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Research Article:

The Influence of spatial configuration on residential communal places Erbil residential complexes as a case study

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Abstract

In modern residential complexes, place quality arises from residents' subjective experiences and objective spatial arrangements. Movement potential and illuminated visibility influence daily use, safety, and environmental legibility. Research confirms that relational spatial structure, particularly integration and connectivity patterns, is crucial for social encounters, wayfinding, and perceived usability. Although spatial configuration plays a central role in shaping residents' everyday experiences by influencing accessibility, social interaction, privacy, safety, and overall usability. This paper investigating the influence of spatial configuration on the communal spaces' quality inside residential complexes in Erbil city and exploring the performing comparison between mean place quality and spatial configurations. according to that the research flow a mixed methodology by using space syntax- depth mapX for analyzing spatial configuration metrics -VGA connectivity, visual integration, and whole Isovist system with 120° of vision in playground area, sitting area and analyzing the place quality from resident's perception questionnaire in three selected complexes in Erbil city (Cihan city, Lalav City, and Shahan City). The results shows that the legibility indicator got higher score among nine selected indicators, and there is a consistent positive relationship between spatial configuration and perceived place quality with the connectivity, and visual integration showing the strong contribution to social and visual dimensions. The research suggests a focusing on networks of movement, clear visibility structure, and legibility of spatial organization to improve both measurable and perceived place quality outcomes.

[1] Introduction

The Residential complex quality has become an increasingly a central concern in urban design and planning, particularly in rapidly urbanizing areas where large-scale housing developments are replacing traditional neighborhood forms. Beyond the provision of housing units, contemporary residential developments are increasingly expected to support social interaction, visual comfort, safety, identity, and a sense of belonging-indicators. These qualities are central to the broader concept of place quality, which links the physical characteristics of built environment

with social, perceptual, and experiential values (Carmona, 2019); (Mehta, 2014). One of the key factors of built environment that could shape movement, visibility, encounter, and spatial use is spatial configuration. In space syntax theory, spatial configuration refers to the relational structure of space within a system, including how streets, pathways, buildings, and open spaces are arranged, connected, and visually accessible to (Hillier & Hanson, The social logic of space, 2005); (Tuner, 2001). Many studies before found that the spatial

configuration is related to spatial quality, social interaction, social sustainability in different urban and residential context. For example, (Can & Heath , 2015) in Izmir, they examined how in-between spaces and the connectivity of streets affect on social interaction in different neighbourhood morphologies, while (Zerouati & Bellal, 2020) they studied mass-housing in-between spaces in Algeria and they found that permeability, connectivity, and spatial configuration were directly related to user's social practices. (Gümüş & Erdönmez, 2021) analyzed the relationship between spatial configuration and spatial quality in public squares in Venice and Istanbul. On the other hand, (Soltani S. , Gu , Ochoa , & Sivam, 2022) investigated that spatial configuration is associated with social sustainability indicators such as safety, social interaction, and sense of place. Therefore, the role of this study is to examine how spatial configuration influence the perceived place quality indicators across selected local residential complexes in Erbil City. Accordingly, this study asks:

RQ1: How do the selected residential complexes differ in terms of spatial configuration?

RQ2: How do residents evaluate the social and visual-perceptual quality of communal spaces?

RQ3: To what extent do spatial configuration measures correspond with perceived place quality indicators across selected cases?

1.1 Research aim

This study aims to examine the influence of spatial configuration on social and visual-perception place quality indicators inside communal spaces of residential complexes in Erbil city due to Erbil's rapid urban growth and the expansion of residential complexes.

1.2 Research objective

The Main objective of this research is to investigate how spatial configuration influences place quality in Erbil's residential complexes, focusing on the relationship between physical design (connectivity, integration, and visibility), social, and visual-perceptual dimensions of place quality.

1.3 Research Hypothesis

This study hypothesizes that residential complexes with higher local connectivity, stronger visual integration, and wider visibility fields are associated with higher perceived social and visual of place quality. On the other hand, the layouts with weaker connectivity, more visually segregated communal spaces are expected to show lower score of perceived place quality.

[2] The Methodology

this research will be focusing on:

- Defining place quality dimensions and building a theoretical framework about it.
- Determining spatial configurations and classifying them into metrics.

- Examining the influence of spatial configuration metrics on the place quality specified dimensions.
- Discussing the findings and exploring the most effective indicators on the place quality.

[3] Literature review

The theoretical relationship between the place quality and the spatial configuration is dependent on the assumption that everyday experience is defined by the spatial structure. Configurational metrics define how easily residents move, navigate, gather, see, meet, and orient themselves and this in a way that shapes the social interaction experience, the perceived safety, and comfort (Hillier & Vaughan, The city as one thing, 2007). Empirical research data in various urban contexts demonstrates that integration and visually coherent spatial arrangements help people to be more socially active, spatially legible, and place based oriented (place attachment), and compared to segregated or spatially fragmented ones, these arrangements also destabilize the attributes (Gümüş & Erdönmez, 2021); (Qiang Sheng, 2021). Local connectedness facilitates the opportunity to encounter and the active use of place shared common spaces, whereas visual integration and large scale isovist fields help to promote legibility and natural surveillance (Jacobs, 1961); (Tuner, 2001). Spatial segregation and visual fragmentation on the other hand, can undermine experiential quality even when functional provision is adequate.

3.1 Spatial configuration and space syntax theory:

Spatial configuration refers to the rational arrangement of spaces within a spatial system, including how paths, buildings, open spaces and communal areas are connected and visually related. The relations between spatial can influence movement, visibility, accessibility, co-presence and patterns of social use (Hillier & Hanson, 2005); (Hillier, 2007). In this approach, spatial configuration can be measured through metrics such as connectivity, integration, depth, choice, and visibility-based measures VGA. Connectivity indicates local accessibility, while integration reflects how accessible or segregated a space is within the overall spatial system. Visibility-based measures are important because isovist describe what can be seen from a specific point, while VGA shows intervisibility across the spatial system (Benedikt, 1979); (Tuner, 2001). Therefore, this study uses VGA connectivity, Visual integration HH and isovist-based visibility metrics to examine the spatial configuration of communal spaces.

