The Concept of Quality in Public Courtyards: Explanations and Analyses Case Study: Mausoleum of Shah Ni'mat-Allah Vali

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Abstract

Quality is a highly esoteric concept which compels theorists to offer different explanations. Based on library resources, quality can be defined as an interaction between individuals and their environment, which is caused by a set of environmental components differing in each environment. This paper studied the concept of quality in public courtyards. The Mausoleum of Shah Ni'mat-Allah Vali, which provides a reasonable setting with four distinguished public courtyards was selected as the case study. Owing to traditional patterns and frameworks of Iranian architecture, these courtyards are immensely popular amongst Iranian scholars and architecture students, and a formal imitation of this pattern is prevalent, while the qualities of such spaces are often neglected. By employing a wide literature review, the different theories regarding dimensions and components of quality in public open spaces were categorized based on the year and author. In the Delphi panel, experts narrowed down the literature review and suggested that the main dimensions are Functional, Visual and Morphological, Experiential and Perceptual, Social and Ecological, each of which has several components. These components were achieved using the Delphi method. Moreover, the authors used the analytical hierarchy process (AHP) method to understand the importance and to prioritize the dimensions and components. Furthermore, by using questionnaires and interviews, this research analyses the public courtyards of the case study. Based on the results, individuals could perceive all the proposed components and dimensions of the research and consider them while labeling a place as a high-quality environment. This highlights the fact that individuals' minds recognize the role of these components in the real-world, and consciously or unconsciously evaluating with the aim of discovering a place more pleasant, attractive, and with higher qualities.

Keywords: Public Courtyards, Architectural Quality, Public Open Space, Built Environment, Shah Ni'mat-Allah Vali Mausoleum

1. Introduction

Built environment as a part of mankind's living space is comprised of qualities that establish an interrelation between people and spaces in architecture and urban design. People and their surrounding environment usually influence each other so that there are various types of mutual interaction therebetween (Saadati, 2019). The designers configure and integrate these distinctive environmental qualities into a method to fulfill individual needs (Lang, 1987), which are highly effective in the level of human satisfaction as these fundamental attributes can influence the quality of life (Sirgy et al., 2000). Therefore, the reason that individuals consider a place to be more desirable, and hold to them for a considerable time is interpretable through the qualities offered by spaces. It is noteworthy that, the physical built environment has a constitutive role in everyday experiences (Iranmanesh & Rasooli, 2018). therefore, contemplation on the concept of "quality" in the built environment could be beneficial in the design of different projects. The concept of "quality" has a plural and multi-dimensional nature with various interpretations (Golkar, 2001:3). It is necessary to study theorists' quotes, viewpoints and introduced criterions in the very first step to achieve a meaningful and comprehensive framework for the concept of quality. This structure is crucial both for analyzing an existing place or for constructing a high-quality one.

Quality is the consequence of a set of attributes which differs in each environment. Quality and environment are an inseparable pair that are only interpretable through each other. For instance, the attributes which build up qualities of a private place is different than those of a public place, in some cases going as far as being in contradiction. This paper is authored with particular focus on public spaces. Legal ownership and boundaries can define spaces physically. some open spaces are exclusively used by one person or a few individuals, while other spaces are shared with more people, being available, or belonging, to everyone (Woolley, 2003). Public places offer tremendous value for the community and civic environments and are created for their use, benefit and enjoyment (Tibbalds, 2001). Broadly defined, public space (relates to all those components of the built and natural environment, public and private, internal and external, urban and rural, where the public has free, although not necessarily unrestricted, access (Carmona et al., 2008). The term "public" refers to the presence of individuals of different ages and cultures in a space where numerous community activities can take place (Rafieian et al., 2013). Social life is often formed in these spaces, and they are accessible to all citizens. Public interrelation and confrontations occur inevitably in public

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spaces and they can facilitate recreation, work, and commerce (Pakzad, 2004). Public open space (POS) offer a plethora of benefits to individuals and communities, such as encouraging physical activity, enhancing mental health, fostering community social cohesion, and reducing urban heat island effect (Koohsari et al., 2018).

The places that make up the public realm come in many shapes, sizes and uses. One such environment are open spaces inside public buildings, which designers introduced them as public courtyards. There are various definitons offered for courtyards, for instance, an enclosed area surrounded by a building or wall and open to the sky (Almhafdy et al., 2013). Human used the courtyard form initially in residential buildings, but later on, realizing its merits, different civilizations employed these elements in public buildings as well (Gangwar & Kaur, 2016). As an open space within a cluster or urban fabric, courtyard fulfills various functions, namely offering social and leisure applications and shaping microclimate. The significance of such a space was derived from its location in central sites within the urban fabric or building (Meir, 2000). Courtyards can be utilized as an appropriate place for promoting a natural, healing environment, which is itself used as a climatic element in some regions (Almhafdy et al., 2013; Soflaei, Shokouhian, & Mofidi Shemirani, 2016b). Based on the aforementioned studies, the purpose of this study was to elaborate the concept of quality in public courtyards. These spaces are highly of interest to the scholars and architecture students while the attributes which are incorporated in creating a high-quality courtyard are not well-defined in the literature, and hence, this research analyzes the concept of quality in public courtyards. For the purposes of this research, authors suggest a reasonable context for quality analysis. Persian traditional architecture provides a rich background with various public courtyards. Traditional central courtyards in Iran, as one of the oldest civilizations in the world, date back to 3000 BC (Edwards, 2006), and people of the civilization have used this concept for different functions (Soflaei et al., 2016a). Hence, authors choose Mausoleum of Shah Ni'mat-Allah Vali as the case study of this paper, a unique context which has four distinctive public courtyards.

Based on the aforementioned arguments, this study seeks to offer solution for the following four questions:

- What are the major dimensions and components of a high-quality public courtyard?
- Do these dimensions and components have the same importance, if not what is their order of importance or priority?
- Do these dimensions affect individual tendency to assume a public courtyard as a high-quality place?
- Do any resemblances exist between experts' viewpoints and individual judgments?

1.1. Research background

Researchers from various backgrounds and expertise have studied and analyzed the qualities of courtyards in architecture and urban fabrics, and underlined some characteristics of a courtyard perceived as high-quality. Some studies have concentrated on the social qualities and the affordances of the public courtyards. They have suggested concepts such as opportunities for sensory stimulation, socialization and meaningful activities for the people as factors involved in enhancing the quality of a public courtyard. From their views, the better the public involvement and the more social interaction shaped within in the courtyards, the higher the quality of the courtyard. The benefits of the passive engagement with the courtyard space include increased socialization, as they are also capable of providing spaces for meeting, dialogue, or relaxation, through which people will become more satisfied with the environment (Darkhani et al., 2019; László, 2018).

Furthermore, numerous studies have been performed on the climatic and environmental qualities of the courtyards. These qualities and attributes are rather related to the ecological elements, such as the extent of greenery, energy efficiency, noise control and exposure to the sunlight. According to these studies, the mentioned qualities can both improve the well-being of the individuals and also promote a place as nature-friendly, hence improving the quality of the public courtyard in the process. From this viewpoint, the quality of a public or private courtyard can be narrowed down to various energy issues and nature-friendly criterions (Zamani et al., 2018; Li et al., 2019; Rivera-Gómez et al., 2019). The positive effect of nature on well-being and the capacity of the public courtyards to increase the biodiversity of the built environment have been previously argued in various studies. A high-quality public courtyard can provide a context in which the people can spend their time in a less stressful outdoor environment and away from congested areas. It is a space where they could resort to for a while from their potentially stark environment and thus rejuvenate their minds against long working hours. These qualities of public courtyards could even have therapeutic effects on mental or physical conditions, as the utilization of such vital environments are increased even in public health complexes with the purpose of contributing to the patients' treatment process (Mat Idris et al., 2018; Kazemi & Sharif, 2020).

Moreover, in some cases, the morphology of the courtyards was the main theme for their quality assessment. Items such as geometry, area, aspect ratio and side to width proportions of the courtyards were summarized by analyzing the traditional, and transcendent public courtyards of different eras and locations. Based on these studies, these attributes have a direct influence on the aesthetic and visual qualities as well as the energy optimizations of the surrounding context, through which quality of the courtyard can be significantly improved (Soflaei et al., 2016a; Moradi Nasab, 2018; Natanian & Auer, 2020). Some studies discussed of the functional aspects of these courtyards. Courtyards can function as buffers, forming a spatial hierarchy from inside of a building to the external urban clusters, i.e. from a peaceful quiet space to the walking flow of the outside pedestrians (Almhafdy et al., 2013; Mat Idris et al., 2018). On the other hand, the semiotics and perceptual aspects of the

courtyards have been examined in various studies, the results of which revealed that well-designed courtyards, especially those with traditional and vernacular roots, can convey various meanings and concepts to the individuals, and even artists from other disciplines have embedded these perceptual effects of the courtyards in their works. Thus, public courtyards not only offer physical, social, morphological and functional attributes, but also, in a higher level, can transmit meaningful concepts which themselves have positive mental effects (Goudini et al., 2018; Goharipour, 2019).

As previously discussed, different researchers have proposed different dimensions for a high-quality courtyard. Moreover, quality is perceived as a highly plural concept with numerous aspects, all of which require detailed attentions. Therefore, it is necessary to thoroughly examine this concept, its meanings and interpretations as well as the factors involved in creating a high-quality space, which is presented in the following sections.

