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HENRI PROST'S OPEN SPACES (*ESPACES LIBRES)* FOR ISTANBUL: THE FORMATION OF PARK NO 2 *(LE PARC N'2)*

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Abstract

After the proclamation of the Republic of Turkey in October 1923, the capital of the country was relocated from Istanbul to Ankara and the funds of the Republic were canalized to the formation of Ankara as a new capital city. Following the creation of Ankara, an urban planning competition was organized for the planning of Istanbul. Three specialists (Donat-Alfred Agache, Henri Prost, Hermann Eltgöz) were invited to participate in the competition and German planner Ehlgötz's plan was chosen. However, his plan was never put into implementation and in 1935, French architect-urbanist Henri Prost was re-invited for the planning of the old capital city. He worked between 1936 and 1951 with a conservative and modernist attitude. He gave importance on open spaces *(espaces libres)* and proposed three public parks. The largest proposal was for the ''European core'' which was the area extending from today's Taksim Square to Maçka Valley *(parc n2).*

The focus of this study is to investigate Prost's Plan Park No2 and to define the process of its formation from last period of Ottoman to the Early Republican Period of Turkey. In the study, the 'digital urban history method' (telling the history of the city in the age of the ICT revolution) was used through the power of various direct and indirect sources with GIS and 3D modeling techniques.

Keywords: Urban formation, city planning, modernization, digital urban history, Taksim, Maçka, Henri Prost

Introduction

With the end of the First World War, Ottoman Empire collapsed and, secular Republic of Turkey was born in 1923 under the leadership of Mustafa Kemal Atatürk. The Republic of Turkey represented a significant turning point in Turkish history. This new period was the starting point of a modernization process that includes with change of the country's political and social structure such as figures and symbols of the Ottoman Empire and their replacement with secular values for the new nation-state (Çelik, 1993). As a result of this, the Republican authorities had decided to transfer the political capital to Ankara where the War of Independence was directed from. Thus, the old imperial capital Istanbul lost its status. This change was more a strategic than a symbolic decision of the new regime (Tekeli, 1994). The limited funds of the Republic and professional architects and engineers were mostly directed to the creation of the new capital Ankara and, only some years later, the financial and intelletual efforts were moved to Istanbul.

In those years, Modern Movement started to have an important role as a significant character in the context of architecture. Urban planning was perceived as an effective tool of the Republic's modernization movement: urban planning was seen as a modernization approach to satisfy the needs of the industrial age. The Republican authorities considered it as one of the principal works of the new age (Bozdoğan, 2002).

Municipal laws were prepared for the appropriation of land and for their financing. Planning for large cities has become mandatory and professional architects and engineers were assigned to the construction of buildings. After the creation of modern Ankara according to the Jansen Plan, the Republican Government turned its attention to the planning of Istanbul according to the Republic's modernization program(Gül&Lamb, 2004). Istanbul was the perfect city to exhibit the modern and laic character of new regime. It was the most Western city of the state with the long and rich history. To obtain a plan for Istanbul, in 1933, the municipality organized an urban design competition by inviting specific international experts. In fact, in the letter sent out to the planners by the Muhittin Üstündağ, clearly underlined that the proposal was not an 'urban design competition' but the real objective was to take the professionals' opinions. Major-Governor Muhittin Üstündağ invited three foreign professionals - Henri Prost, Donat-Alfred Agache, Hermann Ehlgötz - to submit their proposals for the future city of Istanbul(Bilsel, 2010). The fact that these three professionals were the leading figures of the first generation urbanists who contributed to the creation of the new discipline and its institutionalization, had been influented the choice of invitation. Agache and Prost were effective and essential members of Musée Social which was an important and leading research center into city planning, social housing and labor

organization in France (Cohen, 2010). Also, the German urbanist Herman Elgötz was known for his success in preparing plans for various cities in Germany, and in particular, planning the Essen industrial city. However, Henri Prost was occupied by the Masterplan of Paris metropolitan area at the time. Therefore he had to decline the invitation and suggested his colleague Jacques Henri Lambert to his task. Agache, Lambert and Ehlgötz submitted their proposals and finally, Ehlgötz plan was chosen. But his plan never was put into implementation and Henri Prost re-invited for the planning of the city by the Municipal of Istanbul. One of the important influential in making this decision was that he was perceived as the most important and leading figure as the plan for Paris. He worked as a head of Planning Office of Istanbul between 1936 and 1951. Prost became not just the urban planner of Istanbul but also he was leading the bureau. Thus he was teaching the employees of the Planning Office by building new expertise (Pinon, 2010). In these fifteen years, he worked for several urban studies such as masterplans and detailed projects. Prost's plans for Istanbul have been percieved as Haussmannian's renovation of Paris by historians (Akpınar, 2014). Prost had to awareness of Haussmannian Paris but also the following 50 years of studies on the new cities within the intellectual atmosphere of the Musée Social affected his works. These new works brought the modern city to life where a secular society was born.

Among all these works, this paper will focus on one of the Prost's public park proposal named Park No 2 into the heart of Pera district which was the area extending from today's Taksim Square to Maçka Valley. The study contributes to the interpretation of the idea that the park was conceived as a new method of infrastructure with public spaces and functions.

The ICT (Information and Communication Technologies) revolution makes it possible to help the understanding of the architectural/ historical outcomes and Cultural Heritage by using digital tools (Tamborrino, 2014). In this study, the method is used for obtaining, processing data/information and evolution of the outcomes. These data are processed through mainly using ArcGIS software. The reason for the selection of the software is its easing the make a comparative study rectifying different basemaps prepared in different years in the same accuracy. The aim is to analyze in which way Prost saw the possible evolution of Istanbul with focusing the Taksim-Maçka Valley and to check if some idea has been realized until the end of his position as a head of Planning Office of Istanbul.

Henri Prost in Istanbul and open spaces *(espaces libres)*

In his tenure of office, Prost prepared the Masterplan for the European side of the city (1937), masterplan of the Asian site (1939), the planning of the two coasts of the Bosphorus (1936-1948) and numerous detailed urban projects for plazas, squares, construction of new avenues, parks and promenades. Henri Prost based his studies of Istanbul on three principal issues: transportation *(la circulation),* hygiene *(l'hygiene)* and aesthetics *(l'esthetique)* (Bilsel, 2011).

During the planning of Istanbul, Prost was inspired by the rules of Cornudet Law *(Loi Du 14 Mars 1919 Plans D'extensıon Et D'amenagement Des Villes)* which was adopted in 1919 in France. In accordance with the Cornudet Law, everything directly concerning the family life of workers (housing, gardens, open public spaces, nutrition) will be topics of primary importance in research, interviews, and efforts in public action and propaganda (Pinon, 2010). The law indicates the necessity of the preparation a masterplan for each city which has more than ten thousand people. The main aim of the law to regulate growth and to determine the location and character of all open space(public parks, gardens, and squares) as well as of monuments and public buildings(Hautecœur,1960 p.228).

In this framework, firstly he completed the Masterplan of European side *(Le plan directeur de la rive européenne d'Istanbul)* which was formed of two separate plans of 1.5000 scale, namely the Old Istanbul Plan and the Plan of Galata-Pera (Bilsel, 2011). The masterplan consisted the zoning settlement decisions as well as urban development projects with open spaces (*espaces libres* as he called them): wide boulevards, large squares and public parks formed like European models. Besides, his masterplan had two principal aims: firstly, the structural development of the existing city by including a transportation infrastructure and a system of green spaces; and secondly, the transformation of the existing urban fabric.

In 1940, Prost also prepared a detailed urban transportation plan *(plan de reference).* The new transportation system necessitated the opening of several new avenues and streets or use/expand of the existing street network. These are listed as 'operations to be realized in priority' in the Prost's reports of masterplan (Özler, 2007). The urban transportation plan was designed around a spine for linking the new development areas on the north side of the Historical Peninsula on the south side of the Istanbul. This urban circulation network consisted with two main connection. The first one was started in Taksim Square on the north, went through the old district on the west of Pera, reached to Historical Peninsula by Atatürk Bridge, in addition, the second one was started again from Taksim Square, crossed Pera and Galata through tunnels and viaducts to reach Karaköy

before the Golden Horn by Galata Bridge (Bilsel, 2011). In his reports, Prost explained this decision as follows: *''The drivers that will reach the bridges from the Taksim, will find a direct and a long road that they can safely use''*(Özler, 2007) (Figure 1).
In view of these decisions, we can say that Taksim Square was always considered as a main node of the plan.

