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Quest for the Optimal Built Environment (Traditional or Modern) Through the Perspective of the Kaplan Model

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ABSTRACT

The field of environmental psychology is used in this study to help advance discussion among experts worldwide on the benefits and drawbacks of traditional and modern built environments. This research article uses the model given by Kaplan to prefer one environment over the other by taking case study sites from Islamabad and Rawalpindi cities of Pakistan as examples of modern and traditional built environments, respectively. Kaplan's model suggests that the four information variables; complexity, legibility, Mystery, and Coherence, can inform the users' preferences about the environment. The study aims to distinguish between the function and impression of traditional and modern built environments through a qualitative approach. It is concluded that the traditional built environment has merits over the modern built environment. The study calls on further research on the subject matter instead of blind following the modern built environment as the only solution in the case of Pakistan.

***Keywords*:** Built environment, modern, traditional, Kaplan model

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INTRODUCTION

According to Rapoport (1982), a built environment is an artificial area that offers a series of indications that "trigger behavior," so creating a connection between people and their environment (Chay, 2015). Traditional or modern, are two schools of thought that produce man-made built environments. There is now a debate among researchers worldwide about

the merits and drawbacks of traditional and modern planning approaches to evaluate which should be used for the benefit of the community (Sharifi & Murayama, 2013).

The process of determining whether an environment is favorable or unfavorable is complicated. Nevertheless, it is crucial for behaviour prediction. On a broad scale, people choose and engage with situations they assess well and avoid environments they do not. The first query has been addressed by environmental psychologists using a range of operational definitions. A favorable evaluation, for instance, can be interpreted as a preference in some contexts over others, as a cognitive assessment of beauty, or as a pleasant dynamic response to the surroundings. Each method has discovered various yet connected physical environment characteristics influencing evaluative reactions. In terms of stress reduction, enhanced cognitive and emotional functioning, and the formation of identity, efficacy, and meaning, there is a substantial body of work on the environmental determinants of human psychological well-being and how they are affected, the layout of homes and other structures, and interactions with the surrounding environment (Bechtel & Churchman, 2003; Clayton & Myers, 2015; R. Kaplan, Kaplan, & Brown, 1989; R. Kaplan, Kaplan, & Ryan, 1998; Scannell & Gifford, 2014).

The mystery/complexity/legibility/coherence model of Rachel and Stephen Kaplan (1989) is one of the most extensively researched models in environmental psychology. According to this, people's basic needs in environments will be comprehending and exploring. Additionally, these requirements may apply to what is immediately apparent or to what may be apparent if one travels to a different location. The four factors were referred to as "informational variables." The informative variables are categorized as Coherence (instant understanding), complexity (immediate exploration), legibility (inferred knowledge), and mystery (inferred exploration) (Stamps III, 2004). As potential determinants of environmental preferences, all four informative factors were proposed (R. Kaplan et al., 1998). According to Kaplan's thesis, people have two different types of fundamental desires regarding their surroundings: a need to comprehend and a desire to explore. Together, understanding and exploration create the framework for his preference matrix, which explains why people would prefer and select certain environments over others based on above mentioned four factors.

MATERIALS AND METHODS

Based on the question, which place would you rather prefer? The nature of the entire study process is exploratory. A thorough assessment of the literature on various theoretical ideas to decide the environmental evaluation and preferences using the subject of Environmental psychology. The work of Kaplan and colleagues is decided as a base for conducting the case study.

Since the study infers the pre-established definition and theories about the built environment evaluation, it suggests a deductive way to investigate the research question. Visual surveys and spatial analysis of existing architectural spaces in connection to human senses are conducted to discover different tiers of information in the built environment. The case studies are chosen from the city of Islamabad and the old city of Rawalpindi as examples of Modern and traditional built environments, respectively. Maps are obtained from respective offices of CDA and RDA and through websites. Frequent visits are made to the sites to take photographs. Actual on-site measurements are taken to draw drawings