2. The Concept of Quality

2.1. Definitions of Quality

The term "quality" is a derived from Latin words "quālitās" and "quālitātīuus" meanings temperament, character, and disposition and also the French word "qualité" denoting nature or characteristic (Partridge, 1983: 2666). Thesauruses define quality as "the standard of something as measured against other things of a similar kind", "the degree of excellence of something", or "a distinctive attribute or characteristic possessed by someone or something" (Oxford Dictionary, 2010). Theorists from different backgrounds proposed various expressions and intellectual perceptions for the concept of "quality" and offered distinct components and frameworks for it (Latifi & Sajadzadeh, 2014: 6). Quality in daily conversations refers to positive values which stimulate approval and admiration. Quality is the consequence of a series of attributes which distinguishes different objects. These attributes could be positive or negative and, in this way, we perceive objects as being high-quality or low-quality. Judgment, evaluation, and comparison are all implied in quality (Rönn, 2011). The official definition is "the degree to which a set of inherent characteristics fulfills stated, implied or obligatory needs or expectations." 'Obligatory' refers to compliance with all laws, statutes, codes, and regulations, while 'Expectations' refers to the fact that there are also various requirements defined by the 'customer', which in architecture is the client, alongside the end users and the public, and in some cases even financial institutions (Nelson, 2006). Quality is the leading cause of differences between phenomena and could be the outcome of the object, the perception of the mind, or a mixture of both (Pakzad, 2006). Quality determines the degree of excellence, yet the challenging issue is discovering the components generating this excellence (Golkar, 2001: 5). Quality is hard to quantify, which fluctuates over broad spatial scope and could function varyingly based on the consequences of human or natural activities (Nichol & Wong, 2005). Quality is the concept of seeking to understand the essence of the person-environment relationship. In the built environment, one can explain quality as the concern of the level of congruence or dissonance between city dwellers and their urban surroundings (Pacione, 2003). Quality relies on the interrelation between exposed physical features of an environment and their comprehension and evaluation in the minds of audiences (Nasar, 1994). Lansing and Marans (1969) described a high-quality environment as one that conveys a sense of well-being and satisfaction to its occupants through characteristics that may be either physical, social or symbolic (Lansing & Marans, 1969). Numerous researchers assume that quality has a multi-dimensional nature, and in evaluating the quality of built environment, they proposed a holistic approach. Environmental quality results from the quality of constitutive parts of a region but yet more than the sum of parts, it is the perception of a location as a whole (Tabibian & Mansouri, 2014; van Kamp et al., 2003). By discovering and impressions of each component designers can improve the resultant quality of environments (Haghi, Samavati & Eskandari, 2018; Alipour et al., 2012; Marans & Spreckelmeyer, 1982). According to the aforementioned viewpoints about quality, we could conclude that the quality of an object or an environment is the consequence of interrelations among individuals and environments. It is in fact the result of a combination of components, attributes, and dimensions. These attributes could be either inherent in the space or be borne in people's minds might. Humans evaluate these attributes, based on which he/she assigns a rating or degree of transcendence or excellence to the object or environment. Through the result of this process, one can perceive an environment as to be of high or poor quality. Yet the question remains, what are the constituent components of quality (in this paper architecture and public spaces)? Accordingly, the next section examines viewpoints about dimensions and components of quality in the public spaces.

2.2. Quality in architecture and public spaces – theories and viewpoints

In his multi-volume work "De Architectura" at the beginning of the Roman Empire, Vitruvius describes three qualities served by architecture systems: "firmitas, venustas, and utilitas", i.e. "solidity, beauty, and usefulness". Solidity refers to the construction and technical aspect, i.e. the methods, technologies and the quality of the materials used in the building process. Usefulness deals with how spatial communications are formed and functional needs are met. Beauty refers to aesthetic concerns, with the purpose of promoting contemplation and enjoyment (Bittencourt, Pereira, & Júnior, 2015; Fronczek-Munter, 2011). In another taxonomy, Van der Voordt introduced four factors of "Functional (utility value, future value), Aesthetic (experiential value), Technical, Economic and Legal" which are similar to Vitruvius's triple dimensions (Voordt & Wegen, 2005). Elsewhere, Voordt proposed four steps to determine the quality of a built environment, namely (1)

Determining which factors should be taken into account in any assessment; (2) Measuring the relevant variables; (3) Evaluating the outcome of those measurements; and (4) Assigning weights according to the importance of each different factor (Van der Voordt & Vrielink, 1987).

Quality has also been implied to have a relationship with human needs and requirements (Burt, 1978). Abraham Maslow introduced the famed hierarchy of needs, which are "physiological, safety, love/belonging, esteem, and self-actualization" (Maslow, 1943). Based on Maslow's theory, Jon Lang described a model with six factors for the quality of a place, according to which, the built environment provides human biological needs such as shelter; safety needs including physical and psychological security; sense of belonging and esteem through environmental symbolism; self-actualization needs through freedom of choice; cognitive needs through access to opportunities for growth; and aesthetic needs through formal beauty (Pakzad, 2006). In "the theory of a good city form", Kevin Lynch proposed five dimensions including vitality, sense, fitness, access and control and two meta-criteria, namely efficiency and justice, which can enhance and measure settlement quality. Lynch argues that by evaluating the aforementioned dimension, a particular group of individuals in a real situation could judge the relative quality of their place (Ford, 1999; Lynch, 1981). Some theorists have discussed the quality of the built environment from the perspective of urban vitality, safety and crime prevention (Fennelly & Perry, 2018; J. Jacobs, 1961; Newman, 1972). In "The Death and Life of Great American Cities" Jane Jacobs insisted on restoring, maintaining, or promoting a vital urban life. Designers should characterize the physical environment through diversity, safety, attention to the sidewalks and pedestrians, social interaction and cohesion, and flexibility (J. Jacobs, 1961; Sung, Lee, & Cheon, 2015).

Ian Bentley proposed responsive environments in which the built environment should provide its users with an essentially democratic setting, enriching their opportunities by maximizing the choices available to them, to the extent that such environments can be considered as high-quality structures. According to his work, seven qualities play a critical role in the creation of responsive environments, namely permeability, variety, legibility, robustness, visual appropriateness, richness, and personalization (Bentley, 1985). Later in 1990, Bentley added three supplementary components, i.e. biodiversity, energy efficiency and pollution, to the framework with the purpose of addressing the issue of sustainable development (Bentley, 1990; Punter, 2007). Some researchers noted that a high-quality environment contains a sense of place, place attachment, sense of belonging, memorability as well as the natural elements (Falahat, 2006; Norberg-Schulz, 1985; Tuan, 1977). Simon Bell mentioned the quality of diversity and are that human-made environments which contain natural elements are more alive and attractive (Bell, 2012). Jacobs and Appleyard proposed several goals essential for the future of a good high-quality urban environment: livability; identity and control; having access to opportunity, imagination, and joy; authenticity and meaning; open communities and public life; self-reliance; and justice (An environment for all) (Jacobs & Appleyard, 1987). David Canter believes that the concept of place is the product of physical attributes, human conceptions, and activities (Canter, 1977). Based on this notion, Koroush Golkar implies that "place" and the built environment could be altered, and proposed triple dimensions of "functional, experiential–aesthetic and ecological" elements for evaluating the quality of built environment (Golkar, 2001: 40). Mathew Carmona revealed six overlapping dimensions of urban design which contribute to formation of better high-quality environments, namely 'morphological, perceptual, social, visual, functional and temporal' (Carmona, 2003).

Various researchers argue that activity is the cornerstone of every public environments and hence the main criterion for creating high-quality spaces. Michael Walzer introduced two types of public spaces: single-minded space and open-minded space. Single-minded spaces are formed with only one activity in mind. Open-minded space includes spaces where the context provides a plethora of functions, and where the space itself is more likely to be used for activities of a less hurried nature, such as watching, walking, talking, eating lunch and discussing politics and world affairs among others (Walzer, 1986). These single-minded and open-minded spaces reflect, to some extent, the necessary, optional and social activities previously described by Jan Gehl. Necessary activities include those that are more or less compulsory. Optional activities are those that are participated in if there is will to do so and if time and place allows. Social activities encompass all activities that depend on the presence of others in public spaces. When outdoor areas are of poor quality, only strictly necessary activities occur. When the quality of outdoor areas is good, optional activities occur with an increasing frequency. As levels of optional activity rise, the number of social activities usually increases substantially as well (Gehl, 1987). Furthermore, the affordance theory of James Gibson can influence the frequency of optional and social activities. Affordances of an environment are what it offers or provides to the individuals (Gibson, 1977). As mentioned, there are numerous explanations about quality and its components in architecture and public urban spaces. Each theory covers and fulfills a particular part of the big picture of the concept of quality. To achieve a holistic viewpoint, this research gathered the most famous theorists' viewpoints (Table 1). These components are applicable to all buildings and public places.

Table 1
Components of a high-quality built environment based on the viewpoints of different theorists, (Source: The authors).

Theorist	Components
(J. Jacobs, 1961)	Mixed-Use, Safety, Social interaction, Flexibility, Access, Permeability, Density, Diversity of Activities, Attention to pedestrians, Control & Surveillance
(Southworth & Southworth, 1973)	Legibility, Natural Conservation, Form, Accessibility, Comfort & Convenience, Health & Safety, Historic Conservation, Openness, Vitality, Diversity of Activity, Diversity of Form, Delight & Pleasure, Meaning, Maintenance, Congruence/fit, Sociability, Equity, Adaptability
(Lynch, 1960, 1981)	Vitality (social), Sense, Fit, Access, Control, Efficiency & Justice, Legibility, Vitality (natural)
(Shirvani, 1981)	Compatibility of uses, Views & Focal points, Visual interest, Natural Elements, Preservation, Order, Maintenance, Safety, Ease of Movement, Attention to pedestrians, External Form, Image & Identity
(Violich, 1983)	Readability, Freedom of Choice, Urban Form, Sociability vs. Privacy, Voices from the Past, Regional Ties
(Bentley, 1985, 1990)	Permeability, Variety, Legibility, Robustness, Visual Appropriateness, Richness, Personalization, Biodiversity, Energy Efficiency, Pollution
(Trancik, 1986)	Linking Sequential Movement, Lateral Enclosure, Edge Continuity, Axis & Perspective, Indoor-Outdoor Fusion
(Gehl, 1987; Gibson, 1977)	Attention to Affordances, Human Perception, Optional Activities, Social Activities
(A. Jacobs & Appleyard, 1987)	Livability, Identity and control, Access to opportunity Imagination & joy, Authenticity and meaning, Community & public life, self-reliance, An environment for all
(Colman, 1987)	Preservation & Conservation, Design for the pedestrian, Variety of use, Cultural Environment, Environmental context, Architectural values, Vitality
(Whyte, 1988)	Social Life, Accessibility, Ease of Movement, Sun and light, Furniture and Facilities, Natural Environment, Sensations, Sidewalks
(Vandell & Lane, 1989)	Materials, Fenestration, Mass Composition, Public Interior Space, Skyline, Exteriors, Responsive to Neighborhoods, Provision of Public Amenities
(Greene, 1992)	Function, Order, Identity, Appeal
(Goodey, 1993)	Permeability, Flexibility, Vitality, Diversity, Human Scale, Context Harmony, Personalization, Legibility, Richness
(Nelessen, 1994)	Walkability, Maintenance, Human Scale, Views, Diversity, Ecological Responsibility
(PMUDTF, 1994)	Demonstrate Design Excellence, Distribute Benefits Widely, Environmental Benefits, Responds to Local Features & Needs, Relevant to Contemporary World, Possible Continuing Adaption & Change, Forges Connection with the Past
(Haughton & Hunter, 1994)	Variety, Concentration, Democracy, Permeability, Security, Appropriate scale, Organic design, Economy of means, Creative relationships, Flexibility, Consultation, Participation
(Punter & Carmona, 1997)	Permeability, Legibility, Form, Landscaping, Density, Morphology, Safety, Accessibility, Mixed-Use, Visual Appropriateness, Materials, Personalization
(Force, 1999)	Access, Permeability, Mix of Activities, Diversity, Efficiency of Land use & Density. Attention to site, context, scale & character, Sustainable buildings, Ecological Responsibility
(DETR, 2000)	Identity & Character, Continuity & Enclosure, Ease of Movement, Legibility, Adaptability, Diversity, safe, Work for all in Society, Attractive, Density and mix, Structure, urban grain, Landscape, Scale: height, Scale: massing, Details & Materials
(Tibbalds, 2001)	Mixed-Use & Activities, Human Scale, Access for all, Walkability, Legibility, Places Matter Most, Environmental comfort, Energy efficiency, Materials, Gradual Changes, Flexibility
(Chapman, 2004)	Equity, Access, Variety, Vitality, Shelter & Exposure, Security, Legibility, Visual and Spatial Qualities, Understanding Space, Contrasting Spaces, Space Sequences
(Voordt & Wegen, 2005)	Functional, Aesthetic, Technical, Economic & Legal
(Carmona et al., 2008)	Clean and Tidy, Accessible, Attractive, Mixed-use, Flexibility, Inclusive, Vital and Viable, Functional, Distinctive, Safe and Secure, Robust, Green & unpolluted, Fulfilling, Sense of Place
(Dempsey, 2008)	High Residential Density, Mixed Land Uses, Accessibility, Connectedness, Permeability, Legibility, Attractiveness, Inclusiveness, Maintenance, Safety, Character
(PPS, 2018)	Sociability, Uses & Active, Access & Linkage, Comfort & Image