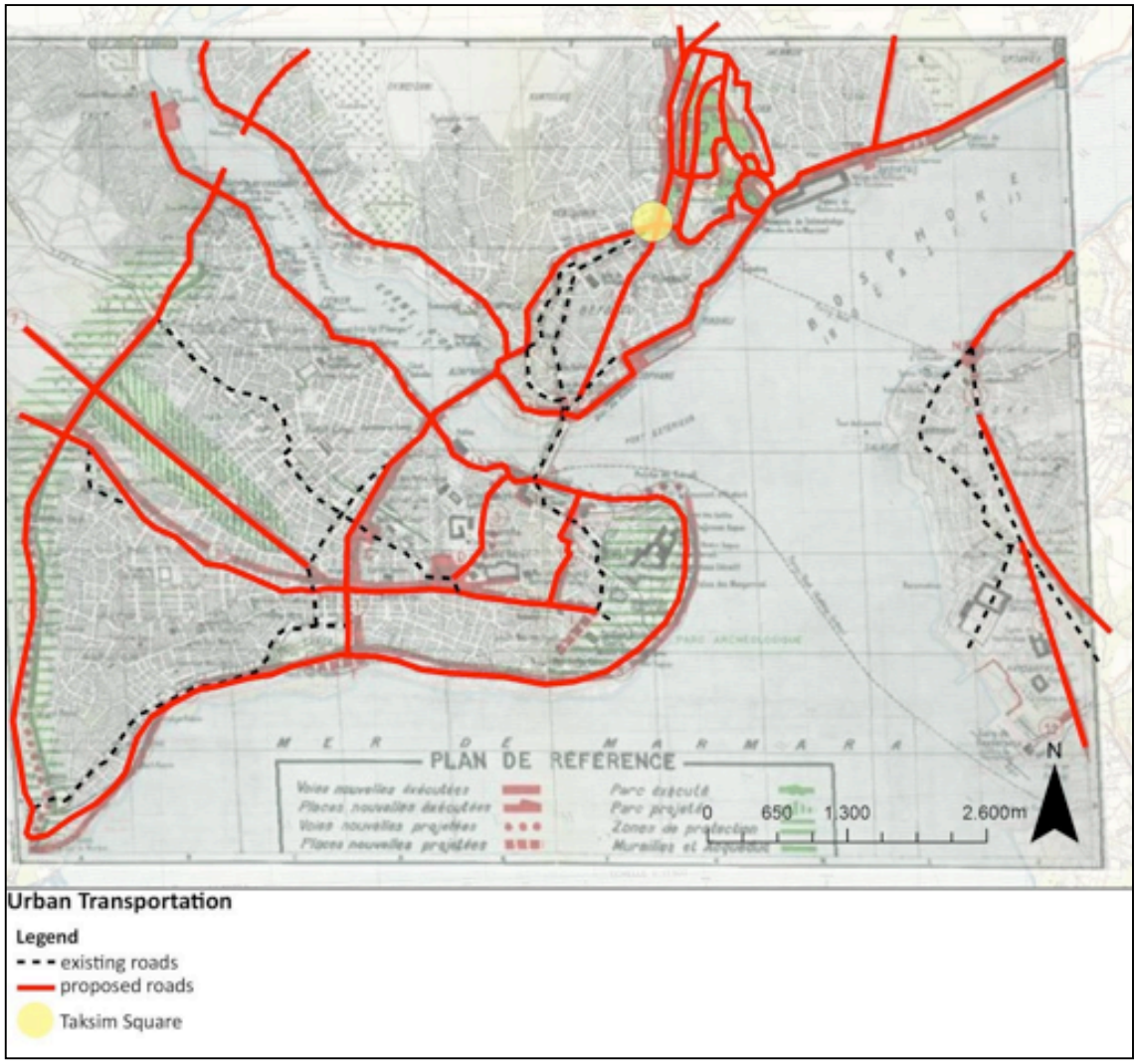

Figure 1. Urban Transportation; Basemaps 1/17500 Plan d'Ensamble De La Villa De Constantinople-1922 [1] and Plan de Reference-1940(Hautecoeur, 1960) are georeferenced by the author (Software: ArcGIS)

With the 19th century, the green areas were considered as an important condition not only for enhanced the livability of the city and the moral standards of its citizens, but also as a cure for the ills of the city prevailed. In other words, the green areas became a norm of shaping 'healthy cities' in the urban planning approaches(Alpahnd, 1867). Regarding hygiene *(l'hygiene)* issue from Prost's principal issues on Istanbul, he proposed several public open spaces as defined with his words, *espaces libres.* Prost's espaces libres included parks, promenades, squares, terraces, boulevards, sports areas. Within these open spaces proposals, he proposed three major public parks. In fact his proposal was to adopt three parks for three city center: One of these parks was considered as an archeological park at the heart of Historical Peninsula *(park no1),* the other one was considered as a park with cultural, arts and sports functions into the heart of the Pera district which was the area extending from today's Taksim to Maçka Valley *(park no2)*, the last one was also located at Historical Peninsula and considered for the Olympic Games *(le site du parc olympique)* (Figure 2).
Prost's aim for Park No 1, was creating an Archeological Park as an open-museum including the Topkapı Palace, Byzantine Hippodrome and Hagia Sofia. Furthermore, he suggested an archaeological excavation for revealing and defining the Byzantine remains. Nevertheless, Park No 1 was never put into implementation(Pinon, 2010) Prost's other proposal on the Historical Peninsula was for the Olympic Games (Bilsel&Zelef, 2011). However, also this park was never put into implementation. The only park from Prost's proposals that was put into

implementation, was the largest proposal (approximately 30 hectares) located at the European core at Taksim*(parc no2).*