3.2 Place quality as a multidimensional concept:

Place quality is commonly defined as a

multidimensional concept that links the physical characteristics of the built environment with residential's social, perceptual and experiential values. In urban design literatures, place quality isn't limited to physical form, but also includes functional performance, social interaction, perceptual experience, legibility, comfort, and physical condition (Mehta, 2014; (Carmona M. , 2021), while (Carmona M. , 2021) explain urban design through several interrelated dimensions, including (functional, social, perceptual /visual, physical, cultural, environmental, and temporal) dimensions as shown in figure 1. However, this study doesn't examine all dimensions of place quality. Instead, it focuses on selected social and visual-perceptual indicators of place quality because these are most directly related to spatial configuration, visibility, movement, co-presence and resident's experience of communal spaces. The remained dimensions are acknowledged as relevant but remain outside the empirical scope of this article.

3.3 Evidence from residential and in-between spaces:

Many previous studies shown that spatial configuration is related to spatial quality, social interaction, user behavior in urban and residential environments. (Gümüş & Erdönmez, 2021) assess the spatial configuration and the spatial quality relationship within the urban open areas and assume that the concept of spatial quality cannot be effectively conceptualized by taking into account only physical or visual attributes but requires the evaluation of spatial structure such as connectivity, integration and isovist properties also shape movement, social interaction, and spatial experience. (Golshan, Motalebi, & Behzadfar, 2021) explained that integrated and connected spaces may support social interaction, but they emphasize that social behavior is affected by cultural and behavioral factors. (Zerouati & Bellal, 2020) also demonstrated that the configuration and permeability of mass-housing in-between spaces influence resident's social practices. The regional studies by (Layla M. Raswol, 2023) (Hammoodi & Al-Hinkawi, 2023) further indicate that syntactic analysis should be interpreted in relation to cultural and contextual spatial condition. These studies support the need to examine spatial configuration together with resident's perceptions rather than placing configuration as the only explanation of place quality.

3.4 Trade-offs: visibility, social interaction and privacy

There are crucial trade-offs in the relationship of spatial configuration and place quality, particularly between visibility and social interaction/privacy. Enhanced connectivity and visibility can enhance legibility, sense of safety, movement and social

encounter. But too much sight can diminish privacy and comfort, especially in residential environments where privacy is important and they must have a balance between community and control. (Benedikt, 1979) associates isovist analysis with the concepts of visibility, spaciousness, view control, defensibility and privacy. Spatial segregation and visual inaccessibility can sometimes help to achieve visual privacy in residential settings, as demonstrated by (Ravari, Hassan, Nasir, & Taheri, 2024).

3.5 Erbil-specific rationale and study gap:

The literature reviewed shows that spatial configuration is already linked to spatial quality, social interaction, visibility and residential in-between spaces in other contexts, Therefore, the gap in this study is not whether spatial configuration is relevant in general, but how this relationship appears in the contemporary residential complexes of Erbil City. In recent urban expansion, Erbil has seen the emergence of gated and semi-gated housing complexes in various spatial patterns and spatial organization of communal space. But it is not known whether these spatial configurations relate to residents' perceptions of the social and visual-perceptual place quality. This paper therefore asks to investigate the three selected residential complexes in Erbil city based on the Space Syntax measures and the data obtained from the questionnaire data filled by the residents. The uniqueness of the study is the testing of the strength of association between the spatial configuration and the selected place quality indicators in a specific local residential context without making causal claims. Based on the reviewed previous studies, this study narrows the broad concept of place quality into operational framework that can be empirically tested through space syntax analysis and resident's questionnaire data as shown in table 1.

[4] Materials and Methods (Practical study)

4.1 Research design:

The study used mixed method analysis for spatial configuration metrics (VGA connectivity, integration, isovist) and place quality of resident's perception through resident's questionnaire data of communal spaces. The study selected three residential complexes in Erbil city as a case study to found the influence of spatial configuration on communal place quality inside these residents, the complexes are:

1-Cihan city 2-Lalav city 3-Shahan city.

Were Examined the same spatial and perceptual indicators. The analysis identifies whether higher or lower configurational values correspond with resident's perceived place quality across selected cases.

4.2 Case study selection

This study selected three residential complexes with mid cost as a case study in Erbil (Cihan, Lalav, and Shahan) city because they represent different spatial

layouts, different degrees of connectivity, and different patterns of visual permeability within a shared urban context. The selection criteria were:

- the presence of shared communal spaces such as playgrounds, open areas and internal movement networks.
- clear variation in spatial configuration.
- accessibility of site plans for Space Syntax analysis.
- the possibility of conducting residents' questionnaire surveys. This selection strategy allowed the study to compare how different spatial arrangements correspond with perceived place quality while reducing contextual variation between cities.

The detail of location for selected cases are presented in table 2 and in figure 2 Erbil map presented to show exact location of them, while figure 3 shows the site plan of selected case studies in detail.

4.3 Spatial configuration analysis

By using space syntax methods in depthmapX 0.8.0 version the spatial configuration was analyzed. The site plan of each complex was prepared and converted to visibility graph in order to calculate the three selected metrics of spatial configuration, VGA connectivity was used to know the degree of local visual accessibility, while the Visual integration HH to identify how visually integrated or segregated each communal area within the overall spatial system, and Isovist used to assess the visual field from selected communal spaces, spatially areas used for social interaction such as play-grounds, and sitting areas. For this study the average number of each result (VGA connectivity, Visual Integration HH) are taken into consideration, and the grid spacing is 2, while the drawing units are by M, and R value of visual integration HH is (n), while the single-point isovist analysis is sensitive to the selected viewpoint and viewing angle 120°; it is used only as a comparative indicator of directed visibility in the playground/sitting area, and the isovist for whole system is used.

4.4 Place quality assessment

The place quality assessed through resident's perception by using structured questionnaire.

To find the number of respondents (n) simple size the below equation used while (Level of confidence calculated as %95, Z value as 1.96, Margin of error %5, P as 0.50, and $q=1-p=0.50$) which initial sample size $n_0=384$:

$$n = n_0 / [1 + (n_0 - 1) / N]$$

the required sample size shown in table 3.

