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# Evaluating the impacts of possible outcomes on urban design projects: Three layers of Taksim Square and Gezi Park, Istanbul

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***Abstract***

*Taksim Square and Gezi Park, have been one of the unique places to study social and spatial layout change throughout the history. Taksim as a political and social beating heart of Istanbul, it has been the subject of a never-ending cycle about urban design decisions. Currently the underground tunnel system is open to traffic and pedestrianized Taksim square, which is a vast concrete space awaits for an urban design project since 2013. The construction In March 2020, Istanbul Metropolitan Municipality, declared a contest for an urban design project in Taksim. Between 146 applications, only 3 projects were allocated design equivalent award. These three projects are unique in their space production with different urban design solutions. While the winner project, brings a new layer to the top of the area with a pedestrian bridge, one of the equivalents proposes a pothole to link the square and underground from different point of view. On the other hand, the third equivalent, brings back the old design choices with more green utilization. In this paper, the urban space design of different proposals are evaluated with a mathematical method, Space Syntax technique. Firstly, axial and segments maps are created from three proposals to create syntactic maps and measures. The analytical methods of Space Syntax are used for comparison to better understand how the morphological characteristics of Taksim would be changed with these proposals. Axial maps, segment maps, visual graph analyses and correlation graphs are used to prepare the models of measures: Integration HH and different R values, choice, synergy and visual integration in DepthMap. It is believed that this study contributes for contributors and municipality during implementation of the design. This study also shows the potential of Space Syntax for testing proposals and situations during urban design process.*

***Keyword:*** *urban design contest, Taksim, Space Syntax*

## Introduction

Taksim Square and Gezi Park area is one of the social and political centres of Istanbul, located in Beyoğlu in the European part of Istanbul (Figure 1). The square was underdevelopment of subject to 'pedestrianization' project since 2013. In 2020, a competition that was named as "Taksim Urban Design Competition" was held under the name of Istanbul Metropolitan Municipality Directorate of Cultural Heritage to integrate the 2013 Pedestrianization Project. There were 146 applications for the first-tier of 2020 competition. 20 of them were found successful and selected for second tier to narrow the results. In the last stage, 3 applications were found the most successful by a jury appointed by the Municipality and these three projects were opened to public voting.

This research was designed upon the mathematical calculation that evaluates 3 projects that were allocated design equivalent award. The researchers also anticipated that the potential of mathematical methods for

testing proposals and situations during urban design process. In order to test this hypothesis, the Space Syntax method was applied. The aim of the research is to evaluate potential impacts of the urban design projects on the spatial configuration of Taksim between 3 equivalent projects. The research comparatively analyses the spatial configuration and design decisions in these projects by using Space Syntax parameters. It also tries to judge a possible implication of the winner project for the pedestrian movement in the area. Another possible outcome is comparison of winner projects between achievements and outcomes by mathematical values. The researchers also anticipated that the winner project would positively affect the pedestrian volume in Taksim Square and Gezi Park and bring people from metro underground to surface. On the other hand, for this study it is impossible to test these observations and intuitions due to pandemic and the project has not been implemented yet.


*Figure 1 Taksim Square and its vicinity*

## Subject & Aim

The research is important for providing a comparative evaluation of rival urban design projects based on same area in a quantitative way. It also contributes guidance for the discussions on the benefits and adverse impacts of the project by evaluating location choices for function proposals in the area. Furthermore, the methodology presented in this study enables working between various scales, thus, the implications of Taksim Square and Gezi Park separately.