3. Methodology

Taking all the above discussions into consideration, four fundamental challenges of this research are:

- What are the major dimensions and components of a high-quality public courtyard?
- Do these dimensions and components have the same importance, if not what is their order of importance or priority?
- Do these dimensions affect individual tendency to assume a public courtyard as a high-quality place?
- Do any resemblances exist between experts' viewpoints and individual judgments?

Offering a solution to each question requires a method compatible with the essence of the question.

3.1. Delphi Method

For the purposes of the first research question, the researchers conducted an immense literature review to determine the meanings of quality and to discover its components in a public place (Table 1). For the next stage, the authors employed a three-round Delphi method. Delphi method is used for structuring a group communication process, effective in allowing a group of individuals, as a whole, to deal with a complex problem (Linstone & Turoff, 1975). In this research, individuals are experts of urban design and architecture, and the complex problem is to reveal the components which can affect the quality of public courtyards. Delphi panel is consisted of 20 experts who studied and revised components of table 1 in three rounds. Based on the result, experts narrowed down the main dimensions and components to be employed in construction and post-analysis of high-quality public courtyards.

3.2. Analytic Hierarchy Process (AHP)

To prioritize the dimensions and components and to examine how much weight the experts attribute to each component in a high-quality public courtyard, an Analytical Hierarchy Process (AHP) method is a preferable choice. In AHP, using pair-wise comparisons between components as inputs, a system of rating compatible with the theory of relative measurement is devised. In fact, in cases where the precise score of each component is not of interest, knowing their relative measurements suffices for allocating their priorities. Moreover, when the nature of components is intangible, it is difficult to devise a measurement scale and thus employing relative measurements simplifies the analysis (Brunelli, 2014). Therefore, based on the resulting dimensions and components from the Delphi panel, the researchers produced pair-wise comparison questionnaires by considering Saaty's pairwise comparison scale (numeric values) (Saaty, 1982). The experts of architecture and urban design filled out these questionnaires and the data was analyzed using Expert Choice Program V.11. It calculated the consistency ratio (CR) which was approximately 0.04 and as Saaty suggested that consistency ratio (CR) of 0.10 or less to be acceptable for conducting the AHP analysis (Saaty, 1982), this value was acceptable. This research prioritized the components and dimensions of quality in public courtyards using this method.

3.3. Case Study

In order to assure that whether these dimensions and components function properly in the real world and affect people's tendency to assume a public courtyard as a high-quality place, authors also conducted a case study.

3.3.1 Reasons for choosing Shah Ni'mat-Allah Courtyard as case study and a brief introduction

According to aforementioned discussion, quality involves multiple and highly complex factors, and as Groat and Wang (2013) implied the level of complexity involved also suggested the virtue of a single case design (Wang & Groat, 2013). Therefore, one case study with acceptable attributes was chosen for this purpose. The case study is located in a regional context in which we there are transcendent patterns of public courtyards evident. There is evidence that courtyards existed in Persia around 8000 years ago. There are a number of surviving buildings with courtyards from both the pre-Islamic and the Islamic period which confirms the longevity of the symbiotic relationship between courtyards and Persian society (Edwards, 2006; Tabbaa, 1987). With four distinctive courtyards, Shah Ni'mat-Allah mausoleum in Mahan city (35 Kilometer of Kerman) of Iran (Fig. 1), which was designed for Shah Ni'mat-Allah Vali, the famed Persian mystic and poet (d. 1431), is one of the most prominent works of urban public spaces (Fig. 2). Public courtyards of this complex were built and restored in three different generations, namely Timurid (1370-1506), Safavid (1501-1736), and Qajar (1796-1925). Thus, this place offers the essence of the architecture and urban space of three different dynasties in which the Persian architecture was at its transcendent state (Jackson & Lockhart, 1986; Khajeh-hasani, 2015). This mausoleum is a well-designed complex, through which all the dimensions and components of urban spaces can be discovered and analyzed. Furthermore, this complex has four courtyards, each with distinctive features, which offers different attributes for the visitors. As a result, this complex not only provided a setting as a prominent work of urban design and architecture, but also embedded 4 transcendent public courtyards. Hence, this mausoleum is suitable choice for the case study as it is:

- Located in a geographical context famous for its courtyard patterns during history;
- belonged to a period of Persian architecture in which the courtyard pattern was at its transcendence proper for surveying a high-quality public courtyard;
- Embodies 4 distinct courtyards in just one cultural context, therefore all the conditions and circumstances are similar during the assessment (hence decreasing the level of complexity).

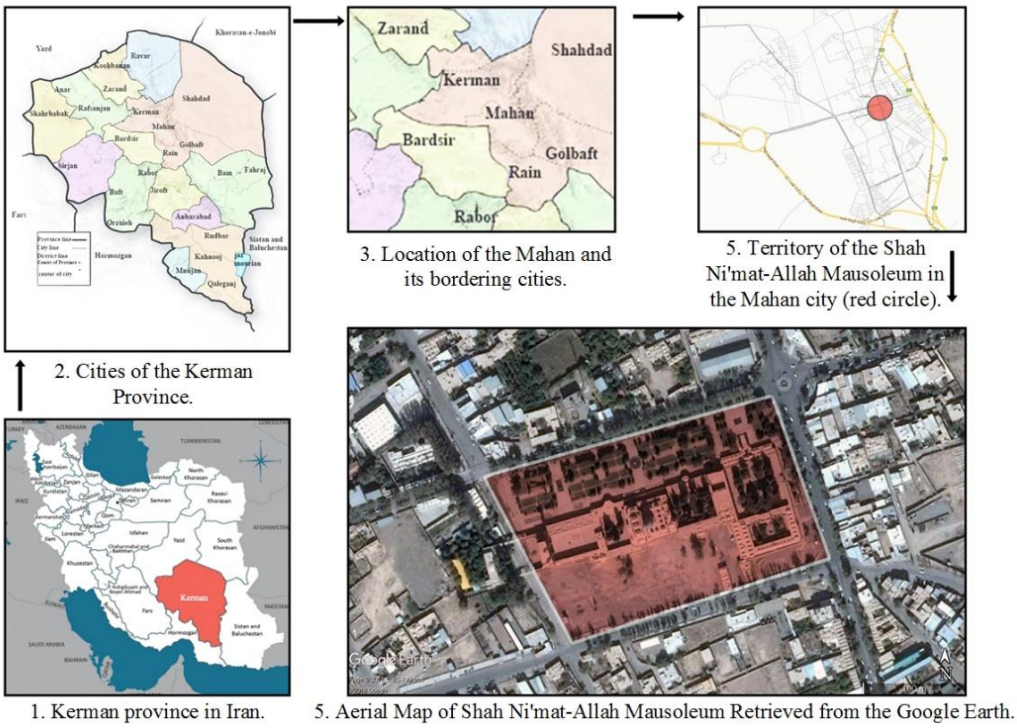


Fig. 1. Geographical location of the Kerman province & the Mahan city, (Source: The authors); Aerial map of the studied complex, (Source: The Google Earth).

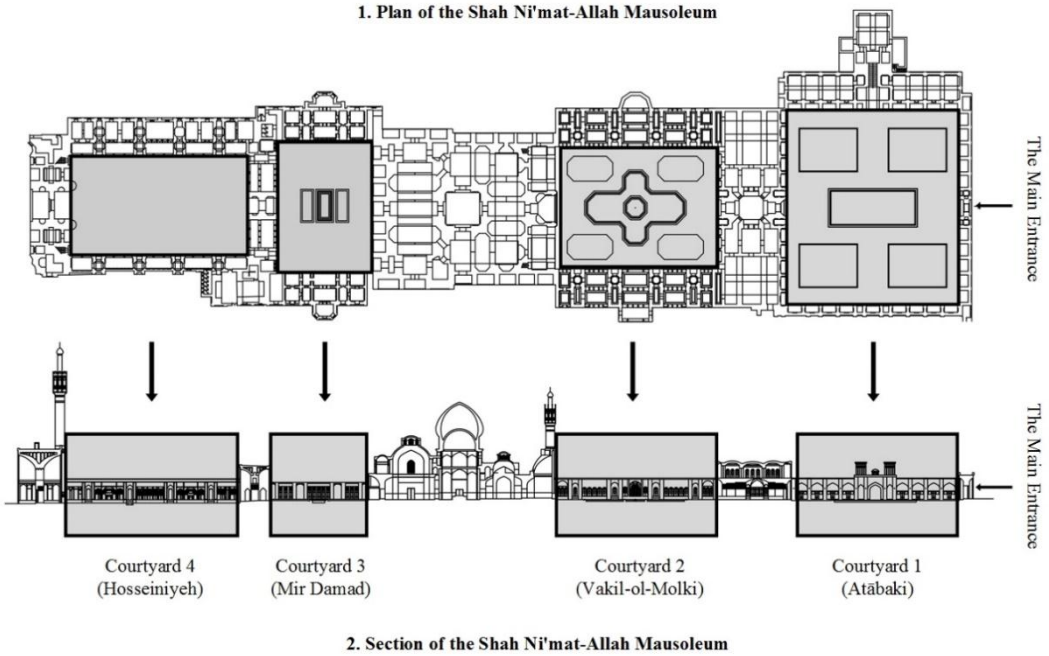


Fig. 2. Architectural plans and sections of the Public Courtyards of the Shah Ni’mat-Allah Vali mausoleum.

