

# Analysis of Visual Impacts in Compact City's Form

(Based on Lynch's cognition theory)

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**ABSTRACT:** Desired physical form of cities has been noticeable since the beginning of urbanization, from old patterns of early civilizations to the latest urbanism's theories, which offered to build better cities. The opinions in recent decades have expressed that compact physical form of cities is a better form than sprawl form to achieve urban sustainability. The form of the city is the embodiment of its physical form so in compact and sprawl form of city, it will be created various visual effects for the residents. In this paper, visual impacts of cities' form, which it caused by compression of their forms, examined with utilizing method of content analysis of texts. For this purpose, review the comments, which presented in the form of city, proving that the more compression the city is desirable for its better form. Among these theories, we used the elements of "Lynch's" theory for a better cognition of the city. Finally, this article shows the desirability of the compact physical form of cities for achieving better cognition of its form.

**Keywords:** *Compact form, Visual impact, Physical form, Urban form*

## INTRODUCTION

The topic of form and related theories has been discussed also has been interested in architecture and urbanism. The comments about form vary and cover a wide range and even have the opposite approach. Mies van der Rohe negates the existence of form lonely: "It is not the goal of act, but the result of it". He sees the form as a goal as formalism, and rejected it. On the other hand, Alexander believes that form is ultimate goal of the design (Habib, 2009). He says: "The ultimate object of design is form. The reason that iron filings placed in a magnificent field exhibit a pattern –or have form, as we say-is that the field they are in is not homogeneous. If the world were totally regular and homogeneous, there would be no forces, and no forms" (Alexander, 1964). The city has many dimensions and different factors that may influence on the final shape of its physical form. It is because of it directly exposed to the human senses and perceptions. When we talk about the effects of urban form, it is about the effect that has the instances of the built environment is effective and legible. Some researchers distinguish between different elements of urban form and checks in each element individually (Hillier and Hanson, 2006). Others are concentrated only on physical geometry of the buildings in the city. Studies and analysis of the plan and the city is more common in qualitative researches. The term "built environment" covers both city form and land use. Since Kevin Lynch wrote A Theory of Good City Form in 1981,

little progress has made overall. Lynch concluded his book with a review of what he called 'functional' theory, having failed to rise much above it himself. Consequently, the nature of theory that emerges altogether fractured since there are few shared theoretical constructs, ideologies or paradigms. Kevin Lynch offers his own eclectic combination of aesthetic choices as to how city design should take place. Christopher Alexander's ideas are utopian, utterly impractical and require society to reinvent. Roger Trancik presents us with choices between various elegant patterns, and Hillier's models require doctoral-level mathematics to understand them. As a result, the major theorists in the discipline present us with concepts of urban form that are unrelated, largely devoid of any social content and alienated from any serious socio-economic and political base. There is no recognition, except in some rare instances, that the production of the built environment, its form and symbolic content are part of the material production of society (Cuthbert, 2006, 20). Urban design will condemn recreating potentially limitless taxonomies of essential characteristics' that began with Kevin Lynch's five discrete units of the city: paths, edges, districts, nodes and landmarks (Cuthbert, 2006, 256).

## MATERIALS AND METHODS

The desired physical form of the city has always been a concern for city planners and designers. Design of ancient towns like Kahun, Babel and Miletus is the oldest precedent of human-built cities, based on a physical form design. In

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some periods, considering shape of the city was so important that placed magical effects for some urban forms. The importance of giving attention to physical form of cities would continue in the Roman Empire, medieval and renaissance. Urban renaissance disciplines conducted according to a predetermined plan. Renaissance art and urban growth in the exact physical geometry, related with the growth of literary and scientific humanism. After the fall of the Roman Empire, the science of urban planning used as a defensive phenomenon. During the industrial revolution, innovations and utilization of coal resources provided the best conditions for the exchange of goods and people's transfer. In the early twentieth century, the modernism thought of mass production has been expression in many forms. Modernists argue, urban designers must provide a background to all life's experiences, be a coordinated experience and dimensions of their projects encompass the entire city. In the early twentieth century, the progress of physical science on the one hand, and materialism in worldview, on the other hand, led to find all city problems' treatments in the physical form. Most of theories developed under influence of spiritual geometric shapes in the Middle East, Rome, China, India and many other civilizations. Use of the location and shape of cities to strengthen the government's power, was transferred to the West, has continued until today. For example, the evolved form of Renaissance ideal cities, it is a sign of a regular mathematical world (Lynch, 1960).

