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Retrieval of Models, Forming the Physical Structure of the City in Order to Explain the Concept of Urban Development Machine[1]

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Abstract

Urban spatial structure and organization, as the appearance of the interaction of factors which affecting them, is a characteristic that judgment on the urban space specifications is conducted about it. Although with the advancement of human knowledge, impressive titles and modern sciences have been involved in the formation of urban spatial structure and organization, however, the resultant effect of these factors can be identified as forming skeletal structures. The aim of this study is the recovery and classification of techniques or process-centric approaches that urban concept has been created over time by them. In this regard, using the descriptive method and also comparison and analysis of specialized text contents, after recovery of the same concepts in architecture, visual arts and philosophy, the result of research led to the development of the new concept entitles as Urbanism machine. By definition of this new concept, the ability of thinking advantage addition and machinery production to urban planning and designing at different scales has been studied. Introducing the technological synthesis as a contemporary urban machine is another result of this study.

Keywords

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Introduction

Many efforts have been made in understanding the process and the factors forming cities and therefore results have been obtained, but it should be noted that most of the findings are limited to discussion's content and procedural approach is remained obsolete or is seen as sectioning guidelines. Kevin Lynch in his book named as "A Theory of Good City Form" explaining the idea of the normative general theory has follow-up the debate in terms of form and function, Lynch in a part of his book writes: "It seems that using these performance characteristics, the foundations of a normative general theory about the cities can establish. Development of a limited number, not an individual general theory covering all the important aspects of the city form will be our present purpose. This solution will replace the imperative norms and criteria that has habitually led discussions associated with goodness of the cities" (Lynch, 1997: 140).

If this issue is also examined with procedural approach, the presented arguments focused in particular in the field of urban design that in most cases, forms the procedure step by step and logical proposal starting from the recognition of the problem and ending with evaluation after implementation of the project. It is worth noting that prominent scholars in the field of urban planning, were aware of the lack of the attitude integrity to meet all requirements of the city and providing complement solutions, beside the models provided they have increased the area of their effects. For example, some believe that: "Although these models organize the thinking and design of our decision-making process that is appropriate for the task at hand, but urban design does not take place in an accurate and certain phase manner, as mentioned models (models of urban design) have suggested. Urban design is a controversial process of forming ideas and testing them for reciprocating (Lang, 2007: 40). Based on the above issues development of a holistic model, which its solutions cover both procedural and substantive aspects at the same time, firstly is

effective in the decision-making speed, then creates harmony between process and product, in order to achieve the desired objectives in accordance with the conditions.

Problem statement

Many designers know design process as a quite intuitive and unexplained process. Other people believe that designing is a rational process and others know it as a polemical process. Most people who have considered the design process, at least consider steps for it and different people pass these steps in different ways (Lang, 2002: 42).

Considerable interest in each of these procedures, is necessary to carry out the process in accordance with instructions from the beginning to the last stage, to achieve the desired result that the process requires in every certain time you exercise this process. Another thing that can be noted is that the process framework is limited to the developing time. Although in many common procedures the identification and analysis is incorporated, but the procedural logic is excluded from the rule of updating and due to their creation time stays constant. The actuality of this process has been vanished just after edition and any products derived from them will be naturally belonged to the past (of course, in the current definition of the value of this devotion date, the update state of the products will be determined). The same is true with regard to the content, forms or functions arising from decisions related to a topic, due to the relatively long time to achieve the implementation phase and results do not have high efficiency in most cases and new problems will decrease their performance over time. Therefore, to overcome shortcomings arising from the discussion of time, it has been tried to find a more inclusive system that, contrary to the usual procedure, it has the ability to provide the appropriate process and product without having to take the relevant steps. Due to the similarity of the nature of the above definition with the concept of the machine and the mass production, the term urbanization has been used for structures recovered.

Assuming the comprehensive instructions presence for organizing urban physical models, the following questions have been answered through this research.

1. What are the urban machine and its attributes?
2. Which machines have been used in different historical eras?
3. What are the benefits of applying the machinery approach in urban problems solution?
4. What is the contemporary urban machine?

Methodology and Background

The research method in this paper is descriptive-analytic and library studies have been done to achieve theoretical literature. The methodology of this article is based on the comparison and analysis of text content that, has identified the main elements for the formation of the settlement centers through history by investigating effective views in the development of urban planning and comparing trends and their different levels. In order to achieve the purpose of the research, various classifications have been created in output of related scientific studies, then, by these theories, new classification has been developed using common sense among concepts proposed. To cover all the common aspects of these concepts, the quality which has a more comprehensive meaning has been selected as the identity of each group. In some cases, due to the subject matter, the method of paradigm analysis has been used, this means that for properly and rationally justifying the subject, sine, and not necessarily linear trends and events around a theme or concept have been studied.

