the biological processes evolution in an analogical sense, thus it is compatible with Broadbent (1973) analogic theory.

The Romantic analogy and Dramaturgical analogy did not mention by the other texts in this section, according to the research scope they will be excluded from the research concern.

The Linguistic analogy unleash the communicative aspect of the building by takes one of these three models, Grammatical, Expressional and Semiotic.

The Grammatical model presupposes rules (syntax and grammar) that govern the relations among the elements. Conceptually, it is same as the mentioned Syntactic theory by Eisenman (1976) and Broadbent (1975), but obtains a different name.

The Mechanical analogy, tend to imitate the machine in terms of functioning, truth of parts. Building "must be true to itself, logically transparent and virginal of lies". Again it is adoption of ideas from different context, thus it is a pure (Broadbent, 1975) analogic theory.

The problem solving analogy is mainly focused on the analytical part on design and ignore the form creation stage (Mahmoodi, 2001). According to research scope it will be excluded from the research concern. Likewise the Adhocist analogy because it is occurred directly in the real site taking a form of very pragmatic decisions.

4. Jeff Kipnis (1993), strived to introduce the polemical form design theories that satisfy the appealing of new architecture he argued about. The neoteric spatial and formal attributes were summarized in five points parallel to the Le Corbusier ones, which are: Vastness, Blankness, Incongruity, Pointing, and Intensive coherence. These attributes cannot be sustained unless new form generation strategies are invented that is the: Information strategy and Deformation strategy.

The former generates forms by collecting grafts, via injecting different mixture of programmatic and formal elements. The concept is similar to Eisenman (1976) Multiplicity and fragments strategy, both are superimposing differences and heterogeneous mixtures. Further, Tschumi's project "Le Fronsy National Centre of Art" that was used by Kipnis as a citation for the information strategy, is in fact a superimposition of fragmented formal elements and programs. The modern roof, steel catwalks, and steel staircases are superimposed on top of the existing historical building (as mentioned in the second chapter). The deformation strategy emphasized the visual effects of the engenderment of new spatial forms, derived by event spaces generated from new geometries. Kipinis (1993) linked the realization of Deformation conception with the employment of catastrophic fold to generate forms as he cited with Bahram Shirdel's fold in Nara Convention Hall as mentioned before.

5. Jenks (1997), seeks to define a design polemics theories that generate form through reflecting universe processes and generative systems, with grammar of elegant wave forms, smooth folds, variations and fractals. The complexity occurred in science and architecture was the motif to construct those new strategies. Three form generation theories were introduced: Self-Similar Fractal's language, catastrophic Fold and Superimposition.

Self-Similar and Fractals are a high sameness attitude, where the resemblance extends from the parts to each other to the part and whole. The concept was stemmed from the variation of shapes in nature. Thus this strategy is merely fallen under Broadbent (1975) analogy theory, and also share the same conceptual description with Attoe (1987) organic architecture theory . As Jenks he attached the fractals with the pioneers of organic architecture (as mentioned in the second chapter).

The Catastrophic fold language offers an alternate theory for containing differences and heterogeneous mixture. Departed from the previous theories of collage and violent fragmentation used by both Postmodernism and Deconstructivism, the fold offers a smooth transitions, inclusive unity of reconstruction. The same theory was mentioned before also by Kipnis (1993).

Superimposition language invites a complex visual qualities by presenting numerous layers simultaneously, blurring the contrasts, and adjacent the categories together while preserving their ingredients. This theory is conceptually similar to the information strategy of Kipinis (1993), which also was linked previously to Eisenman (1976) Multiplicity and Fragmentation strategy. The same concept was mentioned by (Eisenman, 1999), as a serious of superimposed layers derived from the history of the site and act as a fragmented signs, this strategy used in his Romeo and Juliet project.

6. Browne (2003) in his polemic categorized design theories into tow, from outside architecture and from inside architecture. The from outside architecture adopted conceptions are the typology, functionalism (Determinism) and Pattern language (Behaviourism) , which generally speaking based on scientific motifs. The from inside architecture theories are, Universal space; Served and servant space theories. Typology

as once more is mentioned as a form design theory, same as Broadbent (1975) did. Alexander's pattern language theory appeared once more as previously was mentioned by Attoe (1987).

7. Fil Hearn (2003), made a broader investigation for design theories since the classic design methods before 1800th until the postmodern design methods after 1965. The methods were exhibits in a chronological sense and as following:

A) Theory before 1800: Classical Design method, B) Theory from 1800 to 1965: Rational design methods, Generative planning as the basis of design C) Theory since 1965: Rationales beyond Rationalism methods.

Generically, the classical design methods appreciated the "ideal image", thence, derive the method upon that attitude. Form is designed in accordance to the ideal of that time, which was the Vitruvian perpetual temple and instructed to the dichotomy rules and orders.

This method then is holding the same conceptual qualities of Typology theory that mentioned by Broadbent (1973), Rowe (1987), all influenced by a reference type.

Rational design methods were associated to the propulsion of the process as a problem solving mode. Form design shifted from adherence to the prescription of classicist. Violete le Duc made a great contribution by his step by step rational design method (as mentioned in detail in the second chapter). The theory of rational method established the basis for the functionalism at the modern time, as in (Hearn, 2003). Consequently, the rational method mentioned by Hearn (2003) is the same theory of Functionalism mentioned by Brawne (2003).

The metaphor as spur of design mentioned by (Hearn, 2003), which offers analogies like mechanic and organic, is the same strategy that mentioned by Broadbent (1975), and also by Attoe (1987). The generative planning method were based on the assumption of the importance of space, as centre of architecture. These methods give the birth for tow theories universal space and served and servant space, which were mentioned before by Brawne (2003). The honesty of structure articulation method was mentioned only by this author, so according to the research scope it will be excluded.

Theory after 1965 experienced the emergence of methods aims to layer meaning within form. Architects of the time insisted to endow form with cultural stain, satisfying the patron's cultural expression motifs. They borrowed a fragmented formal elements from different historical contexts according to the desired outlook. The ultimate expressive impact is recognizable and restore a sense of " cultural belonging, because the borrowed elements convey a meaning.

The collection of different formal vocabularies implied in the method of layering meaning in forms are conceptually similar to the semantical analogy mentioned by Attoe (1976). This compatibility also confirmed by other authors like Mallgrave & Goodman (2011), Jenks (1976) and Eisenman (1971), all refer the linguistic concept of semantic as the strategy of layering meaning in forms.

8. Vander Voordt and Van Wegan (2005), categorized design methods into: Analytical methods consist of (the three method hierarchical decomposition, functional analysis, analysis of interconnected discussion area). Creative design consists of (combination, mutation, analogy, first principle), and Typology as design method.

The Analytical methods shared the same passion of "detailed exploration and analysis of the problem". But since their main focus was directed to the analytical actions, they fall in a spot out of the scope of this research. Automatically, these methods are excluded from the content.

The Creative design methods are nothing but catalysts for the design decision-making area. They define four ways in which thinking can be directed in a particular way. For example: the method of combination, is combining different already used concepts mixed to engender a completely new idea. These methodologies, in terms of their concern with the level of ideas, can be compared to Broadbent's (1975) four methods (mentioned in the second chapter). Their similarity is that both draw a broad outline defining a particular way of thinking.

The last method mentioned was the Typology method, that make it similar to (Broadbent, 1975) and (Brawne, 2003), in pointing it as form generation strategy.

9. Kari Jormakka, (2014), inclusively surveyed many of the design methods and then organized them under categories that were determined according to the author's vision. He linked the invention of all these methodologies to the modernism attempts to escape the historical form authority.

The first category mentioned was "Nature and Geometry as authorities " that put the "Quadrature and triangulation method" and the "Biomorphic architecture theory" as form generators, the former was "secret of the masons" in the Gothic architecture lead to their harmonious and coherent proportions among the parts in themselves and between the whole. The later strategy is a matter of tendency towards nature either as

a direct analogy or adoption of generation system. In general the category of "Nature and Geometry as authorities" was mentioned also by Attoe (1976).

Second category was "Music & Mathematic as models" that appoint "musical analogy", "Higher dimensions" and "proportions" methods as form generators. The former is offering a direct interpretation for the musical notes graphics into form, or materializing the ephemeral sound patterns into frozen forms. This is a purely coincidental actions and cannot be relied upon as a reliable methodical. According to the research scope it will be excluded.

The "Higher dimensions method" appears once and did not mentioned in any of the previous texts, so it will be excluded. The "proportion method" can conceptually correlated to the "classical design methods" mentioned by Hearn (2013), because as mentioned before proportions were the backbone of classicist ideal image form.

The latter category was "Accidents and the unconscious as sources", which includes the strategy of "Heterotopias" and "Surrealist device" strategy. The former, is the method used by Alvaro Aalto, the method of non- organization rules in generating forms, the absolute freedom to choose any form to accommodate any function, just to satisfy fantasy of designer. This method is entirely guided by the subjective taste of designer and leave no chance to track any systematic traces on it. Therefore, according to research scope it will be excluded.

The "Surrealist device" method as was described relies on accident - the accident force is the probability of involving accidental combination of diverse images - as a driving force for the process of form generating. So, also it will be excluded from the research

concern in accordance to research scope.

The category of "Rationalist approaches" introduce tow strategies" Performance form" and "Pattern Language". The former is a rationale supported the objective scientific knowledge to base the form generation, based it on a logical reasoning. This attitude is based on the rationale of Violete le Duc that mentioned in the classification of Hearn (2003), and also it is the same concept of functionalism strategy mentioned by Rowe (1987). All are constructing the ideas of form design in a functional logical reasoning.

Other method of " Pattern Language" was mentioned in the classification of (Attoe, 1976), and (Rowe, 1987).

The category of "Precedents" involved tow methods, " Typology" and " Transformation of specific model" strategy , the first one as was mentioned in several occasions under this heading, typology as a form generation strategy was fostered by (Broadbent, 1973), (Brawne, 2003), (Vander Voordt & Van Wegan, 2005).

The later strategy "Transformation of specific model" demand for adopting a precedent model, which can be any type and then a process of transformation occurred to adapt the original conditions of type to suit with the new demands and desires. In somehow it is conceptually can referred back to the theory of typology itself.

The category of "Response to site" holds on it tow strategies "Regionalism" and "Contextualism" strategies. Regionalism assumed to instil connections between the intended form and the local or regional conditions of the site. The connections are exceeding the figurative manner and reaching the spatial organization and even

construction techniques, this conceptually imply the same concepts of Pattern language strategy. In both the local conditions are the main influence for form generation, the same comparing approach between the two strategies was held by (Mallgrave & Goodman, 2011).

The contextualism strategy confined on the figuration connections with the physical context surrounded the form, the same conceptual quality of this strategy was exhibited by the deformation strategy. To clarify this relation the comparison between the forms generation processes from the two camps are necessary. From the first camp, Jormakka (2014) cited with Richard Mayer Arts and Crafts Centre as contextualist ideal, where the initial steps of form generation stemmed from a particular morphology existed in the physical context that was a 19th century villa, from which the whole process were driven, refer to (Figure 4.2).

Figure 4.2: The contextual derivation of the form from the site surroundings (Combined by the author). A. Richard Mayer Arts and Crafts Centre, the evolving of formal organization from the 19th villa, (Jormakka, 2014) B. Peter Eisenman, Columbus Centre model, the evolve of form from the pre-existed train lines (Kipnis, 1993)

On the other camp, Kipnis (1993) cited by Eisenman Columbus Centre project at Ohio, where the initial form of the building was relied heavily to the "train track switching system" that formerly existed on the site, refer to (Figure 4.2).

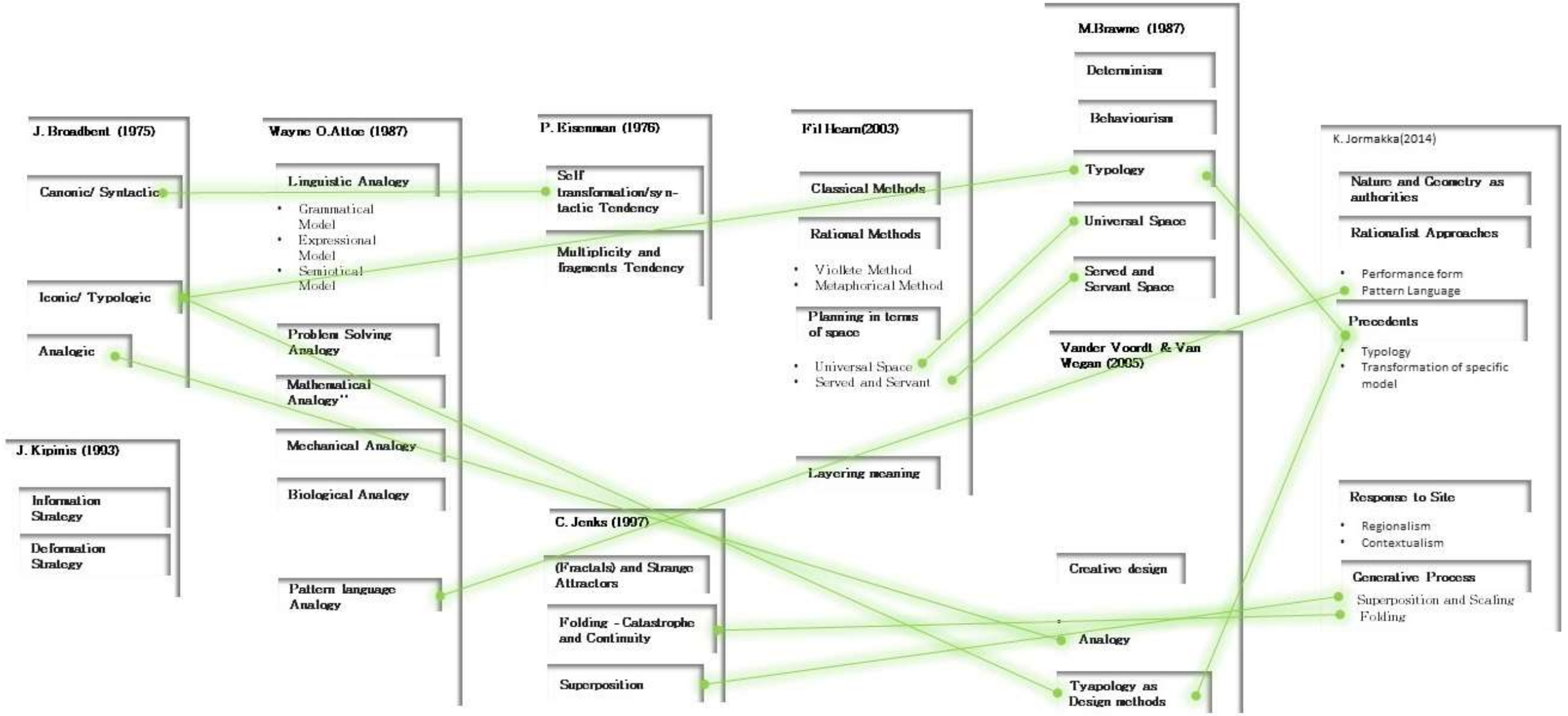
The category of "Generative process" holds tow strategies superposition and folding. Both strategies were indicated directly by Jenks (1997) polemic, and also both are conceptually compatible with Kipinis (1993) theories of Information and Deformation Strategies (the correlation was made before in Jenks part).

4.4 Reorganizing the literature: Affiliating form design theories

The classification of literature exhibit multiple form design theories with shared names in some cases, or with mutual descriptions on the other. Within this heading the intention is to reorganize depend on their typical terminologies and conceptual similarities.

4.4.1 Correlating the Intersected Mutual Relation among Theories

The classified literature appeared in (Figure 4.1) has provided three types of mutual relations among the form design theories. The first group consisted of theories that were addressed in literature with the same term in the shared texts, which are termed here as Typical theories and indicated in (Figure 4.3). Second group is consisted of theories that shared the same descriptions but were addressed in different terms by different authors in literature, which are termed here as Similar theories and indicated in (Figure 4.4). Third group is termed here as Relative theories consisted of theories that have the potent to be related relatively due to the shared conceptual description among them, as indicated in (Figure 4.5). Refer to the previous heading to find the correlation process that preceded this affiliating.



Typical Relation among theories: consisted of theories that were addressed in literature by different authors with the same term.

Figure 4.3: Typical Theories matrix of relation, which were addressed in literature with the same term in different texts by different authors. (Created by the author)

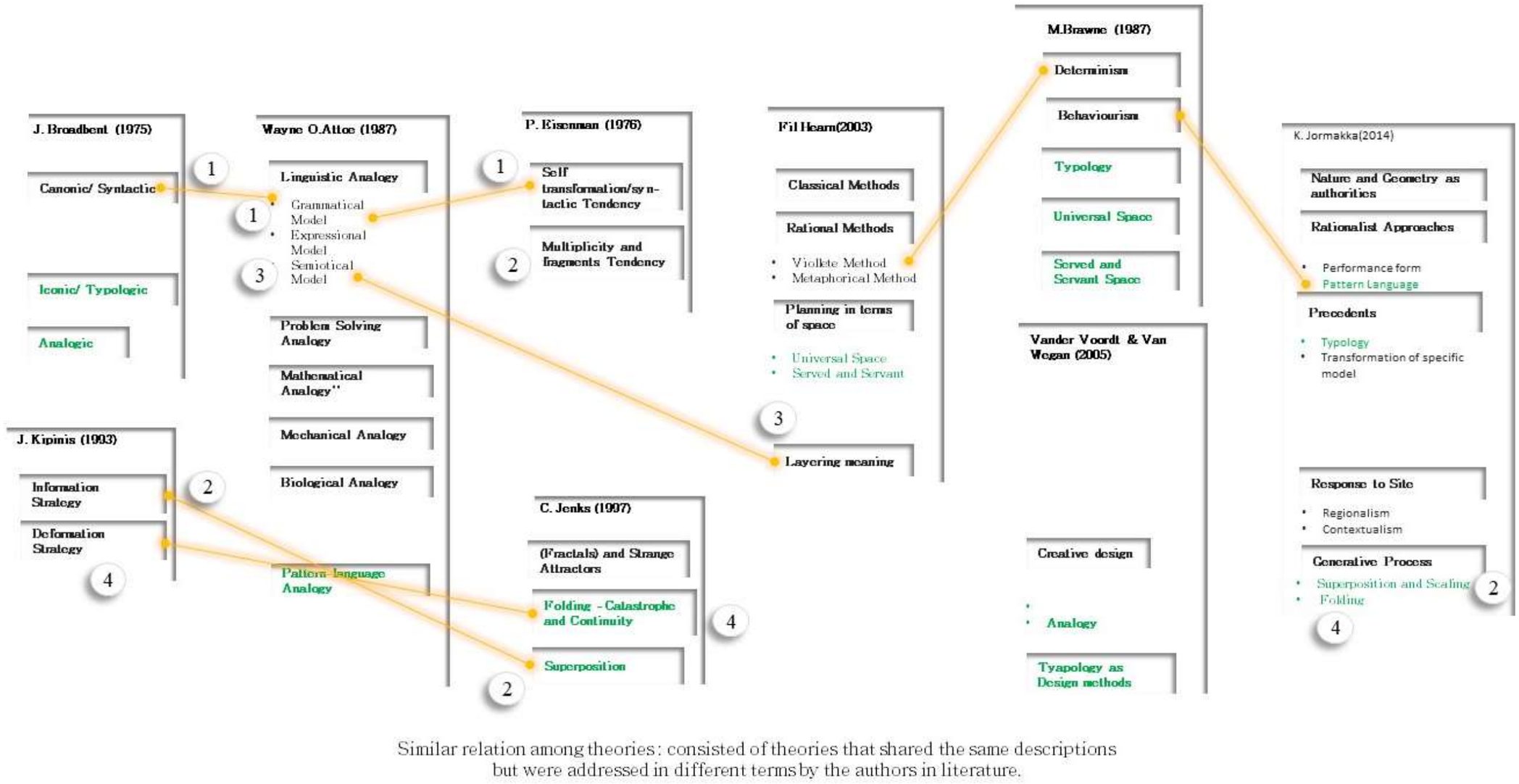
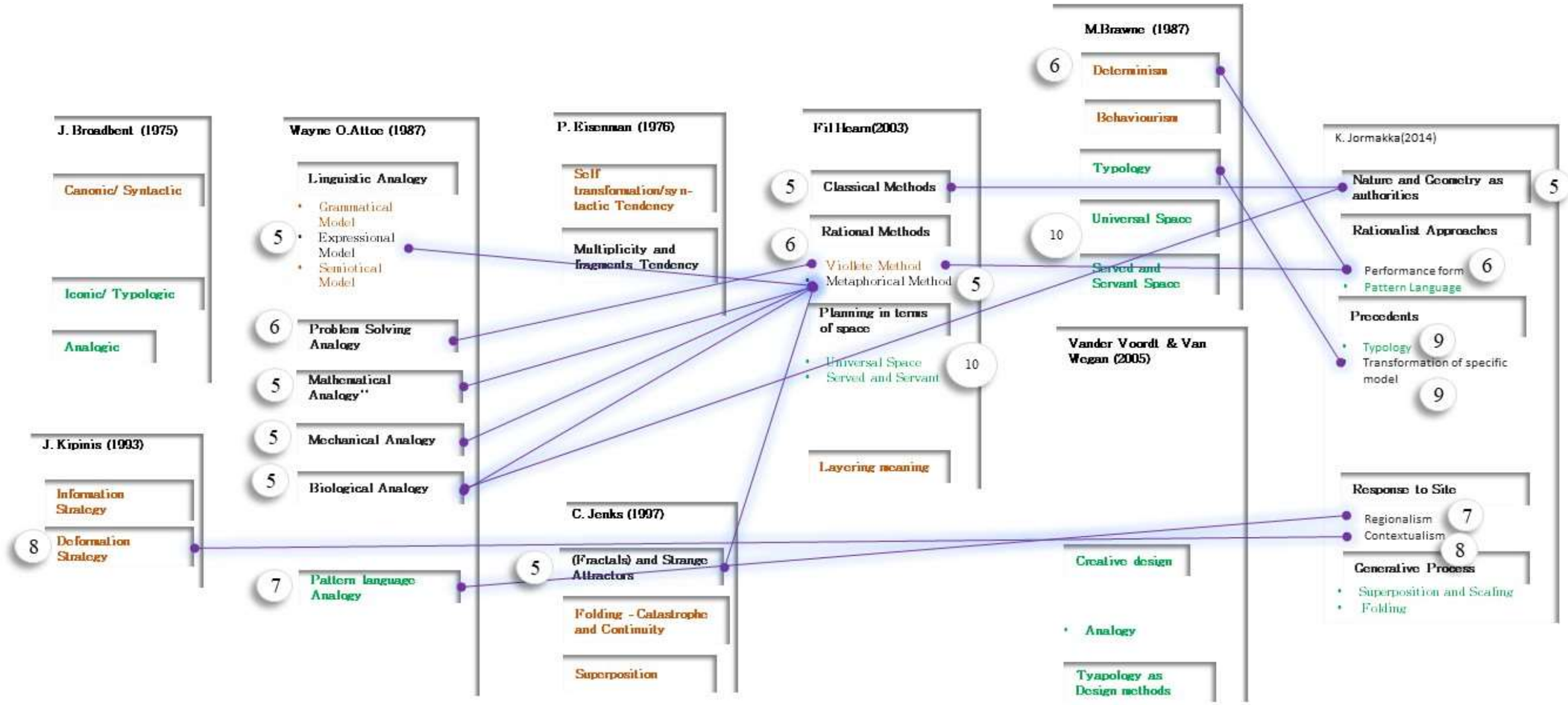


Figure 4.4: Similar Theories matrix of relation, which shared the same descriptions but were addressed in different terms by different authors in literature. (Created by the author)



Relative relation theories :consisted of theories that have the potent to be related relatively due to the shared conceptual description among them.