As the research only studies the courtyards of the complex, the introduction enfolds these four open spaces which are Atābaki (Courtyard 1), Vakil-ol-Molki (Courtyard 2), Mir Damad or Shah Abbasi (Courtyard 3), and Mohammad Shahi or Hosseiniyeh (Courtyard 4). For the ease of readers, the authors used the number of courtyards instead of their original names in all parts of the article. Courtyard 1 (Atābaki) is in the eastern part of the complex with dimensions of 51 meters on each side. In the center, there is a rectangular Howz (i.e. symmetrical axis pool) and in the north, there are two wind catchers with the Āb-Anbār (traditional reservoir or cistern of drinking water). Also, there is a caravanserai (inn where travelers could settle and recover from the day's journey) in the south. At present this courtyard operates as the main entrance of the complex and also acts as a buffer to the courtyard 2 (Vakil-ol-Molki). Courtyard 2 is the entrance of the main roofed building with

dimensions of 32 meters in width and 44 meters in length and has a cruciform Howz in the middle. Courtyard 3 (Mir Damad) is the smallest one with a rectangular shape of 24 to 32 meters in width and length respectively which was established in the Safavid era and was restored in the Qajar era. Also, a small Howz and old cedars exist nearly in the middle of this courtyard. Courtyard 4 was the main entrance in the past, located in the west side of the complex with two Minarets (towers typically found adjoining holy places in Islamic age and taller than its environs). The dimensions of this courtyard are 25 in width and 45 in length. All four spaces are currently open to the public with visitors from different cities and even countries. These courtyards have their own character and afford distinctive capabilities in one physical built environment (Fig. 3).

Fig. 3. Different views and perspectives of the Shah Ni'mat-Allah Vali mausoleum's Public Courtyards.

3.3.2 Analyzing the case study: interview & questionnaire

Authors designed an interview and a questionnaire for people visiting the mausoleum with the purpose of understanding the effects of dimensions and components on their perception. Since most of the visitors do not contemplate on the meaning of the items, the authors would explain the concept and meanings of the items for the respondents if necessary, to reduce misunderstandings. The interview was just a simple question: "which courtyard do you prefer mostly (estimate as a high-quality space) and why?" in this method they must choose only one courtyard and then explain their reasons. This research employed a five-level Likert scale for questionnaires. The respondents were asked to score each item from a scale of 1 to 5 (1: Unacceptable, 2: poor, 3: Acceptable, 4: Good, 5: Excellent). The researchers calculated the statistical values of individuals' scores, which can determine the ultimate score of each component in different courtyards. Through this method, the most preferable courtyard was determined and the scores of its dimensions and components were calculated.

Furthermore, to compare suggestions of visitor with experts' viewpoints, first the items expressed in the interviews were analyzed with the aim of realizing whether there is any other items which could be added to the components previously discovered using the Delphi method. Second, the components of each courtyard were sorted by people's scores (arithmetic means) and then they were compared with the order of importance in the AHP method.

3.3.3 Sampling and Reliability

Cochran's formula ($n = \frac{N \times z^2 \times pq}{Nd^2 + z^2 \times pq}$) was employed to determine the sample size (Cochran, 1977). At 95% confidence interval, the Z values would be 1.96, per the normal tables. To determine the value of N parameter, the month from each season with the highest number of visitors according to statistics of the local municipality were selected, namely January, April, July and October. Then, based on observations, it was revealed approximately 40 distinct people visit the complex each day of these months which represents the amount of 1200 distinguished sample for N parameter in a month and 4800 in 4 months during one year. As a result, according to the Cochran formula sample size was estimated to be nearly 355.

$$(n = \frac{N \times z^2 \times pq}{Nd^2 + z^2 \times pq})$$

(N=4800, z=1.96, p=q=0.5, d=0.05)

$$n = \frac{4800 \times (1.96)^2 \times 0.5 \times 0.5}{4800 \times (0.05)^2 + (1.96)^2 \times 0.5 \times 0.5} \cong 355$$

To check the reliability of the questionnaire, a pilot study must be conducted on 10 to 30 percent of the sample size (Isaac & Michael, 1995), and as such, the researchers implemented the pilot study on 20% of 355 samples. Therefore, 71 questionnaires were handed out for to test the reliability of the inventory. The reliability analysis was completed by calculating the coefficient alpha in the SPSS program V.24. and was equal to 0.919, which is an acceptable amount because it is higher than 0.7 (Cortina, 1993). Figure 4 describes the full process and stages of this research.

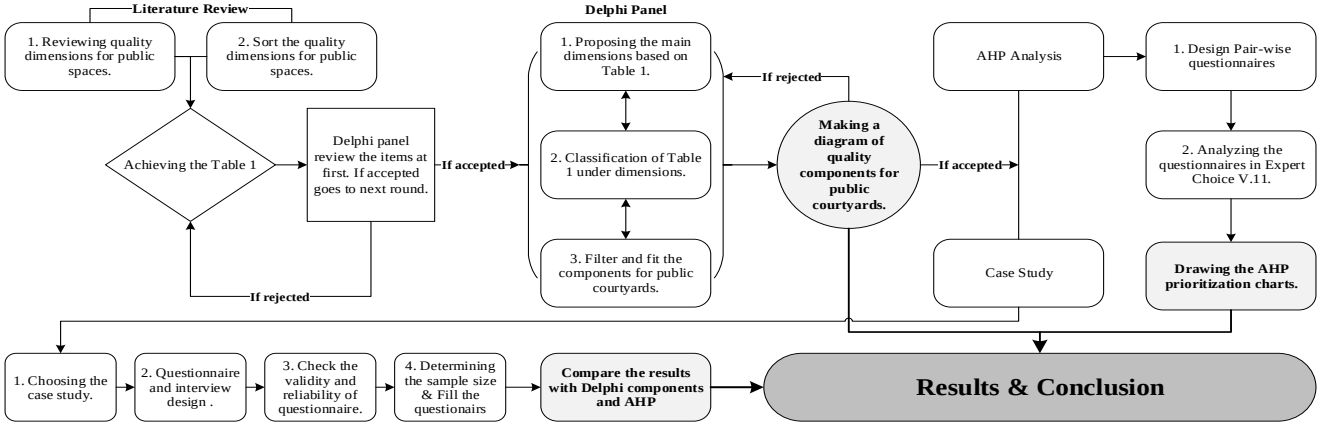


Fig. 4. The full process of the methodology, (Source: The authors).

4. Findings

4.1. Dimensions and components

As demonstrated in Table 1, components for developing a high-quality public space are highly extensive and there are considerable similarities and contrasts among the perspectives of theorists. Experts in the Delphi panel suggest that to compile this table and to render it applicable for public courtyards, the components should be categorized in more dominant dimensions, which are placed higher in a hierarchical order. The panel discussed all the items in table 1, and they proposed 5 dimensions of Functional, Visual & Morphological, Perceptual & Experiential, Social and Ecological (Fig. 5). These dimensions are to some extent analogous to Carmona's dimensions (i.e. morphological, perceptual, social, visual, functional and temporal) (Carmona, 2003) and Canter model (functional, aesthetic & experiential) (Canter, 1977).

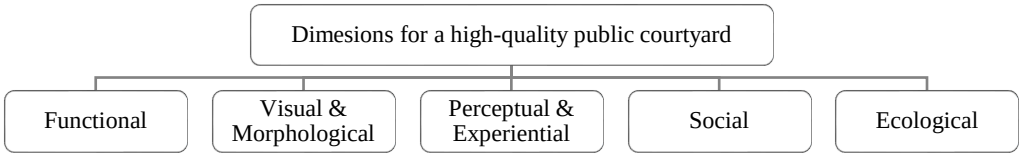


Fig. 5. Main dimensions of a high-quality public courtyard, based on experts' viewpoints in the Delphi panel.

The Delphi panel organized and restructured the components from Table 1 based on the final dimensions proposed (Fig. 5). The items that were repeated were integrated in a single component. Table 2 describes the components and dimensions in detail. It is notable that the items cited in this table are comprehensive and embrace all public spaces, thus the Delphi panel refined them for another round.

Table2
Classification of the components under the main dimensions, (Source: The authors).

Dimensions	Components
Functional	Mixed-Use, Flexibility, Accessibility, Permeability, Diversity of Activities, Attention to pedestrians, Historic Conservation, Maintenance, Congruence/fit, Adaptability, Efficiency & Justice, Compatibility of uses, Preservation, Ease of Movement, Access to opportunity, Variety, Robustness, Linking Sequential Movement, Attention to Affordances, Architectural values, Provision of Public Amenities, Preservation & Conservation, Design for the pedestrian, Variety of use, Function, Access & Linkage, Technical, Furniture and Facilities, Sidewalks, Mix of Activities, Walkability, Responds to Local Features & Needs, Possible Continuing Adaption & Change, Democracy, Economic & Legal.
Visual & Morphological	Permeability, Density, Scale: massing, Form, Openness, Diversity of form, Views & Focal points, Visual interest, Order, Freedom of Choice, Urban Form, Voices from the Past, Variety, Visual Appropriateness, Lateral Enclosure, Edge Continuity, Axis & Perspective, Indoor-Outdoor Fusion, Scale: height, Architectural values, Appeal, Human Scale, Context Harmony, Views, Demonstrate Design Excellence, Relevant to Contemporary World, Forges Connection with the Past, Concentration, Appropriate scale, Organic design, Creative relationships, Landscaping, Morphology, Comfort, Efficiency of Land use & Density, Attention to site, scale, Continuity & Enclosure, Details & Materials, Structure, urban grain, Attractive, Density and Mix, Places Matter Most, Visual and Spatial Qualities, Contrasting Spaces, Space Sequences, Aesthetic, Connectedness, Public Interior Space, Exteriors, Materials, Fenestration, Mass Composition, Skyline.
Perceptual & Experiential	Legibility, Meaning, Personalization, Sense, Image & Identity, Readability, Voices from the Past, Richness, Attention to Affordances, Human Perception, Identity and control, Authenticity and meaning, Territoriality, Sensations, Identity, Sense of Place, Identity & Character, Places Matter Most, Understanding Space, Distinctive, Fulfilling, Image.
Social	Safety, Social Interaction, Control & Surveillance, Vitality (social), Delight & Pleasure, Sociability vs. Privacy, Equity, Territoriality, Regional Ties, Community & public life, Optional Activities, Social Activities, Livability, Imagination & joy, an environment for all, Cultural Environment, Social Life, Distribute Benefits Widely, Security, Consultation, Participation, Safe, Work for all in Society, Access for All, Equity, Inclusive, Responsive to Neighborhoods, Active.
Ecological	Comfort & Convenience, Health, Maintenance, Natural Conservation, Natural Elements, Biodiversity, Energy Efficiency, Pollution, Environmental context, Architectural values, Sun and light, Natural Environment, Vitality (natural), Ecological Responsibility, Environmental Benefits, Economy of means, Landscaping, Sustainable buildings, Environmental comfort, Energy efficiency, Shelter & Exposure, Clean and Tidy, Green & unpolluted, Self-reliance.