Considering the differences of opinion in this study, documented background were not found in the subject matter in urban areas. A similar concepts in art, philosophy and architecture for these topics are retrieved that the results of their study have been used to develop theoretical foundations.

Theoretical Foundations

Login philosophical attitude to art and architecture has been performed as a machine or the machine product, perhaps first by motives other than the intended use of the research. Walter Benjamin in his most important article about the proportion of context and text entitled as "artwork in the age of mechanical reproduction" considers reproduction of visual art as the cause of ritual originality loss for the artwork just as reproduction of the printing industry of the written text. He believes that by mechanical reproduction of art works, the characters have lost their main characteristic and are not considered unique anymore, which seem immortal works and seem like holy objects by keeping the distance from the audience (viewers, listeners). Thus the work of art is lacking in originality and has no other ritual value (Ahmadi, 2001: 37). As a result, the art come out of its aristocratic isolation and will be available to the masses and in their intellectual and material vicinity will have a lasting impact. Considering these topics and more thoughtful attitudes of this kind, machine concept at this stage implies the structural-philosophical interpretation which means that in this attitude machine is a technique or tool by which the concept or model is created, at first the design created machine needed and then the machine will be capable of producing large-scale works. It should be noted here that the expression of machine, unlike the usual attitude that it knows the machine as a product, is producing the products. For further clarification, examples of different interpretations represented in architecture machine will be discussed.

The discussion of architecture machine can be traced in Cretan myths. A valuable myth which is famous for an architecture a tale, in this myth the Queen was served the architect named Daedalus to build a construction in order to conceal his son Minotaur with the cattle head and the human body. Daedalus in order to create an illegible and complex structure invented the caliper and created the concept of the labyrinth by it. By adopting these measures, the place of the Minotaur was considered at the center of the labyrinth and so those who want to meet the Queen's son lost the ability to exit by entering the labyrinth (Raeisi, 2001).

Although it is possible for the invention of caliper to

have another origin other than this myth, but it can be cited as a machine. Here the architect creates a machine to answer a question, and then produces a concept of it. With this view, it can said that there has been machined for different ages and given the cultural, economic, political, social conditions and artistic developments of each period have been changed and updated. As an example perspective can be cited as a machine in the Renaissance age or Cubism and collage in the early twentieth century as a strategy organizing the concepts presented.

In this regard, a number of contemporary architecture pay attention to the problem of machine and have tried to invent machines for the production. For example, Daniel Libeskind in a section of the book "The Space of Encounter" offers a model for his production machine, which has three parts: reading machines, reminding machine, writing reminders. With the development of this process that is beyond the scope of subject matter for design, Libeskind has provided a mechanism by which the need to start the process of creating a design has been met and this machinery issue is done quickly for any project. He has provided an approach for preventing aging machine logic, for him to achieve this, three questions must be answered: First, what is the previous machine? In the next step, what is today's machine? And finally, guess what will be the future

machine? (Libeskind, 2000: 180).

Peter Eisenman is also another famous contemporary architect who knows his design concept taken from his new machine.

Eisenman architecture machine is Blurring, he tweaks the elimination of clarity in his works and provides a new definition of architectural space that is unique in its kind. For example, in the design of his house number three, rotating a nine-part square grid, has undermined Andrea Palladio's ideas in his villa designs and made it ambiguous. According to Palladio, man's place has been in the center of this grid and this issue has clearly created transparency and readability in his works. Points of entry in on the idea have been considered in accordance with the geographical directions and spatial hierarchy has been well respected by the design structure. Applying Eisenman's idea, the creation of the ambiguity in such a design has been fulfilled, due to its simplicity in speech and immense readability, simply by adding the same rotated grid. With this approach resulted from the prevailing attitude in designer's thinking, users of space have gotten disability and confused in their understanding of where they are located (Major & Sarris, 2001); (Fig. 1).