Figure 4.5: Relative strategies matrix of relation, strategies obtain the potent to be related relatively due to the shared conceptual description among them (Created by the author).

In Figure (4.3) the Typical Relations theories unfolded are: (Syntactic- Typology- Pattern language- Served and servant space- Universal space). All were mentioned with the exact name at least between two authors. In Figure (4.4), the Similar Relation theories unfold are :(Syntactic and Grammatical model – Semiotic Model and Layering meaning- Multiplicity of Fragments, Information, and Superposition- Deformation and Folding-Behaviorism and Pattern Language). In Figure (4.5), the Relative Relation theories unfold are: (Analogic, Mechanical Analogy, Biological Analogy, Metaphorical, Nature as Authority, Fractals and Strange Attractors– Problem Solving, Viollete method, Determinism and Performance Form- Pattern Language and Regionalism- Deformation and Contextualism- Typology and Transformation of specific model).

Each group of those affiliated theories has the potent to be categorized under a unified label, since the theories under its umbrella are already have a shared conceptual qualities.

4.4.2 Relabeling of Theories

Referring to the upper affiliation of theories, it can be noticed the necessity to relabel the grouped theories under each category of Typical, Similar and Relative theories with a unified name.

Since the concern of the research is directed to the form synthesizing and generating, then the new label of the theory will be selected according to the logic of form generating, i.e. the similar strategies (layering meaning- semiotic model) share the same description, both are referring to the concern with codifying meaning to the form. Semiotic is a pure linguistic term, while layering meaning is closer to the logic of how

this strategy generating form, where the meaning (specific formal elements in this case) is registered to the object as a canvas that overlaid on it, as a layer.

The following numbering are in accordance with the numbers indicated in the affiliation diagrams in Figures (4.3), (4.4), and (4.5):

1. Syntactical analogy theory and the Grammatical model theory, both are originated form Chomisky's concept of Syntactic structure (Broadbent, 1975), (Eisenman, 1976), and (Attoe, 1976). The hidden system or the deep structure provides a generator of surface structure via subjecting the inner syntactic integers of objects to a set of operations and transformational rules (Gandelsonas, 1968). The nominated term for these theories then can be Deep structure transformations theory.

2. Multiplicity and Fragments theory as previously was explained as serious of fragmented signs stripped from meaning and accumulated to represent more basic condition (Eisenman, 1976). Information strategy was theorized by (Kipnis, 1993) to become the other strategy that can embody the five points of New Architecture claimed by him. Superposition is a device to accommodate the disparate ingredients on top of each other (Jenks, 1999), (Yormaka, 2007). In this manner Superposition final form is multiple layers of accumulation fragmented signs, thus it has included the first strategy within it. Superimposition is part of the Information Strategy, which is more holistic and precise to be the nominate name among this group of theories.

3. Layering meaning method was addressed by Hearn (2003) to describe the process of collaging disparate formal elements with embedded meaning together, the selection of those elements was decided upon the desire to reflect a specific message through the form. While Semantical model theory also is a linguistic concept belongs to Saussure's theory of sign- a dual sided entity implies signifier (a material

representation) and signified (refer to the concept of a thing) formally recognized upon a social contract- aiming to create a plural taste culture architecture, by consult the classical meanings (Jencks, & Szacka, 1992). As explained above, the layering meaning theory is closer to the logic of how this strategy generating form.

4. Folding theory were described by (Jenks, 1999) and (Yormaka, 2007) as an analogy to the Catastrophic fold diagram of Rene Thorn, gentle folds and bends. The Deformation Strategy on the other hand, was theorized by Kipnis (1993) as one of two strategies that can embody the five principles of the claimed New Architecture. Then he selected the fold as the device that allow to generate the desired continuous deformation of the object. Therefore, the Deformation Strategy is more holistic, either it holds the fold as part of it.

5. Metaphorical Method was the resort to metaphor to load designers with the creative impulse during the form generation stage (Hearn, 2003). Hearn introduce Mechanical Analogy and the Biological analogy as the parts from the metaphorical method, while (Attoe, 1976) introduced them in a separated manner. Jenks (1999) Fractals and strange attractors were analogy to the language consumes in nature for morphogenesis, which is the same method that meant by Jormaka (2007) as resorting to Nature as Authority in form generating. All these strategies fall under the umbrella of Metaphor, further as a form generator Metaphor indicates a basic condition of what the form should refer to. The nominate name representing these theories is the Metaphor as generator theory.

6. Functionalist theory implies to put the form under the fully compliance of function during design, as was described by (Brawne, 2003) under the title Determinism.

Sanctifying Luis Sullivan slogan "form ever follows function", and falsely misinterpreted on purpose to satisfy the dictates of technological production and the economic efficiency (Hendrix, J, 2015). Rational method was referred by (Hearn, 2003) to generate the form that solve the purpose demands and structure organization, throwing to Viollete le Duc the father of rational method. Which, then constructed the base of functionalist. The rational method exceeds the logic of fulfilling purpose to the so-called Design research, Analytical models, and more, which makes it a loose and floaty. Performance Form method extended the purpose and structure by added all other forces that can affect the performance of the form, i.e. the environmental forces (Yormaka, 2007). The form designed by exhaustedly perform the function and other factors until reach the level of optimization. Form Performance theory was nominated to become the name that represent these theories.

7. Pattern language -was entitled as Behaviorism by (Brawne, 2003)- and Regionalism theories share the same interest on the local and reginal conditions that surrounded the intended object form. The former name is more signifying the process of generation, where in both theories the vernacular shared formal and spatial patterns are combined to create the object. Thence, the nominated name is the Pattern Language theory.

8. The Deformation strategy offers more holistic and inclusive principles guiding to how generate form than the Contextualism does. Indeed, both are grafting from the site the suitable references to establish the form generation process (refer to the second chapter for more details). But the Contextualism theory confined on that morphological references while the deformation strategy extends to more spatial and formal prescriptions. Therefore, the nominate name is the Deformation Strategy.

9. Transformation of specific type method looks more indicative on how to generate form than the Typology theory, besides it is more generalized. In the former any specific model (type) of art or architecture can be adopted as a first trigger for the generation process after then the intended transformation would be carried on, while in the later the adoption is imitated solely to the architypes, with no any indication of how to procced the rest of the process.

10. Universal space and Served and servant space theories both appoint space as main source for form generation. Then the nominated label for this theories is Space as generator theory.

Ultimately the new labels for the justified strategies are:

i. Deep structure transformations theory.
ii. Layering meaning design theory.
iii. Deformation design theory.
iv. Form Performance design theory.
v. Information design theory.
vi. Metaphoric design theory.
vii. Pattern Language design theory.
viii. Transformation of specific type design theory.
ix. Space as generator design theory.

The above mentioned relabeled theories are still fall under the typology of Descriptive Design Theories. Means that they describe the real practice of design as was mentioned before, therefore they obtain no explanatory power to guide the stray designer through the process of form synthesis. The reason why, those theories need to be dissolved to

redefine their conceptual structure, consequently arm them with an explanatory power.

4.5 Dissolving of Theories: Extracting the Design Ingredients

The verified nine form design theories from the upper step will be dissolved by exposing them to the analytical device that was developed in chapter Three. Aiming to extracting the design ingredients from each form design theory. The analysis will be based in the definition of each ingredient, as the ingredients hierarch from the general description for a model of decision-making adherent to certain rules (strategy), then in narrower manner of the decisions themselves (technique), and then the (tool) designated to implement these decisions (Figure 4.6).

Putting these definitions in considerations, a qualitative analysis will be carried out for each theory based on the conceptual description to breakdown into its primary components. On that, it will be resorted to the literature of the architect who theorize the theory, and also to the author qualitative interpretations to analyze projects in which these theories have been applied. The reason is that the design ingredients are not explicitly mentioned in literature so they need a closer look to extract them.

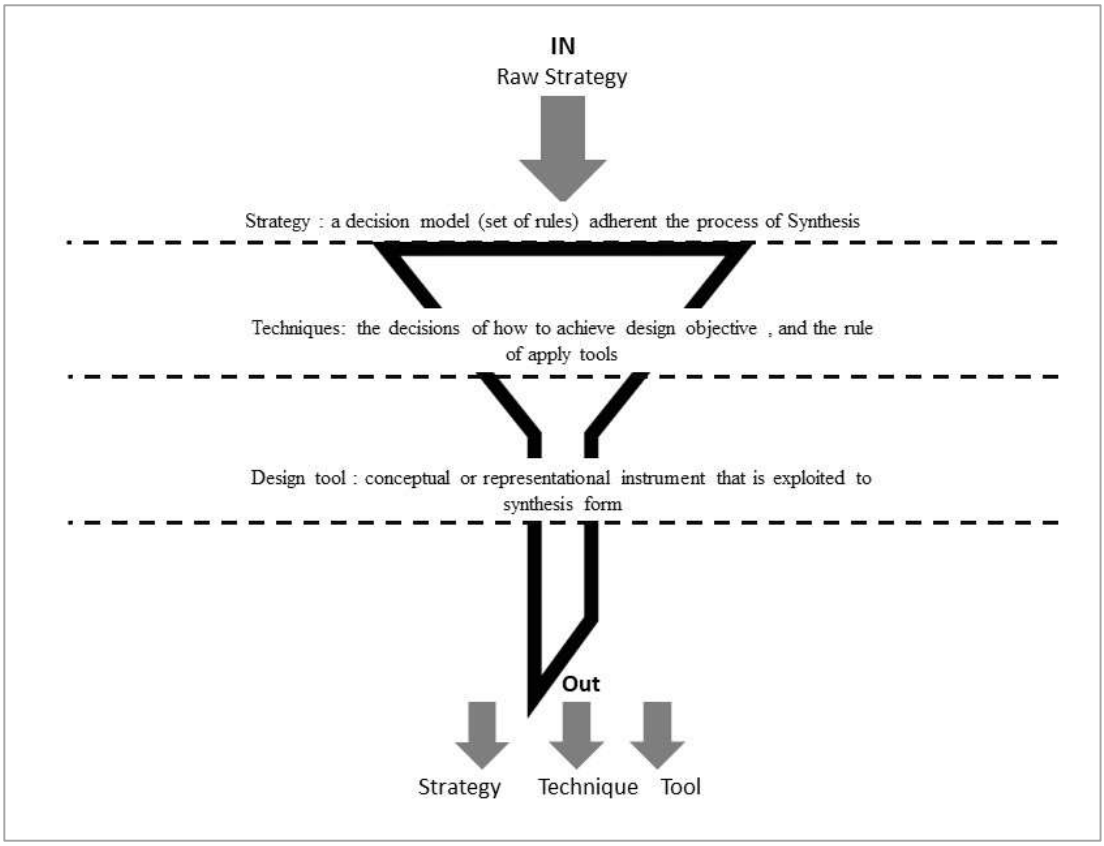


Figure 4.6: diagramming the analytical device of dissolving theories, gradient from a broader intellectual action in the upper level to a precise conceptual tool for form generation in the bottom level. (Created by the author)

4.5.1 Dissolving the theory of Layering Meaning

I) Introducing the Theory:

Architecture on the eyes of some are seen as a system of cultural meaning, a system of information that crystalized into tangible form, which able to communicate with a beholder in a specific context (Gandelsonas & Morton, 1972). "Theory of signs" seems to be the promising source for this type of architecture that strive for a better understanding for building meaning and it is symbolization. Theory of signs invented by Ferdinand de Saussure's and later developed by Charles Sanders Peirce. The shared concern was to develop a theory of signification – or the so-called semiotics and semiology- In short, it describes how anything stands for something evoked another thing that is it, the typical Vitruvian ancient belief of signifier and signified (Broadbent, 1977).

Theory of signs from the proposition of Charles Sanders Peirce the American philosopher categorized sign into Icons, symbols and Indices. Icon is a sign that make a reference to the object which it indicates by showing similar characters to it. Index is a sign or it can be a representation that make a reference to its object by obtains a dynamical or spatial connection to the object itself and with the receiver memory or senses. Symbol is a sign that make a reference to object by an arbitrary or culturally association with it (Broadbent, 1975).

These semiotic notions take an applicable place in the physical environment architecture. Church in instance, is the most obvious example to the notion of symbols in architecture, as a sign that appointed by the society to symbolize Christianity. The icons in architecture consist of all representation means, photographs, models, or drawings, but from other sense the building itself stands as an icon in the case if it is bring an analogy of something else, e.g. Le Corbusier analogy of crab-shell at Ronchamp roof (Broadbent, 1975).

II) At the Level of Strategy:

This theory drew the attention to codify a frame of meaning into the intended object based on a linguistic theory of signs. The tendency towards inscribing meaning on the architectural object lied in the purpose of communicate with society. Encouraged the celebration of differences in society and a respect of local, particular and regional.

The strategy imply an adjustment of a "transcendent image" by subjecting the program, the space and the structure to a distortion conditions in order to suit the intended image. To derive an exemplary clarification for that, it is brought the polemic theory of Venturi and Denis Scott that initiated between the duck and decorated shed. The duck is a symbol in itself that has authority to subjugate all architectural systems

to reveal itself. The symbolic form – the duck- gives itself the right to distort and submerged the space, program and structure. In contrary, the decorated Shed is a form that pay itself to the service of program that shaped the space and structure, then the ornament is added independently (Venturi, et. All , 1975).

III) At the Level of Technique:

The communicative transcendent image demands the object to reflect a multi coded culture. Make it hybrid and mixed in a constant tension between differences. To extrapolate the technique of the strategy it is better to analyze the forerunner examples that fostered this strategy from literature.

One of the forerunner examples on this respect as described by (Jencks, & Szacka, 1992) is the low cost housing in London designed by Jeremy Dixon. Each building are a hybrid condition of Edwardian typology [1], a mixed elements types between vernacular and modern [2], and it even suggest a classical symmetry in the composition [3] , as can be seen in (Figure 4.7).

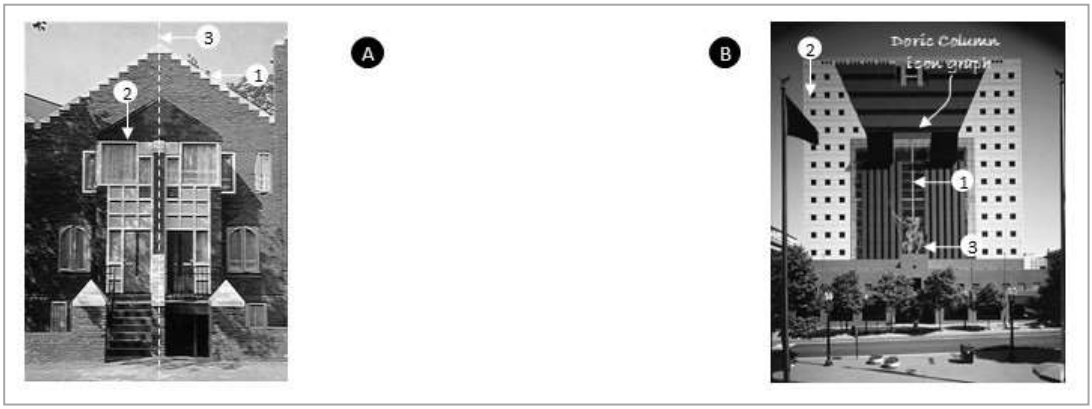


Figure 4.7: Layering meaning strategy, the collection of familiarized signs in the specific context (Combined by the author) A. the low cost housing in London designed by Jeremy Dixon (Jenks, 1972) B. Public Service Building in Portland, designed by Michael Graves (Jenks, 1972)

Other forerunner project was Michael Graves's Portland Public Service Building. The form was composed by combining various fragments, partly modernist promoted by the black glass signifying the inner spaces [1], partially urbanist indicated in the green arcades, partially rationalist appeared in the selection of small square windows caused by the energy crisis [2], and finally the overall proportions and garlands inspired from Baroque and Egyptian. The hybrid building harmonized itself perfectly in the urban context via established correlations with the adjacent modernist slabs and classic city hall. The building created a strong visual relation with the beholder via the incorporation with the proportion of human body. The mixed language in the collage reached the extent of revived the notion of sculptures integration [3] (Jencks, & Szacka, 1992).

Third project is the famous Piazza d'Italia building- public center for the minority of local Italians in New Orleans- designed by Richard Moore. The mixture of different elements that convey different meanings have brought the nostalgia of italic communicative and social functions to the new context. The complex consist of various spaces and forms, the building mass was subtracted reviling a negative circular space that is the piazza itself [1]. At the entrance a typical small temple with the classical language is inserted, the temple is framed by a fragmented raw of columns [2]. A fountain basin is placed in the center of the composition represents the "Mediterranean" bathing falling from "Alps". Sicily is symbolized in the piazza center to signify the origins of Italian immigrants are from there [3]. The convex façade that surrounded the plaza is a system of juxtaposed references refer to the five classical orders [4]. The columns itself is subjected to a distortion process affected the proportions and the parts morphology, e.g. the bases take a shape of fragmented architrave, the columns are isolated from the capitals by a ring tube of colorful neon. The upgrade of

the classical language to become up to date language via mixing it with the Pop Art language, is a reflection of the transplantation of Italians into the new world (Harvey, 1990). (Figure 4.8)

Figure 4.8:Piazza de Italy complex, designed by Richard Moore (Combined by the author) 1.The circular typology of Colosseum theatre 4. The collage of orders, arches, entrances in one scene 2. Displacing the temple from its context and its function to become an entrance to the complex, with distorting the materializing of it. (Combined by the author from https://www.pinterest.com/tim_jacoby/charles-moore-piazza-ditalia-new-orleans-1976-79/?lp=true)

Extracting from the example the technique of this strategy is directly guide designer to *search* and *collect* different formal ingredients, which can be an explicit formal elements (Like borrowing of orders in Piaza de Italia), particular artifacts (like the sculpture in Hedjuk design), or system of organization (like the classical symmetry employed by Jeremy Dixon). All allow the form to communicate with users through familiarized signs agreed upon in the specific context, or to harmonize with context by collecting the most mutual formal features.

IIII) At the Level of Tool:

The mixture of different elements that convey different meanings now is ready as fragmented pieces that need to bring together as one layer that hold the communicative aspect and overlaid on top of the object. The assemblage as a tool enable to construct this combination and open the doors to celebrate the liberality of forms. Assemblage in dictionary is "a work of art made by grouping together found or unrelated objects.

