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USING SPACE SYNTAX TO CONVERT A BROWNFIELD AREA INTO A INNOVATIVE PARK: the case of Kayseri, Turkey

AUTHOR:

Ayşe Sema KUBAT
Istanbul Technical University, Faculty of Architecture, Department of City & Regional Planning, Turkey
e-mail: kubat@itu.edu.tr

Özlem KEVSEROĞLU
Istanbul Technical University, Faculty of Architecture, Urban Design Master Programme, Turkey
e-mail: ozlemkevseroglu@gmail.com

Ayşe Özbil TORUN
Faculty of Architecture, Okan University, Tuzla Campus, Istanbul, Turkey
e-mail: ayse.ozbil@okan.edu.tr

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THEME: Public Urban Space

Abstract

The aim of this study is to develop an urban design strategy for the revitalization of post- industrial areas and the railway line in Kayseri –an industrialized city in Central Anatolia, Turkey. With the developments in 1930s, Kayseri became one of the modern cities of the Turkish Republic. In parallel with the world's history of industrialization, Kayseri Sümerbank Cotton Factory was established in 1935 nearby the rail line in order to benefit from transportation and marketplace facilities. The current design of the Factory is characterized by the hostile layout of the railway tracks, which inhibits pedestrian access and segregates the area from the city center. This segregated circumstance is evaluated and new design strategies are developed with the aim of converting the isolated area into an innovative park design including sustainable, mixed-used functions for creating a pedestrian-friendly environment. The basic concepts and the methods of Space syntax are adapted to develop a new strategy for this Brownfield site by analyzing the relationship between the urban form, the pattern of movement and space use. Firstly, axial line analysis is conducted to determine the global and local integration patterns of the city. Even though the Brownfield area seems to be highly integrated at the global level, pedestrian access is disconnected between the city center and the area due to the railway tracks cutting through the city. Secondly, pedestrian counts are conducted along the selected spaces for analyzing the link between pedestrian movement and urban morphology. This is a major step in forecasting the effects of the proposed changes in street layout to pedestrian accessibility. Lastly, Depth map (visibility graph analysis) is also implemented by drawing isovists from several strategic spaces from the proposed layout. This serves two aims: first, to understand how far these isovists extend and overlap with each other; second, to evaluate whether the views offered by the spatial layout support inviting images.

The proposed design project is an integrated approach to land-use, transportation, green space and sustainable development that will create a framework for the future growth of the City of Kayseri and lead to

a vibrant and livable city with an enhanced quality of urban life. By changing the rules of the engagement between plant life and pedestrians, our strategy combines organic and building materials into a blend of changing proportions that accommodates the wild, the cultivated, the intimate, and the hyper-social.

INTRODUCTION

This study is based on a research project for the revitalization of post- industrial areas in the city center of Kayseri in Anatolia, Turkey. The main aim is to develop an urban design strategy for the transformation and re-usage of the post-industrial areas; old Sümerbank cotton factory and the railway lines lying between the factory and the newly (currently) developed zones of the city. A new urban design strategy, which includes the extension of selected roads into the area, is developed and its effect on street layout and pedestrian accessibility are evaluated by using Space Syntax methodology. The fundamental aim is to turn what is currently an unpleasant, derelict area, known as brownfield area into a new active zone without losing its historical character and to create a unified, vibrant town centre. By preserving the historical railway lines, not only a nostalgia is achieved but also a new linear green area and a public park is created on the existing railway lines in between the brownfield area and the newly developed city center. This will better integrate the areas with their surroundings, and at the same time encourage social and fiscal improvement over time.

BACKGROUND

Sumerbank Cotton Factory is a modern architectural heritage that has to be preserved as it is one of the first symbols of Republican modernization. This area includes not only factory buildings but also social activities,educational facilities, residential areas for workers and their families and recreational activities. However, despite the lively neighbourhoods around this part of the city, this historical site is currently in the process of deterioration due to the rigid seperation of land uses by the existing rail tracks.

CASE STUDY

1) THE STUDY AREA

During the rapid industrialization period of the Turkish Republic, Sumerbank Cotton Factory was established in 1935 and this foundation has contributed to Kayseri in becoming one of the modern cities of Turkey. The Factory areas was selected as the case study for its proximity to the railway lines and the city center. As seen in Figure 1, Sumerbank Cotton Factory area lies along the main road that crosses over the railway lines, connecting to the city center and has 1500 m distance (~1 mile) to center. However, the railway lines inhibits pedestrian accsess and segregates the area from the city center. Thus, railway lines plays an important role by connecting Sumerbank area and the city center.