According to Eisenman this approach to the topics of study and the design is a machine to create a general concept for the plan, a machine that he
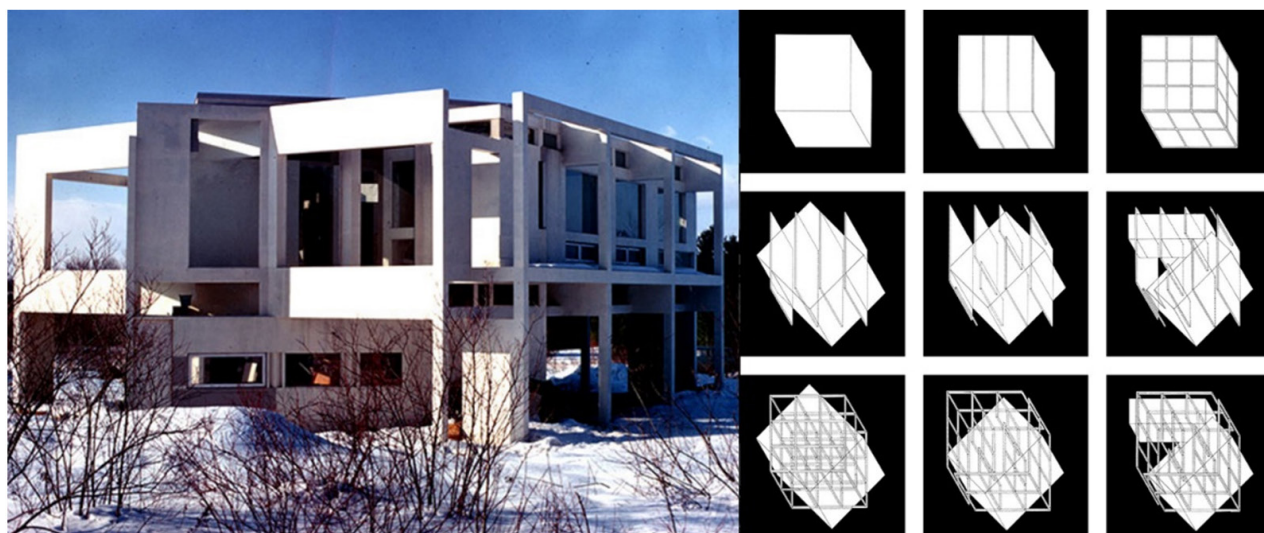

Fig.1. Eisenman's No. three Villa. Source: http://www.eisenmanarchitects.com.

calls it ambiguity. With this machine regardless of which subject is selected to be designed, the general framework is applied to its spatial structure, although in the physical form it looks new but the dominant spatial order will follow the original machine's attitude. Eisenman in the design of the Aronoff center of Art and Design, University of Cincinnati and many other works has used the same structure modeling of the space.

To learn more about the machine concept in architecture, the ideas of one of the most influential architects in the last decade of the twentieth century, Rem Koolhaas will be discussed. Although Koolhaas does not discuss about the machine in presenting his ideas forming his works, but in practice, he uses a mechanism that is based purely on the machine logic. He believes that, while the project scale is expanding, architecture as art lost its application and entering too much detail in the project area, new strategies will be required to advance the goals. In this regard, according to Koolhaas, values of modern architecture such as honesty, openness and transparency lost their importance due to population growth and increasing tastes and large-scale buildings exclude from good and bad evaluation. Therefore the architecture issue in the present age is not the form and the volume thinking, but is the issue of understanding the forces and trends that exist in contemporary society and how these forces can be guided. According to this description, Koolhaas proposed the idea of separation of the envelope and the core and believes that reflection of the demands of each project in its physics is not required, and the structures classification into four categories: small, medium, large and very large, and providing the instructions for each type, he suggests a solution to this problem (Koolhaas, 1995).

In summary, it can be said that "scale" is the machine created by thesis and thinking of "The problem of the large" in Koolhaas's vision, each project in accordance with the logic of this machine has been located in one of the categories level above and will get results without having to go through the

conventional process using guidelines developed.

A tendency to produce a machine of works that are process-oriented, are also recoverable in conceptual art, especially painting. In general, such a mechanism can be seen in many different styles of art, although this has not explicitly been stated, but by studying the logic of styles and effects arising from them, unwritten guidelines can be clearly found that are close to the concept discussed in this article. For example, in realism formed in contrast to its previous methods, i.e. romanticism and free series, actual representation of the environment and avoiding any compliance with contractual aesthetic and scientific and rational attitude are used as the thinker principle. Evolutionary architecture (Genetic architecture) is one of the same processes with machinery approach either. Principal Rule in this style is design a software instead of the product. Using the nature patterns and biological structures evolutions are the basis of evolutionary architecture, which according to, some algorithms are created that getting ideas from biological structures.