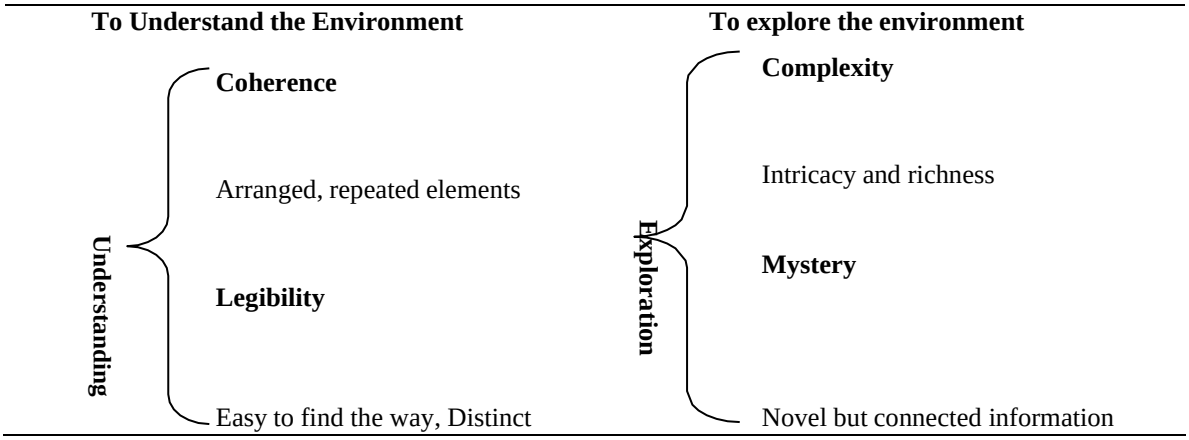
using AutoCAD. Based on the variables taken from the Kaplan model (1989), the case studies, traditional and Modern built environments are investigated. Using the infographics collected from case study sites, results are described and discussed.

Choosing a theoretical method to study

To answer the question, which place would you rather prefer? This study refers to Kaplan's works. Kaplan (1975) created a model to forecast people's preferences for particular environments over others. The informative content of those environments is assumed to be a key aspect of environmental choice in this model, establishing a connection between environmental cognition and evaluation. Similarly, Kaplan (1979) proposed that one basis for preferences is the capacity of the person to "make sense" of the environment and the degree to which the environment includes the person by encouraging them to strive to understand it.

The four key elements affecting human preferences, Coherence, legibility, complexity, and Mystery, were recognized by Kaplan et al. (1989) and used to evaluate the Traditional and modern city environment in this article. There is a further elaboration of above mentioned four variables. Understanding the environment includes, coherence and legibility, while exploration of certain environments involves complexity and mystery. Both understanding and exploration are important for an interesting environment. Since chaotic and unoriented environments lead to stressful experiences (Salat, Bourdic, & Nowacki, 2010). In addition, Wild environments may induce undesirable emotional experiences (Andrews & Gatersleben, 2010; Herzog, Maguire, & Nebel, 2003). However, the environments, are too easy to understand and offer low exploration is boring to experience (Davis & Gatersleben, 2013; Fredrickson & Anderson, 1999; Ryan & Bernett, 2016; Williams & Harvey, 2001). Therefore, in this study Kaplan model is used that carries both variables, Understanding and exploration (Table 1)

Four key elements / variables



Source: (R. Kaplan et al., 1998)

Case Studies

The city of Islamabad and the old city of Rawalpindi are examples of Modern and traditional built environments, respectively. *Islamabad,* the Capital city is the best example of a Post-industrial Modern City. The Islamabad is located at an elevation of 1800 feet on the edge of the Potohar plateau. The city is built on level, compacted beds of gravelly sand, but erosion has created deep gullies with high vertical drops that make constructing roads more challenging. A three-person Capital Development Authority was established in 1960. They selected Doxiades, a Greek engineer and town planner, to present a proposal. Doxiades envisioned a large linear city whose length would run at the foot of the Margala Hills for around ten miles in a small wedge-shaped zone. This design aimed to have a skyline that sloped uniformly from the big public buildings in the east to the single-story dwellings at the city's westernmost point (Prentice, 1966).The plan based on the modern notion of segregated activities has a commercial sector, a zone for light industry, a zone for heavy industrial, and an administrative one. There was a national park beyond the city. Streets were supposed to be uniformly straight and arranged in a rectangular arrangement (Prentice, 1966) (Fig 1).