## Methodology

The research is based on comparing urban design proposals in Taksim Square and its vicinity in three equivalent projects. It makes use of the Space Syntax method, which was developed by Hillier and Hanson. It studies the relationship between human behaviour and physical space (Hillier & Hanson, 1984). One of the

studies demonstrated that the methodology is valuable tool to determine a location and size for open spaces in spatial network while considering accessibility for people (Tannous, et.al., 2021). This makes it a proper method to evaluate possible design outcomes of three projects. Three different parameters of this method are used in this study. In the first stage, integration parameter was calculated with the purpose to determine how the spatial structure was suggested between 3 projects. It represents the relation to every point in drawn network. Is Taksim area integrated or separated in both global and local scale now? In the second stage of the research, choice parameter was analysed for importance of the spatial structures and street texture in the entire historical area. At last stage, synergy parameter was measured to understand micro decisions in the area. This measures the degree to which the internal structure of an area relates to the larger-scale system in which it is embedded (Eskidemir & Kubat, 2019). For the purposes of this research, three axial models of three projects were drawn in AutoCAD and analysed by using the Space Syntax method in DepthMap program. Axial maps, segment maps, and correlation graphs are used to prepare the models of measures: Integration HH and different R values, choice and synergy in DepthMap. Considering that there would be a major change about layers in Taksim after the implementation of the winner project, this study also evaluates other proposals' outcomes.

## Spatial results of the previous study

It is proved that Taksim square as the political heart of Istanbul lost its basic character and transformed into one of the ordinary transportation hubs of the city. (Kubat, et al., 2015). It is evident that the construction of the underground level for transit purposes led to an undesired outcome and divided the users in Taksim in two layers. Those who use the square for transportation purposes are channeled to the 'brand-new Taksim' below the ground level, and the pedestrian level on the surface decreased. The findings of the previous research also prove that Gezi Park have always been isolated from its surroundings. According to the analyses and observations conducted in that study, both the pedestrian volumes and spatial values in Gezi Park are quite low before the construction period in 2014. After that period since 2017, the pedestrian volume in the park did not increase even if the conditions in the park were improved by new arrangements. It is declared an urgent need for a new design intervention on the surface level in order to improve the pedestrian levels for Taksim square which is currently an open and vast concrete space. Further planning decisions, and design and landscaping implementations are expected to improve the pedestrian experience in Taksim, make Gezi Park more integrated, and also transform 'the Taksim above the ground' to become a decent city square. The redesign of Taksim square through the proposals of the urban design competition which was held in 2020 created the main starting point of this paper (Table 1). The red dashed lines present the dates of the pedestrian observations that were conducted. It is tried to capture the situation in the critical phases of the pedestrianization project.

*Table 1 Timeline of Pedestrianization Project in Taksim Square and Gezi Park over years (Based on Kubat, et. al., 2015).*

| | 2011 | 2012 | 2013 | 2020 |
|---|---|---|---|---|
| **Bureaucracy** | ***27 April***<br>Announcement of the Project<br><br>***16 September***<br>Approval of the project | **14 February**<br>Displayed of the Project for public viewing | | **24 March**<br>Announcement of the Taksim Urban Design Project<br><br>**25 July**<br>First stage in the competition has been completed<br>20 of the 146 applications in total were selected for the second stage.<br><br>**22 September**<br>Second stage in the competition has been completed<br>3 of the 20 applications in total were selected for the public vote.<br><br>**13 November**<br>Competitor 15 had been announced as winner project |
| **Construction** | | **5 November**<br>Commencement of the construction | **27 May**<br>Construction machines entered into Gezi Park<br><br>**13 September**<br>Completion of the construction | |
| **Court** | | **11 May**<br>Lawsuit filed by the Chamber of Architects | **6 June**<br>Judgement towards the cancellation of the project | |
| | Pedestrian count | Pedestrian count | Pedestrian count | |

**Adaptation of syntactic values in the previous study Kubat and her team**

The methodology of that study involved pedestrian observations from various gates in both square and park area in three different phases of the pedestrianization project. While the data obtained in these observations enabled reaching important conclusions, the researchers deemed it necessary to conduct another round of observations to verify and confirm these conclusions. Therefore, a fourth round of observations was conducted in November 2014 which was after construction, and in addition to gate count, followings at the underground level were also included.