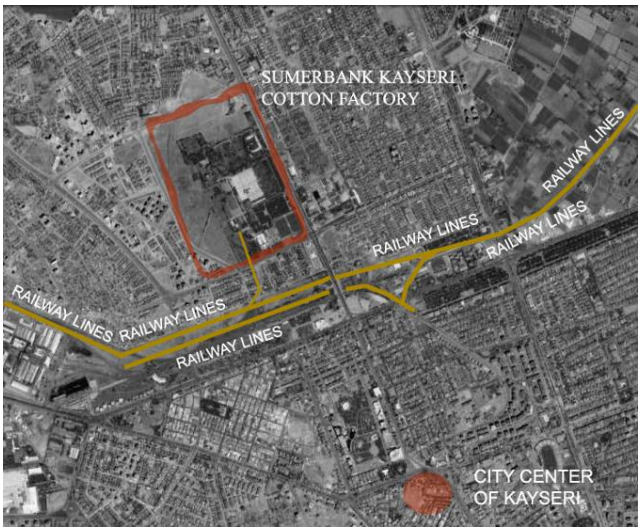

Figure 1: Location of study area in Kayseri

2) PROBLEM DEFINITION

The municipality's new masterplan abolishes the use of the existing rail lines. This implies the transformation of the area into an inactive urban site with a stronger partition effect on the surrounding central areas.

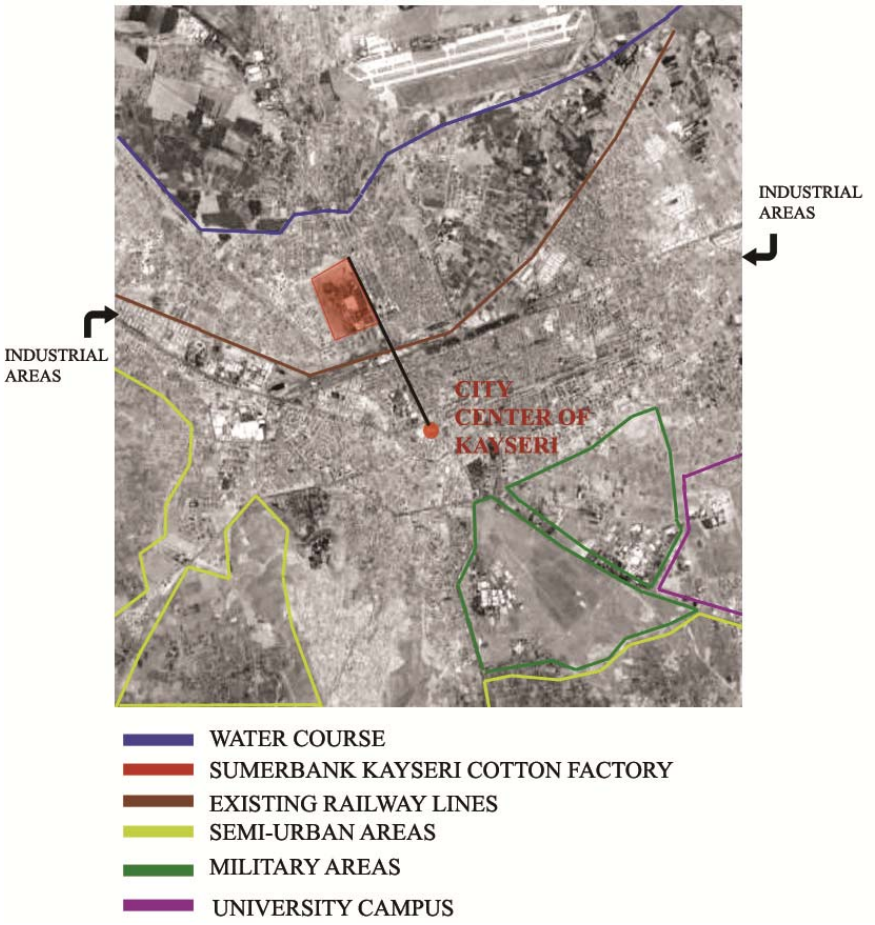

Figure 2: Railway lines seperating the city center and the Factory site

3) PROCESS

In order to obtain reliable results from axial lines analyses, a sufficiently large surrounding area was considered to prevent the edge effect. Natural and artificial boundries were considered as the cut off limits. As seen in Figure 3, water course is provides a natural boundry, while semi-urban areas and military areas define the artificial boundries.