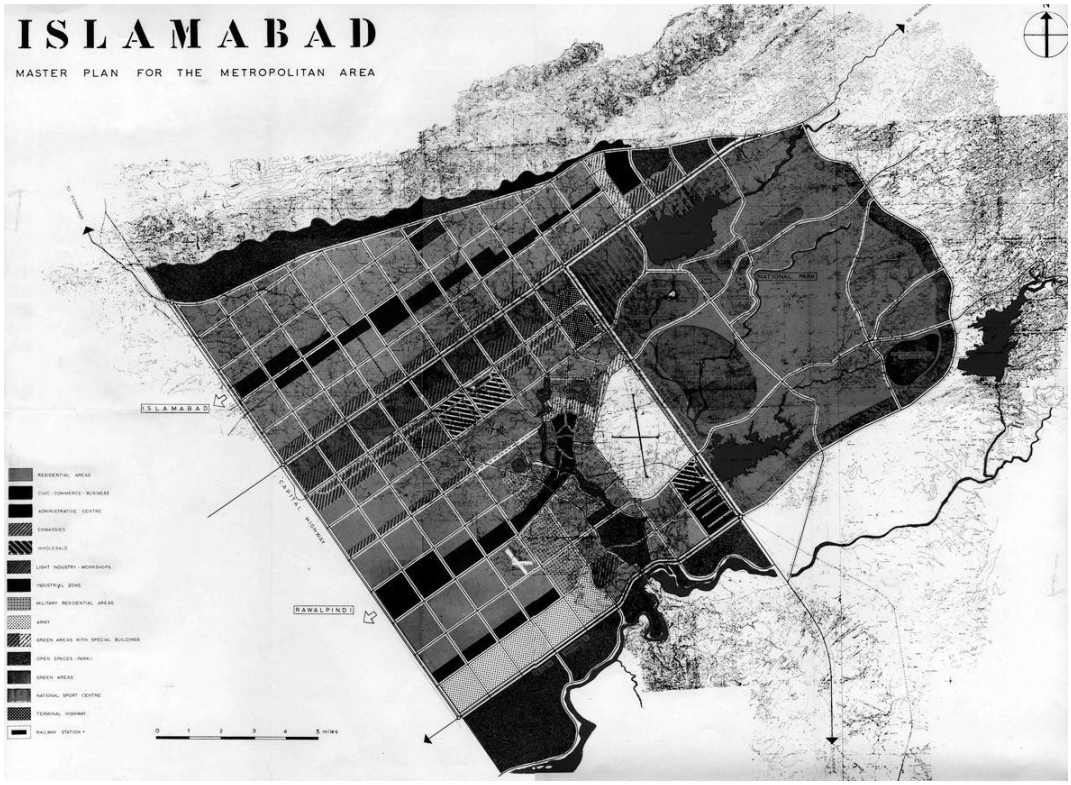


Figure 1. Islamabad planning in a gridiron pattern. Source: (Khan & Vandal, 2011)

Rawalpindi

Rawalpindi is located near the northernmost point of the Potohar Plateau, with the Salt Range to the east and the Margala foothills of the outer Himalayas to the north. Archaeological relics evidence the antiquity of Rawalpindi from around 500 BCE (Ali, 2004). The city operated as a Ghakkar kingdom that stretched from the Indus River to the

Jhelum River while being connected to the Mughal Empire. It is known that Rawalpindi served as the Mughal empire's administrative center, and the Jahangir nama makes mention of Emperor Jahangir visiting the village of Rawalpindi (Malik, 2012). Between 1770 and 1805, the Sikhs welcomed Hindu, Jain, and Parsi traders from places in Punjab to live and trade in Rawalpindi, which at the time had a population of less than 300 (Ali, 2004). City planning has concerns for human senses like other pre-colonial traditional cities. It has mixed-use planning with meandering streets without any set laws. It has a dense organic street pattern juxtaposing Mohallas and bazaars (Rogers, Zhou, & van Oers, 2018).