In this method general ideas are translated to genetic codes and become the instructions to product manufacturing, On the other hand, the impact factors of project base have been studied and simulated. By definition of process logic, interaction between parameters yields to manufacturing desirable product in a short time and also algorithm behavior affects the environment and promote it simultaneously.

Consequently, process first round utilization, new conditions with system feeds which is the product of previous round, made the new product evolutionary cycle (Frazer, 2001).

The idea of mechanized production of artworks in the latter decades of the twentieth century progressed significantly, in the new view, the issue shaping the artworks change its nature of the structural principles to be a tool. In this attitude the artist first creates the considered machine, then relying logic and specific requirement machine produces an art work or concept. One of the most prominent examples in this regard is the work of Jean Tinguely in the late

'60s. Tinguely in his several significant artworks created structures that had the ability of creating of artworks or conceptual art. Although aforementioned structures followed a certain logic, however, by changing a few parameters, the ability to produce different artworks is created (Parmesani, 2000: 66).

Tinguely made products by his mechanized process that, while being different have had common characteristics, and have followed the idea of their forming unit. For example, of a work by this artist named metamatic, several options of the artwork are produced by changing several influential parameters which designed the machine, all of which have similar detectable characteristics (Fig. 2).

Another example, can be mentioned is the climatic machine that, is an Alan Storey's work made in Toronto. This structure produced works by wind and change in its direction that despite the similarity between the laws governing it, each has different content (Storey, 1991: 144); (Fig. 3).

Many efforts have been conducted in the field of conceptual arts to mechanize artwork production. Walter de Maria can be considered as the most influential artist in this field. The Lightning Field as his most inspiring work which field theory also is originated from it, has purely mechanized nature in the production of artworks and at the right time creates significant and pure artworks. This artwork formed of a number of metal electricity conductive rods gone in the ground, has been built in a region

with an unstable atmosphere in the cartoon County, New Mexico. In specific conditions that there is conditions for thunders to be created, an electrical charge caused by the friction between clouds due to the ease of discharging it through the rods located on the ground floor, will be transferred to the ground by creating magnificent and unique scenery (Erbacher, Schoder & Sedlmeier, 2014: 121).

Approach to the machine subject with close concept of the subject of this study were presented in the philosophy field slightly delayed by Gilles Deleuze and Felix Guattari in the mid-twentieth century, which can be considered as the most powerful influence in forming the future movements in art, literature, politics, and consequently society routines. According to them, the machine is not merely an apparatus or technical tool, but also a factor for social composition. This concept of the machine as a technical, social and intellectual setting changed understanding of the interaction between humans and machines, organisms and mechanisms, the individual and society in public opinion. Gerald Raunig in his book "thousands of machines" based on the theories of Deleuze and Guattari has introduced new meanings to the concept of the machine. Raunig used machine concept as a factor in forming the social movements, founded europe help movement since 2001 become a transnational and focused discourse movement on the precarious nature of job and life. In Raunig's studies, very wide scope of the relevant
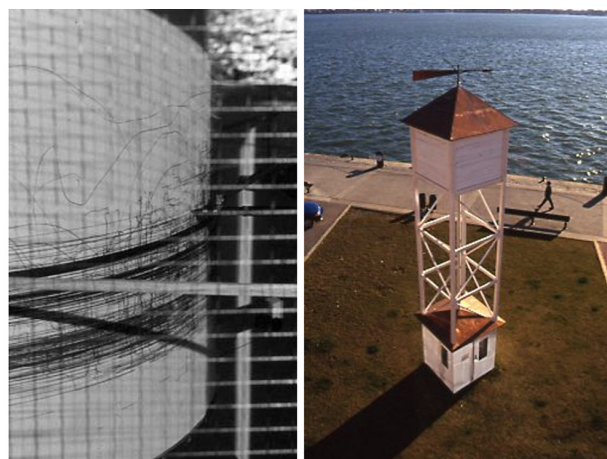

Fig.2.Metamatic. Source: Grande, 2002.

Fig.3. Climatic machine. Source: Grande, 2002.

definitions and theories have been investigated, such as the concept of "truth fallen out of the machine" in ancient Greek literature and the theory of "piece of machine" by Marx as well as semantic perception of several plays and films (Raunig, 2010).

Raunig in the development of his ideas, has suggested another influential theory that plays a significant role in creating or organizing people's movements. Root integration and molecular organization, is a machine like system that Raunig has extracted it from the research on popular movements. Root integration in Raunig's believes means to preserve and affirm difference, and constant discrimination within them and proliferation is growing. The idea of molecular organization can be found in the movement of "human microphone: no man, no microphone".