Or, a sculptural technique of organizing or composing into a unified whole a group of unrelated and often fragmentary or discarded objects."

Assemblage capability to reconcile the differences, combining them to engender a whole, eligible it to nominate as the perfect tool to realize the strategy of Layering Meaning.

4.5.2 Dissolving the Theory of Deep Structure Transformation

I) Introducing the Theory

While the surface structure of an object is the tangible formal information inscribed in the physical properties, as symbolic or iconographic. In more abstract sense lying the deep structure, where the formal information are intangible thus for the individual it is a mental conceiving for the relationships (Eisenman, 1970).

In other words, the manners of manifesting formal information in any environment take two manners. The first one, is via the "notational order", which is the illustration of formal regularities in a particular context. The notation illustrated from the physical presence of shape's geometry (as surface structure). The second manner is via the" relational notation", the formal information on that case is hidden and registered in the relations between shapes received indirectly by the individual mental capacity (deep structure) (Eisenman, 1970).

The deep structure rules are inherited from the "generic forms"-Cubes, double cube, circle, cylinder- that obtain absolute rules and attributes. Cube in example is a centroidal form implies an equal vertical and horizontal axes from its centrum, in addition to the equity off all surfaces. This inherent dynamics are universal, transcendent any aesthetical references or any function. The inherent dynamics of

generics act as basic rules-self generated rules (syntax)- that should followed to create any grammatical distortion in the form (Eisenman, 1963).

II) At the Level of Strategy:

The strategy fosters the manifestation of the object deep structure as ultimate self-referential signification surpassed any external references on it. Revealing the autonomy and singularity of architecture in advance. The form synthesis inherited from the inner rules and mechanisms freed from any sort of commitment with the contextual socio-political conditions. The deviation from this conditions is a critical respond aim to displace architecture form its traditional role as a victim of circumstances.

Therefore, form seen as a self-generated condition result of a transformational series from a pre-existent geometry merely a platonic solid.

III) At the Level of Technique:

In order to extract the technique employed in this strategy, Eisenman serious of houses should be put under analysis lens. The first experiments this strategy was implemented for the first time in Eisenman Houses series, House II, House III and House IV. Eisenman (2006) in "Feints" particularized a detailed description for the process of synthesizing the form of House II.

In House II (Figure 4.9), the center condition is chosen to be a generic square volume that selection was completely arbitrary [1]. Then the square is turned to a nine square grid -which has a long history in architecture since the Palladian villas design, the nine square grid extrapolated by Wittkower as organizing diagram for the spatial organization of al villas. The same hidden system was present in Le Corbusier's villa Stein as analyzed by Colin Rowe, and lately the same grid continued to presence in

Hejduk's and Eisenman's houses serious (Lauder,2012)- each of the nine square point marked in the corners by a square columns resulted a matrix of 16 column . Then the possible conditions for the different conditional options start to exhibit: as a set of volumes, as a set of planes, or as a matrix of columns [2].

The relations between volumes and planes is governed by opposed axes linear and directional relation. The nine square grid is a hidden structure system and the opposed axes of volumes and planes is to cause a transformation on it. This is back to a supposition that the spatial oppositions lead to the manifestation of a virtual relationship between the underlying structure and the actual environment [3].

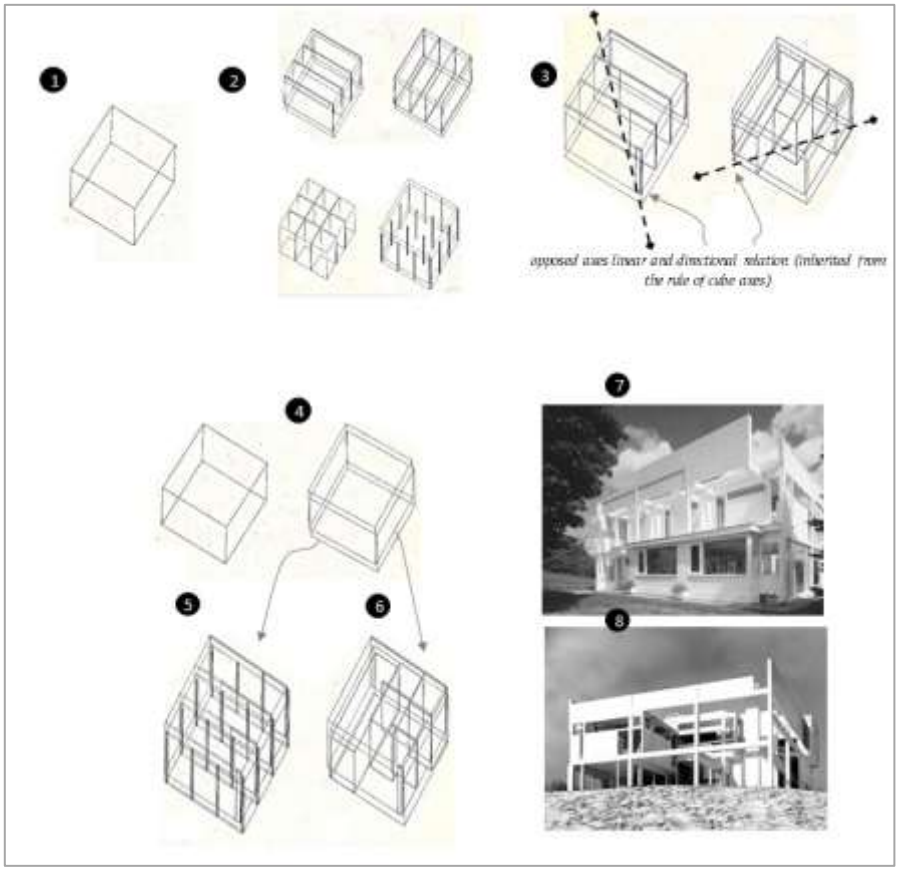


Figure 4.9: House II diagrams, step by step formal evolvement (Developed by the author)

Then from here the more advanced diagrams select to develop one plausible transformation from this deep structure to be as actual environment. After that, another transformation is occurred by a diagonal shifting or dislocating for the first square volume [4]. This shift give the possibility to create another system of opposition in the actual environment, where the first square articulated by a serious of planes [5] and the other one articulated a matrix of columns [6]. This opposition leads to a double reading for the environment, because each system can conceived as datum reference, e.g. from the north side the planes appear as a neutral datum and the diagonally shifted columns as a residue from them [7], oppositely, from the south side the columns act as a reference and the planes as cut from them [8].

In house III [1] and IV [2] the form synthesis process (Figure 4.10), the cube once more became the primary condition as a generic form. The nine square grid divided the cube into four planes or a frame of 16 columns. The transformation technique for House III was a rotation transformation, while for House IV was shift transformation, both transformations occurred in the deep structure.

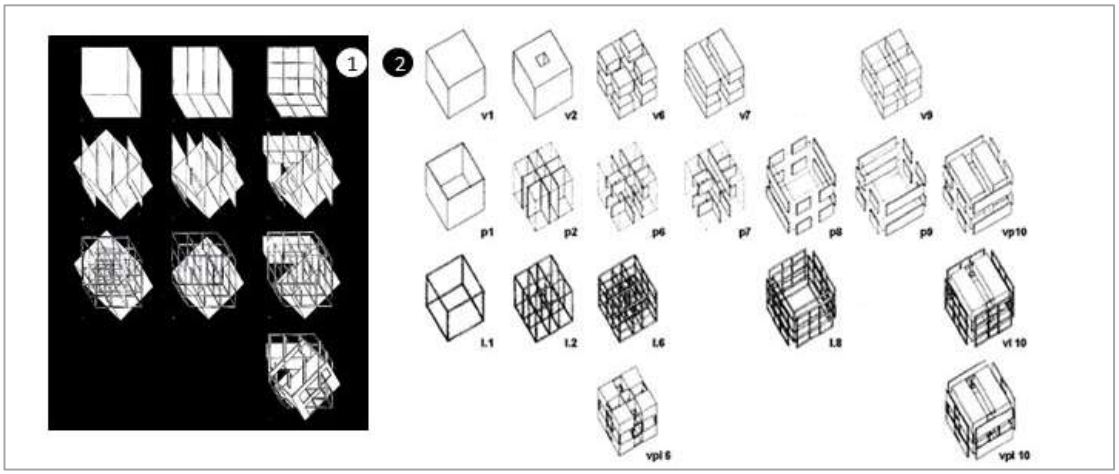


Figure 4.10: Diagrammatic formal evolution 1. House III, and 2.IV diagrams, step by step formal evolvement (Combined by the author)

The technique extracted from above are Diagonal or perpendicular shifts, Rotations, Shear transformations all occurred in the deep structure. Manifested in the surface structure through the basic elements point, line, and plane volume and produce the surface operative formal conceptions in the form like compression, elongation, additions and subtractions.

IIII) At the Level of Tool:

Diagram reveals itself as fundamental tool to realize the deep structure transformations. Eisenman himself appreciate the role of diagram in his design process as indispensable mediation to conceive the set of instructions and transformations (Eisenman, 2006). Diagram in this case is a transparent device that can register the different transformations occurred and also allows to layer them on each other's, as can be recognized on the upper diagrammatic transformations on House II, III, and IV.

The axonometric projection also was present in all the previous processes, allows to visualize the object from three sides simultaneously, thus it was considered as a new way of seeing. That helps designer to track the effect of operations while inscribing on the object. Projection as a tool associated also with Hejduk design experiments, according to (Tepavcevic, 2014) the "reversibility of the axonometric view" is fundamental in the design process of Bernstein [1], Diamond [2], and Bay [3] house projects, as shown in (Figure 4.11).

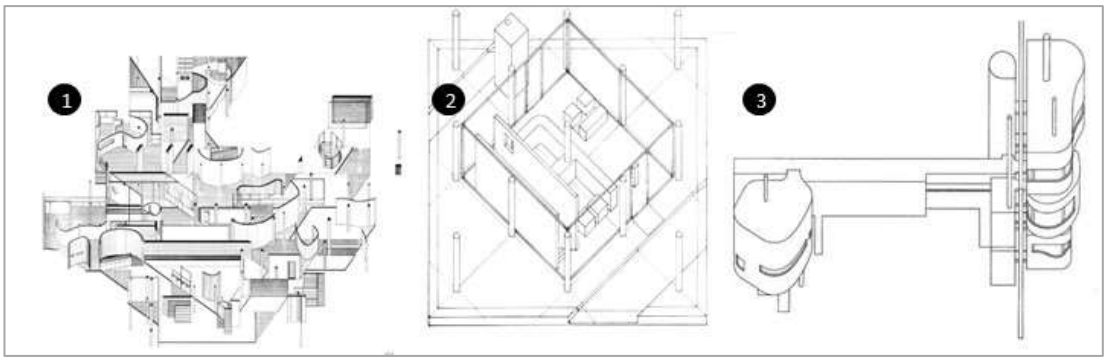


Figure 4.11: Instrumentalizing projection technique as a new way of spatial seeing Hejduk's Bernstein [1], Diamond [2] , and Bay [3] house projects. The presence of projection tool in all, as a new way of seeing. (Tepavcevic, 2014)

The projection instrumentalization was taken to another level in the Stereotomic Permutations-serious of projections formal experiments- of Preston Scott Cohen. The projection Geometry techniques- Orthogonal, Praline projections and perspective- are utilized to generate the intended transformation for the object. Where the object is submitted to series of different projection techniques, each stage maps a certain distortion until the object reaches the exhaustion (Cohen, 2009). In a competition proposal for a head start facility (Figure 4.12), Cohen apply the permutations to synthesis the form, which were serious of deformations starting from a single volumetric object.

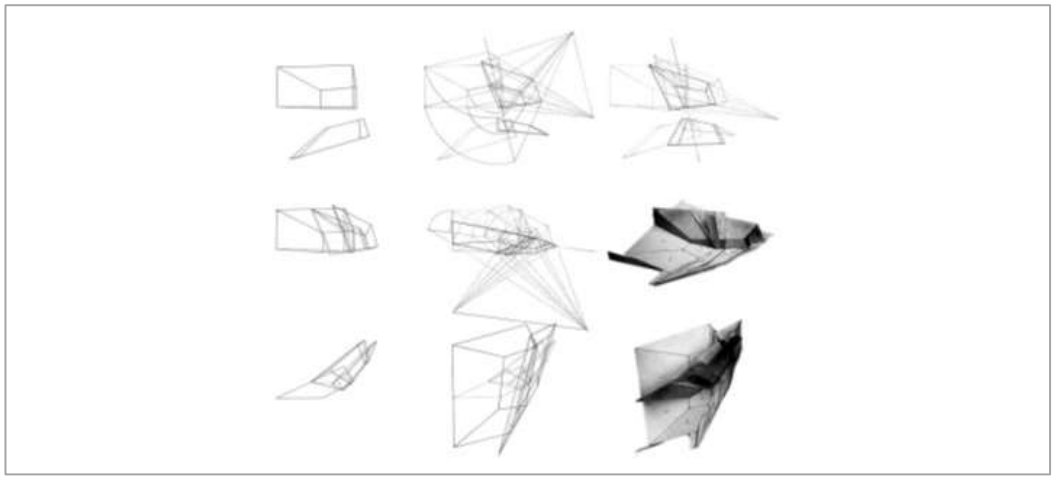


Figure 4.12: Steretomoc permutations, exploiting different projection techniques as a deformation mechanisms, proposal for a head start facility by Cohen (Tepavcevic, 2014)

4.5.3 Dissolving the Theory of Specific Type Transformation

I) Introducing the Theory:

The notion of "type" firstly, described by Quatremere de Quincy in his " Dictionnaire Historique de I 'Architecture", type nor an exact form, neither a direct resemblance of an antecedent came before or built later. It is a "metaphysical representation" for an insight came from the ideal history acts as critical instrument for now (Ornelas, 1995).

Never forget Durand great contribution on classifying buildings into types and genres according to dedicated functional and formal similarities, codified in an inductive manner accumulated to engender the particular type (Picon, 2000). But Durand's attitude towards geometrize the composition process stained his notions of type by a quantitative sense, which took him apart from Quatremere approach of spirituality and subjectivity to become more scientific and objective (Ornelas, 1995).

Two centuries later, the wave of modernism erased all the antecedents of history including the reductive typology concepts. By the leading of Gropius the type was readdressed as a "prototype", an exact repetition and duplication from a source object. Influenced by industrial mass production prototype became a "mechanized reproduction" adaptable to any site conditions and suitable for any divergent purpose (Ornelas, 1995). The prototype maximum benefit exploited at the mass housing projects" the same construction for the same requirement". Le Corbusier usage of machine prototype can be marked in many occasions starting from the Domino House to the towers of Paris urban new vision and Ville Radieuse (Moneo, 1978).

Since the sixties of last centaury a third typology has emerged, a new rationalist typology as termed by Vidler (1976). The new typology based on the eighteenth

centaury visions towards city that the history and form of the city are in a higher place than the fragmented forms produced by "institutional elemental" and "mechanistic" typologies. The new types are stashed urban elements imply a historical semantic residues, but the older meaning would never exist as it is, rather it is gently transformed "through a critical modernist lens". This criticality departed the notion of new type from the nostalgic and eclectic ideologies (Vidler, 1976). Aldo Rossi the Italian theorist and architect appointed by many authors as a leader for the new typological heuristic movement, such authors as Eisenman (1982), Rafael Moneo (1978) and Anthony Vidler (1976).

II) At the Level of Strategy:

The strategy strives to "connect with history", history became a source of analogy, analogy for the "skeleton", the imprint of events that occurred and will occur in the city.

The skeleton is an image, a historiographical act to past knowledge. It is a record of events through time. Only through skeleton -monuments as was meant by Rossi- the past can yet be experienced, although the original building function is not yet exist anymore, but the form is survived and the lost function is a matter of record of time. Here the analogue of the skeleton is present, the skeleton original function was lost because of death and solely there is a form (Rossi, & Eisenman, 1982).

Ultimately, the strategy adopts a precedent model (skeleton) as a start point for the synthesis based on the mentioned motifs, then the certain transformation would be elaborated to critically face the current demands and conditions.

III) At the Level of Technique:

The selected skeleton is ought to be transformed in order to insert the new meaning.

The transformation possibilities or mechanisms can be recognized from the analysis of projects that employ this strategy.

Moneo (1978), named Venturi's houses in Nantucket (Figure 4.13) as a forerunner on implementing ideas of the third typology. The houses form possessed the exact image -skeleton- of the vernacular typology that the wooden American house [1]. The image of the type dominate the outside appearance, while the inside structure loses the sameness with the vernacular inner structure, thus one could state in the interior the resemblance was lacked and likewise the memories of the old [2]. The outside image even shows a difference from the original one, the difference lies in the constitutional elements (windows, staircases) as they are introduced excessively wherever the designer needs them. These resulted a great variety of elements were collected by Venturi as well-known materials, as standards, and as independent entities [3].

What the author recognized is Venturi's vision towards type reduced to image, which is in his belief enough for communication, then he transform the type by manipulating the image –with the excessive place of windows- and also with distorting the inner organization according to the new demands.

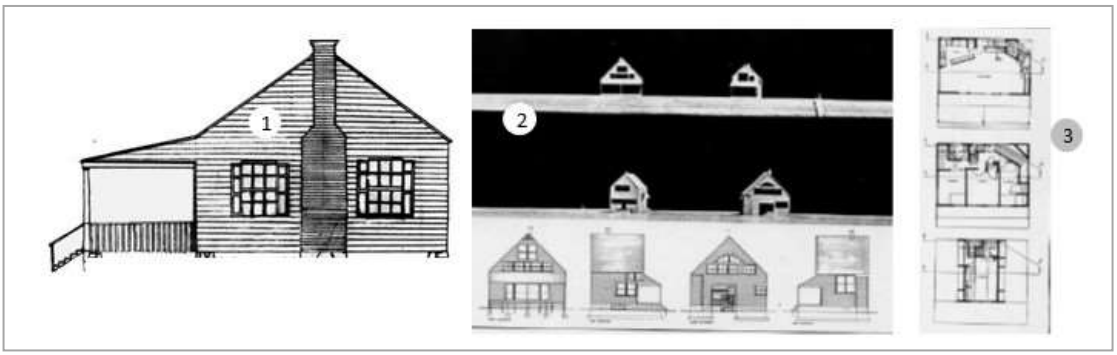


Figure 4.13: Adoption of vernacular American house as type (Combined by the author) 1. The basic vernacular American house 2 &3.Trubeck and Wislocki houses plans and elevations , Nantucket. Robert Venturi and Rauch. (Maneo, 1976)

Rossi's de Amicis school (Figure 4.14) is a leading project in theorizing the notion of type. An explicit borrowing of a historical type was exploited to house a use of school on it [1].The type of segrate fountain [2] -the monument at municipality plaza at Segrate- was transferred as a sign to the school courtyard [3] (Moneo , & Cariño, 2004).

The transformation can be extrapolated form this synthesis process, is the use of specific type for a foreign use – historical type used to house a school- on the other hand the type of fountain transformed by rescaling it to fit in the new context.

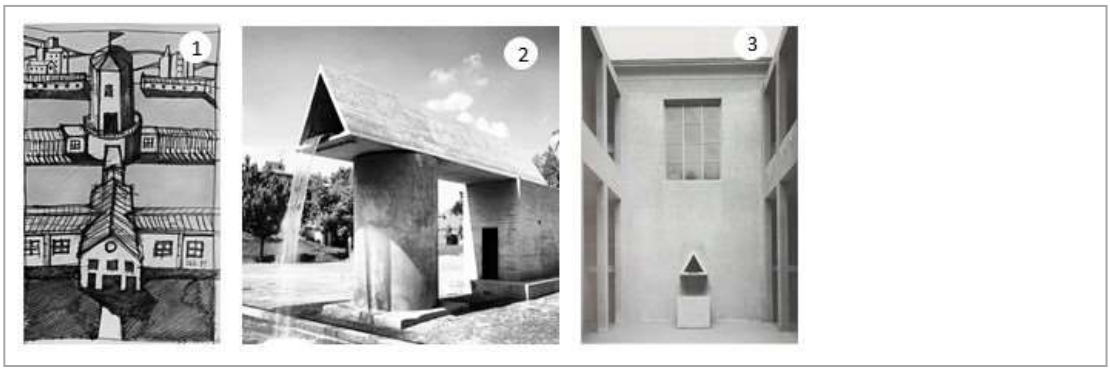


Figure 4.14: Aldo Rossi transformation of specific type collection (Combined by the author) 1.De amicis school sketch, the adoption of historical typology to house the function of school 2. Segrate fountain at municipality plaza at segrate, designed by Rossi 3.Rossi's de amicis school, the dislocation and transformation of segrate fountain into the yard of the school (Moneo, 2004)

The weekend home project Borgo Ticinio (Figure 4.15) Rossi created a mix of geometry of rationalist blocks [1], the symmetrical schema of the old academies [2], and the vernacular architecture construction [3]. The diverse uses are assigned to undifferentiated blocks to preserve the symmetry, which is strengthen more by the placement of corridors in interaction among each other [4]. The image of the building is a nostalgic image of the vernacular construction [5]. The walls are carried by a pilots and covered by a semi-circular roof, both of them are assigned by the corrugated sheets material (Moneo , 2004). The implemented transformation in that process is the

juxtaposition of different types on one scene.