Case study sites

All sectors in Islamabad exhibit similar planning, further divided into four subsectors and a Markaz (shopping area). F-10 sector is an example of Modern planning in this study, and the Bhabhra bazaar from Rawalpindi (traditional built environment) is a case study site.

Figure 2. (a) F-10 with Grid Iron Pattern (b) Bhabhra with the organic meandering street pattern

RESULTS

Both of the case study sites are investigated using Kaplan's four variables: coherence, legibility, complexity, and mystery

Coherence

According to Kaplan (1989), Coherence means the instant understanding of an area. An environment is said to be coherent when all of its pieces effectively complement one another and serve their intended purposes of forming Coherence and harmony. Streets, stores, offices, homes,

Comparison of Coherence (Understanding) between Traditional and Modern Built Environment

F-10 (Modern)	Bhabhra(Traditional)
	
Prediction is easy with the same straight and regular roads	The pattern of meandering and irregular is the same throughout the traditional city, making it predictable since there is consistency of inconsistency
Exclusive use of roads for vehicles. This pattern is coherent throughout the F-10	Inclusive use of streets that pedestrians, vehicles, and carts use with a dominance of pedestrians. This pattern is coherent throughout the Bhabhra bazaar.
The scene in F-10 "hangs together", having redundant components, textures, and structural features, making understanding much easier. It is all Modern	The scene in Bhabhra too "hangs together" having redundant components, textures, and structural features, making understanding much easier. It is all traditional.
Modern Coherence is understandable for insiders and outsiders equally	Traditional Coherence is understandable for insiders but difficult to comprehend for outsiders

Pedestrian zones, green spaces, plazas, and car parks, among other elements of the urban fabric, work together to create a successful city, fostering an effective, livable, and psychologically nourishing environment for people. Moreover, the degree to which the scene "hangs together" is known as Coherence. Having redundant components, textures, and structural features can make understanding much easier. These elements support what could be called "micro-prediction," as they enable one to make predictions from one area of a scene to another (S. Kaplan & Wendt, 1972).

Moreover, A system must generate a complex, interconnected whole using general rules to have geometrical Coherence (Salingaros, 1998). Geometric Coherence is a distinguishable

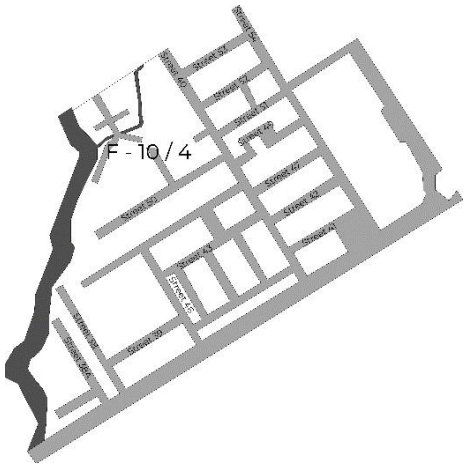
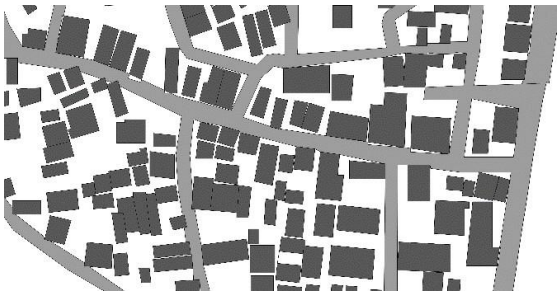
characteristic that unites the city via the form and is a necessary condition for the vibrancy of the urban fabric. The fundamental concept is straightforward: a city is a flexible network of pathways (Salingaros, 1998). The traditional city has a flexible network for different types of users but is inflexible to the speed of automobiles. On the contrary, F-10 is less flexible for all other users but very flexible for the speed of vehicles.