Correlation between mathematical values and pedestrian counts demonstrated that pedestrians have two purposes for using Taksim Square and Gezi Park. First, the area is used to reach Istiklal Street for commercial, cultural and entertainment purposes. Another purpose which might be the main one is to use the square as a transit station during their journeys throughout the city between bus, minibus, metro, finical, tram and steamboat options. The observations conducted before and during the implementation of the project reveal that the highest volume of pedestrian movement occurs between the transit stations in the square. Furthermore, the latest round of observations confirms that the pedestrianization project channelled the pedestrians who use the area for transit purposes down to the underground level. As of now, a user can transfer between the bus stops, Taksim-Haciosman subway line, and Taksim-Kabatas funicular line without coming out to the surface.

Our study can be evaluated as environmental-behavioural science that considers human nature in spaces to consider how effective the physical restriction is. In summary, possible project that decided to apply in this area should take decisions to improve the pedestrian volume and the quality of the pedestrian experience in

Taksim Square and Gezi Park that is based on previous study results. In this study, it is aimed to criticize these three projects if they are successful to achieve the expected purpose and to understand how they were able to reach the demanded outcome. Would it possible to change the fate of the square with the proposals of the winner project and how about other two in this manner?

**The focus of the three challenging projects**

The winner project, number 15, focuses mainly on Gezi Park. In order for Gezi Park to be used more actively, it's aimed to restore two features that the park lost over time. The pedestrian bridge proposed in this project both enlivens the memory of the view terraces overlooking the Bosphorus in the continuation of Gezi, and connects Gezi to Maçka Park by establishing connections with cultural venues such as AKM and Atatürk Library. Thus, it's aimed to bring a new perspective to the square and Gezi. Another contribution of the pedestrian bridge is that a new link will be established between Gezi Park and Taksim and Maçka and Nişantaşı in a way that will balance the increasing tourism pressure in the recent period.

Number 16 is an interpretation of the traces in the memory of the space. The aim is to make the square a multi-purpose center that lives day and night. The square is equipped with an infrastructure suitable for different uses such as concerts and celebrations, the presence of trees has been increased. It has been brought to the cascading waters, cafes, newspapers, flower kiosks, skateboard track, reflection pool have been designed in the square. By taking the vehicle traffic above the ground, the area was saved from the desolate, undefined situation, and the underground passage was transformed into a "Memory Museum" where the memory of the space is preserved.

Last equivalent, number 19 OBRUK, has two main approaches. The first is to create more defined, comfortable, and walkable spaces by expanding the green texture of Gezi Park towards the square and integrating the square with the park. The second proposal is directed to the underground part of Taksim Square, which is still unhealthy and idle, turns into an underground art complex with strong relations with the square. OBRUK is also the centre of the green movement that is planned to spread all over Istanbul, starting from Taksim. Together with the application interface designed with the project, the collective insemination process aims to transform the idle areas of the city into green areas.

Most important thing about these 3 projects are that they try to bring multilevel dimension and new entrances to the area with different additions in order to connect different levels of the area (Figure 2). Project 15 brings a pedestrian bridge continues over both areas that has multiple entrances distributed on various points. This can easily bring continuity and flow for pedestrian movement. On the other hand, project 19 proposed a new underground space with multiple entrances and a huge pothole in the middle of the square. As Zhang pointed out (Zhang, et.al., 2012) that a movement in a space is much more if it is connected to an entrance; it is found that these three projects are successful in bringing people to the area by their rich alternative entrance approaches.