Belief to the structural elements for solving problems in the city has a long history. From Paris modification by Housman, to Howard's garden cities in early last century, all of them represent emphasizing on city's problem solving by construction or modification of physical form of it (Stewart, 1981). It is difficult to separate the effects of physical and social factors. If someone wants to change the quality of the place, it is the most common that change the physical structure and social institutions. Physical construction of city is Apart from the social structure of it (Lynch, 1960).

#### **Physical form of City and Social Organization**

Understanding the relationship between the spatial structure of human settlements and social life of its inhabitants is one of the major problems of urban planning. The importance of geometry in ancient central Asia and the Far East and South America, religious communities, is more than symbolic signs, and is affected everyday life (Lynch, 1960). The study shows that indigenous cultures in the Amazon geometric pattern settlements, was crucial importance in their social organization and ethnic heritage (Levi-Strauss, 1963). Jacob also states that none of the interactions between the form and usage is special and unique. In turn, suggests that this relationship can have many forms and many factors more than the urban physical form, it depends. When Jacob proposed her theory, architectural innovation knew as a tool for treatment of economic and social problems of cities. He invited designers to check of

the complex interactions between the form and the function and she cautioned planners to know the extent of design space.

#### **Research's Framework**

Physical form of the city is a key concept for understanding and analyzing its components must be analyzed according to the type of approach. Compared to nice architecture of single buildings, contemporary urbanism seems to have less ability to create something that Ian Gray calls, "Life between Buildings": Economic and social relationships and patterns of movement that arises from the relationship between the buildings. The city has three productive factors: ideology, economy and the natural environment. Any physical shape for cities will not have without these factors. A group of scholars has put intended merely aesthetic aspects of the city. Some groups focus on functional aspects and are examined other aspects of metaphysics, mythology, metaphor and symbolic of the city. Some of the groups, considered city shape as it include only the morphology of the physical structure, functions and overall office and industrial buildings (Habib, 2009).

Initial impressions evoke an intense medieval city, whose limits are clearly visible, and where the hubbub of daily activity is confined within the city's walls. It is the product of a certain form, scale, and mix of activities. Few of the supporters of the compact city describe it in ways, which are explicit. McLaren in Compact or dispersed? Dilution is no solution discusses the benefits of high population densities in compact cities. Elkin promote the 'intensification of the use of space in the city' with higher residential densities and centralization, and they write that 'planners should aim for compactness and integration of land uses, for some degree of "self-containment"'. Newman and Kenworthy also demand more intensive land use, centralized activity and higher densities. Breheny provides an apt summary of the 'compact city' as a high-density, mixed-use city, where growth is encouraged within the boundaries of existing urban areas, but with no development beyond its periphery. Several authors describe the 'compact city' in contrast to other competing settlement patterns. Owens and Rickaby (Breheny, 1993) describe two key patterns: centralization and decentralized concentration. Breheny distinguishes between centralists, laissez-faire town crammers, and decentralists. Breheny describe five scenarios for accommodating growth: urban infill, urban extensions, key villages, multiple village extensions, and new settlements. With 'urban infill' there is the further distinction between urban intensification (higher density land use), and the reclamation of Brownfield sites (Aldous, 1992, 3). The claims for the compact city are neither self-evident nor yet convincing. The changes presently do not appeal to society, neither are they firm enough to justify any policies to base on them. The claims may be right, but they remain to date unproved. When and if, they substantiated they would form the basis for a new set of policy initiatives, which would be difficult to implement. Sustainable development often called

upon to provide the basis for the argument for the compact city. Interpreted through a concentration on environmental protection, it does not form such a basis. Until the development, aspects taken into the equation this will remain the case, and any mention of development immediately brings in economic and social dimensions. These dimensions, it is often claimed, can be handled by 'demand management', but demand management, however well intentioned, however well motivated, is of no value unless it has social, and thus political, support. (Mike Jenks et al., 1996, 68).