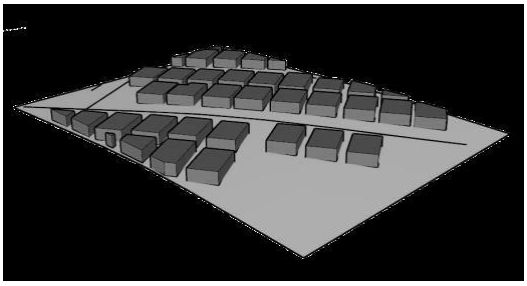
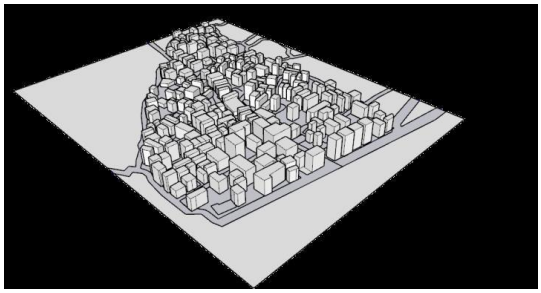
Legibility

Although every urban theorist has a different viewpoint, urban legibility is considered extremely significant when studying urban features. The most crucial idea in spatial perception is legibility, which implies that cities should be simple to recognize and relate to. In reality, it is assumed that a city is a text that can be read or that may be rendered illegible if it cannot be read. Citizens should be able to locate themselves in public areas and feel safe and secure there, thanks to legibility (Lynch, 1960). It is predicting one's ability to function, find their way around, and the simplicity of creating a mental map (S. Kaplan & Wendt, 1972).

Legibility describes elements that provide context for the scene, perhaps by guiding viewers in the right direction or assisting them in creating mental maps (Ryan & Bernett, 2016). The gridiron pattern in F-10 makes the layout simple and easy to understand and guide even for newcomers. Similarly, the predictability of the F-10 area is higher than in Bhabhra in Rawalpindi due to the simplicity of creating a mental map. On the contrary, the organic meandering pattern of a traditional city is complex and not comprehendible for everyone, particularly the newcomers.

Comparison of Legibility (Understanding) between Traditional and Modern Built Environment

F-10 (Modern)	Bhabhra(Traditional)
	

Whereas it is 35' in F-10 with a 6' wide footpath.	Bhabra bazaar is congested as compared to f10 Markaz as the roads are quite narrow, which is 18' wide maximum.
	
The legibility in F-10 is evident through 3-d visualization. Easy to create a mental map, even for outsiders. More legible.	The Illegibility of Bhabhra bazaar is evident through 3-d visualization. Difficult to create a mental map for outsiders. Less legible.

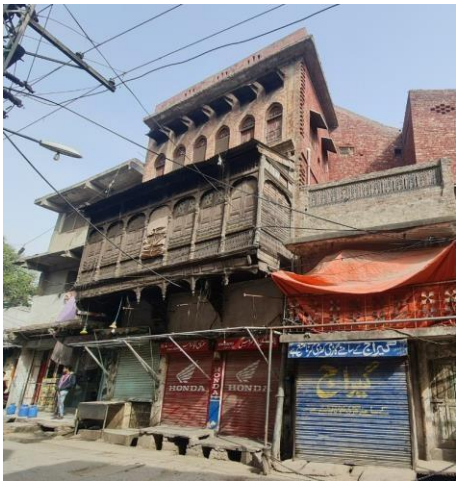
Complexity

Complexity means the variety of visual components in the scene indicates how much is happening (S. Kaplan & Wendt, 1972). Urban design complexity has been quantified in terms of information richness and diversity (R. Kaplan et al., 1989), but studies on space syntax do employ network connection as an indicator of layout complexity (Slone et al, 2016). Moreover, according to the Urban Morphology Institute, diversity and spatial distribution are two complex components (Salat et al., 2010). The objectives of these two issues are distinct, although they are closely related. Additionally, studies show that a pretty complex environment can evoke a sense of mystery, a quality that some people appreciate (Herzog & Kropscott, 2004).

The traditional city is complex in use as well as in Architectural details. Bhabhra is mixed-use with shopping on the ground floor and residences on the upper floors is a complex environment. On the contrary, in F-10, there is segregation of activities, i.e. Residential and shopping areas. F-10 Markaz serves for shopping and rests, while all four sub-sectors (F10/1, F10/2, F10.3, and F10/4) are for residential activity.