Figure 4.15 : Rossi's Juxtaposition of different types weekend home project Borgo Ticinio Orthogonal organization of the project [1], mind the pictorial symmetry that affect the schematization of the Rationalist blocks organization [2] , Vernacular architecture [3]. the resultant form, juxtaposition of three different types.

As was extrapolated from the above examples the technique of transformation for the specific type can take the one of these possibilities: (1) Type can directly adopted for a foreign use (2) Type can be distorted by disrupted the sense of scale (3) Type can emerged from the juxtaposition of various types (4) Type can be transformed by occurring a radical manifestations in the existing formal elements.

IIII) At the Level of Tool:

The transformation techniques in 1 and 3 both can be realized by confronting the different systems together. In this case the appropriate tool to be nominated is the juxtaposition. Which bears to exhibit the differences together then allow to combine or merge two or more types in the same scene to formulate a new form.

For the transformation techniques in 2 and 4, both can be realized by occurring distortions. Distortion tool is including all deformations that can directly affect the formal elements of the selected type, i.e. rescaling, stretching, proportion manipulating.

4.5.4 Dissolving the Theory of Performance Form

I) Introducing the Theory:

This strategy choose the propulsion of the form synthesis in adherence to the problem solving mode. This tendency began to originate since the shift from the classical temples to the Gothic cathedrals as ideal type, from then design turned to a matter of problem solving rather adherence to Aesthetic prescription of tradition. Cathedrals from owe much to reasoning, in example the spatial complexity organizations back to the multiplicity of accommodated functions, the assembly of structural elements was resulted duo to the building stability, and the assign of building materials was governed by seeking an optimal budget as Hearn (2003) clarified.

Viollet le Duc the prominent French architect and theoretician showed an intensive tendency to invite reasoning in form synthesis, evidently, in his articulation of an inclusive theory of design method. The theory articulated a "step-by-step" method to elaborate design from the scratch. The imprint of the rationality detected since the first premise of the method, that revealed the building form is not under designer free futility. Rather it is embodying the "patron needs".

The starting point direct to an inclusive study for all physical site conditions ,Secondly, develop the plan schema according to an intensive review to building program. The plan is created as a process of spatial adjoining and disjoining of requirements in accordance to exposure of light and view, with considering a sensible dimensions and the circulation area. Thirdly, the roof applying phase adjusted in the section from the building plan, in order to understand the heights variation of the building spaces, besides helping to decide the appropriate number of structural elements for the roof, and finally it helps to visualize the roof shape in conjunction with plan.

Fourthly, the elevation design, which resulted from the functional and structural organization, after projecting the layout of spaces. Any geometric regularity or any bilateral symmetry are completely eliminated, unless in the case of functions duplication, the openings placement and proportions are adjusted in accordance to spatial need, likewise the entrance allocation choose the best spot fitted the spaces (Hearn, 2003).

The followed movement, which was the functionalist movement refused to count the prominence or even the existence of aesthetic element in architecture. The good building is that acquire its purpose without any compromises, also that it expresses its true construction, require standardized parts and avoid unnecessary details. The advanced structural systems of the time, liberated plan from the limitations of heavy masonry loadbearing walls. Which provides a more pliancy in responding to the functional concerns during the process of plan generating. Regarding the outer appearance, the intention was to manifest the truth of the construction in the final image of the building (Hitchcock, & Johnson, 1932).

II) At the Level of Strategy:

The strategy obligates the inevitability of form growth starts from inside out. This orthodox was legislated by the Avant-garde of the time. Among them was Frank Wright who postulated: "an organic form grows its structure out of conditions as a plant grows out of the soil, both unfold similarly from within", and also Sullivan refer the outer appearance of building resembles the inner purpose of it, do not forget Le Corbusier explicit statement of proceeding the plan from within to without; the outer is result from the inner, and ultimately Thoreau clarified the beauty of architecture is in the gradual growth from inside–out that steams from character and needs of dweller (Venturi,1977).

The growth from inside out guide to the assumption that synthesizing form inherited from the function. The strategy reformulate the Vitruvius sum: Firmness + Commodity + Delight equal architecture, to become firmness+ Commodity equal delight (Costanzo, D. R, 2012). Then, form is a direct result from the combining of structure and program. The process of combining became the final product itself, any more elaborations is prohibited (Costanzo, D. R, 2012).

Further, the strategy preferred the volume than mass, replaced axial symmetry with regularity, and refrain t ornamental decorations for the sake of construction details. As is extrapolated from as (Hitchcock, & Johnson, 1932).

III) At the Level of Technique:

The growth from inside preposition is appoint plan as the direct source for the form, then as Le Corbusier (1931) see it " plan is the generator". Which would "calculate itself" from the given factors that determining it.

Zoning is believed as one of the determinant factors that lead to generate plan. This technique makes each part independent performing its own function and necessary to the performance of the whole. The premier example of implementing the zoning as a technique appeared in le Corbusier famous Paris urban planning, the fife zones of city (living, working, leisure…). Also, appeared in the scale of building design, in the example of Walter Gropius's Bauhaus building, the building was departmentalized to certain separated units (studios, lecture halls, administration, and accommodation). The technique also appeared in Luis Sullivan tall buildings design but this time in a vertical sense, as he described it in the "Tall Office building Artistically Considered", the underground for mechanical rooms, ground for the main broader functions like banks, first level is for the flexible functions that bear the variant of structural spacing.

(Sullivan, 1896).

IIII) At the Level of Tool:

The techniques of plan as generator and zoning both search for design tools to assist their calculations. The answer is found in the so-called scientific diagrams that was fostered by Hannes Meyer. The first one tracks human body motion in time and space named as flow diagram, the second, is a biological diagram of inner organs in body metaphorically imitated in the organization of spaces in building named as bubble diagram (Lueder, 2012).

The flow diagram was employed by Christine Fredrick since 1913, to differentiate between tow movement sequences proposals in kitchen during the process of omelet preparation (Figure 4.16). The left schema depicts the "badly arranged equipment", in which the sequence is interrupted [1]. While the right one depicts the "proper arrangement", a smooth sequence of processes [2] (Lueder, 2012).

In bigger scale, Alexander Klein experimental diagrams of "functional housing for frictionless living", in which with the instrumentalization of diagram he been able to create a solid basis for the better selection based on functional criteria. The flow diagram allowed him to establish a comparing condition between the sufficient and insufficient, by examining the expected routs of performing given tasks in the spaces (Figure 4.16). The left spatial organization creates high level of paths frictions end up with a chaotic insufficient design [3], while the left one succeed to achieve the frictionless condition , where there had been a separation between day paths and night paths [4] (Lueder, 2012).

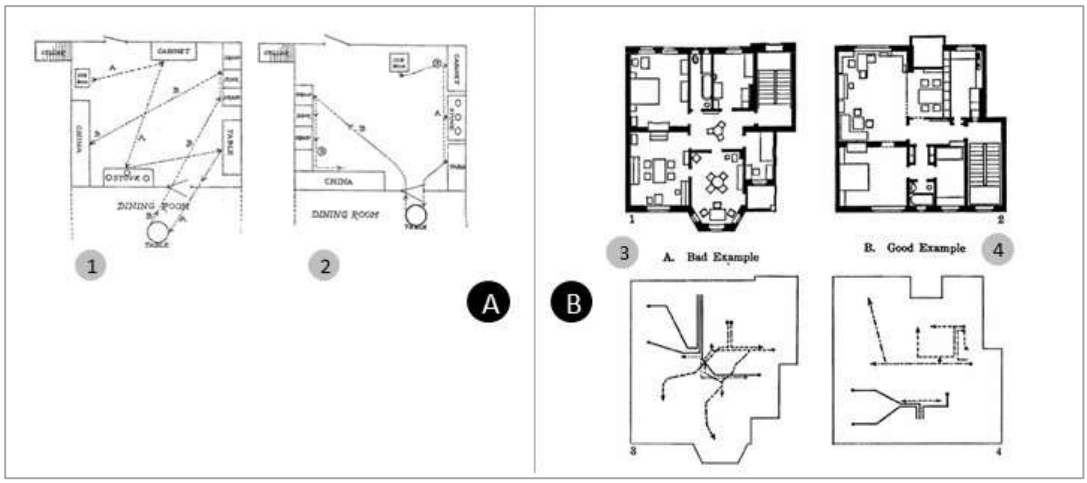


Figure 4.16: Flow diagrams at the level of space and at the level of several spaces (Lauder , 2012) A. Christine Fredrick, organizing the space equipments according to flow B. Alexander Klein, 1927, Functional House for Frictionless Living (Combined by the author)

Flow diagram tool obtains the potential to analyze bodies' movement to register analogically the expected choreographies within single space or more.

The bubble diagram (Figure 4.17) was described as the tool of proposing transcendent vision for the creative act, registering forces to arrange the true source of intended object (Giddings, 2010). In his famous project La Maison Domino, Le Corbusier applied the bubble diagram in an evolutionary process starting by a very simple linear organization of program pieces [1], evolving to an advanced complex network named "circulation" [2], then ultimately [3], very dense packed organization of bubbles labelled la maison (Lueder, C.2012).

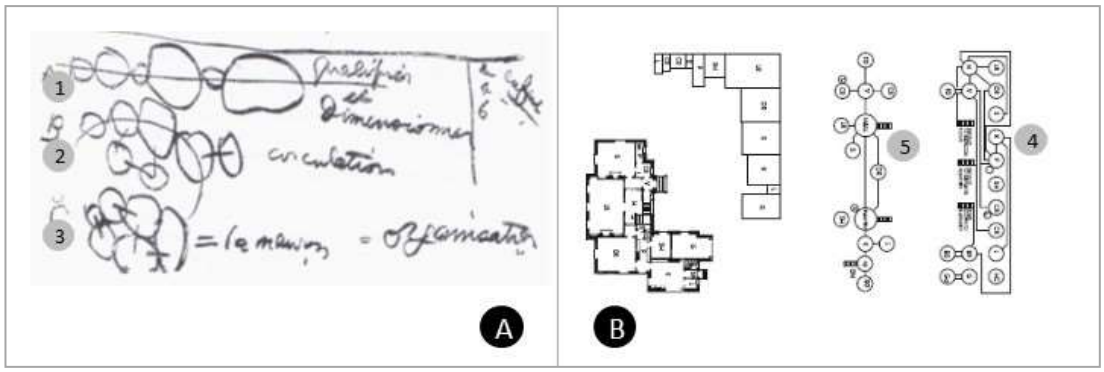


Figure 4.17: Different representations of bubble diagram. (Lauder, 2012) A. Le Corbusier, 1929, Bubble diagram drawn during a lecture in Buenos Aires. b. Percy Nobbs diagrammatical In Percy Nobbs diagrammatical practice, the program components must settled, then connected the related parts by using loops and lines [3], after that the bubbles must regrouped [4] (a topological transformation) to simplify the diagram, the ultimate diagrammatical represents an organization where the conditions of proximity and distanced relations between bubbles represents the strong or weak relation between spaces in building (Combined by the author form (Lueder, C.2012).

4.5.5 Dissolving the Theory of Information

I) Introducing the Theory:

The Information & Deformation as a strategies were theorized by Kipnis (1993) in his analysis to the situation of design generation at that time (refer to Chapter Tow). The analytical critics of Kipnis strive to find a post postmodern design strategies. Ultimately, that desire was founded mostly in the architects projects exhibited in MOMA Exhibition during eightieth, that included Frank Gehry, Eisenman, Tschumi, Koolhas and Hadid. Those projects were deviated from the prevailing iconographics – was mentioned in this research as Layering meaning strategy-of the time offer a new plateau to synthesis the different ingredients demands the form.

The Information strategy mostly can be found in the way how the architects Tschumi and Kolhaas synthesizing forms.

II) At the Level of Strategy:

Generically, Information strategies ignore the excessive pursuit for form aesthetics,

emphasized the role of programmatic events inserted to spaces, as in Kolhaas (2004) typical words "content is the form". All collected to forms obtain the same modernism orthogonal language, monotonous and simple.

III) At the Level of Technique:

The technique synthesis forms by collecting grafts (different layers of information), via injecting different mixture of programmatic layers, that may be manifested

formally or may not, all grafted to a neutral monolith form. The resultant residual spaces of that combination activated by technological effects, events, or programmatic innovation, as explained before on Tschuni's Le Fronsy and also as can be seen in Kolhaas Seattle Library , as is illustrated in Figure (4.18).

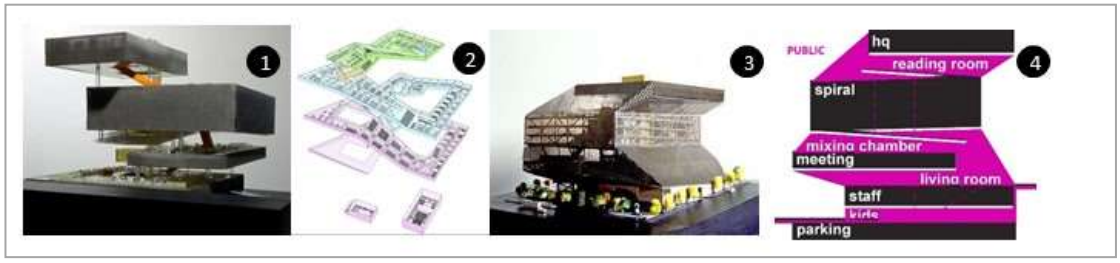


Figure 4.18: Kolhaas Seattle Library different representations (Combined by the author) The complex clusters of desperate program elements were accommodated in big volumes [1]. At the sectional level, the program manipulated revealing residual spaces, which immediately were activated by programmatic events accompanied with the complex circulation system imposed on that residuals [2]. The resultant out line was canvased by a monolith blank form, which absorb all the tensions between the different elements underneath [3]. The residual spaces -between the programmatic volumes and the outer canvased monolith skin- activated by programmatic events to reveal the public spaces i.e. living room, kids' territories [4].

IIII) At the Level of Tool:

As mentioned before in Chapter Two, the superimposition introduced by Jenks as strategy to cope with architectural complexity. Then, previously in this chapter, it has been argued that superposition can be part of the information strategy. Within here, superimposition will be appoint to be the conceptual tool that realize the information

strategy, this assumption was based on the definition of tool in Salaama's classification.

Superimposition in graphics, "is the placement of an image or video on top of an already-existing image or video, usually to add to the overall image effect, but also sometimes to conceal something". Superimposition then allows to register the heterogeneous ingredients of different systems on top of each other. As explained before in Parc de Le villet projects designed by Tschumi and Kolhaas (as mentioned in Chapter Tow).

Tschumi's Acropolis museum form was synthesized by superimposed certain systems on top of each other, the first system is the archaeological excavations of dramatic Greeks antiquity, second system is the programmatic pieces composed of galleries and Parthenon Hall, the third system was the predetermined vector of user movement enabling him to experience all the programmatic parts. The three systems superimposed together to synthesis the basic form, as indicated in Figure (4.19).

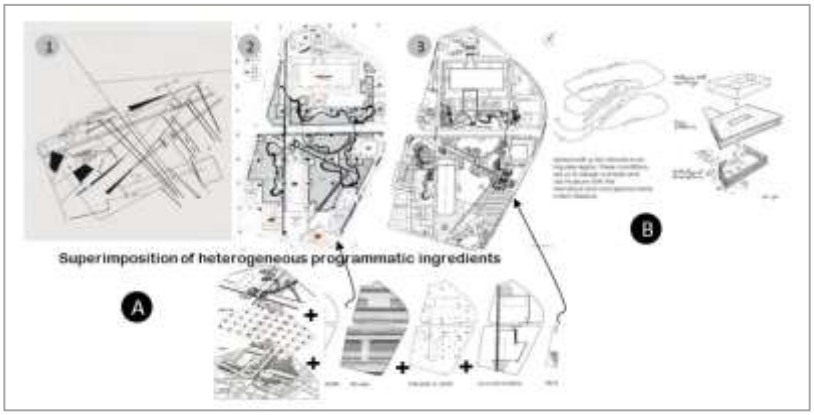


Figure 4.19: Instrumentalizing Superimposition by a several architects (Combined by the author) A. Parc De Le villete proposals of Zaha [1] , Tschumi [2] and Koolhaas [3]. In the three designs. Superimposition was present as a tool to combine the heterogeneous programmatic systems and placed them on top of each other's. B. Tschumi's Acropolis museum form , the synthesis accomplished via superimposing certain systems on top of each other

4.5.6 Dissolving the Theory of Deformation

I) Introducing the Strategy:

The strategy was introduced in the previous heading simultaneously with the information strategy.

II) At the Level of Strategy:

Deformation emphasized the visual effects of the engenderment of new spatial forms, derived by *event spaces* generated from new geometries. The forms to be generated are in most abstract, monolithic, hold no direct resemblance or references to the contextual architectural configurations.

Resultant forms nevertheless resist into stable alignments. The resultant forms are grafted abstract topologies, which can never decomposed, simplified or analyzed by the conventional architecture language.

III) At the Level of Technique:

The strategy offers two techniques, one is the smoothing affiliations, while other is the box-within box section (Figure 4.20). The former as Kipnis (1993) explained are the relations grafted from the site, do not meant here the dominant modes and the predetermined ones. Rather they are "ad hoc links" traced from the existed secondary "contingencies" in the site. The term smoothing comes from the affiliations ability to link the stratified, disjoint organizations into coherent heterogeneity. The latter are free organization of spaces on section challenging the conventional relation between massing and section to the familiar programmatic hierarchies imprinted in the skin revealing the service spaces or minor, and major ones.

The smooth affiliations relations technique implemented by Eisenman in several occasions, in his Columbus Centre as was mentioned in Chapter Two, and recently in

The City of Culture of Galicia [3].

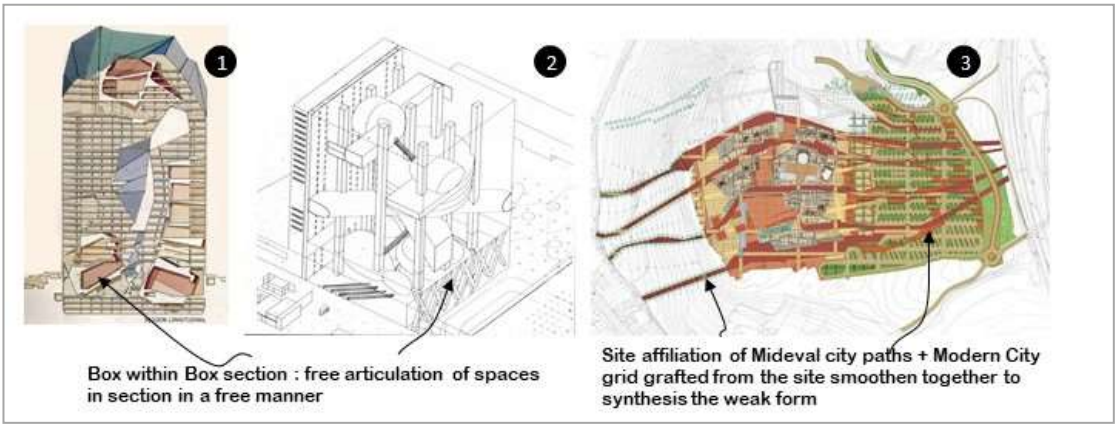


Figure 4.20: The techniques offered by the deformation strategy (Created by the author) Eisenman's Max Rienhert 2. OMA's Très Grande Bibliothèque, the Box within box technique shaped the inner organization spaces. 3. City of Culture of Galicia, the grafted site affiliation layers from the history and present.

The selected affiliation with the site was the old plan of the medieval center of the city of Santiago, the form synthesized after that by superimpose two layers on top of this layer, which are Cartesian grid of the modern city and the topography of the hillside.

IIII) At the Level of Tool:

As mentioned before in this chapter, the fold was correlated to the deformation as a part of it. From the conceptual description of the fold as a gentle bents dislocate the points of plane from the conventional Euclidean X, Y and Z axes to the Topological undefined ones. The description is too close to become a tool nor a strategy or technique. Ultimately it can be stated the fold is the appropriate conceptual tool to realize the desired smoothen effect of the deformation.

Folds in Kipnis (1993) terms are nonrepresentational and monolithic filled with residual and interstitial spaces that realize the technique of Box-in- Box section. Eisenman enrich the discipline with several architectural folded figures, as example not for limitation Max Reinhardt Haus Berlin [1] , City of Culture of Galicia [2] and Church

of Rome competition [3], (Figure 4.21).

