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The Key Drivers on Decision Making for Urban Planning Sites: Inner City Logistic Fields

Kentsel Planlama Alanları için Karar Verme Sürecinde Yönlendirici Bileşenler: Kent İçi Lojistik Alanlar

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Abstract

Today, uncovering the magnitude of population growth in cities and its effects on urbanization are major driver for understanding requirements of assisting urban regeneration sites. It has growing interests in identifying the hotspots over planning for the various amenities fields. However, both these areas and the logistic centers are located in urban internal fabrics even without sub-scale land use planning. It is hard to provide the needed customized information on land use suitability. It was proposed build a conceptual geo-data model for the decision-making process to respond the spatial integration of inner-city logistic fields to the urban fabric. Also it is highlighted how geo-spatial patterns of this model could be applied with urban regeneration project that has growing considerations as part of urban morphology. Morever re-allocation of these logistic fields needs to be integrated with more transformative drivers for adaptation to growing city-size within policy driven land use. A comprehensive perspective should be included in the model to representation of socio-economic concerns collaboration with physical and environmental dynamics to better outcomes. This model provides information to enable effective decision support for the conversion of the logistic areas as a priority with respect to other urban thematics concerns in more cities.

Keywords: Urban Morphology, Land use Dynamics, Environmental Urbanization

Özet

Günümüzde, kentsel nüfus artışının büyüklüğünü ve bunun kentleşme üzerindeki etkilerini ortaya çıkarmak, kentsel dönüşüm alanlarının belirlenmesinde başlıca yönlendirici bileşendir. Çeşitli aktivite alanlarının planlaması sürecinde kentsel öneme sahip alanların belirlenmesi ön plana çıkmaktadır. Bununla birlikte, hem bu alanlar hem de lojistik merkezler, alt ölçekli arazi kullanım planlamasının eksikliğine dayalı olarak kentsel gelişim alanlarında yer almaktadır. Bu durum arazi kullanımına uygunluk konusunda ihtiyaç duyulan spesifik bilgilere erişimi zorlaştırmaktadır. Bu çalışmada kent içi lojistik alanların kentsel dokuya konumsal entegrasyonuna yanıt vermek için karar verme sürecine yönelik kavramsal veri modeli geliştirilmektedir. Ayrıca, bu modelin konumsal modellerinin, kentsel morfolojinin bir parçası olarak ön plana çıkan kentsel dönüşüm projeleri ile nasıl uygulanabileceği vurgulanmaktadır. Bahsedilen lojistik alanların yeniden tahsisinin, politika odaklı arazi kullanımı dahilinde kentsel gelişim ile bütüncül olarak değerlendirilerek uygulanması gerekmektedir. Modelin sürdürülebilirliği için fiziksel ve çevresel dinamiklerle sosyo-ekonomik bileşenlerin etkileşiminin model bünyesinde temsil edilmesi önerilmektedir.

Anahtar Kelimeler: Kentsel Morfoloji, Arazi Kullanım Dinamikleri, Çevresel Kentleşm

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1. Introduction

Rapid and increasing urban growth in sub-urban areas have been surrounding by large metropolitan sites. Also formerly used logistic fields and potentially contaminated sites that have been located internal urban density areas as well. Thus, the transformation of these fields should be redeveloped for providing well-designed urban textural forms and urban fabric zones (Thomas, 2002). Especially, growing settlements increase demand for social connectivity and urban growth patterns and dynamics beyond the housing and infrastructural facilities (McPhearson et al., 2016). Urban characteristics and morphology are identified due to societies demands and societal interactions encourage the using of urban land resources integrated with geography and population density (Wang et al., 2016, Pan et al., 2013). Many formerly used and/or underused logistic sites (industrial, harbors, airports, brownfields, vacant, derelict, abandoned, underused sites etc.) are fully or partly located internal urban areas. The regeneration of these sites have become more common since residential, facilities, recreation amenities and free developable land (green fields) have increasingly become restricted especially in densely populated cities. Although the regeneration of these sites have a potential for public interest and human wellbeing, it is required considerable initiatives to complete their redevelopment process. The identification and analysis of domains for regeneration can support the authorities in selecting these regeneration sites (Pizzol et al., 2016).