Moreover, according to Mandelbrot (Mandelbrot, 1977), the more the fractal dimension (a measure of how well an object fills the space in which it lies, the more the visual complexity. In other words, the high density will lead to high complexity. Therefore, the highly-dense traditional city is more complex than that modern.

Comparison of Complexity (Exploration) between Traditional and Modern Built Environment

F-10 (Modern)	Bhabhra (Traditional)
	
Building heights are according to CDA by-laws.	Building heights have no rule
Grid Iron Pattern adds quality of simplicity and order	Organic and meandering patterns of street add complexity to the built environment
Mostly Modern vocabulary is used in Architectural elements and details	Variety and richness of architectural elements and details
Minimalist architectural details with plain shades and windows panels	Intricate architectural details with bracketed shades, arched windows, jail work, chajjas etc.
	
Typical house in Islamabad with segregated houses.	

	Typical building in the traditional city with mixed-use. Shops are on the Ground floor, and the first floor is used as a residence.
Less complex	More complex

Mystery

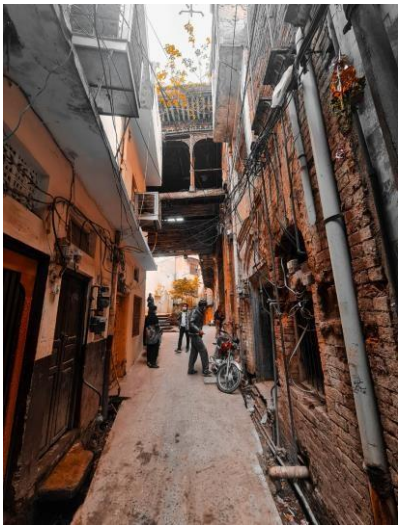
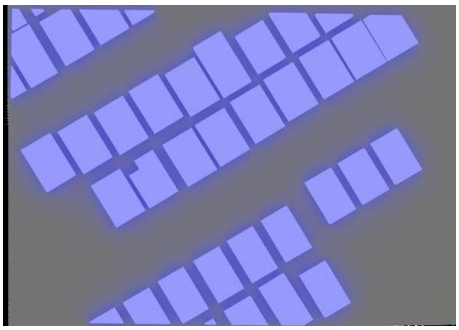
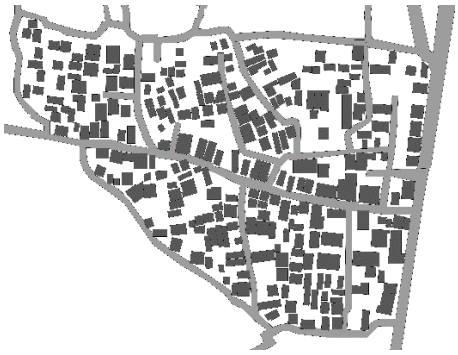
According to Lynch (Lynch, 1960), the mystery is a scene's capacity to reveal new information. Lynch makes it apparent that an urban setting must have a mysterious component to grab the user's interest (1960), describing how people adore the house of mirrors and how Boston's winding streets have a certain beauty. However, the mystery should not be about losing basic orientation and chaos (Salat et al., 2010). In contrast to other patterns like Space, Mystery requires how a person would experience a sequence of spaces rather than staging the experience from a single point or location (Ryan & Bernett, 2016). This staging experience is found in Traditional meandering streets where the other end of the street is not visible from starting point. The passer-by experiences the street in stages. This phenomenon is true for all medieval streets from Morroco, Spain, and Cordoba to the old city of Lahore and Rawalpindi. On the contrary, the Modern setting lack this staging experience due to the straight Gridiron pattern. The other end of the street is visible to the passer-by at the beginning leaving nothing to explore and no mystery.

Designers are familiar with mystery. The "denial-reward approach" technique has been applied to various environments, particularly landscape architecture. Famous examples include Frederick Law Olmsted's Prospect Park in Brooklyn, New York, and the gardens at the Katsura Imperial Villa in Kyoto, Japan. Both illustrations use curved paths, undulating hills, and trees to partially obscure structures, enticing visitors to explore the surrounding path (Ryan & Bernett, 2016). The curvilinear streets of the Traditional built Environment are best suited to create mystery rather than modern gridiron. The Sabat[1] and arched ways in meandering streets offer beauty and safety from strangers and provide an obscure way for strangers. The convoluted planning with its tiny, occasionally blind passageways that end in private courtyards and are frequently covered enhances the feeling of security and dynamic social contact along with the Mystery. Such convoluted narrow alleys, along with sabat and arched ways, are missing in F-10, thus offering less mystery.