The questionnaire focused on the nine indicators of social and visual-perceptual dimensions of place quality. Responses were recorded using a five-point Likert scale. The questionnaires were analyzed by SPSS program 27 to calculate descriptive statistics,

including mean scores, standard deviation, and percentage score for each indicator. Composite scores were then generated for social, visual-perceptual dimensions and overall selected place quality indicators in each case study.

The Likert-scale responses were rescaled into percentage scores to allow comparison across indicators and case studies. No differential weighting was applied; each indicator contributed equally to its dimension-level score.

Data Availability Statement: The anonymized questionnaire dataset, coding sheet, full questionnaire instrument in English, Kurdish and Arabic, and statistical syntax are available from the corresponding author upon reasonable request.

4.5 Integration of spatial and questionnaire data:

The two evidence streams were integrated at the interpretation stage through a side-by-side comparative analysis. First, the Space Syntax results were calculated for each residential complex using the same configurational metrics. Second, the questionnaire results were calculated for the same cases using the same place-quality indicators. Third, the spatial and perceptual results were compared across the three cases to identify whether higher values of VGA connectivity, Visual Integration HH and isovist-based visibility corresponded with higher residents' perceptions of social and visual-perceptual place quality by finding correlation (R^2). This integration strategy allowed the study to examine patterns of association between measured spatial configuration and perceived communal-space quality

[5] Result

This paper examined spatial configuration and place quality in Erbil: Cihan City, LALAV City, and Shahan City in terms of an integrated analysis involving space syntax metrics (DepthmapX), and perceptions of residents (social and visual indicators generated by SPSS), for comparison between the three case studies, the average value of spatial configuration were used.

5.1 spatial configuration analysis

For the spatial configuration analysis, the average values of VGA connectivity and Visual integration HH were taken into consideration. As shown in table 4, Cihan City record highest value of VGA connectivity and visual integration (HH) which the averages are (3886.27, 14.1) respectively, LALAV City was in the medium range with the average values of (2690.64 of VGA connectivity, 12.29 Visual integration). Shahan City recorded the lowest configuration performance with average values (2,266.14 of VGA connectivity, 9.42 Visual integration). These results show a clear hierarchical order among the three case studies: Cihan city first,

Lalav city second, and Shahn city third. The isovist analysis was conducted for whole system, and playgrounds with adjacent sitting spaces, because these areas represent the most socially dynamic shared spaces as shown in figure 4. As presented in Table 5, LALAV City and Cihan City recorded higher ratios of potential visibility, 73.35% and 77% respectively, compared with the maximum viewshed of each site. In contrast, Shahan City recorded a much lower visibility performance, with a ratio of 28%. These results are also illustrated in Figure 5.

5.2 Questionnaires Result:

This study examined the residents of these 3 complexes and the questionnaire survey was conducted across the three selected residential complexes. A total of (680) valid responses were included in the analysis, distributed as (250) responses from Cihan city, (230) from Lalav city and (200) from Shahan city as in table 3 the number of simple sizes is presented. The research followed a structured questionnaire to find out and measure the relative significance of indicators of the quality of place, according to the view of residents, the obtained responses were converted to numbers and analyzed using IBM SPSS Statistics. Percentage scores were used to define the indicator weights mainly, with a support by the mean and dispersion measures, which were used to evaluate the central tendency and response consensus. According to table 6 and figure 6 the legibility had the most perceived importance with 71.15% percent of total impact as a highest one and coexistence had the least importance of 57.54% percent as a lowest one. Accordingly, the weight of 0.71 and 0.58 were allotted to the legibility and coexistence respectively and the indicators that leftover were proportionately weighted. The legibility standard deviation ($SD = 0.92$) which is the lowest of all the indicators shows a high degree of agreement among the respondents and supports its primacy in creating the quality of place. On the other hand, coexistence had the highest standard deviation ($SD 1.02$) meaning that there was more variability in perceptions and also comparatively low consensus on the influence it has. So, the sequence of indicators based on questionnaires result will be as following:

1. Legibility (71.15),
2. Social Interaction (68.62),
3. Comfort Sense (67.62),
4. Perceived Safety (67.01),
5. Aesthetics (66.46),
6. Diverse Identity (64.68),
7. Sense of Belonging (63.9),
8. Visual Control (61.18),
9. Coexistence (57.54)

Throughout the three case-study sites, Cihan City had recorded the highest values with respect to the VGA connectivity, visual integration, isovist area and mean

questionnaire place quality, respectively in that order followed by LALAV City and Shahan City. This agreement in the case of quantitative spatial measures with subjective judgments provides support to the predictive validity of the Space Syntax measures to perceived place quality. This conclusion is further supported by the linear concordance on the scatter-plot visualizations, which demonstrate beyond any doubt that there are linear relationships between variables of spatial configuration and overall place quality results as shown in table 7 and figure 7. Altogether, the empirical data confirms that the Space Syntax measures, the VGA connectivity and isovist area are of significant explanatory power in general place quality, and the visual integration has a stronger salient impact on social and visual aspects of resident's experience. These results point to a methodological similarity between configurational spatial analysis and perception-based assessment measures

[6] Discussion

The spatial configuration results provide a useful basis for interpreting differences in perceived place quality among the three residential complexes. Cihan City's higher VGA connectivity indicates stronger local accessibility and greater route-choice potential, which corresponds with its higher perceived place quality. In contrast, the lower connectivity observed in Shahan City suggests a higher degree of spatial segregation and lower pedestrian permeability, which may reduce opportunities for everyday social interaction and weaken residents' spatial experience. The Visual Integration HH results also show the relevance of readable and visually coherent spatial layouts. Higher visual integration in Cihan City, and to a lesser degree in LALAV City, may support clearer wayfinding, a stronger sense of spatial wholeness, and better visual connection between communal areas. In contrast, the lower visual integration value in Shahan City may reflect more fragmented visual fields and weaker spatial integrity. The isovist results further support this interpretation. The higher visibility ratios in Cihan City and LALAV City suggest that their playgrounds and adjacent sitting spaces have wider and more continuous viewsheds. Such visibility conditions may support natural surveillance, co-presence, perceived safety, social comfort, and habitual use of shared spaces. By comparison, the low visibility ratio in Shahan City indicates that the playground area has weaker visual exposure, which may limit informal surveillance and social movement. The questionnaire results show that legibility was the strongest perceived indicator of place quality. Its low standard deviation indicates a high level of agreement among respondents, supporting its importance in shaping residents' experience of communal spaces. Coexistence

recorded the lowest percentage score and the highest standard deviation, which means that residents' perceptions of this indicator were more varied and less consistent. This suggests that coexistence may depend on more than spatial arrangement alone.