Explanation of the new concept of machine

Studying the examples cited and summarizing their structural properties, the definition of machine concept can be reached. The first feature of the machines is their integrity, this means that it has every aspect of the issue in itself and the user of this structure rarely requires the process of creating the subject. Another feature of this thought is strategic instructions in order to carry out the stages related to the matter, of course it is likely that these instructions

apply as theoretical approach in the form of a style. It should be noted that integrity has not been the machine concept in the whole process, meaning the determination of the final frame and here machine as a tool, in a different context, will produce a different product, but with the same logic. This important issue may be considered as a qualitative difference between the interpretations of mechanical machine with the subject matter of this study. A significant advantage using the concept of machine that justify its utilization, is high speed of production compared with other methods, although this feature may not be friendly about artwork but taking into account the extent of the consumer society at the current time and creating the conditions of relative justice, the speed of production will be considered as a contributing factor. Another feature worth mentioning is the repeatability of the machine. According to the logic of the machine and in dealing with issues, process repeatability and reproduction will be provided. Of course, as mentioned in the previous lines, the product similarity does not happen in this direction and this will be linked to conditions such as time, place, context and purpose of the machines.

It should be noted that the use of machine does not negate the value of the design process. Each machine was definitely born out of the designer's idea and

Table.1. Retrieved parameters for defining machine and compare between two different processes

Description	Machine production	Single Process	Parameter	Row
The idea creates machine	*	-	Separation of process and designers	1
The single processes have the dominant idea either, but there's a chance that the designer will change it.	*	-	Comprehensiveness of design logic	2
Design Substrate items affect both two approaches	*	*	Time and place condition influence the product properties	3
The machine function doesn't depend on time & place of applying the machine and substrate conditions	*	-	Final quality of products doesn't depend on process quality	4
The existence of the dominant idea of product and the machine	*	*	Dominant design ideas are recognized on product properties	5
Repeatability of the process or product quality doesn't necessarily means the similarity of them	*	-	Repeatability of process and the product quality	6
The high speed of production causes this feature	*	-	Establishing fairness	7
The process doesn't need to be started from the beginning	*	-	High speed production and repeatability	8
Due to repeatability of system	*	-	The product properties and its situation could be anticipated	9

thinking which has been produced in a logical process.

Retrieval of Machine Concept in Urbanism History

Investigating summed up features of the machines that have been obtained in the course of this study, structures in urban planning can be retrieved which have performance like the new concept of the machine. Without a doubt, one of the basic mechanisms that have been used as a model in urban planning is the utilization of checkered networking. The reasons for using this former complex biological system are different. For example, in first cities like Amarna in Egypt and even the same and older like Kahun, checkered grid systems simply used to speed up the settlement of workers and contractors and ensured the possibility of political control and enforcement by the board of governors. This pattern acted as a city map in Harappa civilization as the first pre-designed city and has formed the structures of the cities if this civilization, especially the city of Mohenjo daro (Morris, 1996: 24).

Applying this method of the spatial arrangement assessed coinciding with religious principles, established a theoretical and practical basis for urban

planning that following these principles, and requires the selection and use of a suitable and preset map called Mandala (Morris, 1996: 32). The mandala is essentially a geometric table used in Buddhism and Hindu religions that have been used as a symbol for the universe, although this term is used in religious concepts, but can be referred as the first structure forming the urban fabric and the first urban development machine (Burckhardt, 1996).

There have been manifestations of the machine logic in ancient Greek civilization that the most important are:

• Colonial movement, according to the Greek population and their high population growth rate, their settlement centers were facing a problem of food supply so to avoid the pressure of the population growth, the immigrant groups were sent to other places to build other cities in other parts of the Mediterranean (Morris, 1995: 39).

• The dual-core evolution, in this way, regardless of the extent of population, two distinct urban cores for the city have been considered. Acropolis as a religious center and Agora as the heart of the city. Though primarily in small towns, there is no need to several cores, but this principle has been respected as a structural factor in most Greek cities.