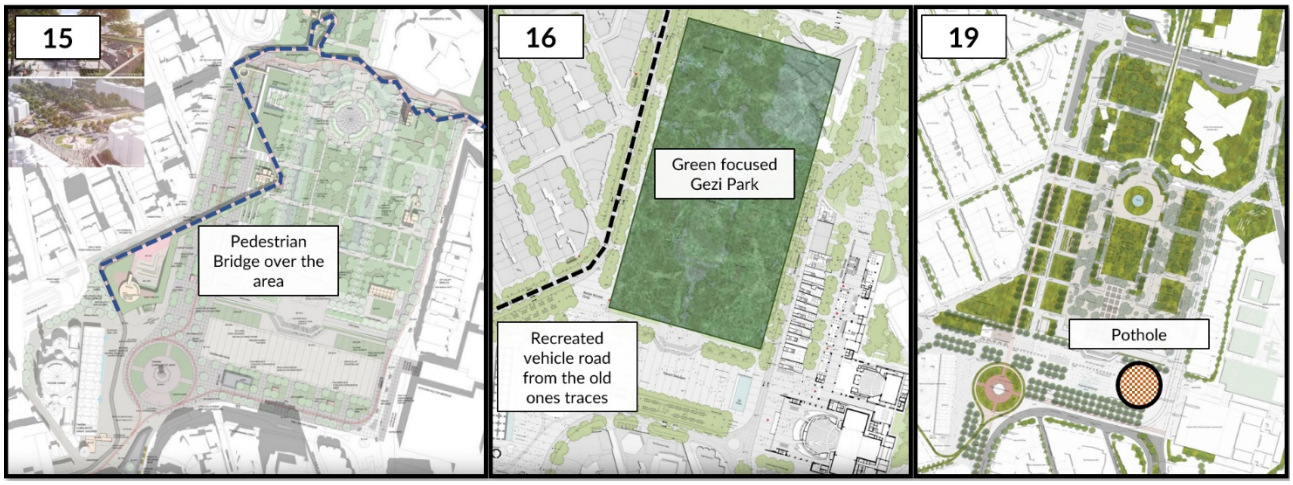


*Figure 2 Three equivalent projects at last stage of Taksim Urban Design Project; 15, 16 and 19.*

## Analysis

In this section, quantitative values obtained through space syntax analysis are compared and discussed. While the previously described parameters and spatial mapping are used within this theoretical approach, design decisions that were discussed in the previous section are also associated with space syntax values and the effect of on the area is compared. According to the analyses conducted in this study, both three projects do not change whole network values drastically. On the other hand, while winner project is more integrated in Beyoğlu scale, the other two have nearly same "integration" value. Axial line count is not the answer here to explain this situation. While competitor 15 and 16 have nearly same line number (1255-1254), 19 has 1237 lines. From this point, it's clearly seen that competitor 19 mainly focus underground level with it's new design areas that connects metro, square and park.

The findings of the research prove that Taksim Square is more integrated than Gezi Park to its surroundings in winner project (Figure 3). On the other hand, it is obtained that competitor 19 has opposite structure than the contestant. Gezi Park is more integrated than square to its surroundings in this project. Another curious data is square, and park have same integration value in competitor 16. The important part here is to explain how integration value differs between 3 projects even same number of additions made as design choice in the area. First key point here is square design in 15 has a lot of routes with new landscape choices. This makes square more integrated with its surroundings, especially with the main vehicle roads which indicates that global integration value is higher in this project. Another important finding is that extensions of Gezi Park in competitor 16 is cut by vehicle road while other competitors keep area connected with keeping that road as pathway. Integration value findings are the same across all ranges (400m & 1200m).