Overall, the agreement between the spatial measures and residents' questionnaire results supports the relevance of Space Syntax measures in explaining perceived place quality. The comparative visualizations and statistical summary show a relationship between spatial configuration metrics and place-quality scores across the selected residential complexes. In general, VGA connectivity and isovist area appear to have important explanatory value for overall place quality, while Visual Integration HH appears especially relevant to the social and visual aspects of residents' experience as shown in figure 7 and table 7. These findings suggest that configurational spatial analysis and perception-based assessment can be used together to understand residential communal space performance.

[7] Conclusion and Findings

This study examined the relationship between spatial configuration and selected place quality indicators in three residential complexes in Erbil: Cihan City, LALAV City, and Shahan City. The findings support the research hypothesis that higher local connectivity, stronger visual integration, and wider visibility fields are associated with higher perceived social and visual-perceptual place quality. Cihan City recorded the strongest spatial configuration values and the highest perceived place quality, followed by LALAV City, while Shahan City recorded the lowest values in both spatial and perceptual results.

The results show that connectivity, visual integration, and isovist visibility correspond with residents' perceptions of legibility, social interaction, perceived safety, comfort, and sense of belonging. Legibility was the highest-rated indicator, while coexistence recorded the lowest score, indicating that spatial clarity is strongly perceived by residents but social coexistence may depend on additional social and contextual factors. Overall, the study demonstrates that combining Space Syntax analysis with residents' questionnaire data provides a useful framework for evaluating communal spaces in residential complexes. The findings suggest that residential planning in Erbil should give greater attention to connected pedestrian networks, visually integrated layouts, and well-positioned communal spaces in order to improve residents' everyday experience and perceived place quality.

References:

[1] Carmona, "Place quality and its impact on health, social, economic and environmental outcomes.," *Journal of Urban Design*, vol. 24, no. 1, pp. 1-48, 2019.

- [2] Mehta, "Evaluating public space.," *Journal of Urban Design*, vol. 19, no. 1, pp. 53-88, 2014.
- [3] J. H. Bill Hillier, *The social logic of space*, Cambridge University Press, 2009.
- [4] Tuner, "Depthmap: A program to perform visibility graph analysis.," in *In Proceedings of the 3rd International Symposium on Space Syntax*, Antlant, 2001.
- [5] J. Andrews, "Analyzing quality-of-place.," *Environment and Planning B: Planning and Design*, vol. 28, no. 2, p. 201-217, 2001.
- [6] J. Gehl, *Life Between Buildings Using Public Space*, London: ISLAND PRESS, 2011.
- [7] M. Carmona, *Public Places Urban Spaces The Dimensions of Urban Design*, New Yoirk: Routledge, 2021.
- [8] J. Montgomery, "Making a city: Urbanity, vitality and urban design.," *Journal of Urban Design*, vol. 3, no. 1, p. 93-116, 2007.
- [9] İ. Gümüş and E. Erdönmez, "Impact of spatial configuration to spatial quality: Venice and Istanbul.," *The Journal of Architecture and Urbanism*, vol. 45, no. 2, pp. 206-216, 2021.
- [10] W. S. A.-H. Shahad Abdulabbas Hammoodi, "The role of spatial value in the reconstruction of religious buildings Mosul city: – A case study.," *Ain Shams Engineering Journal*, vol. 14, no. 10, pp. 1-14, 2023.
- [11] J. B. K. Layla M. Raswol, "The Spatial Configuration of Traditional Urban Core of Zakho City.," *Journal of Duhok University*, vol. 26, no. 2, 2023.
- [12] G. M. M. B. H. Golshan, "The Relationship between Spatial Configuration and Social Interaction in Tehran Residential Environments: Bridging the Gap between Space Syntax and Behaviour Settings Theories.," *International Journal of Architectural Engineering & Urban Planning*, vol. 31, no. 4, p. 1, 2021.
- [13] F. K. Ravari, A. S. Hassan, M. H. A. Nasir and M. M. Taheri, "The development of residential spatial configuration for visual privacy in Iranian dwellings, a space syntax approach.," *International Journal of Building Pathology and Adaptation*, vol. 42, no. 2, pp. 672-703, 2024.
- [14] L. H. Marcus and A. Legeby, "The need for co-presence in urban complexity : Measuring social capital using space syntax.," in *Eigth International Space Syntax Symposium*, Stockholm, Sweden, 2012.
- [15] B. Hillier, *Space is the machine : A configurational theory of architecture*, 4 Huguonot Place, Heneage Street London E1 5LN United Kingdom: UCL, 2007.
- [16] M. Benedikt, "To take hold of space: isovists and isovist fields.," *Environment and Planning B, 1979, volume 6, pages 47-65*, vol. 6, no. 1, pp.

- 47-65, 1979.
- [17] Turner, M. Doxa, D. O'Sullivan and A. Penn, "From Isovists to Visibility Graphs: A Methodology for the Analysis of Architectural Space," *Environment and Planning B Planning and Design*, vol. 28, no. 1, pp. 103-121, 2001.
- [18] B. Hillier and L. Vaughan, "The city as one thing," *Progress in Planning*, vol. 67, no. 3, pp. 205-294, 2007.
- [19] D. W. B. Y. Qiang Sheng, "Effect of Space Configurational Attributes on Social Interactions in Urban Parks," *Sustainability*, vol. 13, no. 14, pp. 1-15, 2021.
- [20] J. Jacobs, *The death and life of great American cities.*, New York: VINTAGE BOOKS A DIVISION OF RANDOM HOUSE, INC, 1961.
- [21] IBM Corp. (2020). IBM SPSS Statistics for Windows (Version 27.0) [Computer software]. Armonk, NY: IBM Corp.
- [22] SpaceGroupUCL. (2020). depthmapX (Version 0.8.0) [Computer software]. London, UK: University College London.