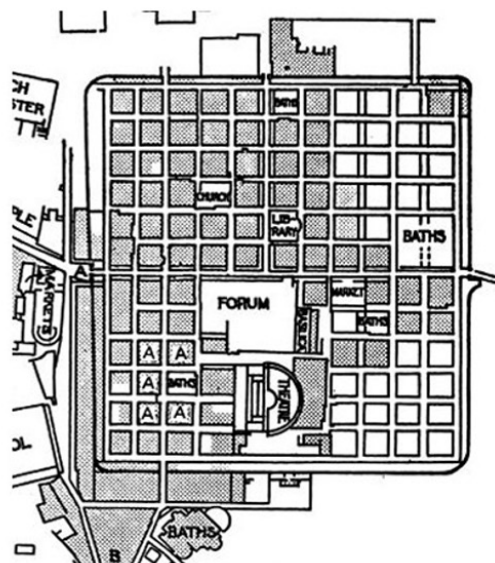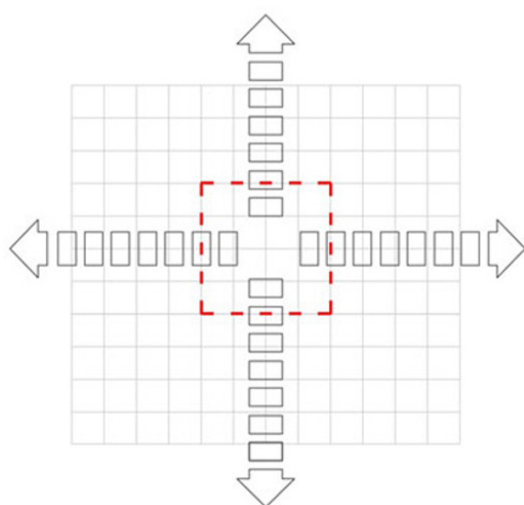• Using the checkered grid network as a systematic

Fig.4. Castermetation diagram and plan of Timgad. Source: Morris, 1994: 81.

manner to organize the cities.

Given that these three approaches has been almost employed as instructions for building all the Greek city-states, therefore we can consider these three laws as a machine used by the Greeks for urban development. Romans established thousands of military confinement camps called Caster to rule and preserve the vast area of their kingdom, these camps were built exactly according to the rules for Caster with checkered grid structure and pale. A lot of Caster created the foundations of sustainable cities which are now known as the major cities of Europe. The system forming the city in this method was consisted of two perpendicular streets of Decomanus and Cardo and forum on one of the corners was formed at the intersection of Decomanus and Cardo (Morris, 1994: 61). Insula that formed the building blocks were created by the intersection of minor roads and this arrangement provides the checkered grid structure of the city. Unlike other military constructions casters were not built to defend, but also were designed to attack, for this reason, they were founded at the confluence of roads and crossing rivers. Although the Romans may have not believed to a mechanized thinking for creating the idea of city constructions, but investigating the residual of remained cities, "Castermetation" can be recognized by its own laws as a machine forming the city in terms of physical approach (Fig. 4).

With the arrival of the Middle Ages and the growing ascendancy of Christianity and the conditions governing the borders and regimes were changed. The impact of incoherence in these cases, directly affected urban structures so that in some cases reduced tendency to urbanization and enthusiasm of constructing a new bio-centers were vanished. Therefore the structural system of a developed sector cannot be recognized to build cities in this period of time. However, elementary instructions for placing the villages, residential layout and connecting arteries were used sporadically in some areas. For example, the distance criteria in England's villages are not based on the calculation of farmland or etc.,

but also it was based on the distance between the two churches in every village and this amount is between 1 and 1.2 miles (Morris, 1996: 116).

Perhaps the most important factors forming the organic medieval cities in Europe have been territory and the way of communication. These two factors together with the natural terrain limit set out the form organic cities. From the perspective of Paul Zucker, except Bastides built in France and England and in the new knights' city, organization of city will not be considered and understood by medieval manufacturers. The formation system of Bastides had mostly military purposes, including a checkered grid network that were given to residents with the trick of a piece of land within Bastide and a piece of agricultural land out. Distance between any two buildings should be respected at 10-inch that will prevent the spread of fire and sewers were flowing in that distance (Morris, 1996: 136).

Despite the conditions described in the 12th century and in small-scale southern Europe, including Germany and Switzerland, 11 cities were founded by dukes of Zahringer who were rulers of that region, and certain conditions were prevailing in their construction. These rules included eight main articles and several structural acts and even the ratios and width of the passages and details were also covered, including the cities of Zurich and Berne (Hager, 1966).