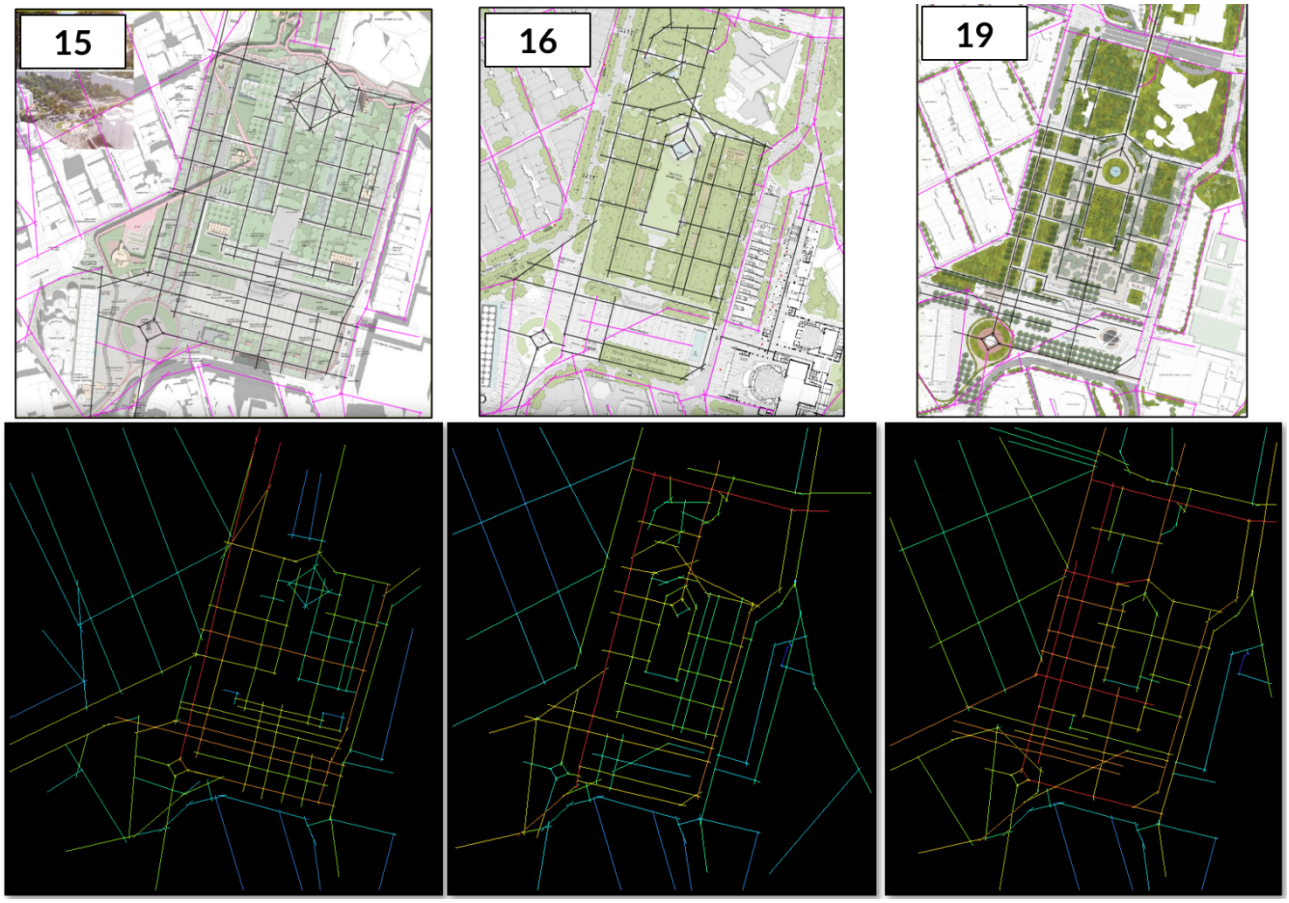


*Figure 3 Integration maps of three equivalent projects; 15, 16 and 19.*

Higher choice value is obtained in winner project as integration value. This means new design choices in the area are effective than the other equivalents in street perspective as new pathways from all spaces to all other spaces. One thing clearly seen in space syntax data maps is that the number of segments of different value in square and park are much higher in winner project. The one tries to convert area into old structure with vehicle road lacks these segments in the area itself, only surroundings have different value ones. “Synergy” parameter is based on the correlation of global and local integration values. This parameter focuses on describing how new function suggestions in these projects influence the area. Winner competitor ranks second in the synergy parameter ranking. In general, each competitor has a value between 1 and 0.45 which means that local scale is effective in the system of every project. On the other hand, “intelligibility” results are bit different for each competitor. Intelligibility is conventionally applied in the axial map as the correlation between connectivity and global integration. A high value of intelligibility is related to the high value of the integration parameter. Also interpreted as space in a system, it can easily define the system on a global scale, which also provides a clear urban system for the user. This parameter is obtained higher than 0.45 value in each competitor. Winner project is ahead of the others with 0.65 intelligibility value while others is close to 0.45 threshold. It means that their systems are close to be an average value and winner one has clear system for Taksim Square and Gezi Park users.