تأثير التكوين المكاني على الأماكن السكنية المشتركة:
مجمعات أربيل السكنية كحالة دراسية

المستخلص

في المجمعات السكنية الحديثة، تنشأ جودة المكان من التجارب الذاتية للسكان و موضوعية الترتيبات المكانية. وتؤثر إمكانية الحركة والإضاءة على الاستخدام اليومي والسلامة ووضوح البيئة. وتؤكد الأبحاث أن البنية المكانية العلائقية، ولا سيما أنماط التكامل والترابط، تُعدّ من العوامل الأساسية للتفاعلات الاجتماعية، وتحديد الاتجاهات، وسهولة الاستخدام المُدرّكة. على الرغم من أن التكوين المكاني يلعب دوراً محورياً في تشكيل التجارب اليومية للسكان من خلال التأثير على إمكانية الوصول والتفاعل الاجتماعي والخصوصية والسلامة وسهولة الاستخدام بشكل عام، يهدف هذا البحث في تأثير التكوين المكاني على جودة المساحات المشتركة في المجمعات السكنية، وتكشف إجراء مقارنة بين متوسط جودة المكان والتكوينات المكانية. وبناءً على ذلك، يتبع البحث منهجية مختلطة من خلال إجراء تحليل تركيبى واستبيان للسكان الذين يستخدمون هذه الأماكن. تُظهر النتائج أن مؤشر الوضوح حصل على أعلى درجة من بين تسعة مؤشرات مختارة، وأن هناك علاقة إيجابية ثابتة بين التكوين المكاني وجودة المكان المُدرّكة، مع مساهمة قوية للترابط والتكامل البصري في الأبعاد الاجتماعية والبصرية. تشير الأبحاث إلى ضرورة التركيز على شبكات الحركة، وهيكل الرؤية الواضح، وسهولة فهم التنظيم المكاني لما في ذلك من دور في تحسين كلٍ من مؤشرات جودة المكان القابلة للقياس والجودة المتصورة لدى المستخدمين.

الكلمات المفتاحية:

جودة المكان، التكوين المكاني، المساحات المشتركة، المجمعات السكنية.

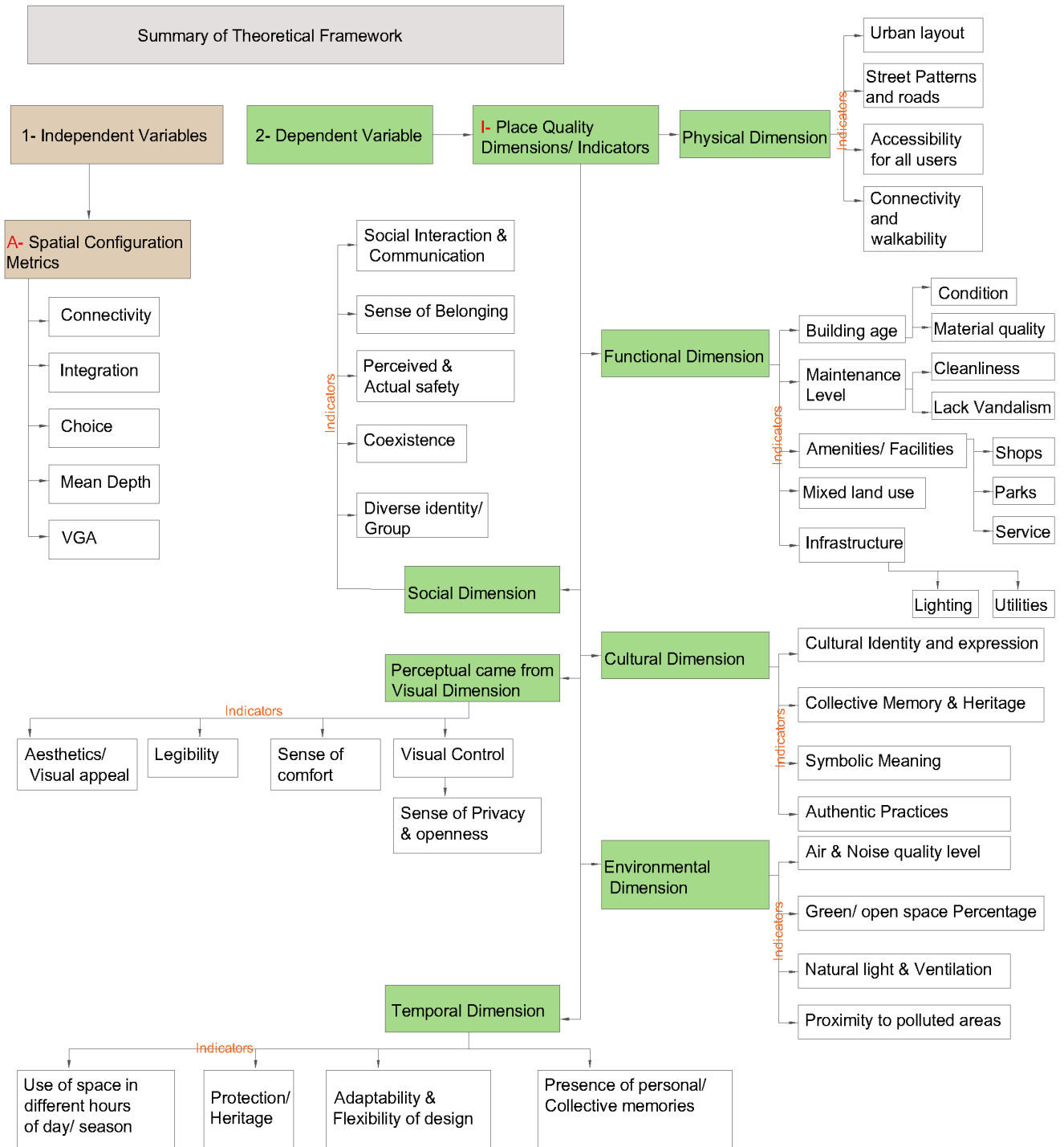


Figure 1: represents the dependent and independent variables of the research: by researchers