Coordinating design and architecture principles of the spaces around them can be considered as a tool for renaissance urban development to complement each other and create a symphonic structure. In renaissance urban development three important elements of the main direct street, areas with checkered grid network and closed spaces were considered, renaissance spatial arrangement tends to internal and cellular balance, the result of this tendency was spaced without mobility and its solutions was developed with the axial symmetry, obstruction of sights and perspective with monuments and memorials, the use of a single facade design and respecting perspective. Hence the use of these three tricks in order to achieve
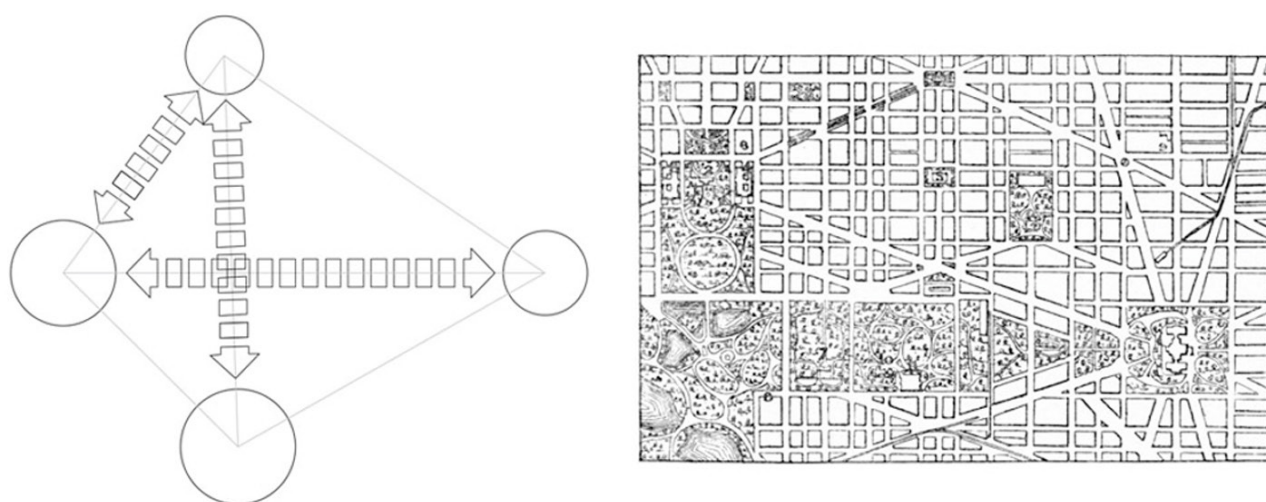
Fig.5. Baroque urban machine diagram and Part of the city map of Washington. Source: Morris, 1994: 376.

balance within the spaces can be introduced to the renaissance spaces as a frequent model for the structure of the sector.

Unlike the case of the renaissance the baroque's city has a significant and oriented status and baroque's city with direct and oriented impact, force the user to have mobility. The creation of never-ending scenery and magnificent scale where baroque's aim in urban designing and this important issue was followed by creating direct and long ways in the urban context, at the end of these paths where were the main streets of the city, there were extreme squares with monuments which are providing the glorious sense. The baroque urban development machine may be called the direct path and square, these specifications have been clearly repeated in the majority of baroque cities in various forms. An obvious example of this approach can be observed in the design of Washington, DC presented by L'Enfant inspiring by the ideas of Jefferson President of America (Fig. 5).

Post-baroque era and the industrial revolution can be divided into two periods, from 1750 to 1850 as idealism and urban reformation period, according to the summary of its properties, and 1850 to 1930 as technology-oriented and expansionism period (Habib, 2012). The main feature of this period was its urbanism surprise and its product, i.e. city against the early changes that did not fit with the

speed of the versatility of the city structure. Because of facing with this volume of change, the structure of the dominant sector in this period to form the structure of the cities cannot be enumerated, the idea for the formation of city structure has been combination of past patterns and emerging tools such as urban planning and structuring and cross-sectional measures, in some cases strengthened it. In paragraph 74 of the Charter of Athens was prepared in 1933: although the cities are in a constant state of transformation, contrary to what was specified by technical circles, their development is performed without precision and control and without taking into account the principles of contemporary urbanism (Le Corbusier, 2003: 160).

The period between 1930 and 1950 is known as holism era. The hypothesis test discussion was raised during this period and then rationalism thoughts prevalent in pre-development projects and urban landscaping in the heart of comprehensive development projects in cities were developed. Zoning regulations and visual order imposed by the rules of spatial resolution and density and occupancy levels can be considered as regulatory tools in the urban structure in this period (Habib, 2012: 171).