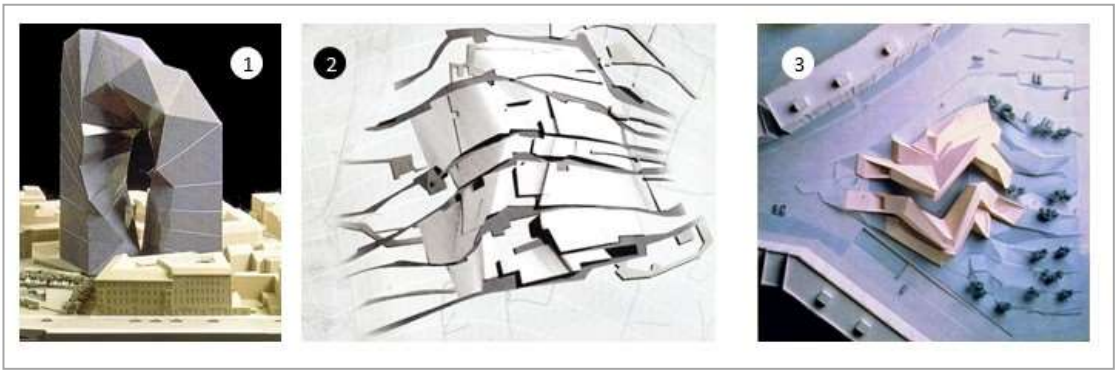


Figure 4.21: Folding tool different CONFIGURATIONS on Eisenman's different projects (Combined by the author) 1.Eisenman's Max Rienhert tower 2.City of calicia culture centre 3.Church competition

The folding implementation coincided with other operation must occur to the intended plane or volume in order to be folded, such as an examples shown in the experiments below by (Vyzoveti, 2004), (Figure 4.22).

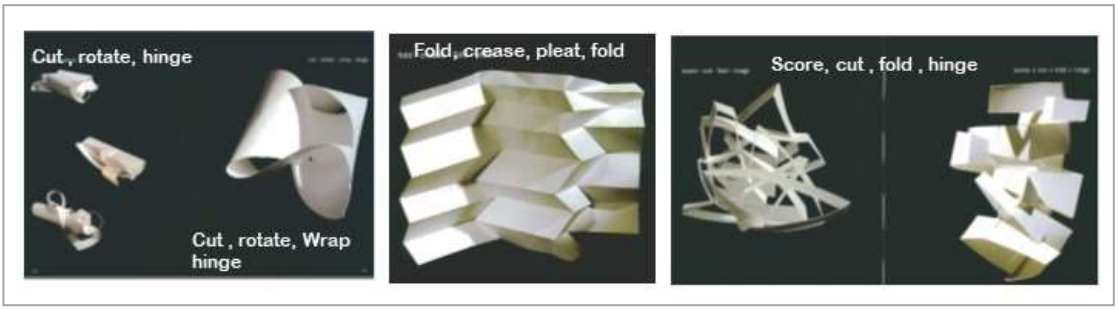


Figure 4.22: Folding tool experiments, shows the coincided operations with the fold as written in each figure by the white font. (Vyzoveti, 2004)

4.5.7 Dissolving the Theory of Pattern Language

a. Introducing the Theory:

Pattern language is set of formulas consisted the whole levels that architecture deals with, from region, to cities and towns, to districts and street, arriving to the building units and consisted spaces, ending with the constructional details of the smallest building parts (Alexander,1979). According to Jutla (1993), patterns are holistic rules

that filtering the vital interactions between the micro and macro conditions in architecture.

Pattern language constitutes another analogy of linguistic but in a different manner deviated from the previous understanding of architecture semantic and syntactic (Mallgrave, & Goodman, 2011). Any language consists of elements or symbols (semantic) inherited by rules (syntactic). The patterns in themselves carry double systems, they are elements obtain a specific role, and also they obtain rules of how they may be created and how they may be combined with the other patterns system. Pattern language offers an endless variations of combinations between elements, therefore resulting infinite three dimensional combinations of physical forms.

II) At the Level of Strategy:

Patterns main frame can be extrapolated from Alexander's (1979) typical words that are to "generate exactly the balance of uniformity and variety which brings a place to life". The livability stemmed from patterns ability to be extremely pliant to individual's special needs, imagination, dreams, life style, site conditions ,……etc, simultaneously this pliancy is framed by harmonic consistency drawn by the repetition of patterns. Refer to figure (4.24) to stand on the investable connectivity and harmonization between micro and macro patterns.

Each pattern must comprise three parts: rule, problem and solution. The rule is an expression of the relation created between the pattern and the system of repeated forces existed in its context. Problem is the system of forces acting repeatedly in the context, and solution is the spatial configuration obtain the potent to resolve forces within the certain context (Alexander, 1979). As was indicated in the below diagram, (Figure 4.23).

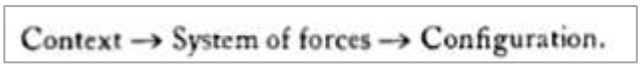


Figure 4.23: Generic diagram for the three parts of the living pattern (Alexander, 1979)

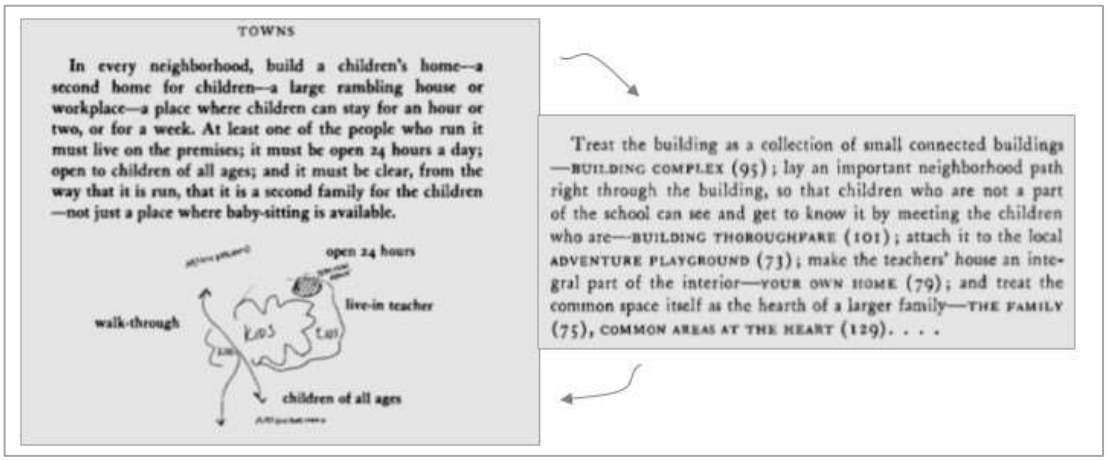


Figure 4.24: Sample from the pattern language book, how the patterns introduced diagrammed, and coded by names and numbers. (Alexander, 1979).

III) At the Level of Technique:

The strategy of Patterns then needs a technique that can allow designer to operate at the level of whole (macro) and parts (micro) simultaneously. The nominated technique for this strategy is what Alexander was termed as "Differentiating process", which is a typical morphogenesis process to synthesis the whole. The way of how the individual patterns in the small units cooperate to shape the larger whole, and how the rule of institution whole shape the individual patterns (Alexander, 1979)

The accumulation of pattern are different from the *conventional* notion of part and whole , the former is a process of addition, the parts are already preformed and then combined, either in Alexander's situation it is an unfolding of complex evolution process. Where, the micro pattern evolved according to its position in the whole, thus it is slightly different character from others-e.g. the multiplicity of leaves and branches shapes (parts) in the same tree (same whole) caused by the pursuit for light and force of the air as exemplified by Alexander himself (1979).

From that sense, the technique of "differentiating process" is synthesizing form by combining micro parts together but to not forget the effect of whole in these micro parts. In Alexander words: "by operating on the whole and crinkling it, not by adding little parts to one another".

IIII) At the Level of Tool:

The technique of differentiating process imply an accumulation of several patterns according to the rule of the whole. This accumulation is in fact an assembling of patterns, a collage of events that suit the local conditions of the specific project and solve all the possible problems.

The application of patterns strategy turns design act to a process of selection from a predefined catalogue, but the selection is not for a ready elements or parts -like the selection manner of layering meaning strategy rather it is a selection or even collage of events that are formally unsolved, e.g. pattern #88 "Street café", this pattern offers the rules of orienting the seats where people lie lazily to overlook the street where the world go by, to attract as a kind of stage". Obviously, the pattern provides a very generic diagram to the particular solution for specific problem in certain context. Then the role of designer is to collage the appropriate patterns and modify them according to his given context conditions

The collage tool was present in the form synthesis process of Sala House designed by Alexander himself, the house was a serious of continuous solutions, events, and figures collaged together to form a livable environment. In example, pattern # 112 "Entrance Transition" [1], pattern #130 "Entrance Room" [2], #242 "Front Door Bench, #137, "Children's Realm" , and #187 "Marriage Bed" [3] . As depicted in Figure (4. 25).

Figure 4.25: Patterns synthesized Sala House. 1. Entrance to the Sala House, 2. Entrance Room to the Sala House, 3. Marriage Bed in the Sala House. The collage of events selected from the 253 patterns (Combined by the author)

4.5.8 Dissolving the Theory of Space as Generator

I) Introducing the Strategy:

This method of form synthesizing was fostered by the Modernism of Germany and Netherlands. The belief that architecture is first and foremost about space was the fundamental motif to adopt this method of designing. The concept itself was experienced before by Bramante's in plan for St. Peter's ,Figure (4.26).

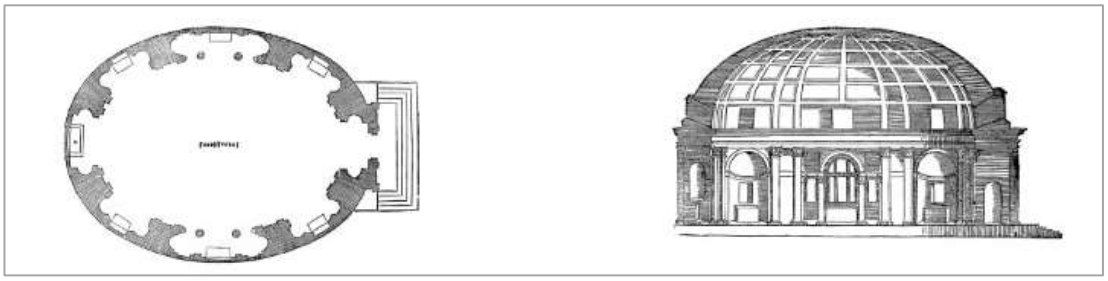


Figure 4.26: Bramante's in design for St. Peter's, the form synthesis manifest the monocular spatial condition (Hearn,2003)

II) At the Level of Strategy:

The main trigger in synthesizing form is revealing the spatial condition of the building. Either, it constitutes of single main space or, a serious of main and sub spaces, ultimately, the final formulation is a process of manifesting the existing spatial condition.

III) At the Level of Technique:

The nominated tow techniques for the strategy are the "universal space" technique; "served and servant spaces " technique. The first was Mies's exploration of the flexible open space, which whose primary virtue is the capacity to accommodate change. The space responds to the user requirements in a loose manner, thus it implies no limitations, no inner divisions. Rather it is prioritized movable partitions that can respond to the tentative need for occupying space. The form embracing such spatial conditions is usually monolithic and entirely free , Fig (4.27).

Figure 4.27: The manifestation of mono space achieved via apply the technique of universal space A. INMOS Microprocessor Factory, Newport, South Wales UK, 1980 B. Richard Rogers and Partners 04 Dyson Headquarters, Malmsbury UK, 1999 Wilkinson Eyre Architects C. Stratford Regional Station. London UK, 1999 – Wilkinson Eyre Architects / Photographer – Susan Kay.

Served and servant spaces technique obligates to segregate the spaces that are served from the spaces that are serving them. The segregation occurs by articulating them differently in terms of formal language. As was mentioned in chapter Tow this notion was registered to Luis Khan's and was applied in Richards Medical Research Laboratories and the associated Goddard Laboratories , Fig (4.28).

This technique can be seen in terms of main and secondary spaces instead of served and servant, as can be extrapolated from Alvaro Alto's spatial organization. The way of how the main spaces were manifested differently as if he celebrated their importance among the secondary spaces

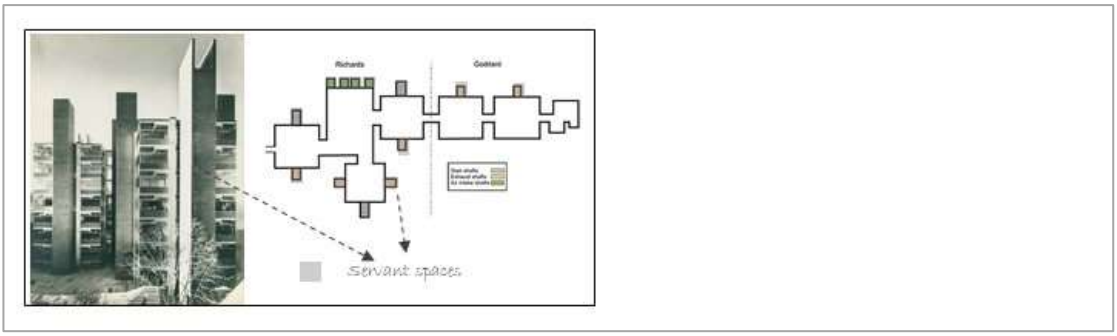


Figure 4. 28: illustrating the differentiated spatial formal manifestation in Richards Medical Research Laboratories and the associated Goddard Laboratories (Created by the author)

The technique then allow designer to celebrate the main parts of program and generated them in different manner than the secondary spaces, as indicated in ,Figure (4.29).

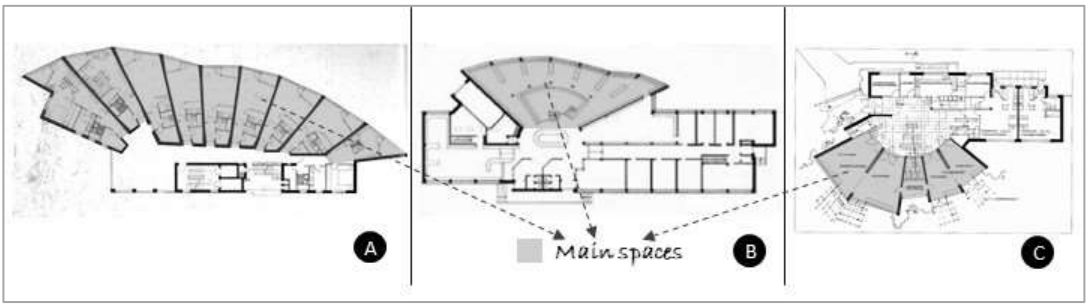


Figure 4.29: the celebration of main spaces in the project by inject a differentiated formal configuration (Combined by the author) A. Torre de Apartamentos "Neue Vahr" B. Bremen*Seinajoki Library Plan*: demanding space, such as a reading room, is allowed more freedom and irreverence as compared to the more rigid demands of administrative offices and bathrooms C. Wolfsburg Church, parish centre and vicarage

IIII) At the Level of Tool:

For the technique of universal space the analysis never reveal a specific tool to apply it. But for the technique of the served and servant space technique, the technique complies for a tool that adequately supply with contrasts and oppositions in terms of the celebrated spaces manifestation. Then, the sufficient conceptual tool to be nominated is the juxtaposition. Which is "the act or an instance of placing two or more things side by side often to compare or contrast or to create an interesting effect".

Instrumrntalization of juxtaposition can be witnessed in the new extensions that were added to Louvre royal gallery by I.M. Pai. The new extension was juxtaposed as a foreign form to the historical context in order to catch the attention [1] , Figure (4.30). Although the architect confessed his intention to camouflage with landscape by applying a fully transparent glass but the new form never stop pointing to itself (Jadido, 1980).

Also, juxtaposition can be tracked in the work of Frank Gehry's City of Wine Complex, the tool allow to combine between the solid static boxes and wavy dynamic sheets, this contrast was established on behalf of space articulation [2]. Once more, In the Royal Ontario Museum Daniel Libeskind employed the juxtaposition of two contrasts to emphasize the new extension for the building [3], Figure (4.30).

Figure 4.30: Juxtaposition of an alien manifestation for the main spaces on behalf of reflecting their dominancy (Combined by the author)

4.5.9 Dissolving the theory of Metaphor as generator

I) Introducing the Theory:

Metaphors in design is regarded as cognitive strategies exploited to defeat design problems. The forces of signs that inherent in the Metaphorical reasoning helps to generate a conceptual system that can structure a primitive glimpse of the process of form synthesis. Metaphor arms designer with the splash of artistic vision as the spur of architect imagination that guide him to complete the journey of design (Hearn,

2003).

II) At the Level of Strategy:

The metaphoric statements, i.e. Organic architecture; house is the machine, derive the process of synthesizing form by resort to analogues problem but from foreign context and employ it to solve the problem on hands. In instance solving the problem of aircraft landing mechanism by analogues to the mechanism of grasshopper legs. As was mentioned in chapter tow metaphoric strategy takes many guises as Biology, Mechanical, and even linguistic.

III) At the Level of Technique:

The analyzed techniques from this strategy guides designer to follow two possible ways:

One is through the direct analogical design, simply it is a visual drawings of analogy to solve the design problem. This mode of Analogy were used by most of the 20th century's architects, who imitated paints, sculptures, organisms, etc. As example not for a limitation, De Stijl's analogy of Cubism paintings, Corbusier's Ronchamp roof analogues of crab shell. Or the analogy can be to express the specific purpose of the building, like the analogy of flying act used in Kennedy Airport.

The other way is through the indirect analogy that is in a more abstract manner, which it was observed as an adoption of the system or the logic of source form. Like the adoption of natural generative system of forms in nature, which in instance revealed the principles of Wright's organic architecture system of growth, Jenks's concept of fractals and strange attractors, and le Corbusier principles of building as a machine (refer to Chapter Two for more explanations) . Another aspect of abstract adoption is the extrapolated structural optimization from analyzing the relation between shapes

and stability in nature, i.e. the imitation that implemented by Galatrava to design the extension of St. John cathedral in New York as mentioned before.

IIII) At the Level of Tool:

Each one of the mentioned technique imply a specific tool to apply it. The technique of direct analogy was already answered by Broadbent (1973), implicitly he appointed the mechanism of drawing as mediator to translate the original source of analogy into the intended form. In this respect drawing is a conceptual tool nor a representational one. The indirect analogy technique, which is the adoption of generative system in nature, can be applied by using the conceptual tools that allow to imitate the form growth system in nature. Previously in this chapter, the fractal, strange attractor, and proportions even fold were placed under the umbrella of Metaphoric as generator strategy. All as was revealed by Jenks (1999) are imitation of the same language generated by universe (refer to Chapter Tow). Then, they will be nominated as the conceptual tools that can realized the indirect analogy technique.

4.6 Diagramming the Resolved Theories: Exhibiting the Ingredients

As one can notice, each strategy allows itself to be disintegrated into its primary ingredients. This occurred when it passed through the critical lens drawn from the prescriptive polemic of Ashraf Salama, which provide deeper propositional logic in how to handle design via processing its various ingredients. Which is now produced not as a general description as is usually the case when architects describe their design philosophy. Rather, it is an accurate and detailed description that would lead the designer from the broad level of decision making activity, to how to apply these decisions, and how to embody them. In order to summarize and facilitate for the reader, in the diagram below in Figure (4.31), all the theories were analyzed previously were compiled and placed according to the qualitative hierarchy imposed on them from

strategy to a technique to a tool.