The concept sustainable development came into use when the World Commission for Sustainable Development used it as a central tenet in its analyses. Since that time, governments worldwide along with the UN have made sustainable development a political goal for society. Though what is included in 'sustainable development' is not clearly defined, the most classical definition says that sustainable development is the ability to "meet the needs of the present without compromising the ability of future generations to meet their own needs". Sustainable development is a global, general concept. A more concrete definition might arrive at by placing the emphasis on natural limitations. Ecologic economist, Herman Daly has expressed it this way: The main principle is to limit the human scale to a level, which, if not optimal, is at least within carrying capacity and therefore sustainable. The idea is that the scale of the economy delimited by the ecosystem's capacity for functioning as a source for the economy's investment products and as a receptacle or receiver for human waste products. Daly's thoughts form the point of departure for our images of the future. The goal is to maintain human activities and consumption within the limitations the earth's ecosystem sets and to remain at a level where the value of the natural resources left undiminished for coming generations. Social and economic aspects of sustainable development also frequently stressed. We include these as secondary conditions that may not be ignored, but ones for which it is unsuitable to formulate independent criteria.

These aspects primarily treated in the evaluations. The urban physical structures or, if you will, the urban space comprising the organizational localization pattern and spread together with available transport means join to form the physical setting in which urban residents live their lives. There are hardly any expectations that this will change, even if it is entirely possible that the energy and environmental questions on today's agenda will bring about a new overall pattern over time. However, all ideas, plans and initiatives for urban development today converge mainly towards the three perspectives sketched above: A decentralized, low-rise city; A reinforced, centralized urban structure; New mega-centers or urban cores in a polycentric city (Höjer et al., 2011).

### Urban Theories and Compact form of City

Trancik says according to the "concept of space-mass and the relationship between these two concepts", to define the minimum amount of space required is proportional to the mass. The volumetric mass of the compact urban structure can be realized. Krier uses images for definition of urban spaces that in them all walls around spaces are always continuous. The continuity compression of the surrounding tissue is minimal. Therefore, we can conclude that the more compact fabric carrier space will allow for better definition. Martin and March experiments proved that if a continuous urban spaces and urban design should be defined, allowing the use of more compact body with the same amount of infrastructure to be achieved. Martin has points of view about this: he knows better the spaces, which surrounded by the mass in the formation of cities. Bacon proposed several concepts to achieve the spatial design of cities which continuity and coherence are the most common of them. Cullen says that the space between the buildings made better-qualified life than buildings, which surround them. The Cullen's concept of space does not come true unless the physical mass surrounded and defined. Sitte's ideal physical forms can be visualized in the dense city's form of medieval towns, Renaissance squares and urban spaces. They have characterized by their compact bodies.

Table 1: Summarized topics of selected theories related to compact city's form.

| Theoretician     | Selected variables of theory related to this research   |
|------------------|---|
| Alexander        | The existence of positive urban space is entailed to have a compact and continuous urban form |
| Bacon            | Compact physical form will realize continuity and cohesion of urban form                      |
| Trancik          | Relation between Mass and space is discrete in sprawl form of cities                          |
| Jacob            | Variety and comfort is low without the density (and compactness)                              |
| Zucker           | Space definitions have Rules that is not available in the fragmented urban form               |
| Sitte            | You have to create an enclosed space for create the good physical form of the city            |
| Cullen           | The space between the buildings have higher worth of the building knows                       |
| Krier            | He considers the good city's form in an enclosed and compact form                             |
| Martin & March   | Urban spaces should be carved from compact physical mass of city                              |
| Lynch            | A clear definition and legibility of the city's image, does not happen in the urban           |
| Mumford          | Being compact in structure of city is necessary for its visual unity                          |
| Martin and March | The same area of the scattered form of modern city, can be found in the compact form          |