According to the Delphi method, experts interpreted table 2 in three rounds. To fit this table for public courtyards, experts suggested 4 changes:

- Excluding factors such as "mixed-use, attention to pedestrians, economics, sidewalks, urban form, urban grain" from the assessment as they are more related to neighborhoods, districts, and paths;
- According to the Delphi panel, many of those components express similar meanings through different words, thus they should be combined with similar repetitive components and placed in one category, i.e., "accessibility, access & linkage, connectedness", "conservation, maintenance, preservation", "appropriate scale, scale: massing & height, human scale", "fulfilling, sense, sensation, richness";
- Some components are more homogeneous, and therefore can be placed in a single category, i.e., "proportion and human scale", "details and materials", "accessibility and permeability", "clean and healthy", "authenticity and meaning";
- Finally, some components are more general than some others, the more general one was selected, for instance, from form, fenestration, and skyline, form was considered to be the most general term.

Regarding these 4 principles, the experts established a diagram as final dimensions and components for quality assessment of public courtyards after three rounds of Delphi (Fig. 6). In this figure, the solution for the first question, i.e. 'What are the major dimensions and components of a high-quality public courtyard?' was offered. Accordingly, for creating a high-quality public courtyard, designers and architects should consider 5 dimensions and 32 components during the design process.

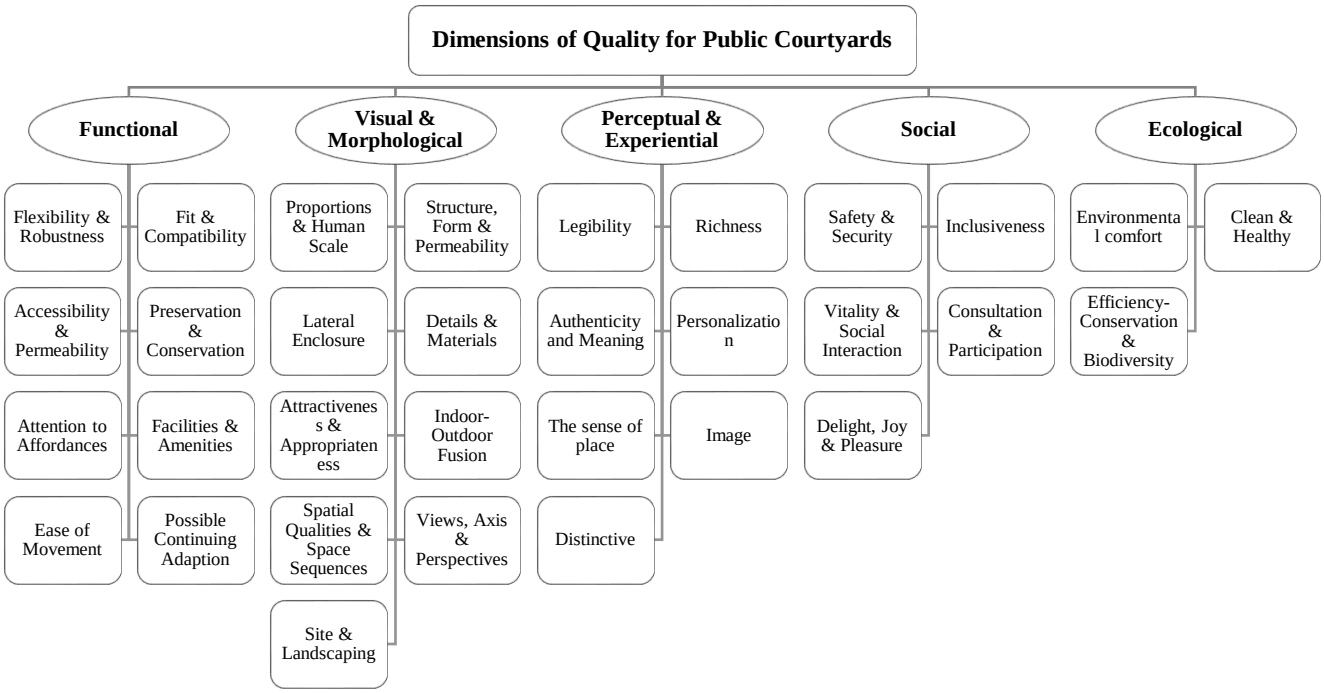


Fig. 6. The final dimensions and components for creation of a high-quality public courtyard based on the Delphi method, (Source: the authors).

4.2. Prioritization of dimensions and components

AHP method and analysis of pair-wise comparisons in the Expert Choice V.11 was used to reveal the priority and importance of dimensions and components according to the viewpoints of experts. Thus, using the aforementioned method, the items with more important role in making a high-quality public courtyard are recognized. Furthermore, in case there is time limit in the design process, the designers can now prioritize the components previously found to be of higher importance at the early stages (i.e. in cases where the time given by the client is too short and thus the implementation of all components is impossible, the designer can choose which items to consider first based on their importance). It is notable that, higher weights correspond to greater importance but the reverse is not correct as lower weights do not mean that the item is not important at all. The diagrams of Fig. 7 illustrate these findings and results.

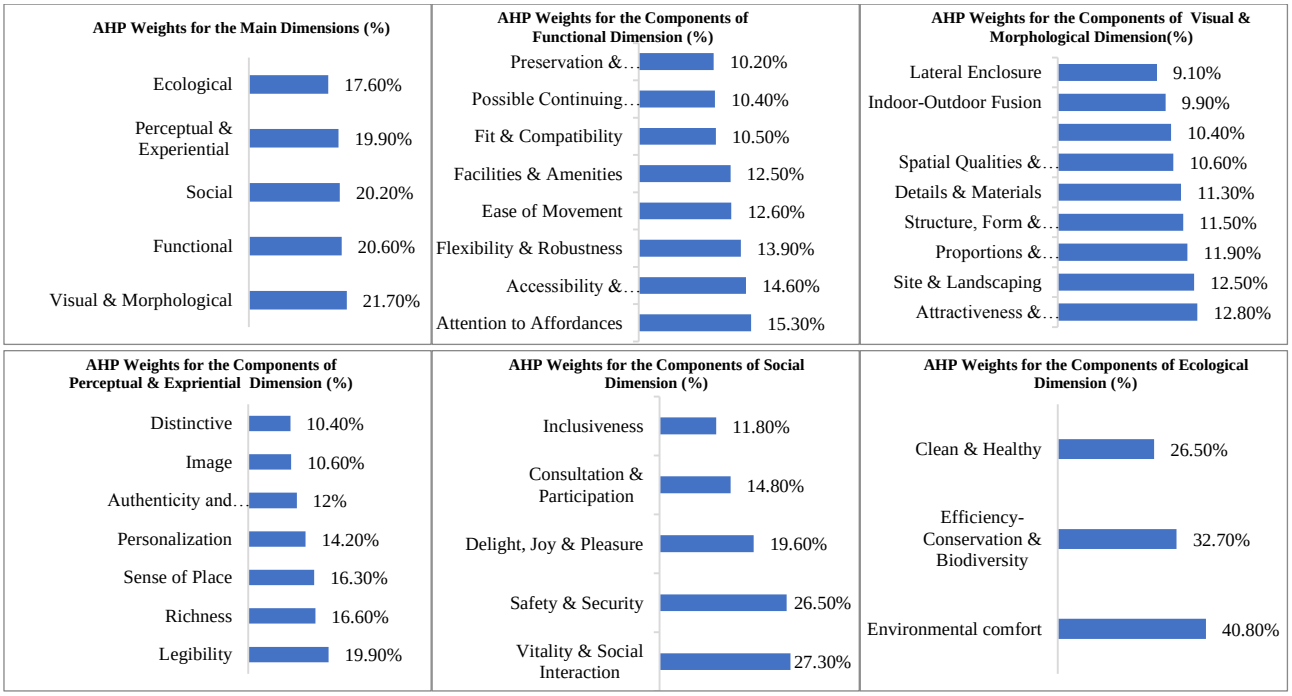


Fig. 7. Importance and prioritization of dimensions and components based on the AHP method.

The above diagrams offer the solution for the second question: 'Do these dimensions and components have the same importance, if not what is their order of importance or priority?' As the results indicate, the importance of the component and dimensions of the quality for public courtyards are not the same and thus they can be sorted based on the analytical hierarchy process as indicated below (number 1 is the most important):

- Main Dimensions: 1. Visual & Morphological, 2. Functional, 3. Social, 4. Perceptual & Experiential, 5. Ecological.

- Functional Components: 1. Attention to Affordances, 2. Accessibility & Permeability, 3. Flexibility & Robustness. 4. Ease of Movement, 5. Facilities & Amenities, 6. Fit & Compatibility, 7. Possible Continuing Adaption, 8. Preservation & Conservation.

- Visual & Morphological Components: 1. Attractiveness & Appropriateness, 2. Site & Landscaping, 3. Proportions & Human Scale, 4. Structure, Form & Permeability, 5. Details & Materials, 6. Spatial Qualities & Space Sequences, 7. Views, Axis & Perspectives, 8. Indoor-Outdoor Fusion, 9. Lateral Enclosure.

- Perceptual & Experiential Components: 1. Legibility, 2. Richness, 3. The sense of place, 4. Personalization, 5. Authenticity and Meaning, 6. Image, 7. Distinctive.

- Social Components: 1. Vitality & Social Interaction, 2. Safety & Security, 3. Delight, Joy & Pleasure, 4. Consultation & Participation, 5. Inclusiveness.