Within the context of the study, in order to understand the relationship between street layout and space use, the existing pedestrian movement patterns were observed at selected gates in and around the Sumerbank Cotton Factory.

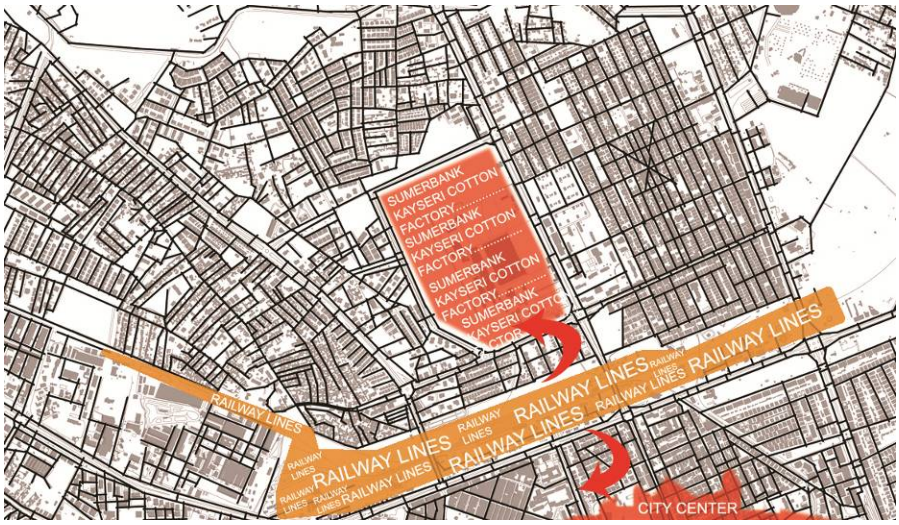

Figure 3: Boundry of the study area

The spatial model of the study area was prepared by using axial lines map. Both global and local spatial integration analyses were conducted in order to evaluate the spatial structure of the entire system.

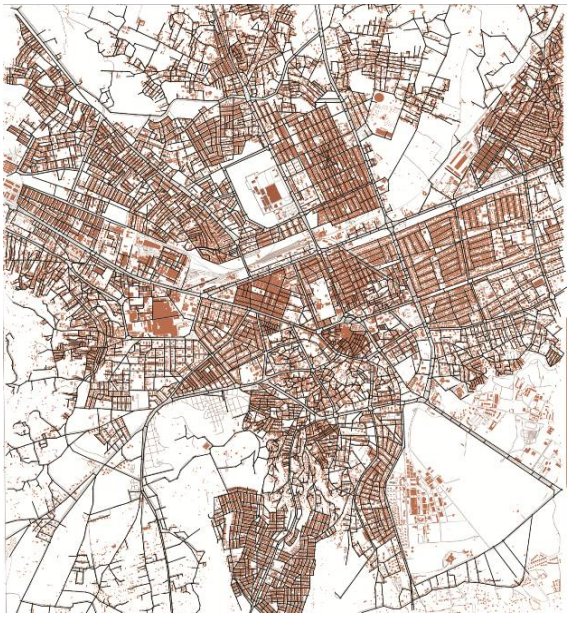

Figure 4: Axial map before analyses

The global integration map produced (Figure 5) gives some idea of the accessibility of pedestrian linkages within the area. Despite the fact that the Factory area and its surroundings lie within the global integration core, due to the treshold effect of the railway lines, the area is disconnected from the city centre, thus cannot benefit from urban liveleness.

Figure 5: Global Integration Analyses

The local integration analyses of the area shows that İstasyon street, the main street, extending from the city center to the Factory area, has the highest integration values whereas the Sumerbank estate has relatively low integration values due to the threshold effect of the railway line.