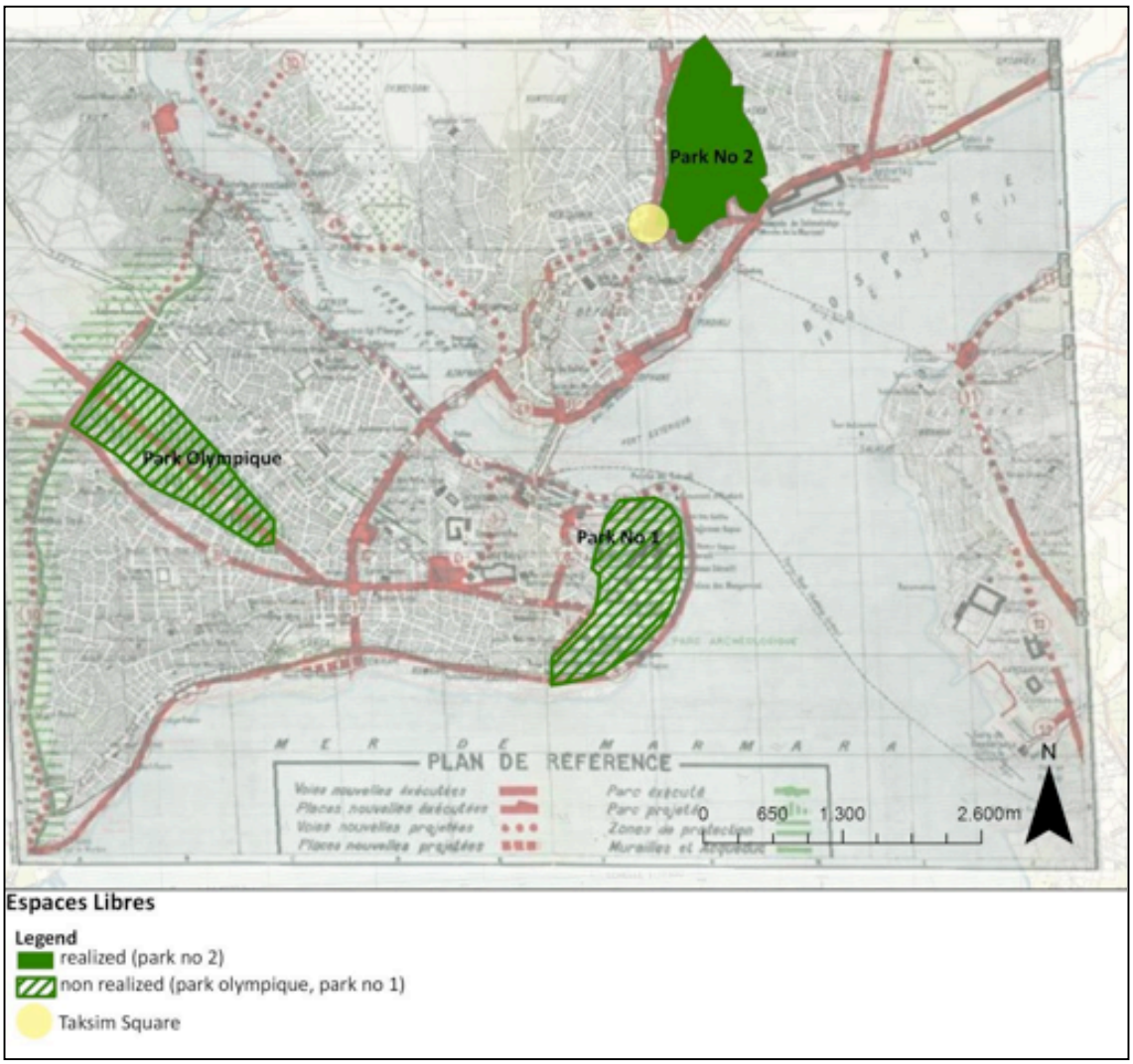

Figure 2. Espaces Libres; Basemaps 1/17500 Plan d'Ensamble De La Villa De Constantinople-1922 [1] and Plan de Reference-1940(Hautecoeur, 1960) are georeferenced by the author (Software:ArcGIS)

Henri Prost's planning of *le parc no'2*

In the 16th century, the area of Park No 2 was known as *'Grand Champs des Morts'* and this area was unique among Istanbul's necropolises for followers of both Islam and Christianity. The area of Park No 2's urban history began in 1732 under the reign of Sultan Mahmud I with the construction of a water distribution building named Maksem. But, the acceleration of the construction around the valley has been started with the Ottoman Westernization Period. The valley was defined as a military area by the reign and a 'barrack construction' movement was began(Tekeli, 1996). Briefly, when Prost came to charge, there were several Ottoman military structures in the area(Figure 3).

In 1940, Prost prepared 1.2000 scaled masterplan for Park No 2 *(plan parc no'2)*. In his planning decisions of Istanbul, Prost put special importance on preserving of Ottoman structures. As a reflection of this attitude, he protected a great number of Ottoman structures at the area of Park No 2 by giving them new cultural and educational functions(figure 4). Most parts of these new functions were for education as an architecture/engineering faculty. Also, the old military school was changed its function as a military museum.

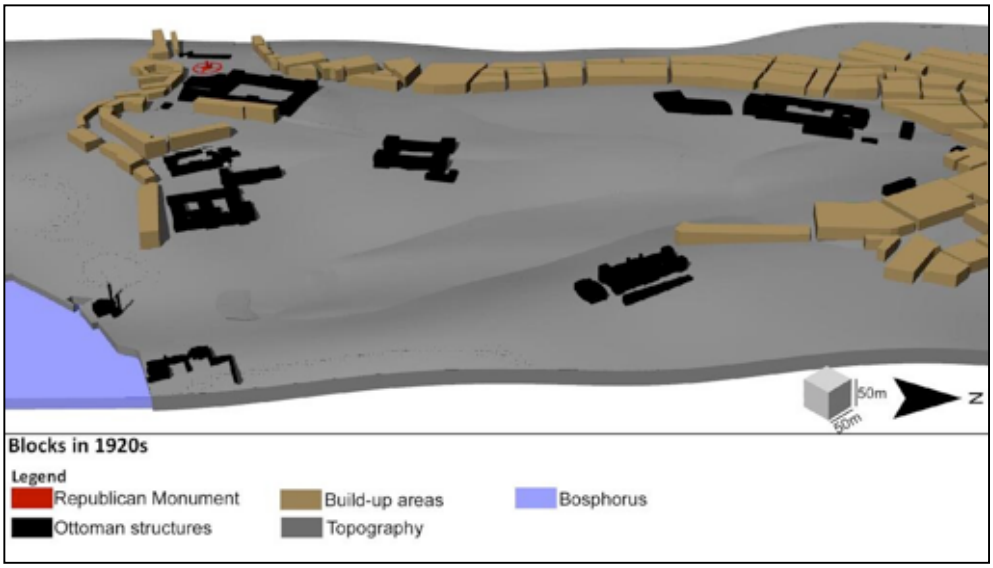

Figure 3: 3D modeling of the Park No 2 area at 1920s based on 1/17500 Plan d'Ensamble De La Villa De Constantinople-1922 [1] (software: Rhinoceros)

Figure 4. Protection Analysis; Basemaps 1/17500 Plan d'Ensamble De La Villa De Constantinople-1922 [1] and 1/2000 Plan Park No 2-1940(Hautecoeur, 1960) are georeferenced by the author (Software: ArcGIS)

As a consequence, Park No 2 is a park which was devoted to cultural, sportive and art activities. The functions of buildings which included in the park were also important at the large urban scale. Prost added Dolmabahçe Stadium, Sports and Exhibition Hall and the Amphitheater to his Park No 2 Plan. According to his reports, he imagined this park as 'Taksim's Boulogne Woods *(Bois de Boulogne)*' defined it as the recreation center and lungs of the new settlement area (Özler, 2007). Even if Prost described Taksim as being related to the park built by Haussmannian, this system was quite different. Altough, the park was concived by Prost within the city with public functions, the Boulogne Woods was outside the city with just the recreation and relaxation functions.

Also, the link between pre-existing buildings and green open space is completely new. Boulogne was a wood, Taksim was/is a 20th century thematic/cultural park. Furthermore, the idea to integrate old city with new planning by demolitions and topographical approaches are totally different. The only building that Prost proposed to be demolished, was the Topçu Barracks *(Halil Pasha Artillery Barracks)* located at Taksim Square. During First World War, it was abandoned and after 1921 the courtyard of the Topçu Barracks was used as a stadium by the community (Çiftçi,2004 p.133). Also, the fact that the Republican authorities want to use the main square as a celebration area affected to Prost's Taksim Square plans.
In addition, Prost was put special attention to topography compliance for Plan Park No 2 decisions. Hence, Maçka Valley side was planned as a fully recreational area and inside the park, cafes *(belvédère)* were designed for the Bosphorus view. Besides, the settlement of the public buildings was also chosen compatible with the heights of the buildings which date to Ottoman Period and topography.

Formation Process (1939-1950)
In June 1939, The Masterplan of the European Side was approved (Bilsel, 2011). As a result of the period of Second World War, the funds of the Republic were limited. Although existing this difficulty, the limited funds were mostly canalized to the shaping of the Park No 2. Firstly, Taksim Sports Club and Taksim Municipal Club realized. After that, aiming to the preparation of the 20th anniversary of the Republic of Turkey, construction of Taksim Square and İnönü Esplanade was accelerated. Prost paid special attention to the shaping of Taksim Square. Topçu Barracks was demolished and İnönü Esplanade was realized (figure 6).

Figure 5. Blocks in 1920s; Basemap World Imagery and the information from 1/17500 Plan d'Ensamble De La Villa De Constantinople-1922 [1] are spatialized by the author (Software: ArcGIS)
Figure 6. Blocks in 1943; Basemap World Imagery and the information in aerial photos [2] from 1920s to 1943 are spatialized by the author (Software: ArcGIS)

The stairs and the terrace at the entrance of the park towards Taksim Square were designed with the aiming to be able to watch the ceremonies to be held in the square as well as to create a monumental entrance to the park (figure 7) and named for İnönü *(l'esplanade İnönü),* Atatürk's second in command in the earlier regime, who became president after Atatürk's death in 1938.