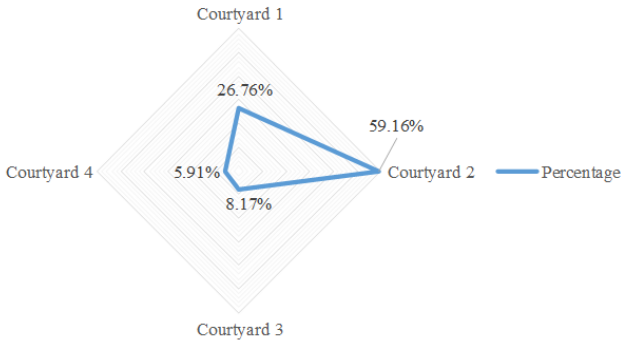
- Ecological Components: 1. Environmental comfort, 2. Efficiency-Conservation & Biodiversity, 3. Clean & Healthy.

4.3. Perception of components and dimensions: ordinary people

In order to understand whether the components and dimensions were comprehensible by the visitors and affects them in perceiving a place as to be more appropriate and have higher qualities, the authors performed a real-world survey (i.e. a case study). As mentioned previously, the case study, the Mausoleum of Shah Ni'mat-Allah Vali has 4 distinctive public courtyards. The survey is comprised of two parts, i.e. interview and questionnaire.

4.3.1. Interviewing with visitors

In the interview, the following question was asked: "which courtyard do you prefer mostly (estimate as a high-quality space)?". Based on the people's opinions, courtyard 2 was the one as having the highest quality (210 out of 355). Also, the authors noted that this courtyard is more crowded than the others. As surveys reveal, 95 people selected courtyard 1, 29 choose courtyard 3, and 21 preferred courtyard 4 (Fig. 8). Therefore, in the mind of people courtyard 2 is the best one while courtyard 4 has the least desirability.



Courtyard	Number of Selections	Percentage of Selections
Courtyard 1	95	26.76%
Courtyard 2	210	59.16%
Courtyard 3	29	8.17%
Courtyard 4	21	5.91%

Fig. 8. Amount of selections for each courtyard as a high-quality space: courtyard 2 has the most desirability.

Furthermore, the researchers asked the people the reason for their selection and derived keywords by generalizing their answers. All the keywords and opinions can be categorized under the components and dimensions of the Fig. 6. The Figure suggests high conformity between experts' viewpoints and people's opinions. Table 3 summarizes these results.

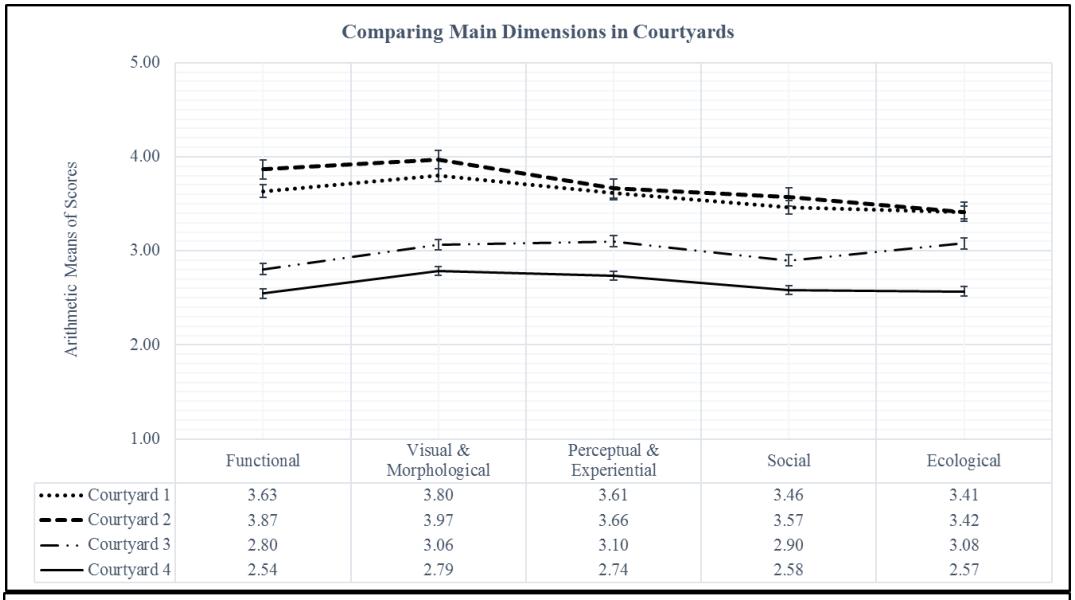
Table 3
Brief reasons of visitors for choosing each courtyard, and classification under proposed components, Source: Authors.

Courtyard	Reasons for their choice's (keywords) proposed by people	Classification of keywords under proposed components by experts
1	Huge, having facilities like stores, green, big howz, beautiful and attractive, openness.	- **Structure, Form & Permeability:** huge, Being small; - **Site & Landscaping:** green, big howz, using water, the shape of the howz; - **Proportions & Human Scale:** Tall minarets; - **Facilities & Amenities:** having facilities like stores; - **Attractiveness & Appropriateness:** beautiful and attractive, appearance, diversity, view of the dome, attractiveness; - **Lateral Enclosure:** openness; - **Details & Materials:** details, materials, sitting; - **Accessibility & Permeability:** accessibility to the main building; - **Preservation & Conservation:** more preservation; - **Richness:** the sound of music and water; - **Vitality & Social Interaction:** more vital, more social; - **Flexibility & Robustness:** more flexible for social or religious occasions; - **Environmental comfort:** more shadow; - **The sense of Place:** the sense of calmness, the sense of quietness.
2	Green, using water, details, materials, sitting, accessibility to the main building, more preservation, appearance, diversity, the sound of music and water, more vital, more social, view of the dome, the shape of the howz, attractiveness, the sense of calmness.	
3	Being small, the sense of quietness, more shadow.	
4	Tall minarets, more flexible for social or religious occasions	

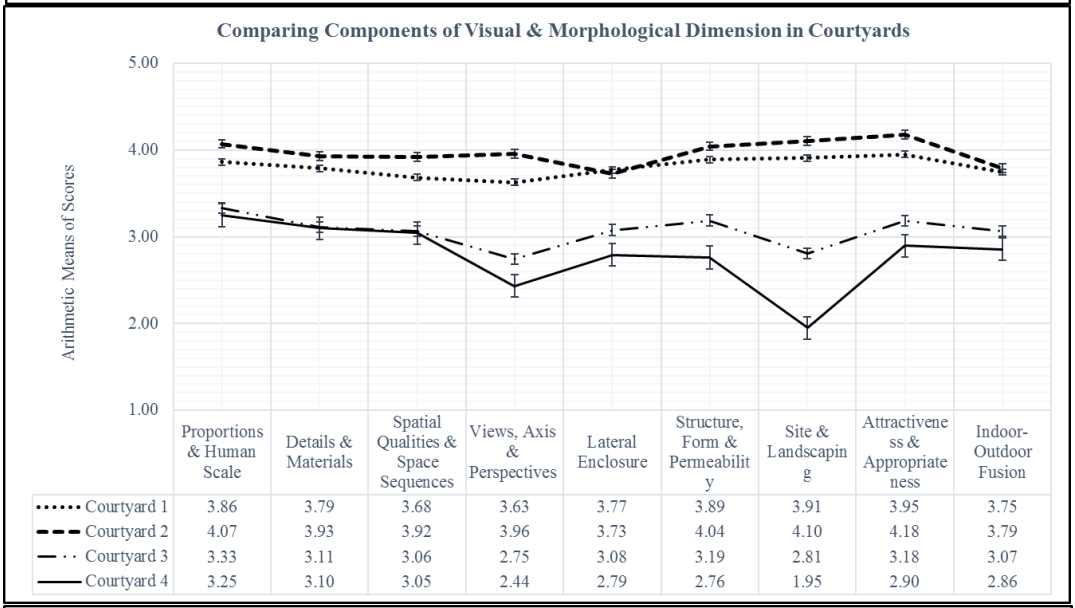
4.3.2. Results of the questionnaires

People filled out the questionnaire about the dimensions and components of Fig. 6. by scoring each component of the courtyards from a scale of 1 to 5. To avoid misunderstandings, the researchers first explained each question in cases where the respondent could not comprehend the exact meaning. The calculation of arithmetic means of each component yields the final score of each component. As disclosed in Fig. 6, a complex set of components makes the upper level dimension, thus Dimensions' scores are the arithmetic means of the components' scores (i.e. the scores of three components of ecological dimension for courtyard 1 are 3.55, 3.15 and 3.53, therefore the final score of ecological dimension would be the arithmetic means of these three values which is 3.41). Moreover, through this method, the conditions of courtyards in each component can be observed, their witnesses comprehended and hence compared. For instance, the scores of courtyards in safety & security component are respectively 3.45, 3.66, 3.20, and 2.88 for courtyards 1, 2, 3 and 4. This comparison shows that courtyard 2 has the best condition and courtyard 4 has the worst. Moreover, since the score of the courtyard 4 is less than the acceptable amount of 3 for this component, it is a weakness for this courtyard and thus requires more consideration. through this method, other components and dimensions can be analyzed. Figure 9 reveals the arithmetic means and graphs comparing courtyards.