Most of cities are mainly troubled by gaps between the lack of land use policy and facility provision for land use information (Zheng et al., 2017). The geo-spatial patterns provide information to support effective management of land use dynamics. It is a key factor on restricted land resources for enabling land use transformation within land use planning especially across the coastal cities (Wang et al., 2016, Shi et al., 2016). Over these cities, the current land use related challenges can be addressed and met by building sustainable connection between urbanization and certain authorities (Acuto, 2016). However, the multi-level governances and administrative units from local to global have become increasingly subject to the threat of lack of land resources and unplanned land use activities. So, the involvement of the building of urban fabric zones and planning urban textural forms for shaping the current and the future urbanization patterns and process are under pressure to be managed sustainability (Wu et al., 2018). The nexus of integrated land-use suitability analysis, land use planning and land use information are crucial for management of land related domains and attributes affecting land-use decision making for selecting of

regeneration sites (Wang et al., 2015). Moreover, it is answered what ownership type and what geographical conditions and what site characteristics make logistic fields more likely to be regenerated (Lai and Zhang, 2016). Further, the representation of geospatial domains for regional differentiation in urban growth management has become an important component of urban models with prediction accuracy in geographic information science (Yin et al., 2018). So, it should be quantified the spatio-temporal patterns of urban expansion mainly for monitoring and planning the prediction process of restructuring and landscape dynamics of urbanization (Yang et al., 2018).

For overall the basis of regeneration process are based on the indicators as; (i) potential hazards to human health, (ii) environmental degradation, (iii) degrading the value of surrounding properties, (iv) barriers to local development. Thus, it is regarded as interdisciplinary research involving a variety of disciplines and stakeholder groups in relation to administrative boundaries within the scope of landscape planning and decision-making for prioritizing of regeneration potential and environmental risks. As providing the prioritization dynamics Geographic Information Systems (GIS) is used for mapping, geo-spatial analysis, and management of land attributes of these fields (Klusácek et al., 2014, Klusáček et al., 2013). As an initial planning activity for fund resources and regeneration, the dimensions namely as socioeconomic index, smart growth index, environmental livability index and financial index make it easily enable. It should be aggregated to location specific variables into monitoring and mapping with GIS (Chrysochoou et al., 2012, Wedding and Crawford-Brown, 2007). GIS can manage the real time geographic data sets of topographical representation that is used for enabling multi-participant environment to support collaborative decision-making (Aydinoglu and Bilgin, 2015).

This paper aims to develop conceptual geospatial data model with identifying and representation of land use patterns and dynamics on decision-making for location of inner-city logistic zones as integrated urban morphology changes with regeneration projects. Therefore, this paper outlined the requirements and criteria through the key drivers. In addition, it is comprised to some approaches for integrated urban regeneration projects for provide the sustainability. For this purpose, the light industrial district of Trabzon city is determined as study area. Firstly, the current location and geographical structure of this area was mapped. And following, the physical and socio-economic structure of this area is investigated according to city development. As a result, it is underlined the regeneration of this industrial areas as a priority with respect to other urban facility areas in Trabzon.

2. Material and Method

2.1. Urban Regeneration Process

Urban regeneration provides a spatial integration vision and activities for meet and addressing multi sourced challenges in sub-urban fields to improve their socio-economic, physical and environmental conditions (Zheng et al., 2014). Spatial integration that is considered as a reflection of social connectivity is mainly for integration of regenerated urban form into the current urban fabric collaboration with geospatial information. This information framework recognizes significant spatial variation process in physical and environmental components driving the surrounding neighborhoods. All these are for enabling; (i) the viability and feasibility, (ii) to provide housing to inhabitants, (iii) stability to development of mixed-use urban lands as non-residential and residential sites, (iv) to upgrade local environmental resources and (v) leveling urban density and urban quality (Riera Pérez et al., 2018, Zheng et al., 2017, Zhao and Liu, 2017, Zheng et al., 2016). The urban regeneration is involved key dimensions as (i) sustainability vision, (ii) a legal organizational and administrative corporation for decision-making and (iii) measures from socio-economic and environmental analysis (Alexandrescu et al., 2018).