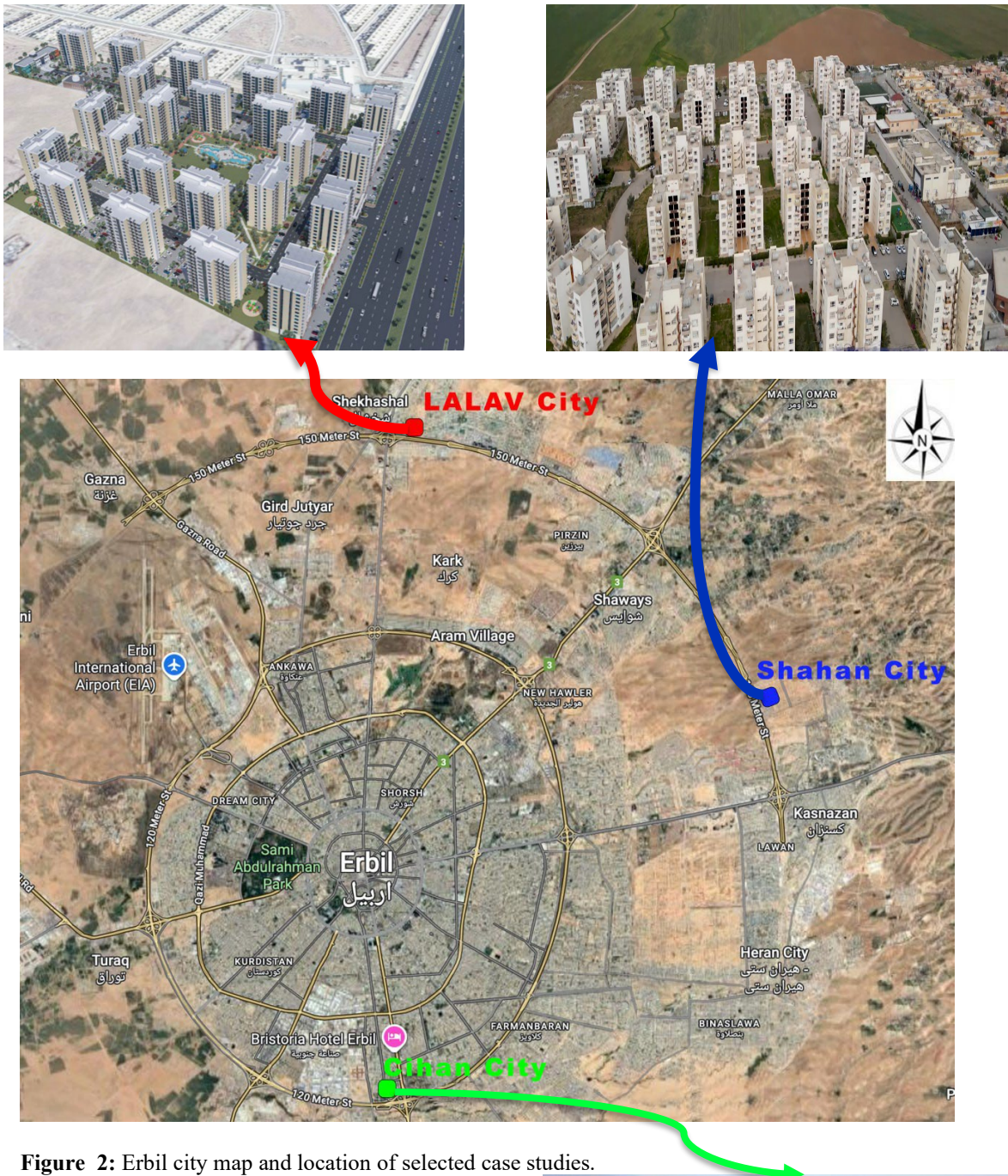


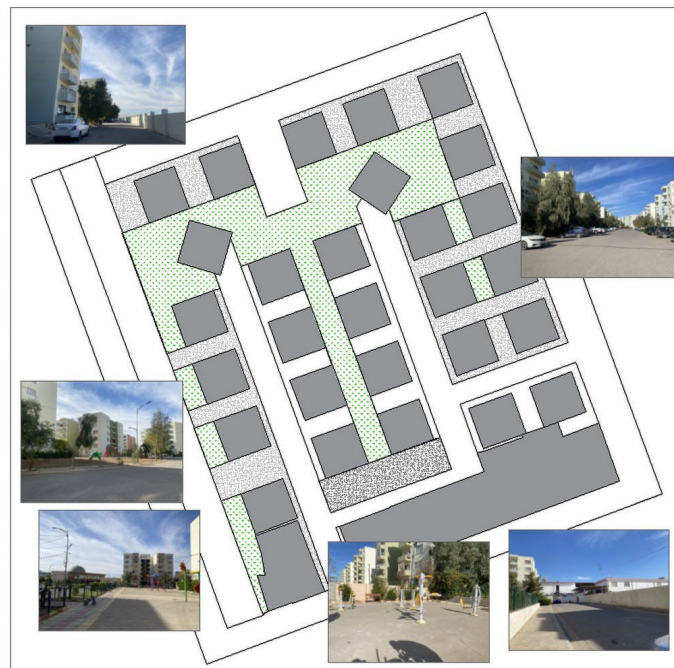
Figure 2: Erbil city map and location of selected case studies.





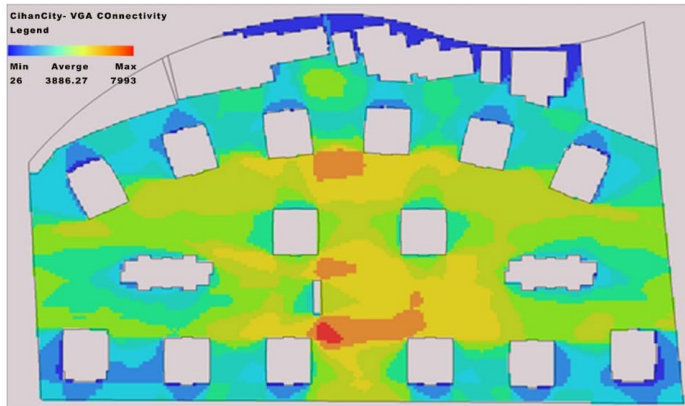
A: Cihan City site plan

B: LALAV City site plan

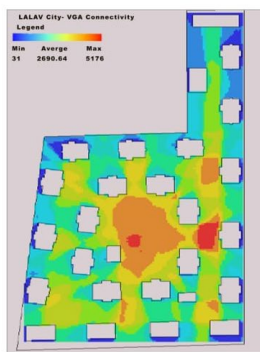


C: Shahan City site plan

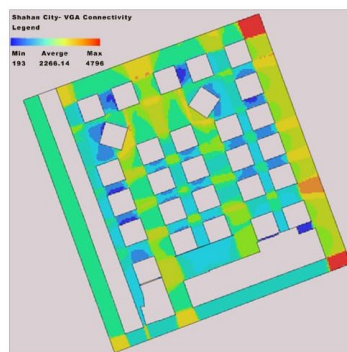
Figure 3: Site Plan of selected case studies.