### Analysis Method

Cuthbert named Spiro Kostof and Kevin Lynch as those who have theories, which directly related to the physical form of cities. Kostof in his first book discusses the formation of the city's form and in the second book, named 5 elements as urban form's factors: city boundaries, city sectors, public spaces, streets, and urban presences (Cuthbert, 2006). To realize why these particular cities already have such a form, and how likely will change, we should use a methodology. Thus, analytical frameworks will offer for approach to the urban development process and its product. This view exposed by Madanipour in four approaches. First thought, is attitudes toward urban geography and architecture. Second thought, bases on the traditional urban architecture and urban morphology. Third thought, come from approaches in social science theory. Fourth thought, the need to study the physical and social contexts, come from the fact that urban fabric fixed in a particular place and Development processes done at the location with specific physical and social characteristics. According to this classification, approach to research analyzed with the combination of the first and second thoughts (Madanipour, 2007). Jones knows of the original factors: land uses, densities, transportation, and how the built environment. He says Kevin Lynch has expressed in the theory of good city form, much earlier than Brundtland Committee refers to the main factors urban sustainability (Johns, 2004). Ultimately, the subjects understood their surroundings in ways that are predictable and consistent and, in doing so, form mental maps, which contain five elements (Amoroso, 2010,10). "Paths", include the streets, sidewalks or other channels that people make use of in order to travel. "Edges" are the linear elements that not used or considered as paths by observers. These include walls, buildings and shorelines and perceived as boundaries. "Districts" are the medium to large sections of a city that distinguished by a particular character or identity. "Nodes" are the focal points and intersections, which include junctions, crossings or convergence of paths as well as places where there is a transition. Finally, "landmarks" are objects that are readily identifiable and that serve as reference points for observers, such as buildings, signs, stores or mountains. Lynch found that paths, which are identifiable, continuous and have directional quality, were the most dominant city elements for most of the people who were interviewed. In total, paths, edges, districts, nodes and landmarks are the building blocks used to make firm and differentiated visual structures within the urban environment. Lynch believed they are elements by which the city conceived. A gathering of people in a plaza or square forms a node. Neighborhoods, parks or areas create districts. "Every city has its intimate inner pattern: the streets, squares, and other openings that make buildings accessible and livable." This, of course, suggests a number of things about how each of these elements can utilize, and the relations between elements, as well as how people perceive each of the three subject cities. P46 In

general, these elements act both independently and in combination. Paths consist of any horizontal physical line of movement. In diagrams, roads often expressed as simple lines or curves when describing a city. A route is one of the easiest entities to reference visually. Edges can further defined as barriers between one section of the city and another, such as shorelines, walls, or edges of different developments (Amoroso, 2010, 48).

### RESULTS AND DISCUSSION

In this section analysis of visual characteristics in the compact city will do based on Lynch's theory in urban form. *The Image of the City* was groundbreaking not because it sought legibility, but because it recognized that such legibility could only ever be an 'open-ended order' (Lynch, 1960, 6). Lynch's desire for a form of urban planning that would use the concept of legibility to rebuild the city in such a way that its 'shape, color or arrangement' would 'facilitate the making of vividly identified, powerfully structured, highly useful mental images of the environment' (Lynch, 1960, 10) was also crucially recognition of the variable and mobile nature of city images. 'While one man may recognize a street by its brick pavement,' Lynch concedes, 'another will remember its sweeping curve, and a third will have located the minor landmarks along its length' (Lindner, 2006). Lynch tried to identify a set of markers, of positioning elements that might transform urban experience into a modern version of the traditional small town, with its squares, towers, identifiable monuments, and memorable street patterns. Echoing Sitte's complaints against the agoraphobic Ringstrasse of Vienna in 1898, Lynch cited psychologists, including Pierre Jaccard, in support of his position that "orientation" in the "overt chaos of the modern city" was a fundamental constituent of good city planning (Vidler, 2000). We cannot pick any one density as "best". Below a certain point, acute difficulties of physical and social communication appear; above another point come inescapable problems of congestion. The "grain" of a medieval city was relatively fine and sharp. Besides size, density and grain, there is the matter of the shape of cities. Even the silhouette of a city tells us a great deal about its living quality. The old cities usually were roughly circular or rectangular in outline, with a sharp boundary commonly marked by a wall (Lynch, 1981). Lynch's project sits in the middle ground of the post-war urban design discourse that, in one way or another, sought to bring social, subjective, and psychological themes to bear on more technical or formal conceptions of the city. Lynch's concern for socio-psychological consequences of urban infrastructures and forms suggests certain affinities with Situations psycho-geographic of the 1950s. However, his restrained academic approach eschews the radical aura and alter-potentialities of that project. In terms of his contemporaries, Lynch might, on the one hand, be contrasted with a figure such as Aldo van Eyck who – drawing inspiration directly from the Situations avant-garde – formulated a theory of interrelated socio-psychological 'forms' and