With the increasing inefficiency of a comprehensive approach to the city and urban development and increased attention to urban management, plans came

out of comprehensive state and were presented and implemented in the form of cross-sectional designs but in a strategic framework. The period between 1950 and 1980 was called the design process and relativism period (Habib, 2012: 177). According to the method-oriented theories and process-centric, urban development was a new tools with leading and controlling the constructions with a legal, financial and administrative context which had been achieved seeking to create a deep understanding of the problems and the complexity of the city. Public spaces, trails, community centers, beautifying the landscape, lighting and other products of the structural design in this period is produced by the birth of the concept of citizen participation in the city. With this interpretation, the machine considered during this period can be called a process, each subject in the urbanism especially urban landscape, is solved through the process.

The last two decades of the 20th century witnessed major changes in the way of designing the cities. Urban designs with their process with any trend, previously provided only by the experts in this area and there was no position for the users' comment. Hence the urban management relying on interaction provided the conditions for entering the user's viewpoints into urban projects under the supervision of experts. This comprehensive tool which is in line with the collective wisdom can be described as a machine that will solve city's most complex equations simply, considering its variables in the diagnosis and prediction stage (Table 2).

The notable point that could be mentioned in the assessment of retrieved machines is applying two or more machines simultaneously. Use of checkered grid in many different civilizations and cellular balance in baroque and its descendants is a good example for this claim.

The 20th-century urban machines have been applied either together or in order to complete each other.

Table. 2. Retrieved machines for some historical eras and its attributes. Source: authors.

Source	Attribute	Retrieved machine	Historical era
(Morris, 2002:39)	Colonial development- dual core evolution- grid pattern	Colonial expansion	Greek civilization
(Morris, 2002:61)	Perpendicular streets- forming a forum besides the corner of perpendicular streets- grid pattern	Castermetation	Roman civilization
(Hager, 1966)	Undocumented rules	----	Medieval age
(pakzaad, 2010:346)	Symmetrical axis- Blocking scenes and perspectives with sculpture- repeatable facade pattern	Cellular balance	Renaissance
(pakzaad, 2010:405)	Endless perspective& Magnificent scale	Square and straight path	Baroque
(Le Corbusier, 2003)	Baroque standards with effects of new life style	----	Post- baroque & industrial revolution
(Habib, 2012:171)	Urban refinement- urban planning	Zoning	1930-1950
(Habib, 2012:171)	Focus on Urban landscape: public areas, pathway, Neighborhood Center, lightening ,	Process	1950-1980
Friedman& Borning,) (2008	Pluralism, participation, interactivity and sustainability	Interaction	1980-2000
(Lim, 2006:14)	Impact of the city as the space between man, matter and information	Technological Synthesis	yet 2000-

Conclusions

This research proved the accuracy of the hypothesis that expressed in the research problem section. Urban machines have been existing and used in different historical eras, although its users did not aware of them completely.

By clarifying the machine definition, it could be said that the urban machine is a self-consistent, comprehensive, fast and repeatable mechanism that has the capability to respond the wide range of urban problems. Feedback ability from the environment updates the logic and the product of the machine and make it flexible. It should be accepted that each retrieved machine that presented in table 2 covers the limited part of urban problems according to their logic. Changing the nature of urban machines from physical form provider to theoretical adviser in the current century seems very important. This topic shows the flexibility of the machine structures and their logic versus environment variables. The possibility of applying two or more machines simultaneously is the other feature of this structure that improves its capabilities. Recognition and application of suitable machine thought, causes solutions obtained to be update and efficient, on the other hand, in the process of providing and recognizing the machines mentioned which its specifications and requirements have been considered, responses compared to conventional designs will have better quality. Excellence in the use of machines is in the relative prediction of the characteristics of their products, repeatability of machining process enables analysis of previous results with similar conditions and this important issue is very effective to get a reliable prediction of the future. Another advantage of this method is high speed procedure in comparison with other methods. Thus, this attitude, even if is not used as the dominant idea for the formation of cities, also has the ability to operate in line with current trends which nowadays is applying as the technological synthesis. According to results, comparative assessment of machines are comprehensive logic, repeatability, rapidity, predictability, reliability of results. Clarifying the framework of this mechanism, that the machine name has been assigned to it, it is recommended that in order to create a machine or machines required for contemporary urbanism, coherent researches are needed to be conducted.

Endnote
1. Word of a machine in this article refers to the rules or practical traditions which when had been founded, can create a product without a creator. Eisenman and Koolhaas both used this word to describe their theory.

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