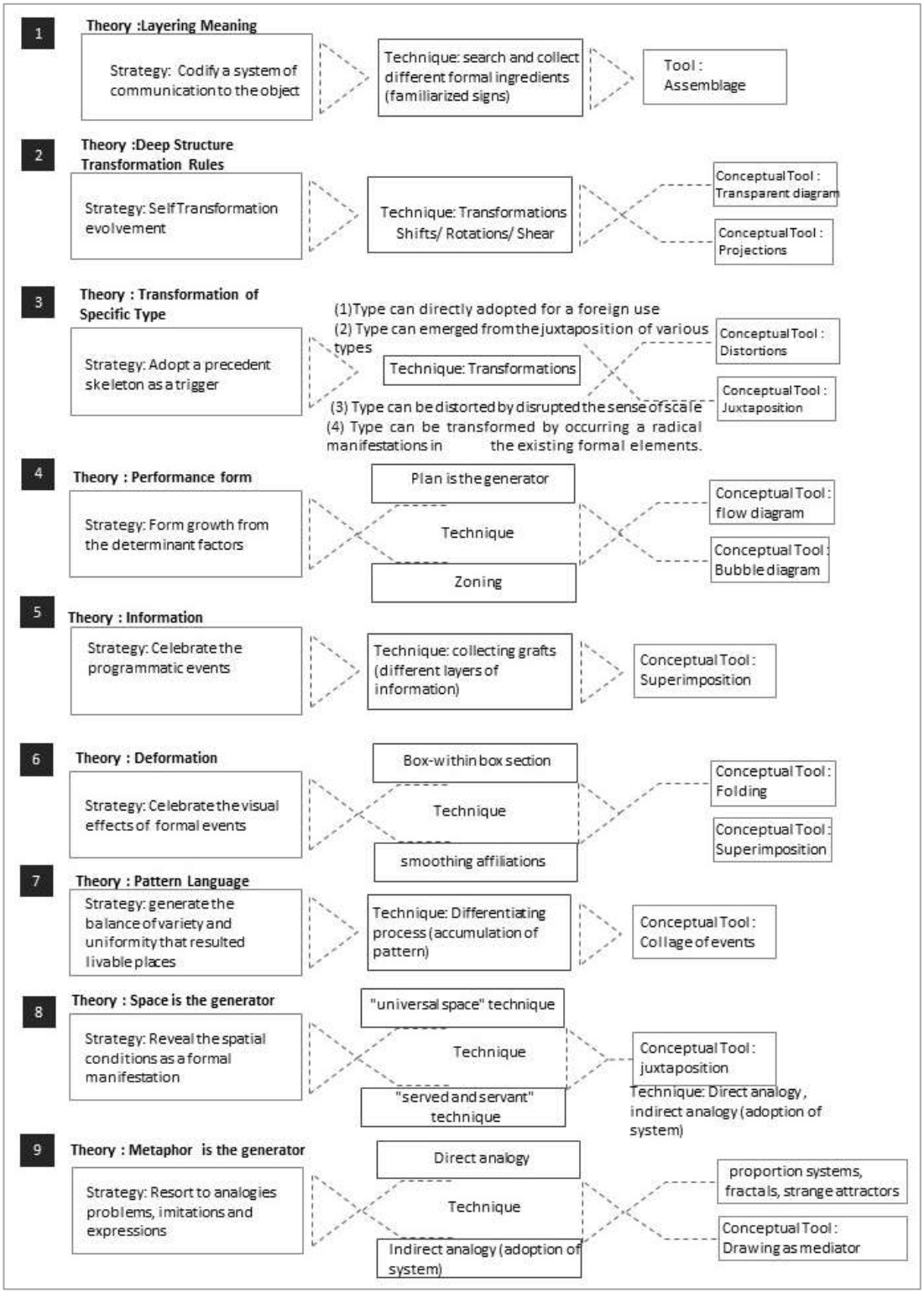


Figure 4.31: Exhibiting the Ingredients: Diagramming the dissolved theories (Created by the author)

4.7 Preparations for the Framework: Analyzing theories Emergence Conditions

The intention from previous step -identifying primary ingredients for each strategy- was to clarify how to apply these strategies and their associations in the process of synthesizing form. Then, the suspense question remains is why should designer elects a particular strategy among the others? Under what conditions? And how these conditions can be inscribed in the object?

In an interview, Tschumi defined architecture as "a cultural reaction to a situation in a moment of time" (Costanzo, 2009). This inevitable attachment becomes fundamental for the coming analysis. Where the analyzed strategies from the upper heading will be connected to their contextual conditions of emergence, meant here the socio-political ones on the first place and the architectural ones on the other. These conditions in advance played a role on the engenderment of each specific technique and tools. This connections are believed to answer the question on hands.

4.7.1 Performance Form Theory: Context of Emergence

As was mentioned before the performance form strategy is in fact a shared property between the conceptions of functionalism and the Bauhaus school of design. Both were associated with the revolutionary era of Modern architecture, which as (Jenks, 1999) stated, fundamental principle of Modernism was to "make it new". The reason why the modernism strategy of design refused all the precedent principles, even it intent to erase their existence. The new strategy based itself on the reasoning fact of science "cause and effect", therefore, the strategy derived by the power of "form ever follows function". The "cause and effect" rule makes the form synthesis process serious of logical acts- do this because of that and so on (as mentioned in the previous heading).

This tendency erase any excessive elements in the buildings and makes them a nude entities embodied solely the pure necessities. The power of Performance form strategy lies in the direct response to all social needs without any limitations implied by a dogmatic formal rules, where the resulted schema of spatial organization decidedly extruded to a physical form. That what was revealed the technique of plan is the generator.

The deterministic nature of the modern world interpreted itself in design act revealing techniques of zoning. The precision of this technique makes each part is independent performing its own function and necessary to the performance of the whole.

The scientific diagram became the tools that helps to realize the deterministic manner implies in the strategy, where the flow diagrams helped to precisely depict the smooth users circulation between spaces, and the bubble diagram elaborates the relationships of adjacency or distance among the different zones.

4.7.2 Metaphor as Generator Theory: Context of Emergence

The resort to metaphor as a strategy of form synthesis was one of the failure consequences of scientific diagrams, the failure lies in the margin between the initial diagramming and final formal configuration that was what led Ernest Neufeurt to direct the attention toward the necessity of post- creative process after the initial diagramming phase (Lauder, 2012). This creative margin is unavoidable because the diagram is mostly a representation nor a resemblance for the physical building.

Metaphor appoints itself in the position of the spur that invoked the form synthesis steps one after another. In instance for the a metaphoric derivation, Le Corbusier fascination with machine permit it to become a model of visual analogy, exemplified

in the glimpses from the ships in his outer envelopes .further, the analogy extends the visual manner and become an adoption of the industrial process itself, where the building became in itself a prototype produced again and again, e.g. the porotypes of le Corbusier's Maison Domino, or in some cases the building turns into a collection of industrialized standardized parts combined together to produce the whole example dormitory in India.

Not to forget the metaphor power of expression for the significance of the object, as was implied in Venturi's polemic of Duck and Decorated shed (as mentioned before in this chapter). The main derive for such metaphoric adoption is to refute the rule of cause and effect, or in other words, form is the consequent result of function. This belief was claimed also by Arenhiem (1977) in his "Dynamics of Architectural Form", whereby explicitly he denied the cause effect relation between form and function, "physical function does not sufficiently determine form", as he stated.

Consequently, the application tools of analogy represented as: Conceptual tools (Fractals, Strange attractors, Folds, Proportions), and representational tools (mechanism of drawing). All are to freed form from the primacy effect of function, and propose a certain forces to synthesis the form.

4.7.3 Pattern Language Theory: Context of Emergence

One can states that Alexander livable patterns emerged as antidote to the dead language of modernism, as he claimed (Alexander, 1979). Which caused by their blinding seek for the economic sufficiency, thus produced an industrialized standardized building language. The tragic result was a sense of dull and malaise in their buildings. Alexander (1979) pointed out a few points of the dead language that employed to generate the buildings," Long and narrow"," Flat concrete wall","

Plywood wall surface". The buildings are ugly, terrible, dead and dark. In contrast, the livable patterns are found in the beautiful places of villages and their houses, the most inspiring churches and mosques, and the touching paths and valleys. Their patterns are livable, deep, and give the sense of intimacy and belonging to the occupants.

From this livable environments Alexander stemmed his 253 pattern, through 8 years of observation and analysis, he enabled ultimately to compose a "whole", " alive", " comfortable", " free", and "exact" patterns. The patterns are a flexible descriptions, an " if / then" solutions for a predefined contexts and predicted problems that were researched concretely (Mallgrave, 2011). Obviously, the pattern provides a very generic diagram to the particular solution for specific problem in certain context. Then the role of designer is to collage the appropriate patterns and modify them according to his given context conditions.

This strategy requires those who need to synthesis a deep rooted form with the local conditions of the site and even with the regional contextual conditions. Patterns were engendered to link a series of idealized events with each other stretching from the smallest space in the project to the largest place in the city. However, designer must pay attention to the different context in which these patterns were emerged, then he must take into account the differences of circumstances. Ultimately, he can follow the same logic to extract the appropriate patterns from the local familiarized spatial events and deal with in a similar attitude.

The technique of differentiating process that guarantee the pliancy of the accumulated parts to the specific conditions of the whole (as was clarified previously in this chapter), this technique is an antidote to the normal combination of rigid parts combine

to create a whole, regardless to the conditions subjected to parts.

The tool of collage of events allows to select the most liveable and beautiful patterns and assemble them together. This also is an antidote to the zoning technique that separated the program parts as independent hierarchal entities, and it is enough to cite with Alexander (2017) critic for the failure of zoning and simple hierarchy as deriving cities to death and malaise, citing by le Corbserian proposals in India as evidences.

4.7.4 Deep Structure Transformation Theory: Context of Emergence

The deep structure- syntactic structure- adoption is a post functionalism notion, enrolled as another conditional source for the problem of form creation. Also, it is another extraction from the linguistics, but this time is not for the intention of communication like semantics, rather for the intention of establishing an autonomy of objects in architecture. Self-referential, singular objects that are freed themselves from any sort of commitment with the contextual socio-political conditions, or as Eisenman (1999) saw it as objects that critically filtered the socio-political conditions then respond to them.

The context of emergence for this strategy revealed by Eisenman (1976) in his polemic " Post Functionalism ", where he argued for a new shift offered by the modern theory, which suggests " a displacement of man away from the center of his world". Man is no longer considered as an originating agent. This new vision is a revision for the previous Humanist theory that view the man as the center of the world. Under this new circumstances the object redefine itself to become an independent idea departed from the man. Further, the man became a discursive function, as a part of the complicated system of language. Man role is shifted from a constituter (as he was during the humanism) to a witness.

This displacement of man give rise to new design ideology, firstly the duality of form function relation of humanism was entirely challenged, secondly the rise of post humanist concepts of atemporal , atonality and the abstract mediation to redefine the relation between man and his physical environment consisted of pre-existent sign systems. Within this new theoretical base, the formula of design could no more sustain to the balance of form/ function, hence it is extended to "a dialectical relationship inherited in the process of form evolution. In more clear sense, the form is a result of a series of transformation from a pre-existent geometry merely a platonic solid (Post func). This explained the cube presence as a pre-existed schema in most of Eisenman's designs at that time (as mentioned in the explanation of house II in chapter two).

From other perspective, the shift in objects conception was manifest in an attempt to revise the social relation with their object world, in a sense of divest the object from the attached traditional meanings. The hidden agenda for this action was somehow an attempt to allow society to realize the poverty and ultimate banality of object world; further it was intended to change this reality through the medium of new form objects that detached from context and traditional meaning, to suggest a new awareness for the object world (Eisenman, 1972).

This agenda explained Eisenman tendency to search for an abstracted relation underlie within the object and operates in the deep structure of it. Relations that obtain their own rule of transformation, independent from any outer influence .But the problem was how to provide a means by which the abstracted relations can be perceptible?

Here, the role of diagram tool starts, firstly, as a mediation devoid the man from the direct relation with object; secondly as a means of transparent instrument composed

of layers of traces, each one can register the inner relational transformative methods (as indicated in house II diagrams this chapter).

Finally, the inner transformative methods is occurred to create a visual illusion within the space mixing the real with the unreal to realize the concept of changing the object world as mentioned previously. An example for the transformational method is the technique of *shift* transformation presented as dotted in House II diagrams (Fig 4.15), the resultant form is a multi-layered space whereby a visual ambiguity is crystalized that bear different way of apperception.

The resort to this strategy stems from the designer's desire to create a self-generated form that derives the ability to evolve from its internal own-rules. Then, reflects it on the outer surface of the form by certain kinds of transformations in its basic components elements, point, surface and volume.

4.7.5 Layering Meaning Theory: Context of Emergence

The neutral language of modern architecture failed to communicate with society. The nude elements were deprived from cultural meaning and disjointed from context. The inclusive single manner of modernism language seems to ignore the tradition and locality, in their desire to impose an international shared existence. But the result was the loss of identity, persecution of minority, crisis of meaning and communication, as asserted by (Broadbent, 1976), (Mallgrave, 2011).

The failure of modernism visions, philosophy and architectural ideology, was an invitation for a new ideologies arrival, to repair the negative remnants left by modernism. Which is at its beginnings aimed to repair the cultural crack, by recommunicate with society and establishing reconnections with history.

Modernism limitation of vocabularies led some theoreticians to tend to semantics as a rigours methods of communication. As Rykwert (1960) stated:" Through a semantic study of environment we can discover the means of discoursing in our buildings. Only that may will we be able to appeal to the common man again". Architecture then transformed to a system of symbolic signs, buildings facades starts to tell stories traces cultural narrations. The historical references adoption became explicit and also ornamental treatments were back. The technique of collecting disparate familiarized signs to generate an outer expressive surface seemed to be successful in communication with the diverse society.

Collage of iconography *as tool* to apply the different collected familiarized signs surface, was a successful to realize the diversity of subcultures in an inclusive incoherent manner. The flexibility of the tool to register a multiple codes simultaneously was the reason of that succession (as explained in Richard Moore's building Italia de Piazza).

4.7.6 Transformation of Specific Type Theory: Context of Emergence

The same motifs of communicating with society leads to other derivation, but this time via the nostalgia to past. Seeking the lost meaning of architecture by searching on the 18th century Neo-Classicists cities formal structure, aiming to activate the disjointed history (Vidler, 1976). The skeleton of the city obtains a historical events that preserved in the memory of society and can revoked by adopting the same skeleton again and again (Rossi, 1973).

Design act became a process in time, a rapid development through history for the single house to the whole of a city. In that way, the buildings and whole city relation became like a living organism grow throughout time, and all interconnected together.

The instrument of historical type was the ideal instrument to create this interconnectivity with the past. The type formal structure hold the history and memory in its skeleton as Rossi (1973) described it. The societies ultimately can celebrate their lost history and reconnected with it.

The exploitation of transformation of specific type strategy offers tow advantages, firstly, the reconciling with the contextual conditions, since the type main objective is the recombination of building elements according to the very specific conditions of use and context (as mentioned in Durand rational composition). Secondly, as Colqohoun (1969) explained, the type will become a logic reason to close the gap between the initial diagramming in design process and final formal configuration, replacing the subjective intervention and self-expressions by an objective expressions of historical types. Thirdly, typology strategy will guarantee the continuation of history development, thus a guarantee a highly social identity, because types in fact are proven urban elements with a residue of meaning (memories) employed again and again. Then a new meaning can be added to the current ones after the techniques of type transformation occurred.

4.7.7 Information & Deformation Theories: Context of Emergence

These two strategies as was mentioned before were an attempt to theorize the principles of a new architecture. The context of emergence for these strategies dated since 30 years before. When architecture begins to raise up its own complexity. Starting by Jane Jacobs (2016), where she refuted the pure zones of modernism urban ideas, a city is not a matter of pure functional zones, rather it is a matter of " organized complexity", a group of diverted functions in type and scale interlink to create a living organism.

A premier realization to the axiomatic attachment of complexity to architecture was made by Venturi (1977) in "Complexity and contradiction in Architecture". He criticized the tendency of simplifying conditions of the problem to engender a simple pure forms, by clearly refuting them revealing that problem in itself is tremendous complex and that automatically resulted an intricate conditions in the form to absorb it. Then, ideas that refer to complexity and contradiction such as "both-and", "juxtaposing contradictions"…etc. ultimately, Venturi intention was to reflect complex conditions through collage of pre-existing, familiar solutions, and the eclectic manipulation of various languages that surround the object on the urban level.

Later, in "Desonstructivist Architecture" of MOMA were exhibited set of heterogeneous, dismantled, and complex formal systems inherited from the inner dilemmas within buildings (Wigely & Johnson ,1988).

The inner dilemmas and complexities in this situation can be understood from Robert Sommol (2002) description for the conditions of contemporary hyper complex programs, "a list of dizzying operational heterogeneity" as he stated, a mixture of independent unrelated functions e.g. day-care, social service, athletic facilities, library, social service, café, job training facilities, etc, theses heterogeneous mixture ought to be accommodated in one project. Thereby, the question of formal manifestation is uneasy to answer unless the project became a field of independent divergence organized by the rules imbedded in the information of each.

Therefore, Information strategy stressed the complexity of multiple programmes and assign the collecting grafts of information layers as the prevailing technique to accommodate the bizarre non-causal relationships between disparate programs. Using

the tool of Superimposition to place the heterogeneous layers on top of each other without treating the difference among them. All are embraced under one monolithic neutral form reflect no one.

The deformation strategy on the other hand, celebrate the space form as event in itself, make it an extreme, surpassed the importance of the contained heterogeneous ingredients. The technique of affiliation graft is the one responsible to engender of that form, and the tool of fold provides the necessary.

4.7.8 Space is the Generator Theory: Context of Emergence

Architecture's role is to host the cultural values and social reality via the spatial dynamics that embodied by the integral variables of space and time duality. Jointly, they shape the so-called social life (Abbott, 2000). Indeed, space is fundamental in modulating society socio-political life. This primacy of space architecturally and culturally was the main reason to the emergence of this strategy. Strategies that stemmed from within architecture rather from without, therefore they sanctify the spatial value nor the formal value of the building, either the contextual conditions surrounding it (Brawne , 2003).

The technique of universal space offers a continuous homogeneous space, thus a very democratic space as was described by Kipnis (1993). The space gives its users a liberate flexibility to shape it in accordance to the tentative conditions. On the other hand, the technique of serve and servant space, or main and auxiliary spaces, was based on architectural premise that is to enhance the performance for programmatic duties of the space by serving it.

4.8 Synthesizing the Intended Framework

This section is devoted to synthesis the intended proposal that is the essence of this research. Which will be presented as a framework to facilitate understanding and implementation by designers. As was mentioned previously this framework is believed to be an intermediary between subject (designer) and the object (intended project to be designed).Aiming to replace the arbitrary subjective decisions and turn them into objective rationale ones. Or, from other perspective, it can act as a reference points (Norms) through which designer personal decisions can be passed then based on authoritarian principles. The framework will include the various form synthesis theories that have been analyzed and examined during this research. Also, it will imply the answers of questions "why" and "how.

Why should the specific strategy be adopted by designer? To answer this, nine possibilities were offered by the strategies, which are: (Functional, Self-Referential, Communicative, Adapted to Physical Environment, Space Based, Expressive, Complex and Heterogeneous, and Heterogeneous and smooth) Forms. Other question is: How designer can implement the adopted strategy? The proposed derivation range from the broad concept of strategy, then to the specific orientation included in the technique, then to the direct application by using the tool.

After all, the framework will be presented as a diagram, because it is simple direct way to display disparate information in such a way that the necessary correlations are affordable. The main stipulation of the diagram schema that it should not indicate any sense of hierarchy neither priority to any of the theories, rather indicate a complete neutrality.

At this point came the choice of the Central diagrammatic organization because it is

not favoring any part among the others. This organization makes the following of each strategy starting from the center as the area of intellectual decision making, in which designer finds the intention, then towards sides more explanations can be found, which enable designer to create a quick, concise but clear idea for each strategy. Below, presented the synthesized framework, as an inclusive general one in Figure (4.37), then as a particular detailed ones from Figure (4.33), to Figure (4.40) respectively.