Figure 7: On the left side, Entrance to İnönü Esplanade from Taksim Square (Hautecœur,1960) and on the right side, İnönü Esplanade (Güzelleşen İstanbul, 1943)

During the celebration of 20th anniversary of Republic, the symbolic aim of Istanbul planning became understandable. Major-Governor Lütfi Kırdar defined the importance of implementations of the Republican Square as follows:

''…The Taksim Square and The Republican Monument are centers representing the spiritual existence of the nation in Istanbul. The Republican Monument is visited at the national days….a wreath is placed on this monument almost every day. Despite this fact, this center was neglected and ruined. The unlikeable view surrounding the monument was impermissible not just for urbanization rules, but also for national feelings. It was a national duty ordered by the national conscience to make this square open and clean…'' (Güzelleşen Istanbul, 1943)

The Major-Governor Lütfi Kırdar's above speech shows us that Prost's works have been adopted by the single party regime. Nevertheless, Prost has been criticized by some part of the community about the intention of these parks. Against these criticisms, he wrote a note behind one among several photographs that he took as his systematic approach to planning from the park in November 1944 (figure 8):

''The kids and the mothers give the best answer to the question 'What is the use of all these parks?'' (Bilsel, 2010)


Figure 8. Taksim İnönü Esplanade, Sunday 12 November 1944 [4]

Figure 9. Ceremonies in the Taksim Square after rearrangment [4]

Over the time, the park has also been adopted and started to use in everyday life by the community. The following years, Prost's Plan continued to be implemented. On the other hand, during these years, the political policy was changed and the multy-party regime was started for Turkey. As a result of the first multy-party election, the new regime came to power. Following this changing, Istanbul became the stage for more governmental activities and the new regime's one of the first implementation was changing the name of the park from Inönü Park to Gezi Park (Baykan&Hatuka, 2010). In addition, Prost was discharged from his position by this new regime that adopted the policies of Turkishness (Akpınar, 2010). However, until 1950 the implementation of the Park No 2 was almost finished and all proposal buildings were built (figure 10). Although he left the country on 1951, was re-invited by the government and municipality at 1957 this time for the justification of urban developments after his period (Akpınar, 2010).

Nevertheless, the area has been transformed by the decisions taken over time. Despite the general project of a park as a whole, including open spaces, buildings, public functions, a preservation law distinguish between them by separating the monuments. In accordance with Legislation No. 10521. Of The Turkey Council of Preservation of Cultural and Natural Heritage *(Türkiye Kültür ve Tabiat Varlıklarını Koruma Kurulu)* which was dated on 06.01.1999, four elements are mentioned that establish Taksim Square, form a whole with each other and indicate that all must be preserved. These are Maksem, AKM (Atatürk Cultural Center), Republican Monument and Gezi Park *(İnönü Esplanade)* [3] The digital analysis (figure 11) made understandable and show the dimensions the two different notions of the park: the change of the park as quantitative and qualitative dimensions within the city.

Figure 10. Blocks in 1950; Basemap World Imagery and the informations in aerial photos [2] from 1950s are spatialized by the autho (Software: ArcGIS)

Figure 11. Blocks in 1999; Basemap World Imagery and the informations in aerial photos [2] from 1990s are spatialized by the author (Software: ArcGIS)

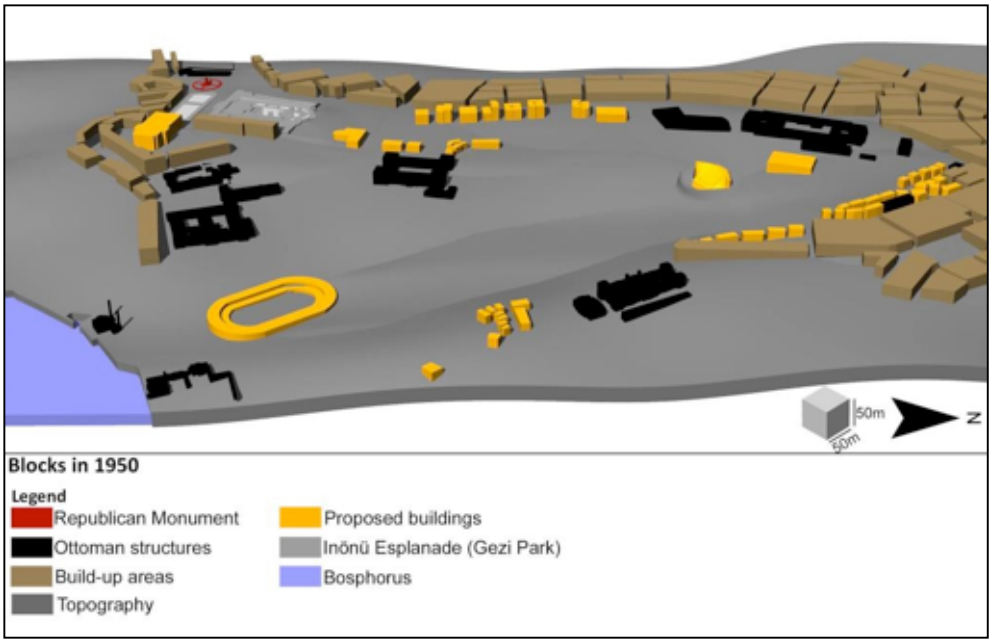

Figure 12: 3D modeling of the Park No 2 area at 1950 based on Prost's 1/2000 Plan Park No 2 (Hautecoeur,1960) (Software: Rhinoceros)

Conclusion

Henri Prost's studies on the planning of Istanbul were put into implementation through a series of urban operations. In his tenure of office, he personally managed the realizing of his projects, such as Park No 2. Besides Prost's plan continued to affect the city's urban formation/transformation process, until the 1980s. By digital tools, the re-creation of the original idea of Prost with parks, buildings and surroundings make it possible to understand the urban scale of his project and the relationships (dimensional, topographical) between the park area and the existing city (figure 12). The study also highlights the differences between the proposal of Prost for Istanbul and the Haussmannian legacy. Prost has planned with an analogous approach to Haussmann's Paris renovation to regenerate an old city. Nevertheless we have to take into account fifty years of new developments, in particular which undertook in the Musée Social. Haussmann's ideas was still based on the inspiration of 'forma urbis': one city, one center. Yet, Prost took into consideration the diversity of Istanbul as a city above by different, and has planned poly centers (old/new) for one city.

In this study, the visualizing of their relationship with the topography and plan settlement by the 3D modeling techniques and processing the obtained data by ArcGIS helped to investigate the fundamental principles of his planning decision, the history of the city in those years and understanding the Cultural Heritage.

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A CENTURY OF TRANSFORMATION WITHIN HISTORIC CITY CORE OF BURSA, A UNESCO WORLD HERITAGE SITE IN TURKEY, VIA HISTORIC MAPS AND CITY PLANS[1]

SERMIN ÇAKICI ALP

Abstract

Bursa, which is one of the UNESCO World Heritage Sites in Turkey, has the potential to be studied in terms of formation and transformation of Ottoman cities in Turkey, via legal aspects in urban planning policy. Although its urban identity is still surviving, traditional texture of its city core has subjected to various changes since the end of the 19th century. Hence, in this study, it is aimed to present chronic deformations above the unity of its multi-layered structure, instead of various types of conservation implementations done for its sustainability.

Within this concept, after a brief introduction about cultural heritage in Bursa, historical background of urban transformation in this Ottoman city is given chronologically, since the end of the 19th century. Moreover, distribution of physical changes within its historic city core is also displayed via overlapped historic maps and city plans. At last, it is aimed to discuss the factors continuously effecting urban transformation in historic cities, like Bursa, while evaluating results in application of legal aspects and new planning policies.