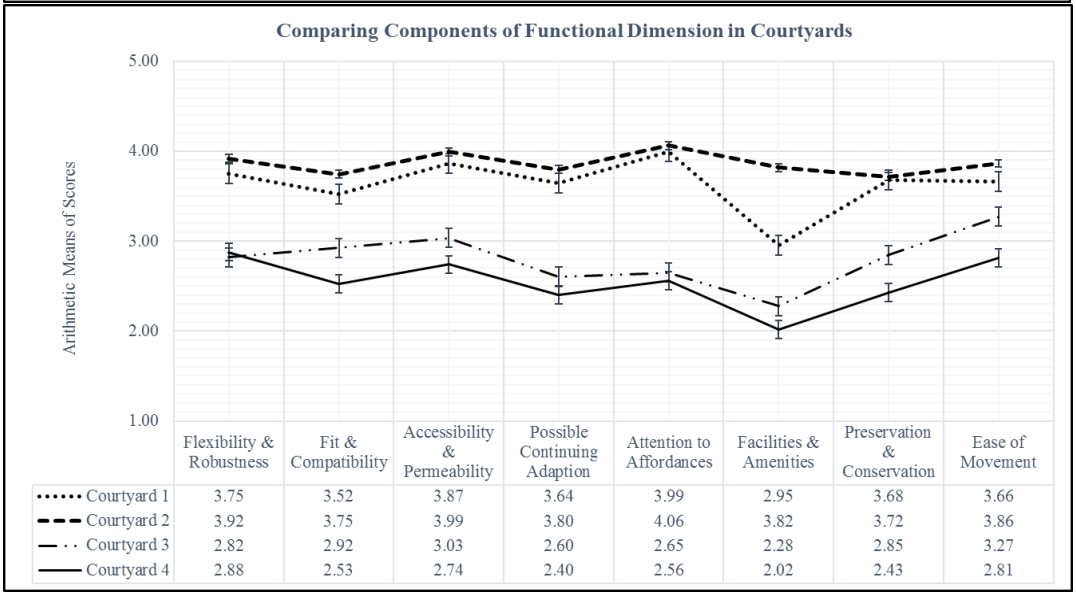
The third question of this research was 'Do these dimensions affect individual tendency to assume a public courtyard as a high-quality place?' As previously mentioned, courtyard 2 was more frequently selected by the people as a high-quality space, and therefore the scores of this courtyard are greater than the others, while courtyard 4 has lower scores and was the least selected courtyard. This reveals that although ordinary visitors do not know the exact names of the components or dimensions, in reality, they experience, feel, and comprehend them, since, if they do not perceive these items, there must not be a relationship between their scores and their selection (i.e. people might choose another courtyard as the most desirable and assume that as a high-quality space). They choose courtyard 2 as the best one in the interview, while its scores were also higher in the questionnaire (Fig. 10). Thus, these dimensions and components in the real-world affect the individuals' minds. daily visitors comprehend the role of these components in the real-world and consciously or unconsciously attribute them scores, thus considering a place more pleasant, attractive and with higher qualities. Consequently, in order to achieve and create a high-quality public courtyard, the urban designers and architects must notice the components of Fig. 6 as they are readily comprehensible and ratable by the individuals' minds.



	Functional	Visual & Morphological	Perceptual & Experiential	Social	Ecological
Courtyard 1	3.63	3.80	3.61	3.46	3.41
Courtyard 2	3.87	3.97	3.66	3.57	3.42
Courtyard 3	2.80	3.06	3.10	2.90	3.08
Courtyard 4	2.54	2.79	2.74	2.58	2.57



	Proportions & Human Scale	Details & Materials	Spatial Qualities & Space Sequences	Views, Axis & Perspectives	Lateral Enclosure	Structure, Form & Permeability	Site & Landscaping	Attractiveness & Appropriateness	Indoor-Outdoor Fusion
Courtyard 1	3.86	3.79	3.68	3.63	3.77	3.89	3.91	3.95	3.75
Courtyard 2	4.07	3.93	3.92	3.96	3.73	4.04	4.10	4.18	3.79
Courtyard 3	3.33	3.11	3.06	2.75	3.08	3.19	2.81	3.18	3.07
Courtyard 4	3.25	3.10	3.05	2.44	2.79	2.76	1.95	2.90	2.86



	Flexibility & Robustness	Fit & Compatibility	Accessibility & Permeability	Possible Continuing Adaption	Attention to Affordances	Facilities & Amenities	Preservation & Conservation	Ease of Movement
Courtyard 1	3.75	3.52	3.87	3.64	3.99	2.95	3.68	3.66
Courtyard 2	3.92	3.75	3.99	3.80	4.06	3.82	3.72	3.86
Courtyard 3	2.82	2.92	3.03	2.60	2.65	2.28	2.85	3.27
Courtyard 4	2.88	2.53	2.74	2.40	2.56	2.02	2.43	2.81

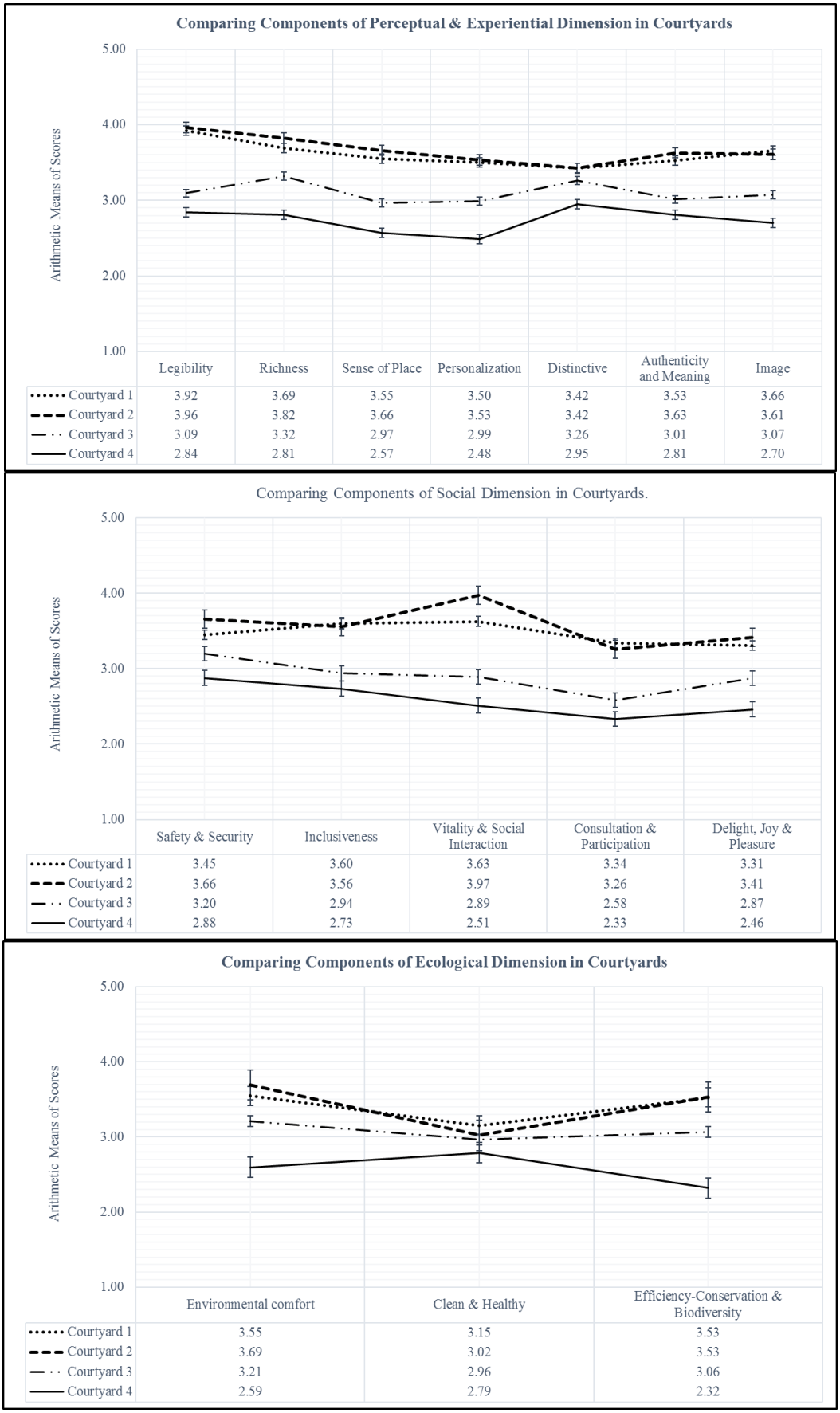


Fig. 9. Arithmetic means of components for each courtyard, and comparison diagrams (S.E.M error bars).

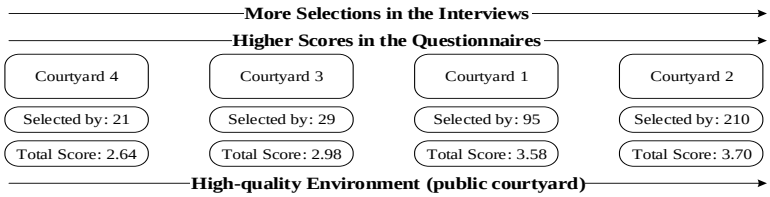


Fig. 10. The relation between the number of selections, scores, and perception of a high-quality environment.

4.4. Comparison of experts' viewpoints and individual judgments

For each courtyard, based on arithmetic means of the questionnaires (described in section 4.3.2), authors arranged dimensions and components, in ascending order and matched them with the AHP diagrams (revealed in section 4.2). So, on one side there are the experts' scores and on the other side, the scores from visitors are presented (Fig. 11). Although there were differences between the orders of dimensions and components, courtyard 2, which was the most desirable among visitors, had the most similarities with the general opinion of experts as being a high-quality public courtyard, while courtyard 4 had the least similarity. Thus, as a response to the fourth question 'Do any resemblances exist between experts' viewpoints and individual judgments?', the answer is positive as there are significant similarities between experts' and individuals' opinions. Also, this question was answered in the section 4.3.1, and in the interviews, there was no new suggestion from the ordinary visitors and all their mentioned items were to a high degree the same. The comparison of AHP with the order of arithmetic means also pointed out that the more people choose a courtyard as a high-quality space, the more similarity exists between experts' viewpoints and individual judgments (i.e. courtyard 2 has the most similarity, and after that are courtyards 1, 3 and 4). This shows a great amount of conformity and similarity between people's orders of dimensions and components and experts' orders. Fig. 11 and table 4 shows this conformity.