Figure 4.32: Exhibiting the main diagrammatic illustration for the framework of form synthesis strategies, techniques and tools. The framework inform the intellectual area of decision making, then passing by the intention of designer and how to realize this intention (Created by the author)

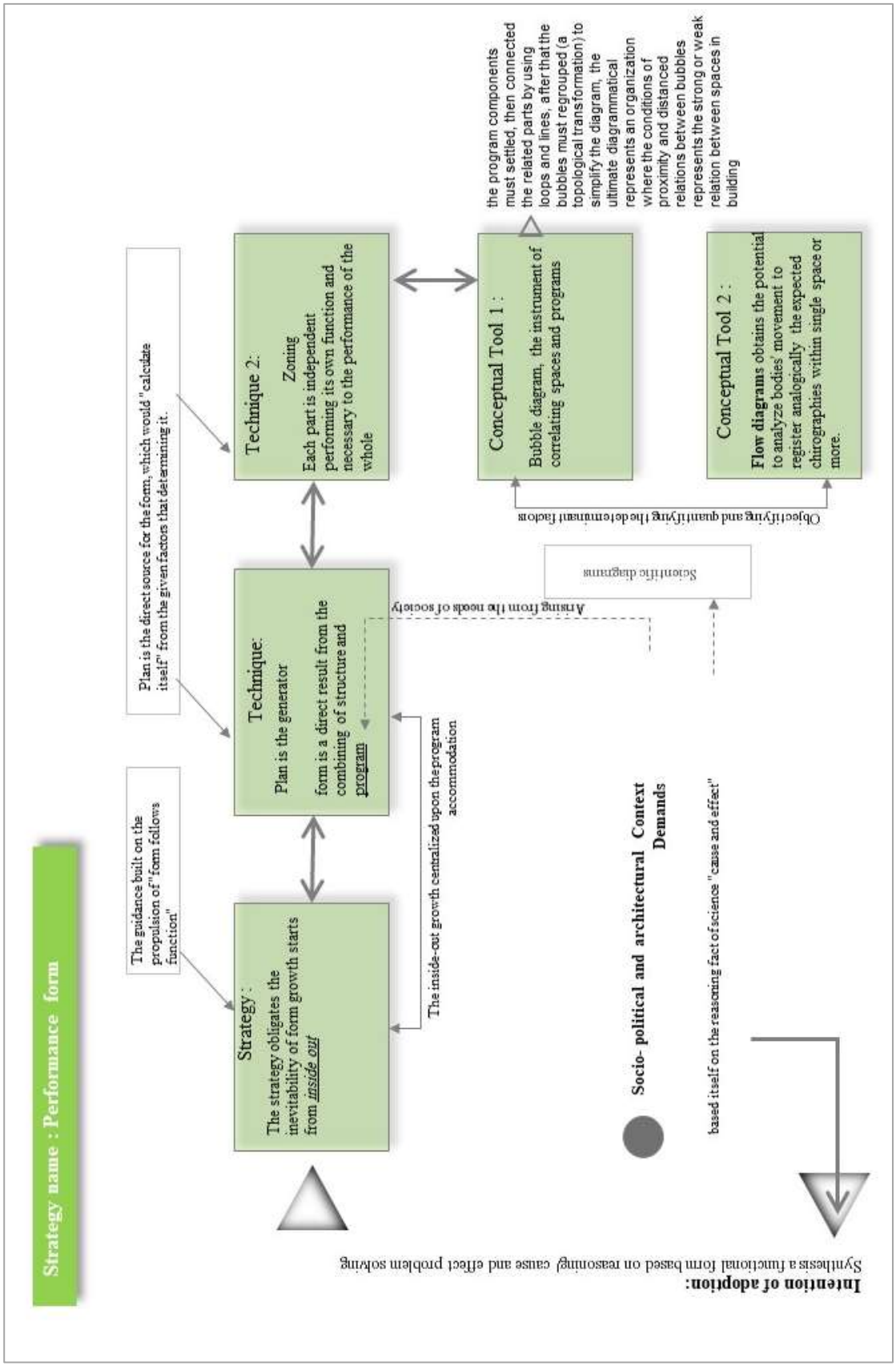


Figure 4.33: Exhibiting a flow explanatory diagram for the performance form strategy, starting from the reason of adoption and passing through several stages until realizing the whole idea. (Created by the author)

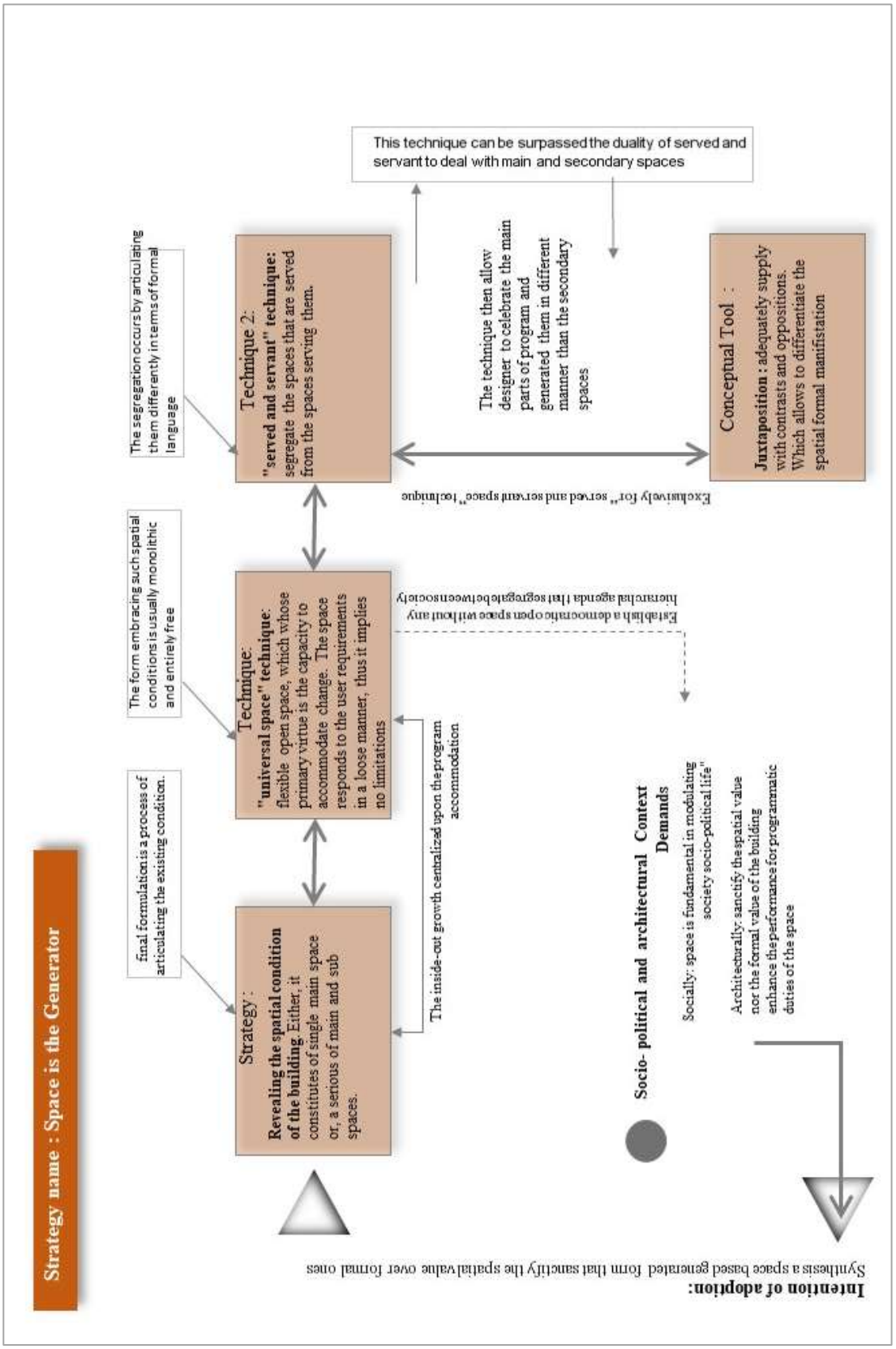


Figure 4.34: Exhibiting a flow explanatory diagram for the strategy of space is the generator, starting from the reason of adoption and passing through several stages until realizing the whole idea. (Created by the author)

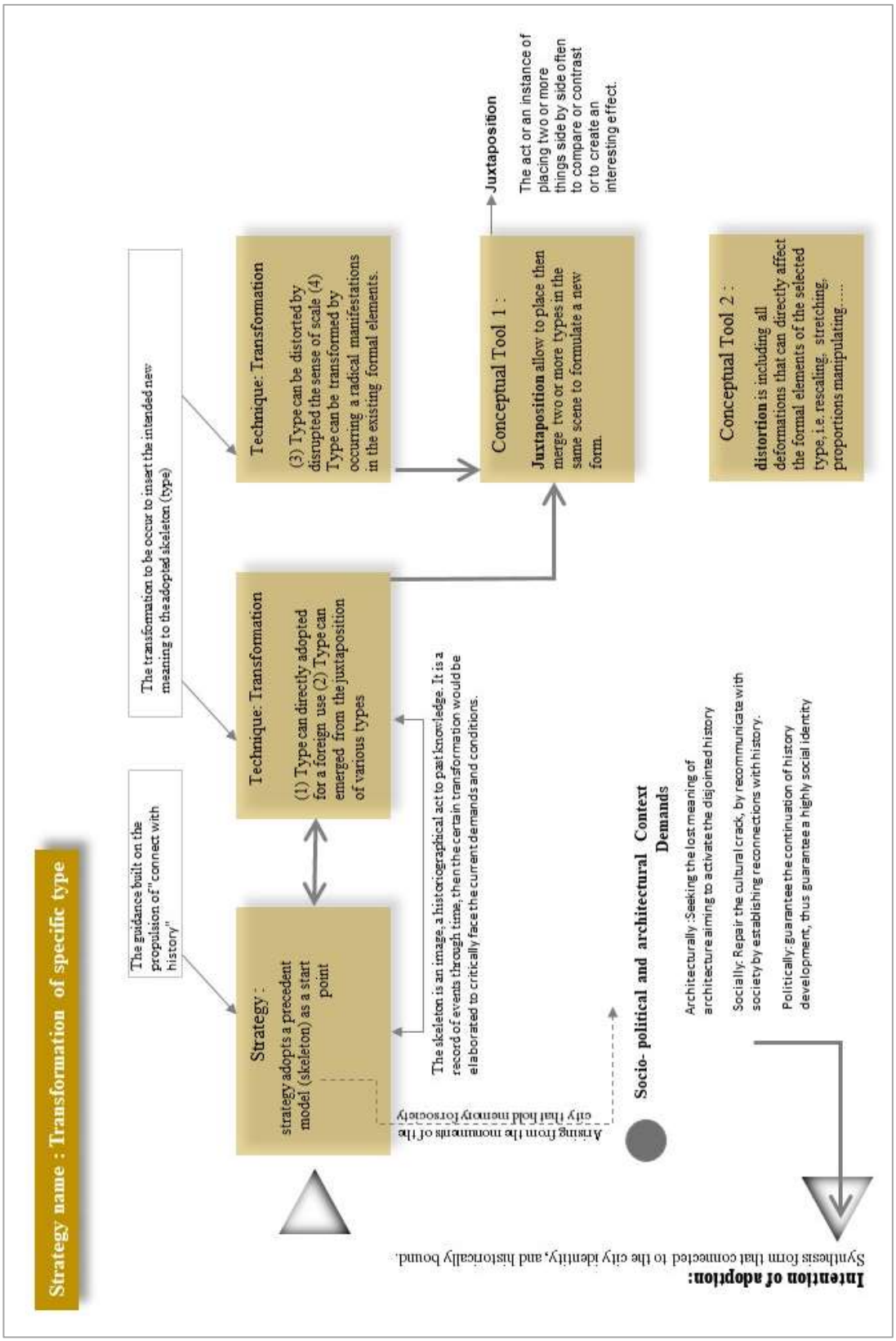


Figure 4.35: Exhibiting a flow explanatory diagram for the transformation of specific type strategy, starting from the reason of adoption and passing through several stages until realizing the whole idea. (Created by the author)

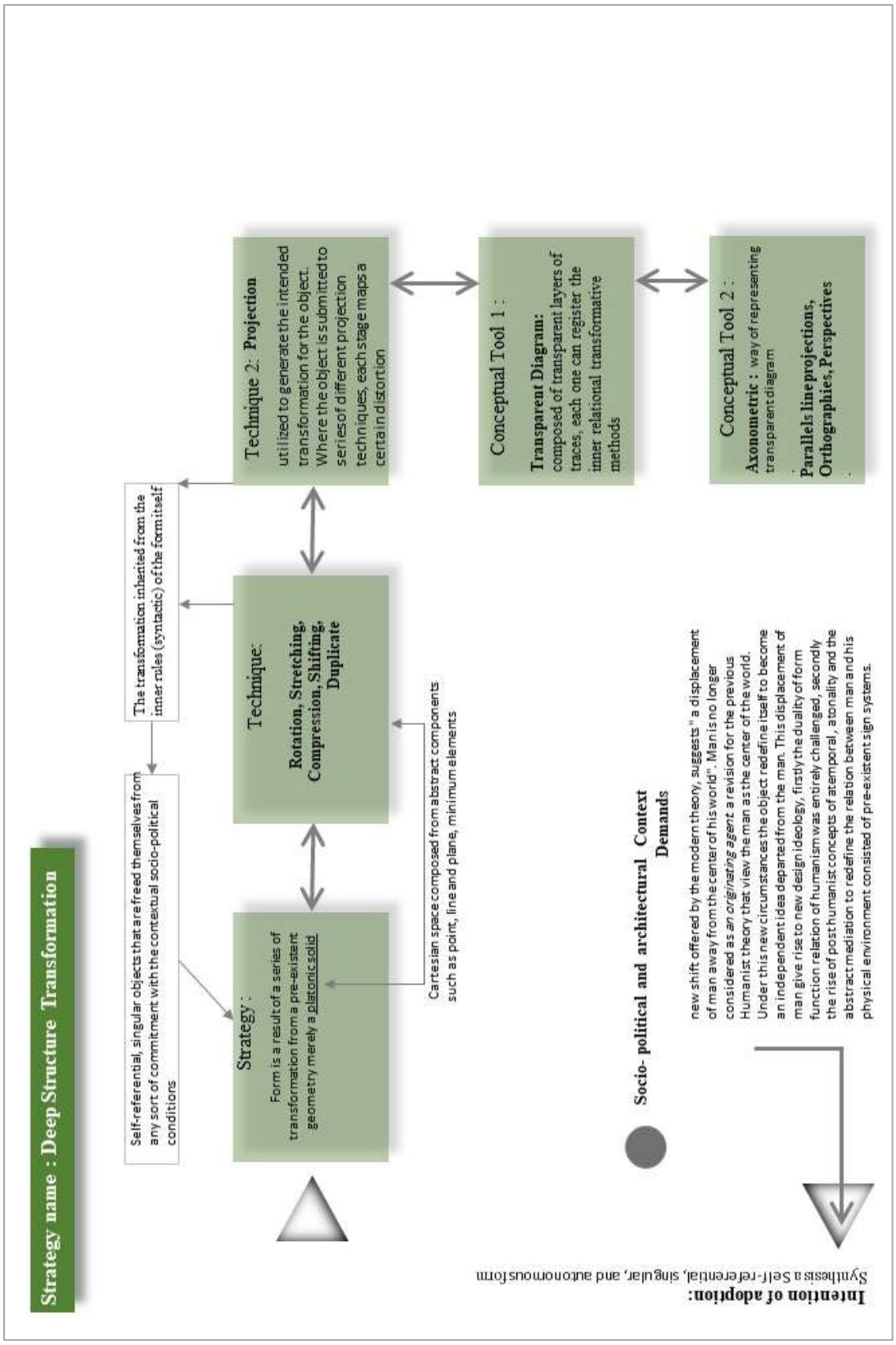


Figure 4.36: Exhibiting a flow explanatory diagram for the deep structure transformation strategy, starting from the reason of adoption and passing through several stages until realizing the whole idea. (Created by the author)

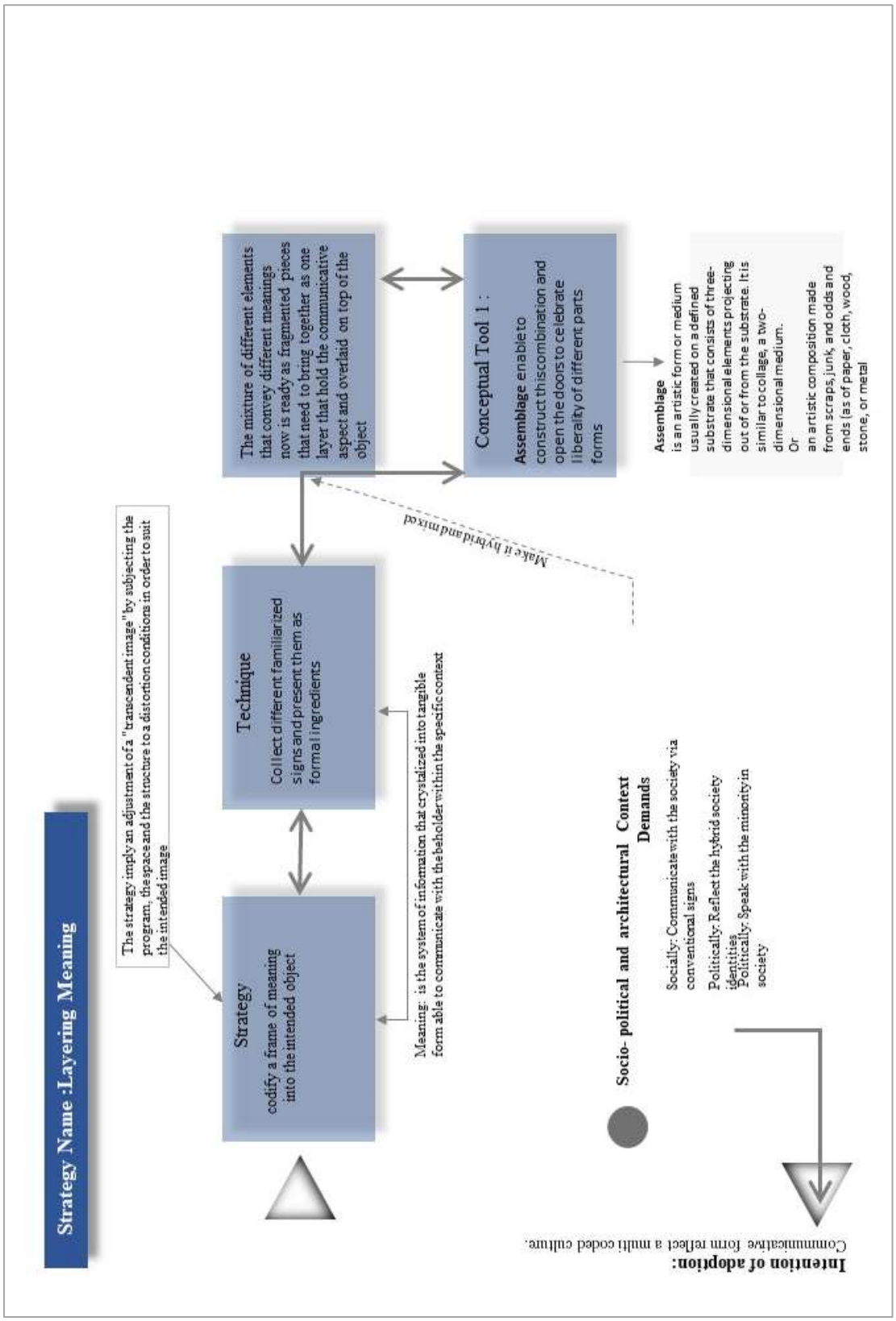


Figure 4.37: Exhibiting a flow explanatory diagram for the layering meaning strategy, starting from the reason of adoption and passing through several stages until realizing the whole idea. (Created by the author)

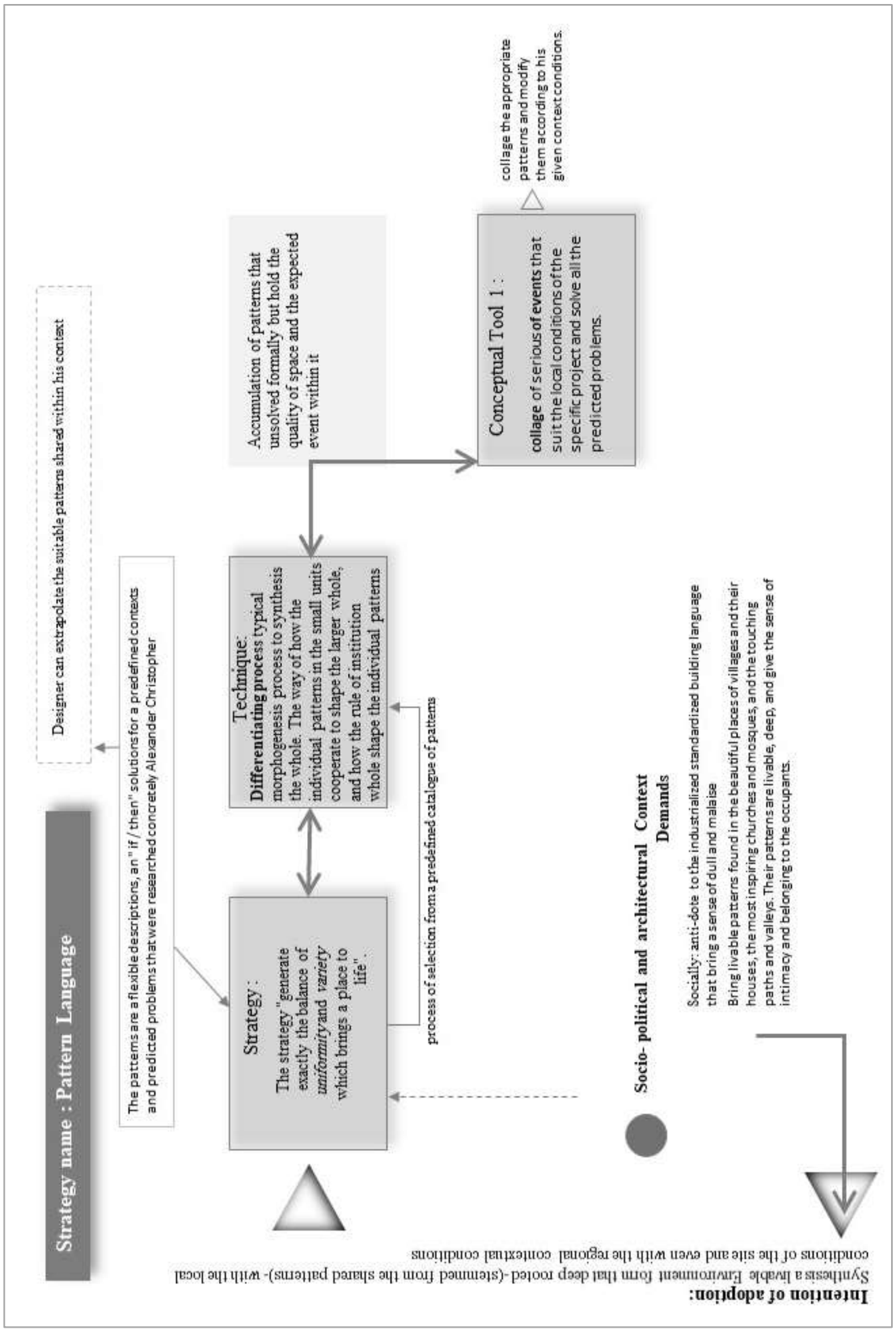


Figure 4.38: Exhibiting a flow explanatory diagram for the pattern language strategy, starting from the reason of adoption and passing through several stages until realizing the whole idea. (Created by the author)