Introduction: Transformation of Historic Cities

The historic cities are constantly subjected to urban development and transformation activities, occurred as a result of economic and social requirements. Urban planning is accepted as combination of technical and political processes concerned with the control of reuse and environmental design in architecture. By the explosion of industrialization in the mid-19th century, new-modern urban planning methods were started to be adapted to the development of existing historic city cores, in order to achieve aesthetic and sanitary considerations. Hence, the historic cores of multi-layered towns are used to witness various types of implementations that are not only conserving but also changing their traditional texture.

Transforming means to change markedly the appearance or form of a structure. Changes in form, appearance, nature and character of previously settled neighborhoods reveals urban transformation. Nowadays, in addition to the climate change, overcrowding and economic straits have all combined to make the cities redesigned for urban development.

After the French Revolution in 1789 concepts such as populism, democracy, justice, equality, and liberty spread rapidly. This paved the way for a transformation period during which absolute monarchies were replaced with constitutional monarchies and multinational empires scattered into nation states. These political changes in the world also affected the Ottoman Empire. The nationalism movement spread first among the Ottoman subjects in Balkans and embraced by intellectuals forcing the state to make reformations in many aspects. This modernization and renovation period started by the Beneficial Reforms (*Tanzimat Fermanı*) (1839) and continued with the establishment of the First (1876) and Second (1908) Constitutional Eras (*1. ve 2. Meşrutiyet*).

The 1st (1848) and 2nd (1849) Construction Charters (Ebniye Nizamnamesi) which aimed to bring modern approaches and practices into transportation and new urbanization in the big cities of Ottoman Empire, also included decisions concerning the protection of the old structures in the new construction zones[2]. Construction Law (1882), which included regulations for application and inspection of construction activities, also had

[1] This paper is compiled from the historical research part of the author's dissertation, which is titled as "An Assessment on Conservation Activities in Bursa, Focusing on Conservation Council Decisions (1955-2012)", finished in 2015 under supervision of Prof.Dr. Neriman Şahin Güçhan, from Faculty of Architecture in METU, Ankara.

[2] "While broadening the roads, the old structures in the fire ground, which are repairable, may be setback or demolished and rebuilt" (1st Construction Chart, Article 4). No timber structure can be built adjacent to hans or in courtyards (1st Construction Chart, Article 16). New construction in Mosque courtyards is prohibited (1st Construction Chart, Article32).

provisions encouraging dissolution of the traditional fabric[3]. It is observed that the legal and institutional reform movements concerning the construction and protection in the Ottoman cities are dated to the second half of the 19th century.

Urban transformation process in Anatolian cities firstly occurred by the application of Beneficial Reforms (1839) for renovation and modernization of historic city cores' planning. Accordingly, the new straight and narrow roads were opened, new gardens, squares and clock-towers were designed while new huge public buildings were constructed in contemporary technologies. On the other hand, the disasters, such as earthquakes and fires, have permanently changed physical structure of the monumental buildings together with their surroundings. Besides, both interior and exterior migrations into the cities have periodically influenced rapid population increase and new housing construction demands in historic cities. Moreover, lack of conservation decisions on new development plans and regeneration projects has currently taken over the task on transformation over traditional texture of the cities.

The Case: Bursa

Bursa maintains the urban features of an Ottoman city, while including architectural remains and environmental qualities in use of industrial and touristic demands for the development of a metropolitan city. As being one of the UNESCO World Heritage Sites (WHS) in Turkey, it contains listed buildings and sites, comprising historical, architectural and cultural value within unity of the historic city center[4]. Apart from the archaeological remains (from the 2nd century BC) and new industrial buildings of Turkish Republican Period (from 1923 till present), most of the existing historic buildings in Bursa were constructed during the Ottoman Period (between the 14th and 20th centuries). Moreover, it is still possible to observe traditional texture of Ottoman neighborhoods.

Various sectors such as agriculture, forestry, animal husbandry, sericulture industry and minery had advanced in Bursa, in addition to trade and tourism, since the middle of 1930s. In accordance with the 'nation-state' ideology of the Turkish Republican Regime, new industrial institutions and factories[5] were opened, in the meantime. These buildings, accepted as Industrial Heritage in Bursa, were constructed in Early Republican Era.

This multi-layered character of Bursa has been subjected to prevalent transformation movements dated to period between the late 19th century and the early 20th century. The changes in historic urban form exposed during application of Beneficial Reforms (*Tanzimat Reformları*) in urban planning, and continued with new urban development activities as a result of Republican Period innovations.

As usual, the disasters and migrations, periodically happened during its urban history, have made its built environment to be transformed permanently, whereas improper treatments and restorations applied in historic buildings have changed their spatial characters.

Formation and transformation of Bursa were visually documented by the maps and plans prepared since the 18th century, by the map of Niebuhr. 1862 map of Bursa is essential to understand the character of an Ottoman city, just before application of Beneficial Reforms. The city plans, prepared in the first half of the 20th century clearly display enlargement of Bursa into the forest at west and the plain at north. Most importantly, the results of industrialization (new housing requirements, increasing population by interior migration, new

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[3] The streets shall be broaden in accordance with the new classification and in this respect the structures on one or both sides shall be demolished (Articles 1, 8, 9). The municipality shall post a legal notice to the proprietor concerning the demolishment of risky buildings and walls he owns; in case the proprietor denies demolishing the building, demolition shall be undertaken by the municipality and expenses shall be charged from the proprietor (Articles 47, 48). Only the façade repair shall be allowed for the existing buildings located beyond the roads the widths of which are re-estimated; extensive repairs shall be permitted after the expropriation of lands for roads are handled (Article 50).

[4] According to Uğurlu (1999a: 60), the historic city center of Bursa is composed of 86 hans, 2 brickmaker's shops, 47 rearing houses, 31 leathersmiths, 4 pottery workshops, 14 silkworm houses, 42 silk factories, 5 olive-press workshops, and 17 paintshops; there were public buildings such as 1 hospital, 9 apotecharies, 2 water pump stations, 46 public lavatories, 1 theatre, 4 printing shops, a Metropolitanate, 16 police stations, and educational buildings including 1 teachers' training school, 1 military academy, 1 military college, 1 girls college, 53 primary school, 4 minority schools, 1 vocational school in the beginning of the 20th century. Besides, there were 9 public squares within neighbourhoods including houses, 109 mosques and 10 churches.

[5] Bursa Textile Factory (1925), İpek-İş Textiles (1926), Dizel Power Plant (presently the TEDAŞ building), Uludağ Soda Factory (1933), Sayas Dairy Products Factory (1934), Teziş and Emek coach builder's shops (1938), Çelik Palas Hotel and Havuzlupark (1938), Merinos Woolen Textile Factory (1935-1938) (Minibaş, 1996: 172) are some of those institutions.

organized industry complexes) started to be observed in new planning policies of Bursa since 1970s, in which term of 'site' were also accepted in conservation regulations of the country.
Bursa is a worthy follower and practitioner of legal and organizational regulations in Turkey, since its urban planning and conservation policy have been consistent and coherent with renewed laws taken since the middle of the 20th century. Afterwards, the new millennium brought new regulations[6] in not only planning policy but also conservation approaches in Turkey. Consequently, the municipalities, the Ministry of Culture and Tourism, and General Directorate of Pious Foundations have taken responsibilities and authorities from related experts, during both preparation and application plans and projects for sustainability of historic city centres.
Hence, it is obvious that Bursa has the potential to be studied in terms of urban planning history, comprising both transformation and conservation activities in related with legal aspects in Bursa. Within this concept, chronic deformations influencing change in the unity of its multi-layered structure are presented, despite conservation implementations done for its sustainability.

Continuity in Transformation of Historic Bursa

Bursa, which was an important commercial city due to its location and social structure, had extended in the east-west axis and improved economically by the revenues gathered from public and commercial monuments, while keeping its urban character from renovations until the 19th century. A sketch map of Niebuhr[7], which was drawn in 1767, is important as it describes urban pattern of Bursa at the end of the 18th century (Figure 1a). According to this map, the city was stretched out in between Muradiye and Yıldırım Neighbourhoods, from west to east. While there is not any building along the plain at the north side of the city center, there was just a sparse urbanization along Maksem, Temenyeri and Mollaarap at the south hillside of Mountain Great (Uludağ) (Kaplanoğlu, 2008: 73). Niebuhr states that Bulgarlar, Hasanpaşa, Doğanbey and Kiremitçi neighbourhoods, located beyond Çatalfirin could define the northern border of the city.