1- Cihan City

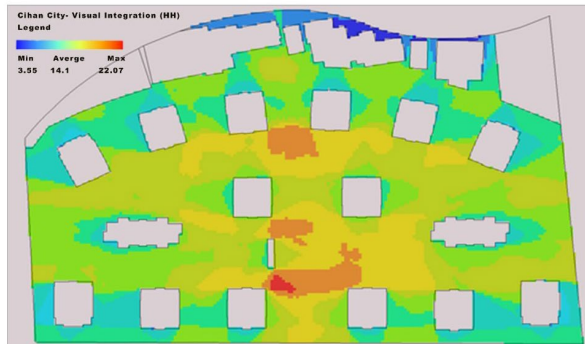


2- LALAV City

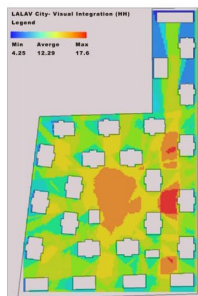


3- Shahan City

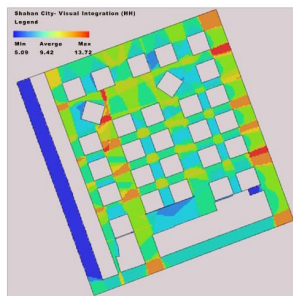
A: VGA Connectivity Result of case studies



1- Cihan City



2- LALAV City



3- Shahan City

B: Visual integration Result of case studies

Figure 4: VGA Connectivity and Visual Integration (HH) result from space syntax of case studies.

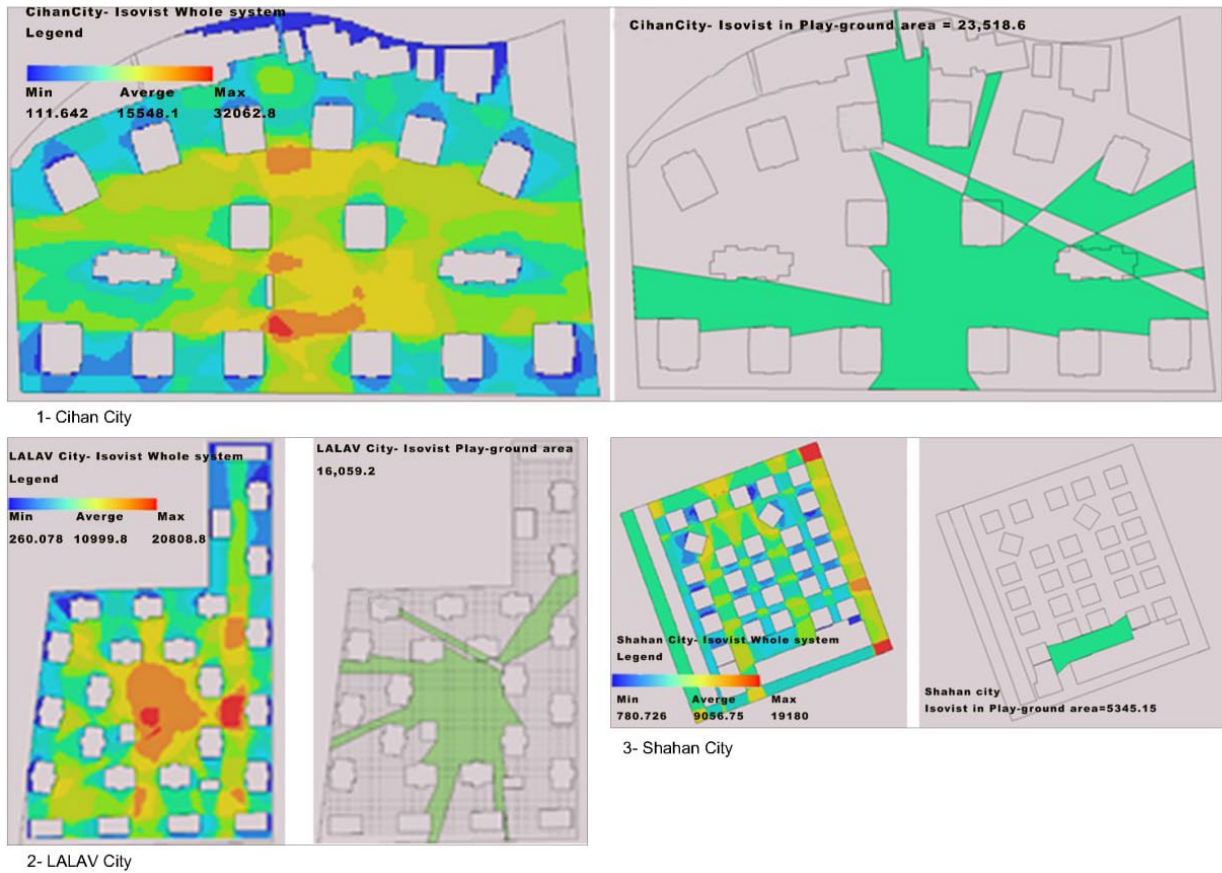


Figure 5. Isovist from whole system with playground and sitting area result of case studies.by the researchers

The respons of the resdints according to the effect of spatial configurations on the quilty of space (social&visual dimensions)