architectural 'counter-forms'. On the other hand, he might align with someone like Gordon Cullen, who promulgated the notion of townscape as an 'art of relationship' activated by the peripatetic gaze of urban subjects. Lynch (like Cullen) pitched his work as moderate, reasonable, and systematic. His openly determinist attitudes towards architectural and urban research gave his work a strong programmatic and operational thrust. So much so that he suggests the viability of a cognitive map can be measured by 'the ease with which [a city's] parts can be recognized and can be organized into a coherent pattern', the 'vividness and coherence' of its form, and ultimately its 'sense of beauty' (Lynch 1960, 2-3, 199). The aesthetic character of Lynch's project is also given an empirical and social scientific dimension. Lynch gathered data from field observation and interviews with inhabitants, commuters, and shoppers in the central districts of three North American cities. The field data then cross-referenced with urban morphological information derived from conventional street maps and aerial photographs, and street-level information through photographs of specified urban scenes and views. This diverse material was the basis for the development of 'diagrammatic representations' (Lynch, 1960, 16). Significantly, Lynch did not conceive cognitive maps as simply the graphic tracings of pre-existing and static urban forms, but foresaw the possibility of shaping those forms to render them amenable to being mapped cognitively. 'Our thesis,' Lynch insisted, 'is that we are now able to develop our image of the environment by operation on the external physical shape as well as by an internal learning process' (Ibid, 12). Lynch's maps (his diagrammatic representations), then, were tools with which to diagnose existing urban forms and to prescribe better – coherent, legible, navigable, beautiful – urban forms (Stephen Cairns, 2006). The scale less uniformity, aesthetic poverty, and general vulgarity of "sprawl-city" are the reification of futureless frenzy. The increasing rarity and exponential "costs" of fossil and nuclear fuels will in the coming decades enforce and return to ecological technology, to muscle-power economies, and to traditional settlement patterns, relying essentially on local energy resources. P291. An urban quarter should be rounded in shape and should not sprawl nor splash. In general, the feeling of security in public spaces increases with the circulatory efficiency and density of the street pattern (Krier and Thadani, 2009). He describes attributes for each of the factors shaping the city. In this section, the attributes, examined with text content analysis techniques. In the purpose of this study, the properties of the compact city will compare.

**Path:** Lynch's definitions: Not only must specify, but also should be continued continuity to support public for their move easy to set this character. **Analysis:** Roads, the lines are filed within two points of the city scale. Continuation of the road in this process is one-dimensional in which scale. In Road two-dimensional maps can be.