2.2. Land Use Planning and Management

Land information has an increasing effect on land administration and land use management as consideration of land use policy (Aydinoglu and Bovkir, 2017) in sustainable urban development and planning process (Wang et al., 2013). Land use planning is an effective tool to manage land-use activities (Cheng et al., 2011). It is highly related to neighborhood pattern integrated with local/regional priorities in sub-urban design process. Land use planning provides an internal accessibility and functional distribution for identifying particular land use activities as basis of size, valuation indicators and location. So, the land-related information is involved: (1) current and projected demographic information, (2) financial conditions of citizens and government, (3) physical conditions of the land/location, (4) urban internal structure and functional relationships within the city, and (5) relationship between the city and others (Wang et al., 2014, Wang et al., 2013).

2.3. Unified Modeling Language (UML)

The conceptual data model was designed with Unified Modeling Language (UML). It is used for object modeling in object-oriented view in relation with geo-spatial standards to modelling feature types, spatial and attributes relations, topology structures. Therefore,

conceptual models and data specifications serve as the basis for an agreement between the geo-information communities namely as all data providers, network infrastructure for sharing data and information and users (Ozcelik, 2016, Ozcelik and Nisanci, 2015, Ozcelik and Nisanci, 2016, Sagris et al., 2013, Ozcelik, 2013, Aydinoglu, 2016, Aydinoğlu and Kara, 2017, Aydinoglu and Bovkir, 2017, Aydinoglu and Bilgin, 2015).

2.4. Description of the Case Domains

Regeneration on logistic fields are required series of land related domains (Figure 1) and prioritizing components (Figure 2). They are as follows; stakeholders groups, monitoring landscape, geo-data and information management standards, land use information for land use planning, legal infrastructure for building and housing, sustainability use of land resources, risk analysis and assessment, social well-beings, the adoption of land use management, waste management and control, funding and financing (Rizzo et al., 2018).

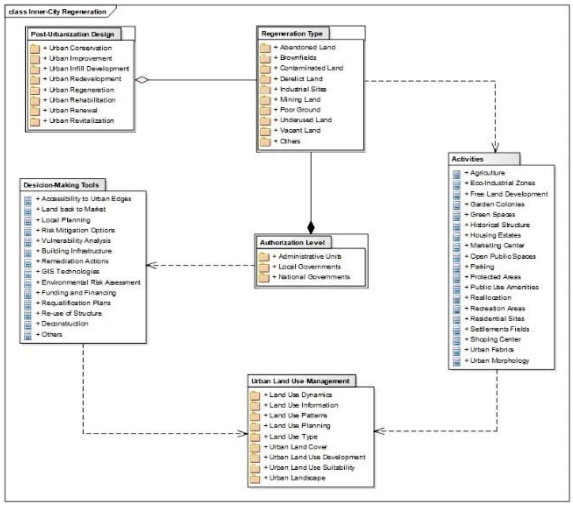

Figure 1. Basic domains for location of ınner-city logistic fields regeneration

These are a sort of considerations and criteria for regarding the regeneration benefits and dimensions in internal urban subdivision as industrial sites, contaminated land, derelict land, land with poor ground conditions, underutilized land, abandoned land and vacant land. To improve the quality of city life, urban texture, urban development fabric zones they should be regenerated in sustainability (Navratil et al., 2018, Loures and Vaz, 2018).