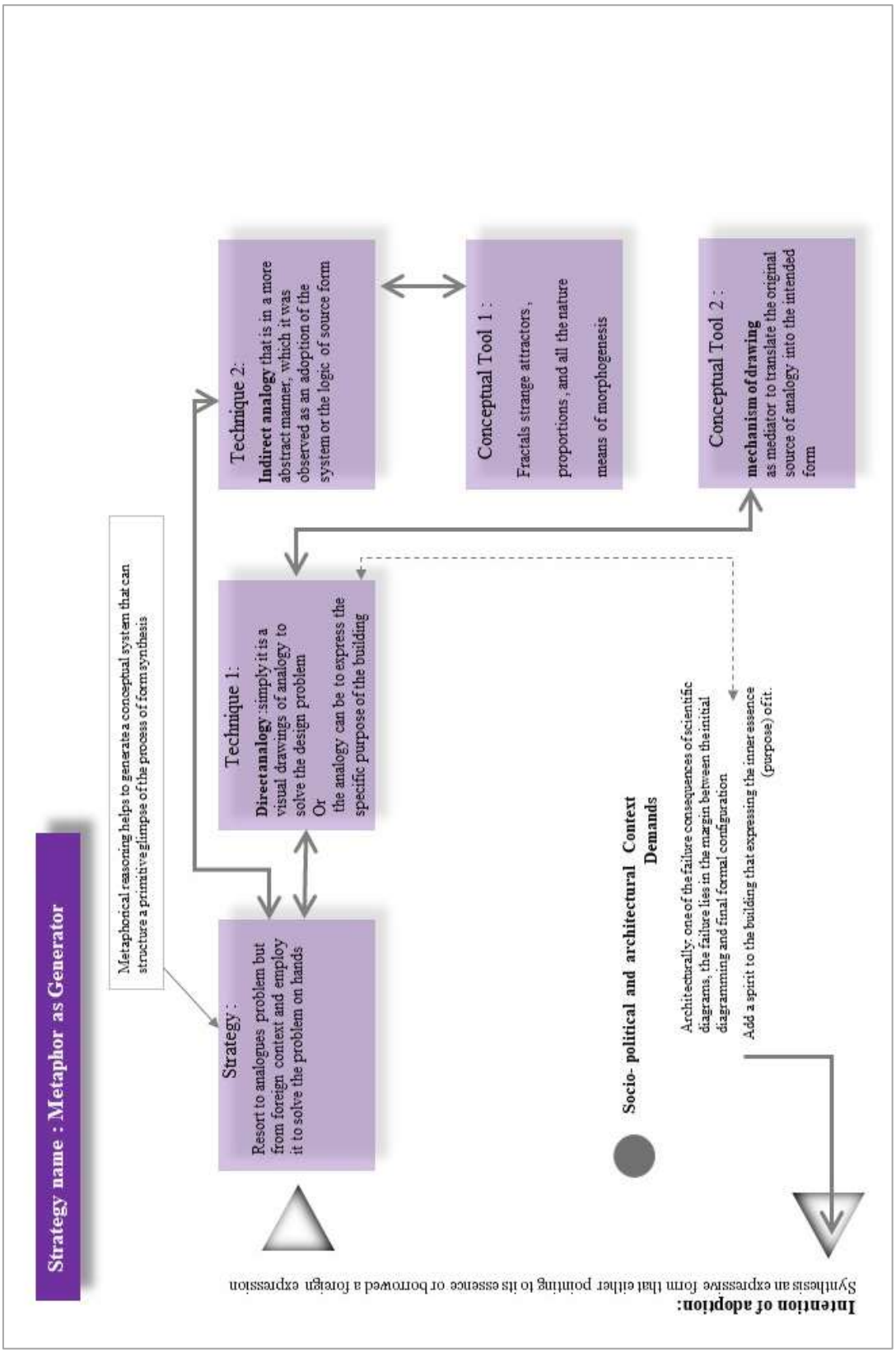


Figure 4.39: Exhibiting a flow explanatory diagram for the metaphor as generator strategy, starting from the reason of adoption and passing through several stages until realizing the whole idea. (Created by the author)

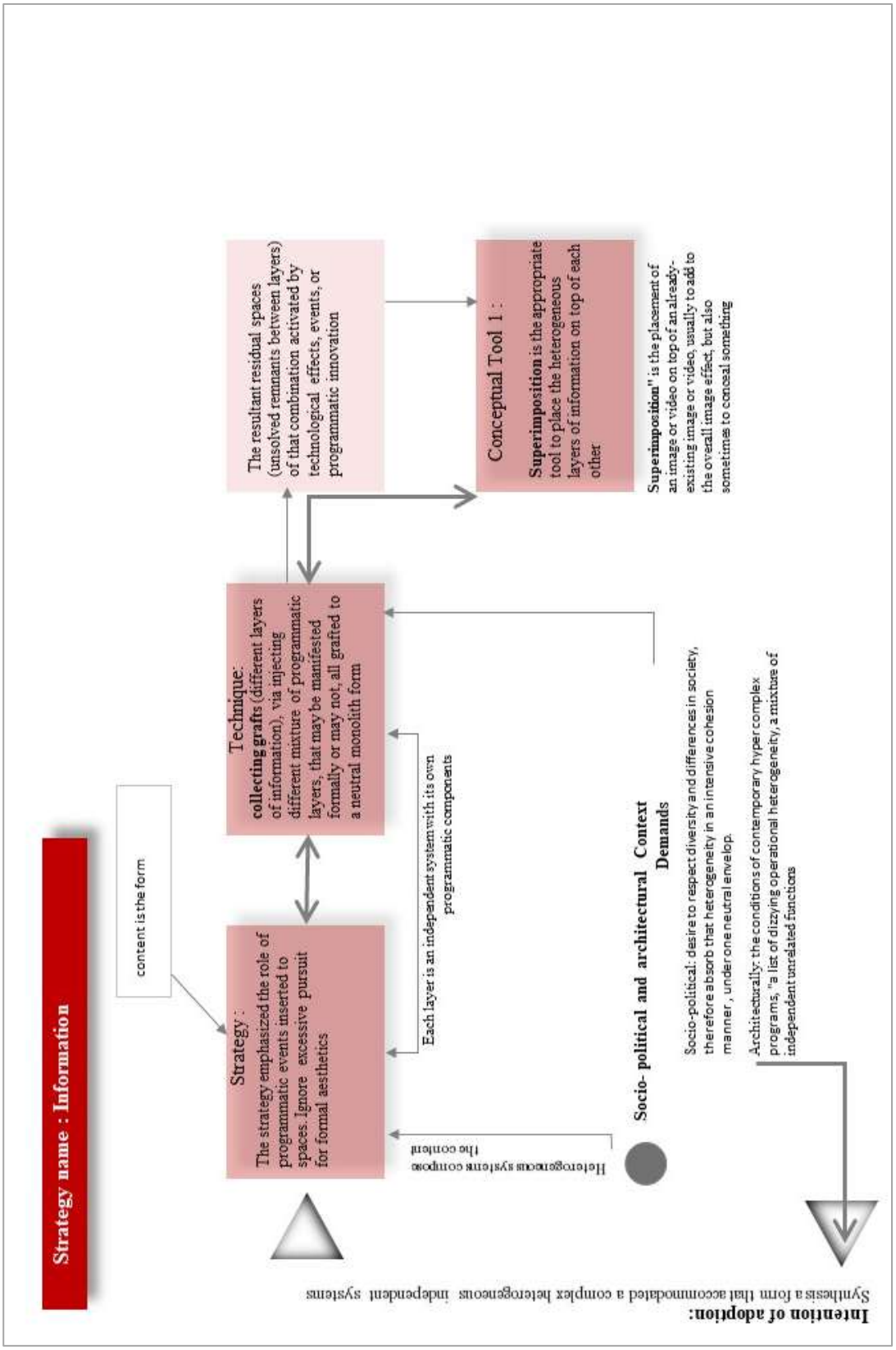


Figure 4.40: Exhibiting a flow explanatory diagram for the information strategy, starting from the reason of adoption and passing through several stages until realizing the whole idea. (Created by the author)

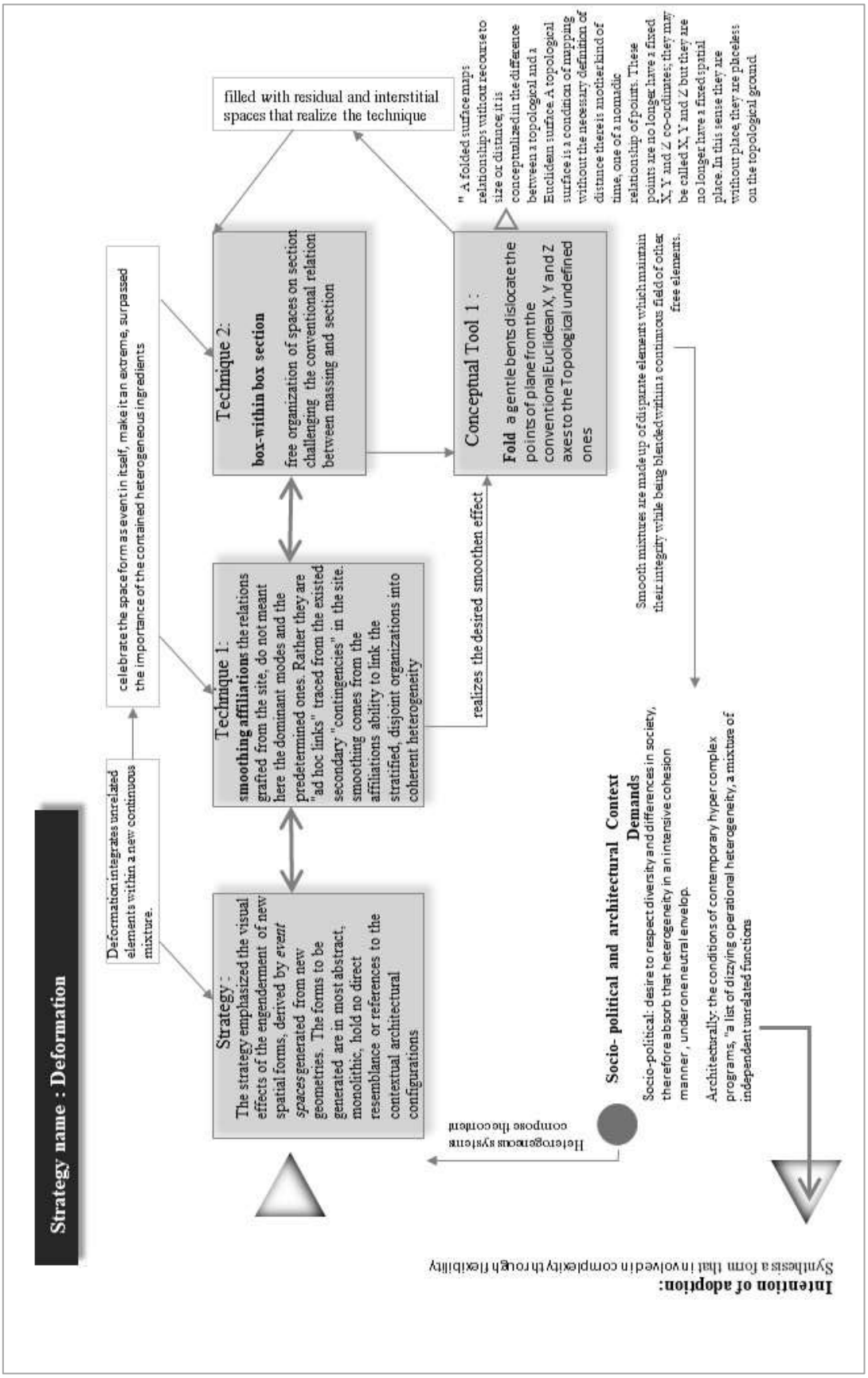


Figure 4.41: Exhibiting a flow explanatory diagram for the deformation strategy , starting from the reason of adoption and passing through several stages until realizing the whole idea.(Created by the author)

Synthesizing the previous framework means that this study was realized the main aim upon which it was established. The main diagram target the intellectual decision making area of designer, providing alternatives of how to direct his intention. Channeling it to the suitable type of form, and then exhibits the strategy, technique and tools that can realize his intention. The partials diagrams are more detailed attempt to point more explanations about the strategy's socio-political and architectural context, purposing to feed designer by the reason of adoption. Also, more explanations are set to define each strategy, technique and tool, interconnecting them with the contextual appeals. Which inform designer decisions of the way of embodying the contextual different demands in the intended object.

4.9 Summery of the Chapter:

Through this chapter the raw findings of literature were exhibited as a 45 form design theories distributed in 9 different texts. The theories in minor cases shared the same name, but not in the majority.

Classifying the raw literature findings established among the different texts resulted a kind of organization for the fragmented literature. The classification links the shared and repeated form design theories among different texts, Of course this easing the exclusion of frequencies and unfamiliar, likewise the ones rely on the subjective unpredictable decisions. The resulted number after this process were 34 form design theories, 4 among them were addressed in the same name by different authors.

The classified design theories were reorganized by affiliating process targeting the conceptual descriptions obtained by them. The results exhibited three types of relations between theories, either Typical, Similar or relative relations. The first group consisted

of theories that were addressed in literature with the same term in the shared texts. Second group is consisted of theories that shared the same descriptions but were addressed in different terms by different authors in literature. Third group is termed here as *Relative theories* consisted of theories that have the potent to be related relatively due to the shared conceptual description among them. This process ending to enclose the 34 form design theory into 9.

After the relabeling process of the 9 design theories readdress the grouped theories together and giving them a new label according to the logic by which they create the form. The result form design theories yet are: Theory of Deep structure transformations, Theory of layering meaning, Theory of Deformation Strategy, Theory of Form Performance, Theory of Information Strategy, Theory of Metaphor as Generator, Theory of Pattern Language, Theory of Transformation of Specific Type, and Theory of Space as Generator.

The dissolving of design theories to extract design ingredients of each, was implemented by filtering the theories through Salaama's Design Ingredients as an analytical device. The result unfolded the design ingredients for each Form design theory as Strategy, technique and tool.

The preparation for synthesizing the framework reveals the reason of adoption for the particular form design theory among the other. This occurred via analyzing the emergence conditions of the nine form design theories.

The proposal was synthesized, presented in a diagrammatic organization .The main diagram illustrates a central organization. The center is the start point, where were

located the ideological biases of the theories as an intentional reasons to base the form synthesis process. The sub diagrammatic illustrations go in depth and explain independently each form synthesis strategy in detail.

Chapter 5

CONCLUSIVE REMARKS AND FOR FUTURE STUDIES

5.1 Introduction

As it may be witnessed through the previous chapters, this study made theoretical insights in the conceptual level for a set of form design polemical theories. Which was resorted to as a solution to decode the uncertainty of post analysis stage in design process. The main motivation stemmed from the slipperiness of this area, despite the variety of design theories, and rich researches. This draws the attention to the necessity of revising this theories and look from a new angle to deal with them in a differentiated approach.

The study made a comprehensive review for the form design theories, after then reformulated their conceptual structure revealing a new understanding for them. The form synthesis strategies, techniques, tools resulted from the study provide more systematic hierarchal explanations for the theories of form design. Transform the polemic theoretical descriptions to an applicable prescriptive guidance.

5.2 Conclusive Remarks

The outcome that achieved from realizing the main aim and objectives of this study pay the attention to the new way of formulation that occurred in the conceptual structure of design theories. The new way of seeing escaped the conventional descriptive narration and also refrained the specificities of each theory. Grouped all

under a new conceptual home, where a general pattern of ingredients govern the whole differences under the power of unified formula. In the conceptual level, the grouped design theories were explained in an entirely new way of articulation. Which opens the doors for a new way of reading for the realm of design theories. For all that, it is believed this study obtain a high potent to expand the theory of design.

The research realized the main aim when the intended framework was synthesized. The proposal presented a verified and accepted theories among the authors, thus they can reach the extent of being considered as norms for design. This framework is believed to decode the uncertainty of the post analysis stage in design process. It holds of the ability to provide a conceptual clarity for the hesitated designer. Offering multiple start points, which broadening his conceptual capacity to answer the demands subjected from the variety of design tasks. Not to forget the reason of adoption that attached to each strategy allows him to place himself exactly in the right selection to tackle the task. Finally, the framework replaces the desperate waiting for the inspiration usually coincides with the start points, but need to mentioning it cannot automatically solved the problem on hands.

The framework was presented in a series of diagrammatic organizations .The main diagram illustrates a central organization, where the center is the start point as the intellectual decision area. Then, locate several ideological biases of the theories as an intentional reasons to base the form synthesis process. This guides to the exact term for the intended form to be synthesized, after that the necessary Strategy, Techniques and Tools to realize that form are registered. The sub diagrammatic illustrations go in depth and explain independently each form synthesis strategy in detail. Drawing a clear map shows how to go through the whole process from the broad intellectual level

of the strategy, to the actions and decisions provide by techniques, to the implementing tools for those decisions.

This main aim was achieved after the defined objectives at the beginning as a maps of this study were also achieved. The literature survey on the area of design theories introduced the Descriptive and Prescriptive as tow typologies of design theories. One is describing how design works in the practice, other is describing how to go about design process, makes claims and hypothesis to improve the former. This portraying of theories was important in the stage of the critical analysis of dissolving theories.

The reviewing of descriptive form design theories in the 9 texts that took the mold of framework, revealed a 45. The theories in minor cases shared the same name, but not in the majority. Taking into account the fact that the term framework did not mentioned explicitly, rather it is what has been extrapolated by the author. The classifying the raw literature findings established among the different texts resulted a kind of organization for the fragmented literature. The classification links the shared and repeated form design theories among different texts, Of course this easing the exclusion of frequencies and unfamiliar, likewise the ones rely on the subjective unpredictable decisions. The resulted number after this process were 34 form design theories, 4 among them were addressed in the same name by different authors.

Correlating the intersected mutual relation among form design theories, was occurred by affiliating process targeting the conceptual descriptions obtained by them. The results exhibited three types of relations between theories, either Typical, Similar or relative relations. Then after a series of conceptual affiliations, this ending to enclose the 34 form design theory into 9. The relabeling process of the 9 design theories

readdress the grouped theories together and giving them a new label according to the logic by which they create the form. The verified form design theories yet are: Theory of Deep structure transformations, Theory of layering meaning, Theory of Deformation Strategy, Theory of Form Performance, Theory of Information Strategy, Theory of Metaphor as Generator, Theory of Pattern Language, Theory of Transformation of Specific Type, and Theory of Space as Generator.

The Resolving of design theories to extract design ingredients of each, was implemented by filtering the theories through Salaama's Design Ingredients as a resolving analytical device. The result unfolded the design ingredients for each Form design theory as Strategy, technique and tool. Analyzing the emergence conditions of the nine form design theories reveals the reason of adoption for the particular form design theory among the other.

5.3 Future Studies

Although the research achieved its ultimate goal, when the inclusive Framework of synthesis phase decoding was realized. But, still there are some notes and recommendations that can be left to those who wish in the future to make further studies in the same scope.

The research was highly attempting to simplify the way ideas are organized and presented especially on the final framework produced. Even though, the reader needs to be equipped with a certain theoretical repertoire, so that he can understand these instructions contained in the Framework. In instance, the framework contains many terms that the fresh designer cannot be familiar with like Heterogeneous space and Fold, although the research strived to explain them. Thus, it is advisably recommended

to revise this point and looking for ways to solve it, and how this architectural discourses can internalize in fresh designers.

This theoretical study in some aspects is touching the domain of architectural education in general and the design studios in particular. In the general aspect the research touches the way that theoretical courses are taught, adds a criticality of how the design theories can be introduced and analyzed. While in the particular aspect, it would cause a revolution on how design thinking is taught in studios. Further, this opens a linking channel between the Architecture theory curriculums and design teaching in studios. All these aspects can be formulated to open the doors for several proposals as a future study.

The Self-generated Computer programs were excluded from the scope of this research for theoretical reasons summarized in the very formalistic approach they invite for. However, it cannot be denied that these programs imposed to architecture design and became a reality that cannot be escaped. Since this study is believed on as a sufficient solution to demystify the puzzle faced in the post-analysis stage. Therefore, as a future PHD study, the findings from this study are planned to be integrated with the digital programs. With the already existed possibilities on the framework to coop with the different programmatic and contextual complexities. It is expected a digital program with very high potentials to make a revolution on the realm of architecture design. Become as a pre-set tools armed with a very sophisticated internalized discourse in which the designer enters the data of the project and its conditions. The program then begins by reviewing the different trends, solutions and alternatives that the project can take.

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