Furthermore, in the Artificial environment (Alexander, 2013), a Planned setting would not be as persuading to continue down the path as picturesque. According to ‘urban picturesque theory’, there is a typical aesthetic of urban shape that is compatible with picturesque notions and pleasing to walkers. This aesthetic appeal may lead to an increase in pedestrian activity.

[1] a room spanning the street, with buttressing arches stretching between the walls on either side of the street to give the opposing walls structural support (Hakim, 2007).

Comparison of Mystery (Exploration) between Traditional and Modern Built Environment

F-10 (Modern)	Bhabhra (Traditional)
	
Wide street without the feeling of enclosure and mystery. No sabat or arched streets are found	The narrow street with sabat adds a feeling of enclosure and mystery
	
Plan ofF-10 sector shows the gridiron streets where the other end of the street is visible from the beginning of the street Planned thus easy to understand, leaving no mystery	Plan of Bhabhra bazaar shows the meandering streets, a modern technique to add mystery, in the traditional setting Picturesque, unplanned setting offering mystery to insiders and outsider
No mystery	High mystery

DISCUSSIONS

Kaplan (1989) created a model whose features represent the functions that built environments play in the daily lives of their residents. His four-preference matrix theory, specifically the concepts of Coherence, legibility, complexity, and mystery, helped to explain this judgment. According to Kaplan's thesis, people have two different types of fundamental desires regarding their surroundings: a need to comprehend and a desire to explore. Together, understanding and exploration create the framework for his preference matrix, which explains why people would prefer and select certain environments over others based on above mentioned four factors. Overall, they explain why some points of view are inherently compelling. Employing Kaplan's Model on the case study sites (Bhabhra Bazaar and F-10 Sector) from the cities of Rawalpindi and Islamabad, it is revealed that while certain elements took the grasp in Bhabhra, it is far more suitable to say that the modern element of legibility and coherence within Islamabad's F-7 integrates a more user-oriented trajectory.

As per (Çalışkan & B, 2017) the key indicators to gauge the coherence are consistency and proximity. Table 2 shows that both of the environments show consistency accordingly. The modern environment in the F-10 sector has modern infrastructure, modern building facades, and modern roads to accommodate modern vehicular traffic. Similarly, the traditional built environment in Bhabhra has the traditional infrastructure, traditional building facades and pathways to accommodate traditional means of transportation and pedestrians. Therefore, both environments are consistent. Although, the factor of spatial proximity in F-10 sector is not as evident as in Bhabhra where one can reach to grocery store without the need of a car or vehicle as compare F-10 sector. According to the definitions of Coherence by Kaplan& Wendt (1972), and Kaplan (1989), the traditional city has Coherence. Since it is understandable for its residents, all components of the built environment complement each other and are tightly knit (Fig 1b). The streets are narrow throughout the place, showing the Coherence concept. Due to this, harmony is produced among different people living around. The building façade and design also create Coherence. Though, outsiders find this Coherence of the traditional built environment difficult to understand. In addition, any elements that organize and provide quick information about the situation promote Coherence (Ryan & Bernett, 2016). Therefore, F-10 is coherent for the residents of F-10 and the outsiders with its gridiron pattern (Fig 1 a). Similarly, all streets are grid-iron and planned based on modern considerations, so the buildings thus coherent.

According to Salingaros (1998), the identifiable urban environment is achieved by geometrical coherence. Salingaros (1998) further argues that the geometrical coherence bears a resemblance to the traditional cities and less to the modern or the planned cities developed during the twentieth century. The geometrical coherence leads to the interconnectivity of paths which is a key factor for a successful environment (Alexander, Neis, Anninou, & King, 1987; Hillier, 1999). This interconnectivity is found in both modern and traditional built environments. However, pedestrian activity in a built environment is supported by pedestrian paths (Gehl, 1987; Hillier, 1996). This quality of the endorsement of pedestrian activity is evident in the traditional environment as compared to modern.