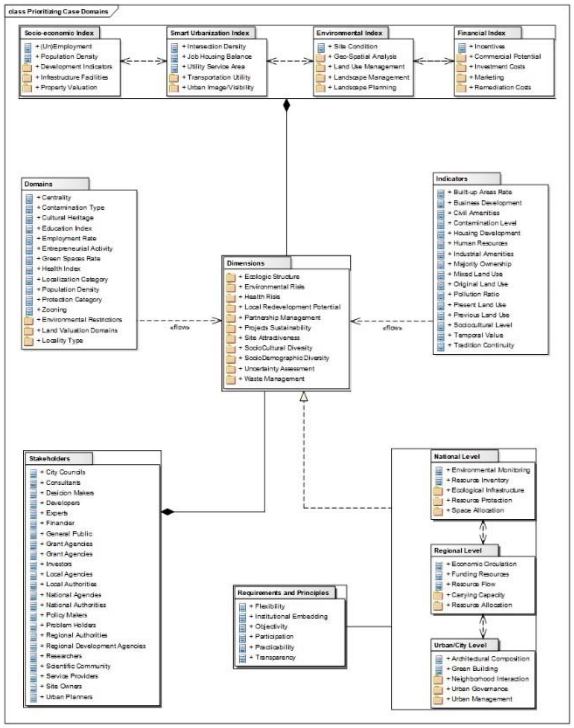

Figure 2. Prioritizing of case domains

2.4.1. Study Area and its Environmental Relation

For this purpose, the light industrial district of Trabzon city is determined as study area (Figure 3).

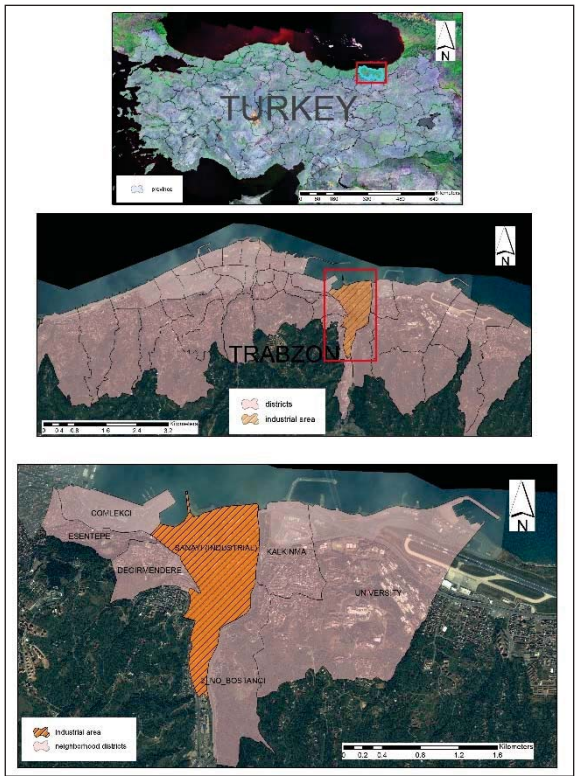

Figure 3. The location of industrial district and neighborhood in Trabzon city

Firstly, the current location of this area is evaluated. And following, the physical and socio-economic structure of this area is investigated according to city development. Within the scope of this paper study, port-industrial area of Trabzon province located in the Eastern Black Sea Region of Turkey was determined as study area. Primarily, approaches for urban regeneration projects applied in the coastlines in both Turkey and all around the world were examined and their significance in the evaluation of urban regeneration applications were assessed. In addition, within the scope of the study, the criteria of urban regeneration in the built environment and sustainability highlighted in the related literature were determined systematically and thus a framework for the evaluation of urban regeneration projects was generated. Industrial district of Trabzon (Figure 4), subject of study area, is surrounded by Degirmendere district (neighborhood) in the south, Kalkinma and University districts in the east, Comlekci district in the west and Trabzon coastal road in the north.

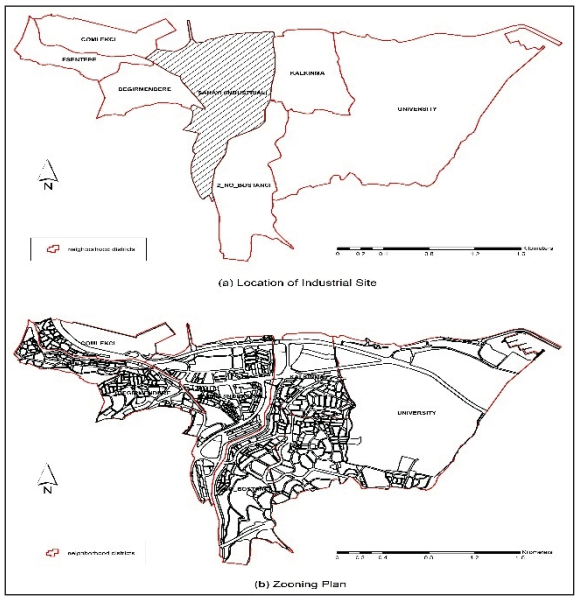

Figure 4. Analytical overview to geographical context of case region with zoning plan