[6] 5226 / 14.07.2004 (*2863 sayılı Kültür ve Tabiat Varlıklarını Koruma Kanunu ile Çeşitli Kanunlarda Değişiklik Yapılması hakkında Kanun*); 5216 / 23.07.2004 (Büyükşehir Belediyesi Yasası); 5366 / 05.07.2005 (*Yıpranan Tarihi ve Kültürel Taşınmaz Varlıkların Yenilenerek Korunması ve Yaşatılarak Kullanılması Hakkında Kanun*); 5390 / 05.07.2005 (*Büyükşehir Belediyesi Kanununda Değişiklik Yapılmasına Dair Kanun*); 5391 / 13.07.2005 (*Özel İdaresi Kanununda Değişiklik Yapılmasına Dair Kanun) ;* 5393 / 13.07.2005 *(Belediye Kanunu*).
[7] It is the oldest Bursa map drawn by Carsten Niebuhr. Original source: "Reisebeschreibung nach Arabien und anderen unliegenden Ländern" – in Turkish: "Arabistan'a ve civarındaki ülkelere bir seyahatin izlenimleri"

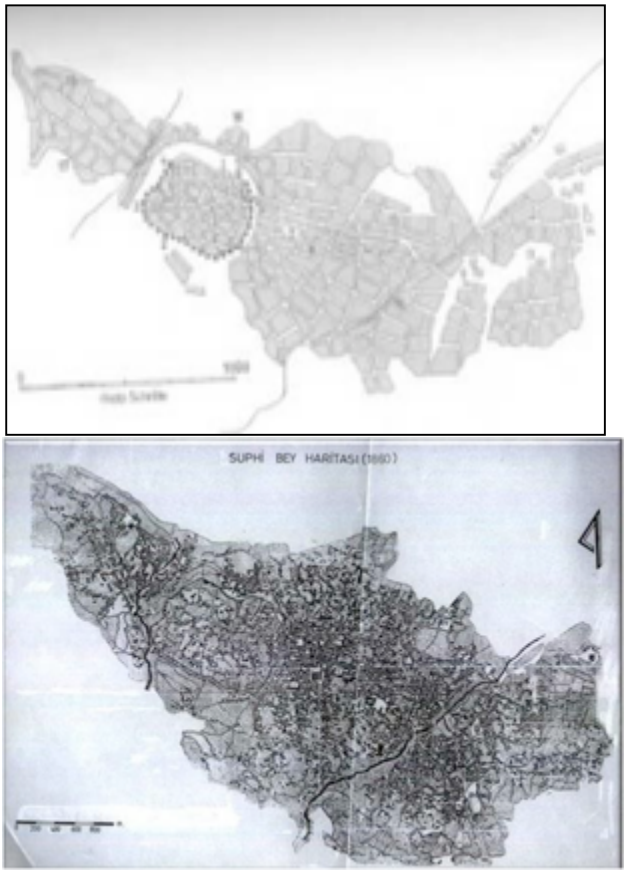

Figure 1. (a) Ottoman Bursa before Transformation Movements dated to the 19th century (map of Niebuhr, 1767; from archieve of Setbaşı Local Library) (b) Bursa in the 19th century (Suphi bey map, 1857-1862; from archieve of Setbaşı Local Library)

Between 1857 and 1862, a team[8] consisting Suphi Bey and his friends who worked for Mühendishane-i Berri Hümayun (Imperial School of Military Engineering) produced Bursa's first city map that was published in the school's print house (Kaplanoğlu, 2008: 73-74). This map is very significant because it reveals the state of Bursa prior to the modernization activities which took place in other Ottoman cities, especially in Istanbul. This 'Suphi Bey Map of 1862' (Figure 1b) offers the cadastral data of Bursa in 19th century in detail, while giving information about the garden-street relationship of the houses in the neighbourhoods. In addition to the neighbourhood pattern composed of Sultan Complexes (imperial building complexes) and houses around them, the commercial centre including Bezzestan which is the backbone of this centre and the shops and khans attached to the bazaars are seen elaborately. Moreover, significant public buildings such as factories, schools, baths, madrasas and mosques are clearly shown together with their names in the map.
Briefly, in addition to indicating the organic urban pattern of Bursa, an early Ottoman city, this map is also considered as a historical document for scholars in which, the historic core of the city involving Hisar district in the centre, Işıklar area, and Yıldırım Kulliyesi in the east, Muradiye Kulliyesi and surrounding residential zone in the west, Great Mosque and commercial core in the north and Pınarbaşı and Molla Gurani neighbourhoods in the south is clearly seen. Therefore, these two maps can be used as a basemap in searching traces of Ottoman urban character of the city before and after transformation at the end of the 19th century.

First Reforms and Transformation Activities

Urban transformation process in Anatolian cities firstly occurred by the application of Beneficial Reforms (1839) for renovation and modernization of historic city cores' planning. Besides, the disasters, such as earthquakes

[8] Detailed information on the research team is given by Abdulkadir in Bursa Tarihi Kılavuzu (Bursa Historical Guide): "In 1274 AH, an assembly gathered by the professors of the School of Military Engineering and armymen came to Bursa…Veteran Colonel Osman Pasha the Champion of Plevna, Ali Saib Pasha, Macarlı Mehmet Ali Pasha, Tevfik Pasha administered this assembly under the presidency of Subhi Bey, the Minister of Land Registry and Cadastre…", 1327 AH (1909), tr. Ömer Kurmuş.

and fires, have permanently changed stability of the existing buildings and contributed to transformation of urban character of old neighbourhoods, which are the major elements forming organic shape of an Ottoman city. 1855 earthquake[9] and 1958 fire can exemplify this relation in between disasters and urban transformations in historic city core of Bursa, in last one century.

Since being known as the biggest disaster of the 19th century in Bursa, 1855 earthquake was followed by aftershocks and fires occurred in the city centre, composed of many deformed monuments and dwellings around. The written travelling accounts are essential to understand before and after this earthquake, which substantially changed the physical features of the city. For instance, Hayrullah Ibn-i Abdulhak Efendi's Bursa travel accounts (1844, 1851-52 and 1863) inform us about the last phase of the city before the disastrous effects of the earthquake. According to its itinerary[10], he compares the state of the city before and after the earthquake and used the definition of "Three Different Bursa in Three Travels" (Danişmend, 1948: 37) as the title of his notes.

Besides, according to the information retrieved from the reports of *İrade-i Dahiliye* (Directorate of Internal Affairs) in the State Archives of Prime Ministry at İstanbul *İrade-i Meclis-i Vala* (Directorate of High Council) in the State Archives of Prime Ministry, the deformations are explained in detail[11] while renovations and arrangements were suggested to be undertaken in three months (Oğuzoğlu, 1999b: 72-80). There was an important expression concerning demolishment of the damaged buildings that a team from the members of the City Council should be employed to reopen the streets by cleaning the rubble and completely collapsing ruined buildings in order to prevent possible accidents around[12]. Although that provided the public security and order in lifestyle, the clues describing traditional techniques of those classical Ottoman monuments were mostly cleared away.

On the other hand, the immigrations after Russo-Ottoman War of 1877-1878 brought on need for new housing settlements to live in. For this reason, existing marshlands were dried to retrieve new zoning areas as infill into these empty spaces. Just in this period, the effects of Beneficial Reforms started to be observed in regulation and renovation of existing city centre according to new planning policies. Meanwhile, Governor Ahmet Vefik Pasha[13] had a major role in transformation of historic city core under the name of 'modernization'. He undertook construction activities in building new roads, broadening of old narrow streets, removal of cul-de-sacs with the aim of transformation of the old organic fabric. his effort to make Bursa a 'modern city', meaning addition of new bridge and new building typologies into the urban structure, establishment of new settlements for immigrants, new squares and new road-broadening, has continued until 1920s.