An environment is legible when it has related and familiar elements (Bentley, 1985; Lynch, 1960). Both environments (Bhabhra and F-10 sector) are legible according to the definition

mentioned above. Since F-10, a modern built environment, has related modern infrastructure and other elements. Similarly, Bhabhra has traditional infrastructure and all other elements. Although, the simplicity and easy-to-read and quick-to-make mental map environment (Ryan & Bernett, 2016) of F-10 due to the gridiron pattern make it more legible as compared to Bhabhra (Table 3). Like a maze, Bhabhra (traditional environment) is only legible to the residents, a clever technique to ward off enemies. But in times of armies and unions, architecture is not required to enclose the city strategically. Hence, legibility becomes major concern in this time of speed and progress. Modern life depends on vehicles, so can't be disregard this need while giving preference to one environment over another.

According to Jacob (1961), high complexity is an essential quality of living in cities, especially cities developed before the Modern era (Salingaros, 1998). Ryan & Bernett (2016) carried the argument further that Intricate or visually appealing sceneries, much like it sounds, cause complexity. Bhabhra, a traditional environment, shows the richness of Architectural details and the use of intricate elements like Jali work, arches, Jharokaas, shades with brackets, etc. This richness and intricacy are consistent throughout in traditional built environment making it aesthetically more pleasing. As per Beardsley (1958), to have an aesthetic experience, there must be an object or collection of objects on which attention is directed, a sensation that results, in some level of complexity, and unity. With a higher level of intricacy, the experience becomes more potent. But despite the complexity, there must be unity: A sense of the general providential pattern of guiding, continuity of development without gaps or dead spaces, and one thing leads to another (p.528). While, buildings in F-10 exhibit a less intricacy and minimalistic approach and Modern Architectural details like pergolas, plain windows, and parapets (Table 4).

The mystery is a great measure of viewers' preferences for outdoor scenes (Herzog, 1984; Woodcock, 1984). Mystery has long been used in landscape design by bending the pathways and high vegetations to cut the sight and persuading the user to keep on going by raising topography to hide the direct scene (Kent, 1989). The bending is apparent in a traditional street pattern where users hardly meet a straight street. However, the condition is the opposite in the modern built environment. To encounter mystery, people must move. Therefore, it is important to consider how people might approach a major object, what sensory experiences lure them into a place, and what spatial qualities will persuade them to continue down a path (Ryan & Bernett, 2016). The Traditional built Environment usually encourages walking and moving through. The mystery of the ever-changing scene and the picturesque setting would make passers-by continue down the path. While the F-10encouarges the movement through the vehicle. The passer-by would not be able to appreciate the scenery while riding an automobile in a modern built environment (Table 5).

CONCLUSION

The two factors, Legibility and Coherence, represent the extent of understandability of the Built Environment, giving more weightage to the F-10 than the traditional built Environment (Bhabhra in old city of Rawalpindi (Table 2 & 3). While the other two factors, mystery and complexity, represent the exploration-oriented environment. The study revealed that both factors are preeminently present in traditional built environments giving preference to Modern Built environments (Table 4&5). Designers use mystery and complexity techniques in contemporary times to make the environment interesting and appealing. Therefore, it isn't

easy to 100% call on one environment by knocking down the other. Though it is quite evident that blind following the modern, considering it as the only best way of creating a built environment and negating the traditional city in the past few decades might not be a wise choice. It is concluded that the traditional built environment offers lessons to learn from, to create a preferable environment. The research doesn't recommend imitating the past traditional ways but learning from the past essence. This research opens avenues for further research on the subject to decide on a preferable built-environment and to fill the void between the traditional city and a modern city without compromising on the former's heritage and the characteristics that make it what it is.

AUTHOR'S CONTRIBUTION

Yaseen A conceived the idea and managed all work from data collection to writing the manuscript. Rest of the authors have contributed equally in writing and formatting the manuscript. The authors declare no conflict of interest.

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