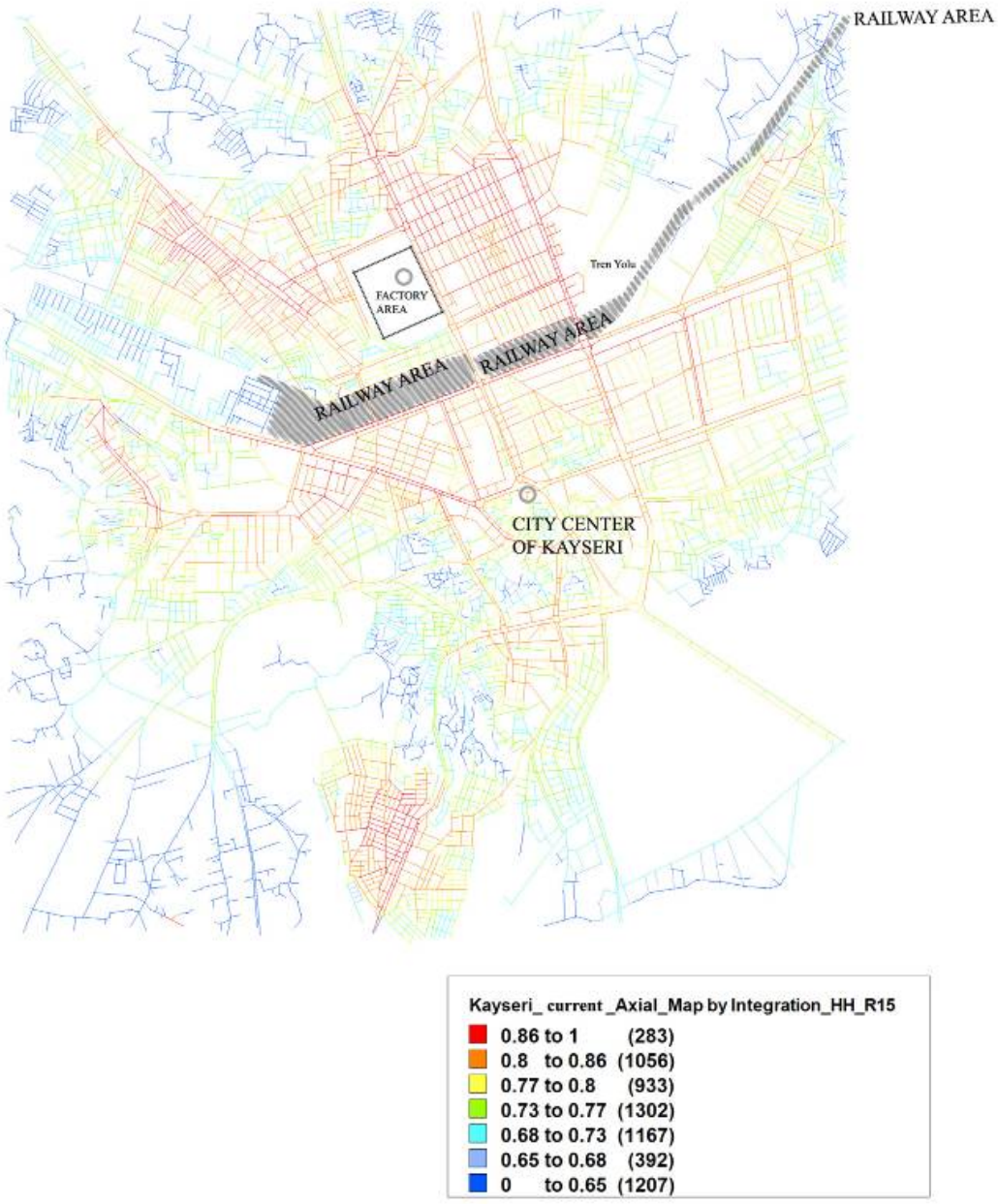

Figure 6: Local Integration Analyses

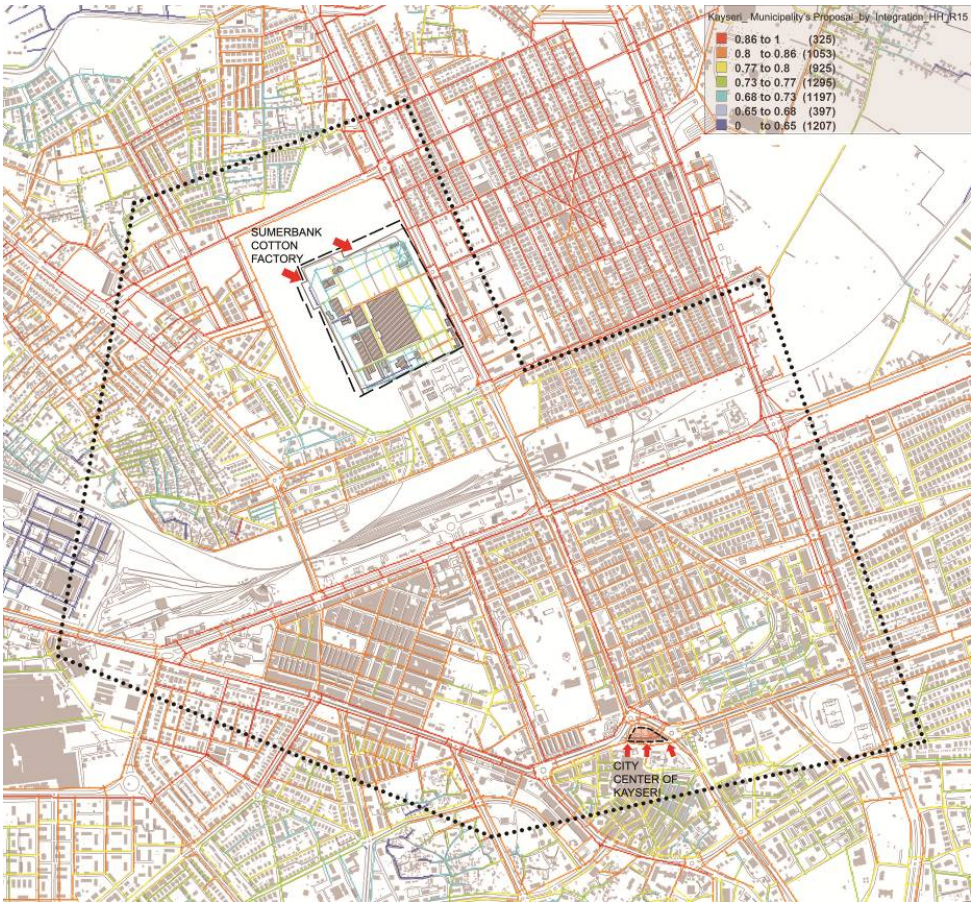

Figure 7: Local integration analyses of Munipalty' proposal

In addition to analyzing the existing layout of the city, axial lines analyses was also conducted to evaluate the design proposals for the Sumerbank estate developed by the Metropolitan Municipality of Kayseri. The aim of the design proposal is to preserved the existing buildings and high density of forest area within in the Sumerbank Cotton Factory. As seen in Figure 7, the Municipality's proposal includes the addition of localized roads within the estate.

Upon conducting axial lines analyses, the following strategic and spatial problems have been identified in the design proposal developed by the Municipality' case study:

- In the proposed design, the layout of the Sumerbank estate is defined with low integration values. The proposed layout fails to promote neither local nor global integration.

- The analyses shows that the Sumerbank area is considered as a landscape project and not as part of the entire city.

- The analyses also underscore the fact that an urban regeneration proposal without any distinct function defined lacks in urban integration. Thus, a successful regeneration design should aim to overcome the partition effects of railway lines-, considering the city as a whole.

Through an objective assessment of the problems and constraints of this historic core using the Space Syntax methodology, we identified alternative design solutions that could enhance the use of the area and decrease its isolation from its surroundings.

Figure 8: Pedestrian Movement Analyses in the study area

The results of the analyses have demonstrated that, the existing pedestrian movement patterns are parallel with the local integration analyses.

By converting the disused railway tracks (Figure 9) into an innovative urban park, this urban belt can serve for public use while enhancing its integration within the city.

Figure 9: Railway track in Sumerbank Cotton Factory

New pedestrian axes (Figure 10) connecting the Sumerbank estate with the city centre are developed.