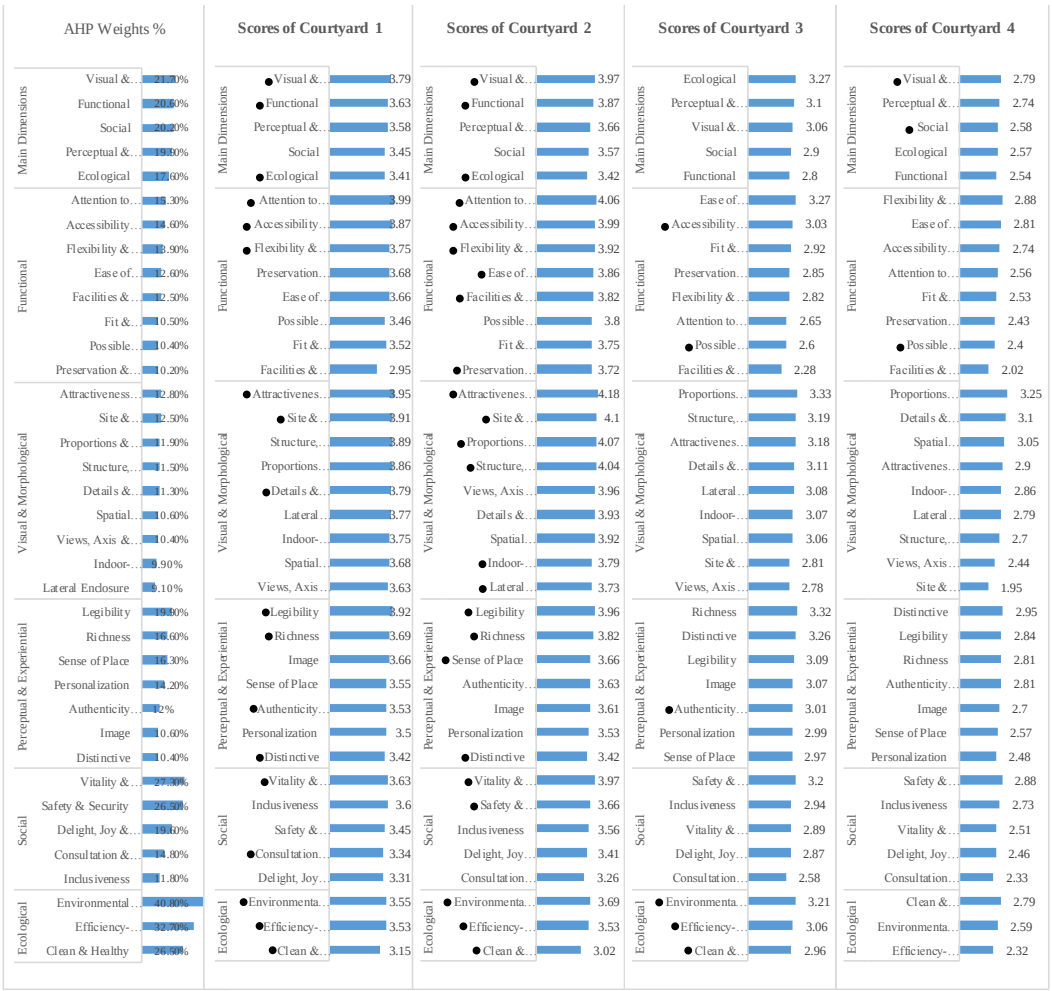


Fig. 11. Similarities between orders of dimensions and components based on experts' AHP and ordinary people's scores, in each courtyard. (●: black dots show the matched items with the AHP).

Table 4
Amount and percentages of similarities between individuals' orders and AHP orders, (Source: The authors).

Dimensions	Similarities							
	Courtyard 1		Courtyard 2		Courtyard 3		Courtyard 4	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Main dimensions	3	60%	3	60%	0	0%	2	40%
Functional	3	38%	6	75%	2	25%	1	13%
Visual & Morphological	3	33%	6	67%	0	0%	0	0%
Perceptual & Experiential	4	57%	4	57%	1	14%	0	0%
Social	2	40%	2	40%	0	0%	0	0%
Ecological	3	100%	3	100%	3	100%	0	0%
Total (37 component)	**18**	**48.64%**	**24**	**64.86%**	**6**	**16.21%**	**3**	**8.10%**

5. Conclusion

The concept of quality has an esoteric and plural nature which is a combination of numerous dimensions and components. This paper explored various definitions of the quality, according to which, the quality of an environment is the consequence of a combination of dimensions and components. They are evaluated by ordinary visitors and based on that a rating or degree of transcendence or excellence is assigned to the environment. As a result of this process, people consider an environment as a high- or poor-quality space. The qualities of the environments are not universal and they vary from space to space, and therefore architects and urban designers need to recognize them. In this regard, the public courtyards were studied as the research scope. For the purpose of this study, the authors proposed 4 questions.

The first question was: "What are the major dimensions and components of a high-quality public courtyard?" To offer a solution to this question, a wide literature review of components and dimensions of quality for public spaces were performed, the results of which are offered in Table1, based on which the experts in the Delphi panel extracted the appropriate factors for the quality of public courtyards and suggested 5 main dimensions of Visual & Morphological, Functional, Social, Perceptual & Experiential and Ecological. Each of these main dimensions have their own components and totally 32 components were concluded which are presented in Figure 12.

The second question was "Do these dimensions and components have the same importance, if not what is their order of importance or priority?". According to the opinions of experts, there is a great level of difference between the importance of the items. All the items are considered vital yet in the prioritization process, their importance is different. Addressing this question is of utmost importance as in cases where the clients, urban designers, architects, city policymakers are on time or budget constraints, considering the more important items at the early stages seems more logical. Also, designers can decide to focus on dimensions and components for public courtyards that will lead them to a better and more desirable environment. Figure 12 shows the components and their importance. All the dimensions and components are sorted by the degree of importance.

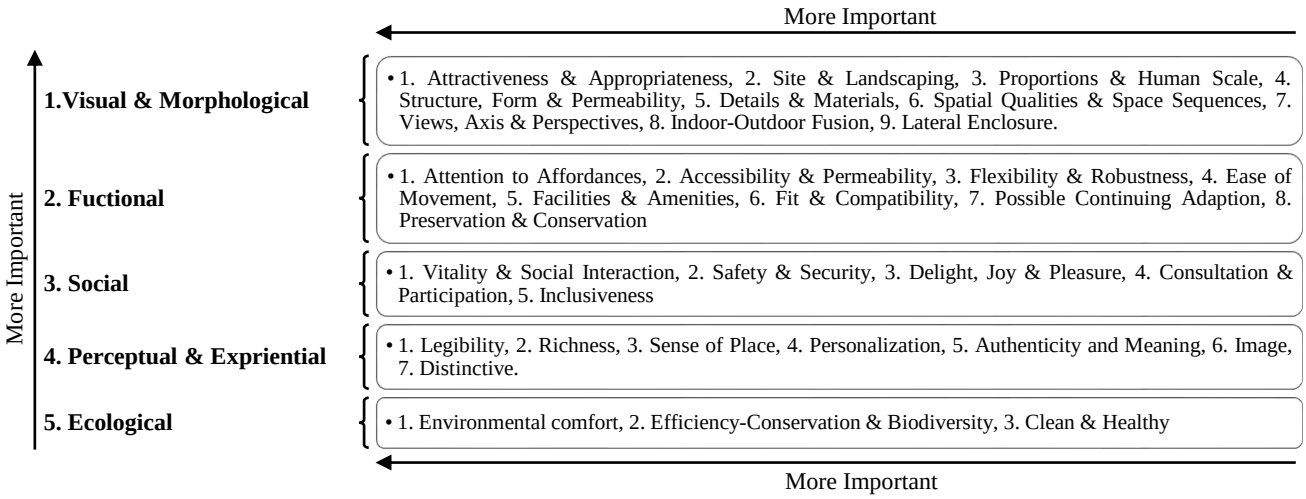


Fig. 12. Achieved Dimensions and components and their importance for a high-quality public courtyard, (Source: The authors).

As a response to the third question, i.e. "Do these dimensions affect individual tendency to assume a public courtyard as a high-quality place?", findings of this research indicate that the dimensions affect the individuals' minds and they are not just concepts on paper. To confirm this statement, in the case study, people

regarded courtyard 2 as the most desirable courtyard among all 4 courtyards. Therefore, courtyard 2 has the highest quality according to the people's choices. In the interviews with the visitors, researchers asked "why do you choose this courtyard?" based on the responses, suggested attributes were either the same as 5 dimensions and 32 components of the current research or can be categorized under one of those factors. Thus, people did not suggest any new item, confirming the integrity of the factors of the research for the second time after expert's approval. Also, in the courtyard 2 has the highest scores in the questionnaires. This shows a relation between the scores of the components and the quality of a courtyard. This relationship also exists in 3 other courtyards. Thus, the higher the score the more quality of that courtyard.

These two findings highlight that individuals' minds comprehend the role of these components in the real-world and consciously or unconsciously allocate them, rendering a place more pleasant, attractive and with higher qualities. Figure 13 illustrates this process: on the left-hand side, as the courtyard get higher scores in the induvial evaluations of components and dimensions, therefore it has a higher quality, but on the right-hand side, as the courtyard get lower scores in the individual evaluations, it has a lower quality. Hence, architects and urban designers must consider the dimensions and components of this research for creating high-quality public courtyards, as this study proves they affect individuals and their assessments.

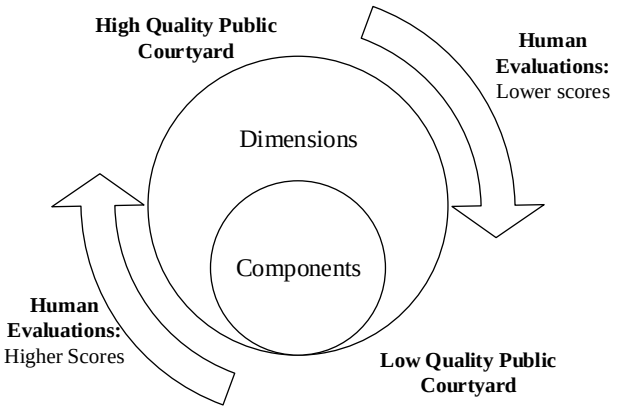


Fig. 13. People evaluate dimensions and components, according to their evaluations find a public courtyard desirable, (Source: The authors).

This study sought to answer the last question, i.e. "Do any resemblances exist between experts' viewpoints and individual judgments?" At the first stage, findings proposed that all the items extracted from the interviews of the ordinary people match with the suggested components of the experts. Second, the order of importance of dimensions and components which was determined through the AHP analysis have been compared with the scores of the ordinary people. Correspondingly, courtyards with more similarities with the order of the AHP have selected more as a high-quality courtyard by the people. For instance, courtyard 2 which is selected more by the people has more resemblances with the order of the AHP. Although there are several differences between individuals' order of importance and experts' suggestions but the percentage of the similarity grows as the courtyard is selected more. This fact is also correct about the other three courtyards. As a result, this article proves that the more people prefer a courtyard as a high-quality space the more similarity exist between the orders of components and dimensions (scores of the courtyard 2 which is more preferable has the most resemblance with the AHP weights). Hence, the authors suggest significant similarities between experts' viewpoints and individuals' judgments of high-quality courtyard.

It is notable that these components and dimensions are not strict and irreplaceable, and this research is the first down this avenue. Other researchers can perform various studies using different methods to add or remove and even to test the proposed components in different public courtyards. This will establish a more comprehensive and reliable framework. Also, it is noteworthy that as the quality is not a concept generalizable to the whole cultural contexts, therefore researchers can customize the components and dimensions of this research and report their works to create a more inclusive framework in the literature.

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