In addition, having the industrial zone located in a place where the roads passing through Trabzon port, Trabzon bus terminal, Trabzon airport, Karadeniz Technical University, Farabi Hospital, Forum Shopping Mall and neighboring southern provinces are intersected makes the region a center of attraction. Topography of the land and its general form of settlement is directly associated each other. Whether having a soft or hard topography affects the transport relations, the way of structure construction and thus intensity and the extent of changes in city silhouette. In this context, coastal urban areas of the Eastern Black Sea Region have been expanded by sea embankment. Within the scope of this study, we conducted a field survey which evaluates the residential and function areas of

Degirmendere and Comlekci neighborhoods. The elementary idea which forms the basis of this assessment took shape in the axis of "urban regeneration" concept. The elementary idea of this study is to observe the developments emerging in any point of transformation/conversion process of these areas (Comlekci Neighborhood) and to obtain analytical data to be used as inputs of the projection. Natural and man-made structures and environmental data in this area were overlaid and the borders of study area were determined. Data related to the study area were obtained by evaluations and observations of the region. In the region textures (Figure 5) analysis performed throughout the study area, building/parcel/block scale investigations were examined.

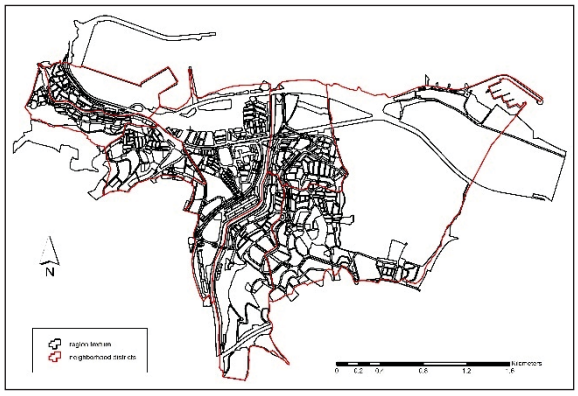

Figure 5. Neighborhood regions texture

Because of the findings and observations, the study area involves a general structure and land use in the related region. In general, study area is surrounded by three regions namely, coastal highway running parallel to the coast in the north of the study area, the city center and the port in the west and the university and the airport in the east.

3. Results and Discussion

Starting with the urban and country locations of the regions in the case study area, it was aimed to develop a physical, social and economic profile of these settlements. The scope of the study includes residential areas, commercial units, amenity spaces and roads which are expected to be affected primarily from the urban regeneration scenarios to be applied in industrial regions in relation to neighborhood regions. Identification of structural characterization of each section is of vital importance for the better understanding of new structure that will arise as a result of the transformations/conversions in the city. Demographic features and environmental factors were identified by examining the function areas, story height, building conditions and building construction techniques. The study area extends approximately 1.75 kilometers along the coastline and covers an area of

approximately 107 ha. Depending on this information, general housing texture especially in the northern part of the region and overall land use and land use in the neighboring regions is represented in Figure 6 and is summarized in Table 1.

Figure 6. The region texture over the industrial district in Trabzon city

Table 1. The construction structure over the industrial district in Trabzon city

In Industrial District	**Neighborhoods of the in Industrial District**
Intercity Bus Terminals	City Centre
Student Residences	City Seaport
Cement Factory	University Campus
City Graveyard Area	National And International Airport
Industrial Area	Primary Schools
Residential Areas	Main Schools (nursery, kindergarten)
Markets	Shopping Centers

The reason for urban regeneration are (i) physically dangerous buildings and risky settlements, (ii) urban depopulation, (iii) outdated land uses and associated physical infrastructure that have lost their competitive, (iv) outdated urban structure, (v) development potential ratio, (vi) negative visualization or eyesores and (vii) demand for responsive urban design with sustainability aspects (Lai et al., 2018).