It is easy to see those new roads[14], bridges[15], factories and neighbourhoods[16] were indicated with their names in new city maps, one of which is the Insurance Map of 1880 scaled in 1/1000 (Figure 2). As being observed in

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[9] There is no consensus on the date of this earthquake (Bursa Defteri 1999b: 83). According to Kazım Baykal it occurred in February 9th 1854; according to Naci Kum, the Director of the Bursa Museum in 1939, the earthquake happened in February 9th 1271 (AH); the first earthquake took place in "Cemaziyelahir 11th 1271" (March 1st 1855), and the second in "Recep 23rd /24th 1271" (April 12th 1855); for İsmail Hami Danişmend, since 1271 AH corresponds to the period between September 24th 1854 and September 12th 1855 in the Gregorian calendar, and the date is known as February 9th, the date of the earthquake was approved as February 9th 1855 in Gregorian calendar.

[10] See "Bursa Seyahatnamesi", Hayrullah Efendi Seyahatnamesi, (1864), p. 395-408.

[11] For the damages in the monuments, also refer to; Naci Kum, "*Tanzimat Devrinde Bursa*", Uludağ, November 1939, no:24.

[12] "As a result of the second massive earthquake occurred on April 12th 1855, the streets were covered with the debris of collapsed buildings. Water pipelines are broken. At times, damaged buildings are collapsing and harming people wandering around. By the decision of Bursa city council, under the supervision of council member Çelebi Muhtar Efendi, 300 labourers were gathered for reopening the roads and demolishing the damaged buildings…, necessary localities should be arranged and new production buildings should be constructed for continuation of sericulture." (Oğuzoğlu, 1999b: 77-78).

[13] Ahmed Vefik Paşa was assigned to General Inspectorate (Müfettiş-i Umumilik) of Bursa in 1863 (Danişmend, 1948: 39).

[14] Bursa-Mudanya railway built between 1873 and 1892 (Kaplanoğlu, 2008: 74) and steamboat trips between Istanbul and Mudanya led to a new commercial and transportation network linking Bursa with overseas cities. New highways were built connecting Gemlik and Mudanya with Bursa, in Danişmend's (1948:38) words "macadam roads with masonry buildings and trees in both sides" were formed.

[15] Meydancık Bridge, Namazgah Bridge and a stone bridge in Tatarlar are some of these bridges (Güray, 1991:24).

the map, Kaplanoğlu (2008: 74-76) describes Setbaşı District, as a newly settled Armenian neighborhood, was formed in a gridal form composed of buildings attached to each other in a lineer order, which makes it "the first example of modern urbanization work" occurred in Bursa, at the end of the 19th century. In the following years, 'Brousse' map (1905)[17], 'Burusa City Map' (1907)[18] and 'The Map prepared for Sewage and Drainage Network' (1909-1910)[19] were prepared as a part of modernization activities in city planning, while new road openings, such as Mecidiye Street (presently, Fevzi Çakmak Street), Mahmudiye Street, Rusçuk and Intizam Streets are clearly indicated in them.

Before the declaration of the Turkish Republic in 1923, there was also an arrangement for another map as a result of collective work between German Union, Bursa Branch of the Deutsche Orient Bank and Ottoman Mapping Company but this attempt could never be completed (Kaplanoğlu, 2008: 77)[20]. Consequently, these maps are accepted as the first witnesses in observation of first urban transformation activities in historic city core of Bursa, until the proclamation of Turkish Republic (1923).

During that modernization period in Bursa, lots of the khans, workshops and bazaars forming the commercial centre of the classical Ottoman era lost their significance as not being a proper market for production and selling of machine-made European goods. Hence, necessity of establishing new factories to revive sericultural production, which was stopped due to the collapse of silk factories, has become clear. Since the foundation incomes gathered from these abandoned buildings, support of foreign capital was sought in order to maintain new construction activities and public services. Consequently, in addition to raw silk production units established beyond Gökdere and Cilimboz streams in the eastern and western edges of the city, new factories were built in remote localities by foreign entrepreneurs (Oğuzoğlu, 1996: 42). Consequently, scale, spatial distribution and togetherness of the new silk factories reshaped Bursa's new built environment, as re-acting the growing up of ruined city just before 20th century.

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[16] Accordingly, the residential zone between Namazgah and Işıklar street, the region between Hacivat and Alacahırka districts and Rusçuk neighbourhood, Yıldırım and Davutkadı neighbourhoods in the east of Gökdere stream, gridiron planned Setbaşı neighbourhood, and new residential zones around Çatalfırın and Altıparmak districts are clearly legible.

[17] Scaled in 1/20000.

[18] This map which is available in the archives of the Municipality is dated to 1907 however other resources propose 1910 for its production. The information in Arabic script was translated into Latin alphabet in the end of 1920s.

[19] This map is gathered from Raif Kaplanoğlu, from the archieve of Bursa City Museum.

[20] According to Kaplanoğlu, this map was used as the base for the Bursa city plan drawn in 1924 and completed in the same year.

Figure 2. New road openings and new quarter plannings until 1922; source map: 1862, 1881, 1909 and 1922 maps of Bursa, from archive of the Municipality (Çakıcı, 2015: 75)

Stagnation in Transformation by the Early Republic Period

Keeping the project of modernization as its main goal, the young Republic of Turkey, proclaimed in 1923, aimed to enhance cities with "spaces narrating the modern life" and thus indulged in certain construction activities.

In the meantime, urban planner Carl Lorcher prepared a new plan of Bursa in 1924, in which the *garden-city* approach[21] was embraced (Dostoğlu, Vural, 2002: 242). In this respect, certain decisions for building garden houses were taken however these decisions underestimated the traditional urban tissue in the historic city centre. Nevertheless, due to the municipality's lack of resources, the decisions related to the historic centre were not implemented. After the first cadastral map was prepared between 1933 and 1934, Atatürk Street, which is stretching parallel to the historic commercial centre of Bursa, reconnected to the Citadel (Kırayoğlu, 2004: 147), and the road from Heykel to Çekirge, via Altıparmak Street was enlarged as double tracked (Özdemir, 2009: 101).

In the meantime, Heykel (Statue) Square and triple buildings of Adliye-Vilayet-Maliye surrounding this square has already been built in 1925 and consequent years; Ataturk Statue and Aviation Society Theatre (*Tayyare Cemiyeti* – presently named as Tayyare Cultural and Convention Centre) were built in 1931 (Bağbancı, 2008: 106). Therefore, the city centre of 'Republican Bursa' shifted from Hanlar and Citadel to the south, titled as 'Heykel Square' and its surrounding.

Afterwards, a new plan of Bursa was prepared by Henri Prost between 1938 and 1940 exhibits the 'axial (lineer) planning' approach of Paris urban plan. Protection of relatively better known monuments such as the Green Tomb, Emir Sultan Mosque and Yıldırım Külliyesi was found satisfactory in the Prost's Plan22 of 1940 although Istanbul Council for Protection of Ancient Monuments pointed out to the protection of all monuments (Madran, 1997: 88)23. Meanwhile, the borders of the city has already extended to Çekirge and Demirkapı in the west, Selimiye in the north-west, Vefikiye in the south and Yenimahalle in the south-east. Due to this

[21] This garden-city approach was proposed by Edward Howard, in order to form 'beautiful city' for less populated towns and cities. According to this romantic approach, that was also accepted by Haussmann's city forms, the houses are required to be built within gardens and green areas, together with with surrounding squares and pools (Dostoğlu, Vural, 2002: 242).

[22] Bursa Urban plan prepared by Henri Prost between 1938 and 1940 exhibits the 'axial (lineer) planning' approach of Paris urban plan.

[23] The report prepared by Istanbul Council for Protection of Ancient Monuments is dated to 1939.

enlargement, renovation of the baths and thermal springs in Çekirge district and their conversion to thermal hotels was suggested (Dostoğlu, Vural, 2002: 242-244).
While the proposal regarding the protection of historic monuments and old streets and keeping industrial facilities and railways out of the city was received positively, broadening the existing streets in order to ease the motor vehicle traffic caused the demolishment of many historic buildings and created adverse effects on conservation works in the historic centre (Vural, 2008: 96-97)24 (Figure 3).