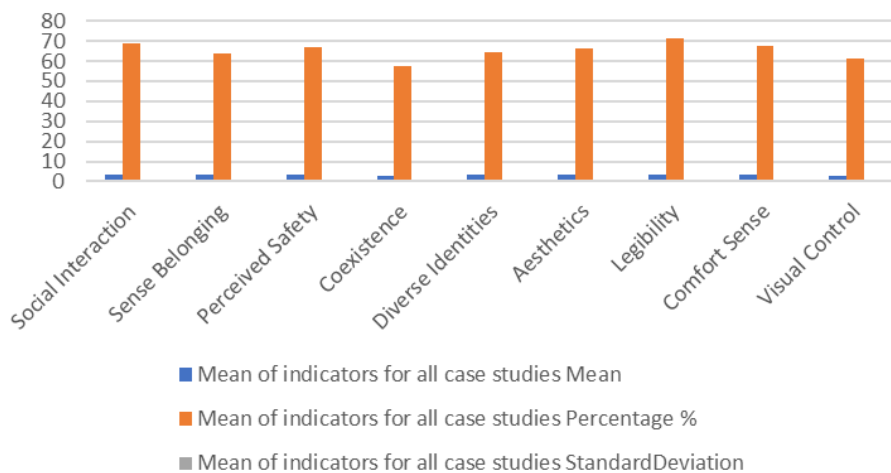


Figure 6: shows the responses of the residents according to the questionnaire by the researchers.

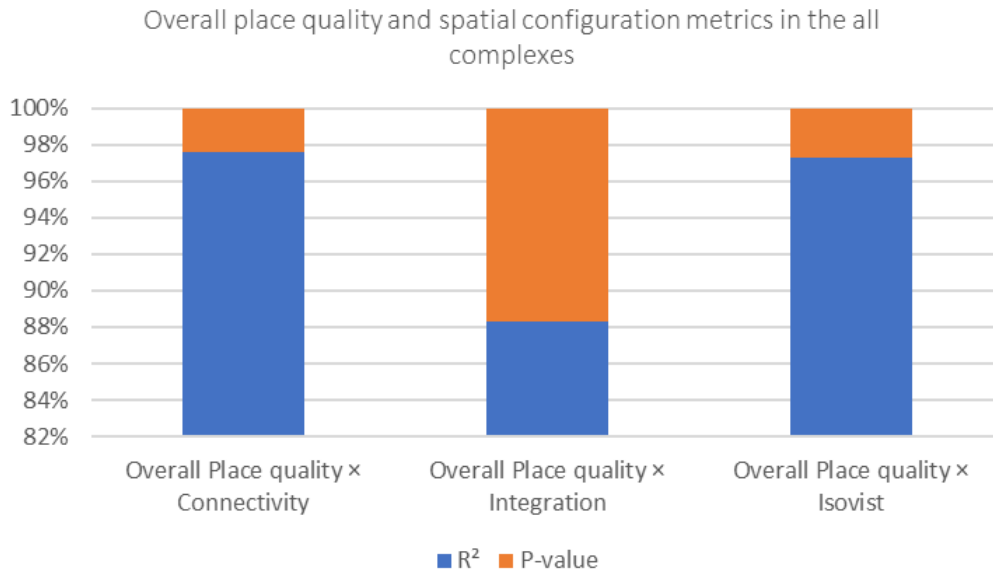


Figure 7: Overall place quality and spatial configuration metrics.by the researchers.

Table 1: Operational framework of the tested relationship between spatial configuration and selected place quality indicators.

Component	Operational meaning in this study
Independent variable	Spatial Configuration of communal spaces in selected residential complexes
Spatial configuration metrics	VGA connectivity, Visual integration HH, and isovist
Dependent variable	Selected place quality indicators based on resident's perception
Dimensions tested	Social, visual-perceptual dimensions
Indicators included	The nine indicators used in the questionnaire under the social and visual-perceptual dimensions
Data Sources	Space syntax analysis using DepthmapX and resident's questionnaire responses analysed by SPSS

Table 2: Detail location of case studies, by researcher.

No	Case studies	Distance from city center (KM)	Location
1	Cihan City	7.0	120-meter-high road and Kirkuk main road
2	LALAV City	17.4	150-meter ring road, between Bahrka main road and Masif main road
3	Shahan City	13.0	150 m high-way ring road, between Kasnazan main road and Masif main road

Table 3: Required sample size for each case studies, by researcher.

No	Case studies	No. of residents	Required sample size
1	Cihan City	714	250
2	LALAV City	572	230
3	Shahan City	416	200

Table 4: VGA connectivity and Visual integration (HH) result.

No.	Project name	VGA Connectivity			Visual Integration (HH)		
		Average	Minimum	Maximum	Average	Minimum	Maximum
1	Cihan City	3,886.27	26	7,993	14.1	3.53	22.07
2	LALAV City	2,690.64	31	5,176	12.29	4.25	17.6
3	Shahan city	2,266.14	193	4,796	9.42	5.09	13.72

Table 5: Isovist result in play-ground area with whole system.

No.	Project name	VGA Isovist (Whole System)			Single point of Isovist Play-ground, sitting area with 120°	Result of Comparison between (Single point /Max. of whole System) *%100
		Ave.	Min.	Max.		
1	Cihan City	15,548.1	111.642	32,062.8	23,518.6	%73.35
2	LALAV City	10,999.8	260.078	20,808.8	16,059.2	%77
3	Shahan City	9,056.75	780.726	19,180	5,345.15	%28

Table 6: shows Mean, percentage, SD of Indicators according to Questionnaire result by the researchers

Mean of indicators for all case studies				
Dimensions	Indicators	Mean	Percentage %	Standard Deviation
Social Dimension	Social Interaction	3.43	68.62	0.97
	Sense Belonging	3.19	63.9	0.95
	Perceived Safety	3.35	67.01	0.93
	Coexistence	2.88	57.54	1.02
	Diverse Identities	3.32	64.68	0.96
Visual/ Perceptual Dimension	Aesthetics	3.32	66.46	0.97
	Legibility	3.56	71.15	0.92
	Comfort Sense	3.38	67.62	1.01
	Visual Control	3.06	61.18	0.98

Table 7: Relationship between Overall place quality and spatial configuration metrics.by the researchers

Relationship	R ²	Interpretation
Overall Place quality × Connectivity	0.868	Very strong
Overall Place quality × Integration	0.673	Moderate– strong
Overall Place quality × Isovist	0.857	Very strong