However, in Perception scale observer must conceive in three dimensions. Whatever the definition of, three-dimensional




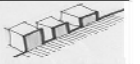
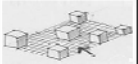





volume around it is stronger, better defined, and the persistence and determination to move the observer would be easier. This is possible in continuous and compact physical forms in which are derived Roads. **Edge:** Lynch's definitions: Edges, in the form of the city are detected as an ancillary references. Strongest edges cannot only seen immediately, but have a continuous form. **Analysis:** Lynch's definitions: He knows an edge like the linear factor and it usually considered it as the border between the two parts. Means it need the interface has two surfaces, for the creation. Therefore, to define a stronger edge, surfaces causing the edges have to be continuous. The surfaces can be a surface in different boundaries. Such crossroads between surfaces in physical volumes, in which case the continuity edge will lie in continues form. It does not appear continuity in Fragmented urban fabric **Pattern.** **District:** Lynch's definitions: Part of the city that has similar characteristics and an observer practically be able to enter. **Analysis:** It seems that the most important physical characteristics for district which Lynch that can observer is able to enter inside it and understand the process. Homogeneity and distinguishing are characteristics that define a neighborhood than others. To create a sense of Entry to district for observer, requires sufficient amounts of mass in the urban fabric. In line with the Lynch's definitions, the physical mass of district are more interconnected, the difference would be more obvious than in other districts. **Compression** of the physical urban fabric, it makes it possible. **Node:** Lynch's definitions: Nodes are important locations in the city. They formed at the junction of roads or particular features forms. **Analysis:** What is the definition of Lynch nodes are focal points.

In many cases, are formed in the end and first of paths or roads or intersections. In this case, the analysis carried out in various ways, nodes related to better define the physical mass of the ways will be more consistent. In other words, if the mass of the physical nodes consistent, clearly it would be more definable. **Landmarks:** Lynch's definitions: Elements of cities that are observe outside of the observer sight. Have different scales. People rely on them, know city's map. They are in conflict with the surrounding fabric. **Analysis:** The defining feature of urban landmarks, these factors of the city's shape, less dependent on the analytical approach desired. Independent signals from their surrounding fabric and even contradictory, no dependence of the physical form. The continuity of the city form will not affect to better define these factors in the city. These analyses visualized in Table 2.

## CONCLUSION

The result of the analysis carried out based of Lynch's constructive theory in urban form and cognition of city images, showed that better definition and achievement to these characteristic factors, need to have a continuous urban physical form in compact urban pattern. Lynch, consciously considers importance of continuity in the form of city. In

Table 2: Visualized Analysis of Lynch's city form factors in compact urban form

| Urban form factors based on Lynch's theory | Factor,s specifications  | Factors STATUS in compact form of city   | Visualize Factors STATUS in city  |   |
|--|--|--|---|---|
|  |  |  | Compact form  | Sprawl form   |
| Path                                       | Must be specified Should be continued.Observer direction can determine by hts continuing.  | Continuation is clearer in the compact form of city.<br>Could create more continues paths.   |  |  |
| Edge                                       | It is important factor in the form of city, there are borders of two factors. There should be seen immediately and must have a continues form. | Since they are bordering on the surfaces, continuity in a compact form creates continuous edge.  |  |  |
| District                                   | It must be homogeneous and distinct from other districts.<br>The observers must feel a sense of arrival.                                       | Dense physical body makes deeper sense to distinguish.   |  |  |
| Node                                       | They are center of attention in the fabric of the city.<br>They are formed mainly in the way.  | According to the analysis which be done, roads in compact and continuous forms will be better defined, so nodes on their intersections will be better defined too. |  |  |
| Landmark                                   | Can be seen only from the outside.In contrast with the surrounding urban fabric.   | Factors characteristics showed that has no direct dependence on this variable.   |  |  |

another part of his book, summarizes form's qualitative factors in 10 which continuity is one of them. His characterization of this factor expressed as follows: Continuity of Edge or city facades, repetition of elements from the city's form of the whole form of the city to create the rhythm, the harmony of similar facades, intuitive understanding of the physical aspects of a city and can easily lead to identity for the city. Forms shall design so that the various components of the city linked together like a string constan. In addition, the coherence and relevance of the night or day, winter or summer, far or near, the feeling is, whether it is static or moving observer, considered accurate or less. Finally, we can conclude denser and more compact urban physical form can be a feature of Lynch's theory than urban sprawl, in order to provide better legibility and better physical form the city.

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