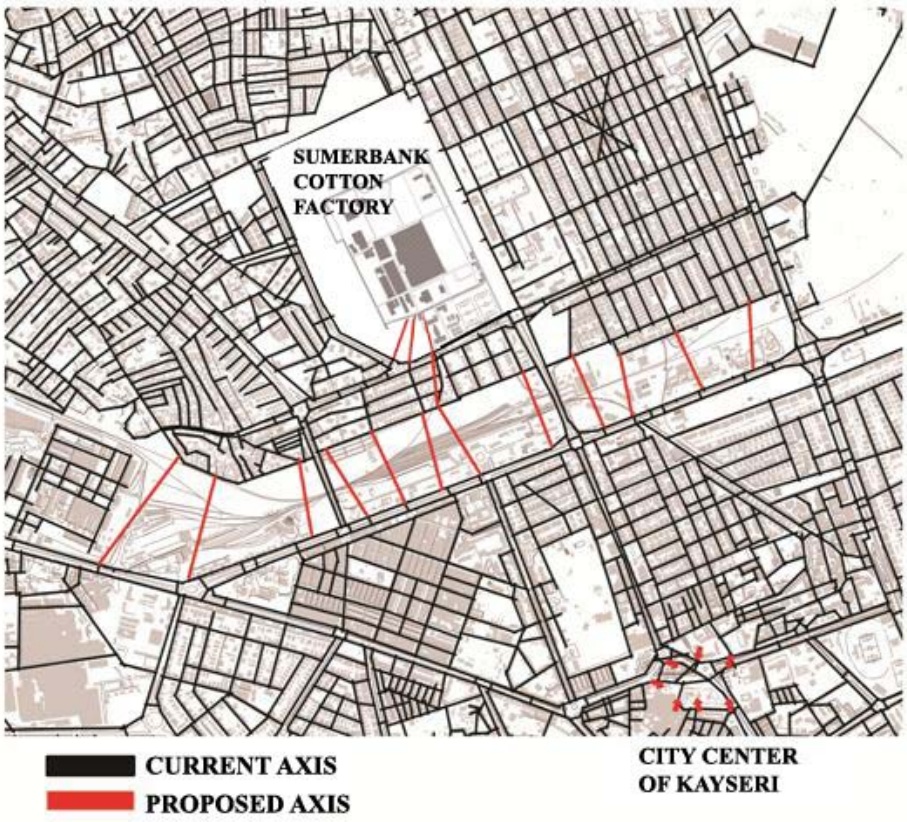

Figure 10: Developed new pedestrian axes

Local integration analyses of the whole area including the proposed pedestrian axes are believed to contribute to future research as well as for evaluating proposals to regenerate historical city centers that have lost their vitality.

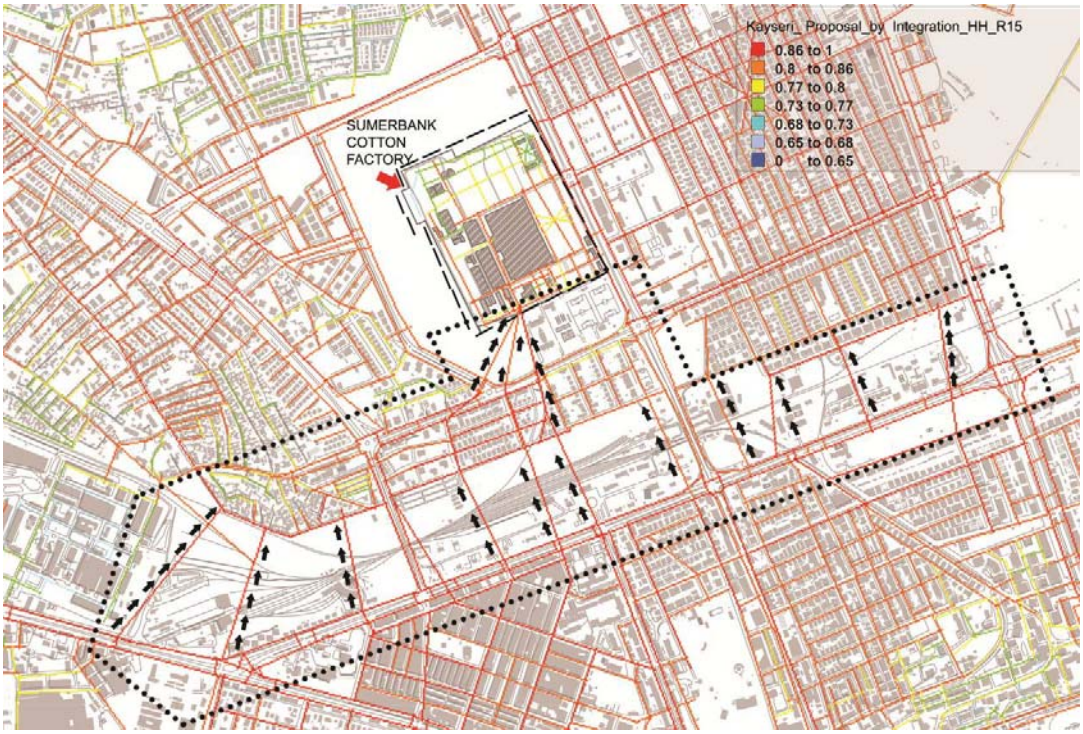

Figure 11: Local integration analyses with developing new pedestrian axes

Figure 13 compares the local integration values derived from the analyses of design proposal as developed by the Municipality and the alternative urban design project developed within the scope of this study. As seen, the integration values for both the streets added within the estate and the existing road circumscribing the estate are higher for the alternative design proposal.