*Table 2 Syntactic values of three equivalent projects that obtained from Depthmap.*

| Competitor | Integration | Integration (r3) | Choice | Choice (r3) | Intelligibility | Synergy |
|---|---|---|---|---|---|---|
| ***15*** | 177 | 24 | 6498 | 39 | 0.6533 | 0.8543 |
| ***16*** | 169 | 23 | 7570 | 37 | 0.4597 | 0.8522 |
| ***19*** | 169 | 23 | 6717 | 39 | 0.5091 | 0.9022 |

There are lots of new function suggestions and ideas in the winner project which makes it perfect to use for synergy parameters. With this parameter it is easy to understand the location choice of new functions by they are integrated to the area or not. Higher rate means that the point is more integrated. There are several important suggested points to analyse in the area, entrance points of pedestrian bridge, observation tower, public amphitheatre, and gallery. Most important one between these is entrance points of pedestrian bridge because these points support the idea of integration of whole Beyoğlu through the study area. There are four entrance points. First entrance point which is close to the Istiklal Street and found out it has the highest synergy value between four. The synergy values of all entry points were obtained to be higher than the average value (0.8543). Accordingly, functions integrated into entry points also benefit from this interaction (Amphitheatre, commercial and observation tower).

## Conclusions

The effect of design choices of these projects can be clearly seen on average segment counts, which varies in size and creates unique tissues. One of the reasons why competitor 15 has more integration value lies here with corelation between segment length and count. While this project has more new lines in the area, they intersect with each other in regular grid pattern. This regular pattern emphasizes that design choices in winner project make the area more accessible in terms of orientation to space. The square in 15 has more linear and long segment lines that is also the only one has segment line in the park parallel to the square. On the other hand, 15 is the only one that tries to integrate the area, with a new pathway with a bridge over park and square, with its surroundings. One of the studies that evaluates bunch of other squares in Istanbul found out that the more integrated a public urban space is more accessible on foot from its surroundings even from larger distances (Torun, et. al., 2020).

Morphological values partially affect the values obtained through space syntax analysis as integration and choice values are higher in winner project as regular pattern design. This finding leads us to the conclusion that linear and continuous urban forms with geometric intersect points have a relation with integration and choice. Similarly, in both projects, the highest integration value axes are those remaining from old vehicle

road that restricts the square and park and which also constitute the skeleton of today's district. One important thing here is converting the vehicle road into a pathway makes it more integrated as seen in competitor 15 and 19. In both, this avenue which is integrated with the rest of the area interact with the square in the centre. In this way, streets provide an accessible system. In 16, accessibility in the whole area is limited. The synergy value is highest in 19, which makes it more suitable for point decisions (0.9022). In 16, where continuity is not decisive design choice like others, have the lowest comprehensibility value (0.45). The fact that the value is close to 0.45 indicates that the urban system is nearly incomprehensible. In addition, when the comparative analyses were made, it was found that in Beyoğlu scale, the winner project is more comprehensible than its pairs unlike local scale (0.6533). This situation can be related to study area is now more integrated to whole district than other designs.

As a result, it has been found that the winner project, competitor 15, is more integrated than others and succeeded its own approach that links the area to whole Beyoğlu; entertainment and commercial district. While this design preference directs the user towards a point in the centre, the high integration and choice values confirmed that urban systems are accessible. Future research using this approach might usefully examine the pedestrian count in the area. Diversification of such studies will contribute to a better explanation of the relationships between morphological processes and urban structures.

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