Underline the fact that the physical structure of this waterfront urban area represents a mixed-use development is part of the city and so mixed-use city centers. Because of the population growth, socio-economic and environmental needs, the tendency on cities and urbanization increase gradually through the urban development policies and initiatives in Trabzon city. Especially, the national and international airport, public areas such a shopping center, sea port and some part of the city center are located in coastal line of city. In general, the industrial areas and urban waterfront areas are incorporated in city center and gained value. In this process the physical, socio-economic and environmental structure of this region should be regarded as key drivers and needs of urban regeneration integrated with urban development policies and implementations. Recall that for sustainable policies toward to urban development created by local governances have an effective role especially for

determination of the urban development areas across the cities. So the industrial areas, seaports, airports and the settlements, facilities areas have to be re-allocated with urban regeneration projects to support for better urbanization and development. Additionally, to enable making long-term improvements of the analytical, economic, physical, social, and environmental conditions for this industrial area, an urban regeneration project should be performed and implemented integrated with sub-scale urban land use planning.

Most cities have undergone constant change (Wolff, 2018). The growing urban regions are prioritization in relation to housing demand, urban spatial structure and urban growth zones (Xu et al., 2018) as urban sustainability synergetic integration (Zhang and Li, 2018). The key domains for identification of regeneration prioritization (Figure 2 and 3) are as follows; 1) parties and users requirements and challenges, 2) data availability, accessibility and quality, 3) stakeholders engagement and orientation 4) drivers and dynamics of regeneration potentials and 5) financing and funding (Limasset et al., 2018). The sort of stakeholders are for primarily interested in information on planning and financing, while the others in more technical aspects like investigation and risk assessment (Rizzo et al., 2015). The location and the geo-spatial patterns of urban redevelopment sites are a function of local redevelopment potential, local occupier-demand for specific utilities, and planning regulations (Frantál et al., 2015). To improved transparency and participation, the land governance in regeneration fields should be provided that is varied between regions and cities (Klusáček et al., 2018) according to their redevelopment potential (Pizzol et al., 2016). It is aimed to respond to understand how people view reuse options; (i) for what factors have a significant influence on a successful regeneration, (ii) to determine how they are used and which design options are preferred, (iii) for what is the level of satisfaction with the present reuse and (iv) for what the main forces are shaping the structure of preferences for reuse (Mathey et al., 2018, Osman et al., 2015, Martinat et al., 2018). Functional reintegration to urban morphology is an important process for regeneration process. So, it should be required to identify the properties that have potential for regeneration and to hazard prevention for urban sites within the prioritizing measures depends on multi-criteria and multi-objective. By measures of sustainability, it involves to ensure the society needs for current and future in more environmentally sensitive, economically viable, institutionally robust and socially acceptable within the regional context (Bartke and Schwarze, 2015, Bartke et al., 2016).

4. Conclusion

The spatial data model infrastructure supports sustainable development of urbanization. As part of urban regeneration projects, the decision-making process on urban planning sites for inner city logistic fields is major application fields. Mainly the driver data themes of social, economic and environmental domains collaboration with physical, textural and morphological features of urban dynamics were represented in this model based on the urban regeneration needs and procedures.

Within the scope of this analysis, observation and identification studies were conducted to determine the user profile of residents in the study area concerning their social lives. Within the context of social dimension, one of the important aspects of urban regeneration process which was set for with its own internal dynamics and started with re-addressing of these issues, industrial district was broadly evaluated. In particular, as indicated in Figure 6, social and economic impacts of housing texture on land use in the surrounding area can be clearly seen. Especially, visual pollution caused by airport and bus terminal located in this region is in contradiction with the rapidly developing urbanization process triggered by university-based socio-cultural life. In addition, having some private dormitories (student hostel), residential and industrial areas in the same environment brings negative effects in terms of both cultural and social aspects. Considering these issues, having reinforcement in this part of Trabzon province make the urban development of industrial neighborhood is inevitable.

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