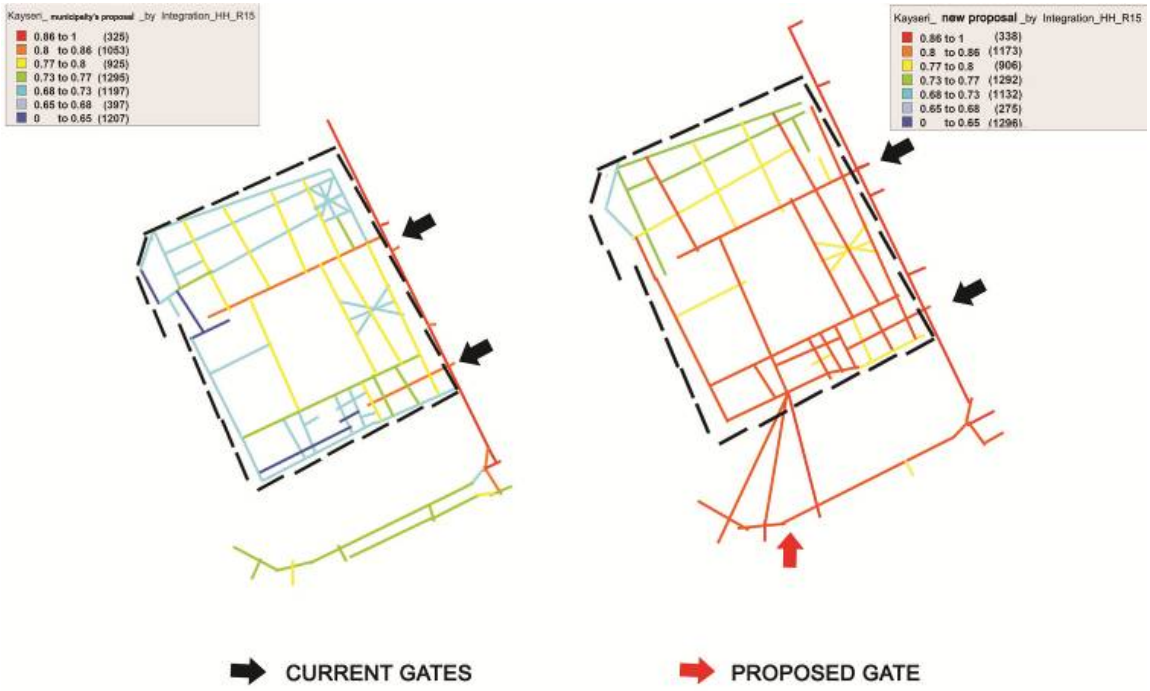

Figure 12: at the left: Kayseri Metropolitan Municipality' proposal, at the right: developing new urban design proposal

CONCLUSION

The alternative urban regeneration design proposal developed in this study includes several components, as outlined below:

- In accordance with the railway transformation project currently under consideration, a linear park design proposed for the urban belt along the railway lines.
- A new gate to the study area, opening through the existing buildings in the Sumerbank estate is developed, transforming the non- functional factory buildings into industrial muesums, culture centers, educational facilities and recreational areas.
- Similar to the Highline Project, this design proposal emphasizes the significance of Sumerbank estate of Kayseri, developing a nostalgic line that showcases the origional premises of the area.
- Considering the fact that the Fcatory holds great potential for a large green areas in the city center, this area should be designed as a recreation park for urban sustainability.
- Strategic actions should be taken for the rehabilitation of the industrial site- a Brownfield area- through landscape design and urban planning.
- In order to activate the shopping and public areas, and to create recreational activities and entartainment facilities, the connections between the premise and the city center need to be strenghened.

- The analyses indicate that the proposed design alternatives will have their positive effects not only on the economical performances of new and current commercial facilities but also on the social structure of the city.

- A sustainable urban design approach is idealized by supporting the functional transformation of these waste lands as cultural heritage passed to future generations.

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