Figure 3: The changes in historic city center of Bursa, by new road openings and new building constructions, during the Early Republican Period; views of Atatürk Street from the Citadel (source: digital archieve of *www.lifeinbursa.com*)

As being one of the developing cities of young Turkish Republic, new public and industrial buildings continued to be constructed but in modern architectural style at the north of the city center. The new governmental planning policy was providing the historic center to be conserved but also filling the plain. Within this concept, Merinos Factory and other new governmental buildings were built along north side of the city. In addition, the first cadastral plan was prepared in 1933, which provides to understand the parcels with or without building construction licence. However, the Ottoman townscape of Bursa was still perceptible (Figure 4a), which means this thirty years can be accepted as 'period of stagnation' in transformation history of Bursa.

[24] For detailed information please check the dissertation prepared by the author, in supervisor of Prof.Dr. Neriman Şahin Güçhan, from Department of Architecture in Middle East Technical University (Çakıcı, 2015: 86-89).

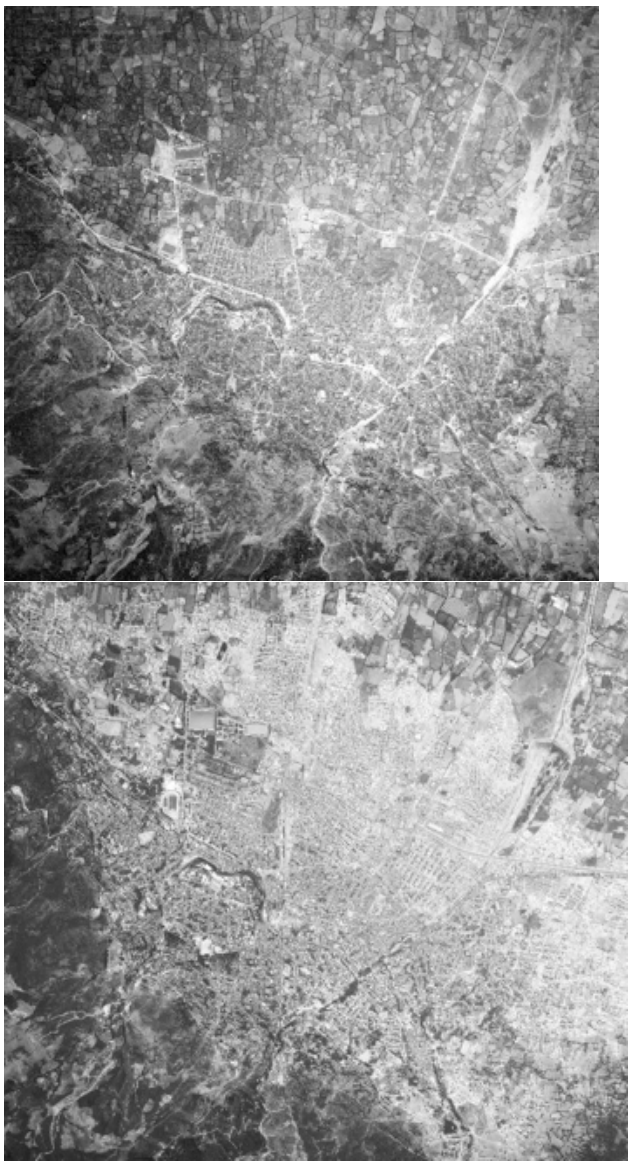

Figure 4. (a) 1943 aerial photo of Bursa, (b) 1973 aerial photo of Bursa (source: archive of T.C. General Command of Mapping)

Industrialization and Immigration Effect in Transformation

The local authorities to improve the lifestyle in the cities could cause permanent changes in physical structure of traditional texture in historic areas of Bursa. One of the mayors known as Haşim İşcan (1945-1950) rearranged the roads to be used for vehicular traffic, at first, which resulted in huge destructions within old neighbourhoods. For instance, while the Altıparmak Street was being enlarged and tarmacked, half of the Ets Achayim Synagogue, Gerush (Exiled, cast out) Synagogue, and a great part of Major Synagogue were demolished (Tör, 1948: 77), (Özdemir, 2009: 316-317). Moreover, expropriations were done to clean surrounding of 'important' selected monumental buildings and to construct new public buildings in modern architectural style, which also demolished the unity of historic townscape of Bursa.

During the mayorship Kemal Bengü (1963-1973), the city started to be identified as an industrial city[25] by the first organized industrial zone foundation (Tarih İçinde Bursa, 1989: 86). As a result of establishment of new nationwide prominent industrial ventures[26] ranging from agriculture to car manufacture, the city was exposed

[25] According to an inventory research held by Mithat Kırayoğlu on the industry in Bursa, sericulture, timber car hooding and car manufacturing were dominant sectors between 1965 and 1966 (Özdemir, 2009: 266). Minibaş on the other hand (1996: 172) states that the first bycicle was produced in Bursa in 1964.

[26] The industrial ventures in Bursa in 1970s were as follows: Çelik Makine Türk Anonim Şirketi, Sümerbank, Bursa Cement Factory, KARSAN (Bursa Karoserleri), AROMA ve TOFAŞ Factories (Özdemir, 2009:130),

to dense immigration[27] and rapid industrialization in between 1970s and 1980s. Accordingly, new multi-storeyed apartment blocks were built attached to the existing traditional houses along Namazgah, Atatürk and İpekçilik Streets[28] (Figure 5).

Figure 5. Urban development activities by enlarging the major roads and construction of new multi-storeyed buildings along them (a) Atatürk Street (source: archive of Bursa Metropolitan Municipality), (b) Altıparmak Street (archieve of Setbaşı Local Library)

In addition to rapid increase in population, changes in law of property ownership and the rise in construction of illegal housing in the eastern and northern parts of the city reveal the scale and distribution of urban transformation in historic city centre of Bursa. Especially Hanlar District has been mostly influenced by those destructive results of new constructions, new road openings and socio-economic changes in the society. However, the most devastating one was dated to a fire, exploded in 1958, at the west part of it.
After the fire of 1958 broke out in the west end of Hanlar District, known as a part of historic commercial centre of Bursa, the khan buildings and shops located in the firezone were burnt down to the foundations and collapsed (Figure 6a). General Directorate of the Pious Foundations and Conservation Council have decided to restore and repair especially the Bezzestan and shops around it. The buildings forming a part of historic commercial center were “reconstructed” with modern materials and techniques in parallel with the dominant conservation approach of the phase which can be formulated as “reinforcement and reconstruction with modern materials”. This stance is the reflection of “renovation through conservation” notion which appeared in Turkey in 1960s (Figure 6b).

Filement Factory founded in 1971 by Ali Osman Sönmez, BİSAŞ İplik ve Büküm Fabrikası, BUSTAŞ Cold Air and Ice Facilities, Cemtaş Steel Machine Industry, Kimsan Regenerate Latex Factory, Robert Bosch Factory (Minibaş, 1996: 172).

[27] According to Turhan Tayan, after the industrialization movements in 1960s, Kurdish landlords started to settle in Bursa (Özdemir, 2009: 296).

[28] Urban Planner Turgut Yalkı witnessed the preparation of construction plans for İpekçilik and Maksem Streets while he was doing his professional practice in 1969 in Bursa. He claimed that the plans underestimated for the possible vehicle traffic in future (Özdemir, 2009: 112).

(a)

(b)

Figure 6. (a) Deformations in the monumental buildings of Hanlar Districts, photographed after 1958 fire, (b) Reconstruction and renovation applications by using reinforced concrete after 1958 fire (source: archive of Umut Ünsal, from the archive of Bursa Metropolitian Municipality (BBB))

Afterwards, Italian planner Luigi Piccinato, who was invited Bursa after Çarşı Fire of 1958, and Emin Canpolat, an architect from Bursa Bureau of Urban Planning prepared a new urban plan[29] for Bursa, completed between 1958 and 1960, with the support of the Bank of Provinces and Bank of Estates. The main decisions of the new plan can be listed as (Kaplanoğlu, 2008: 80-81);

- Protection of agricultural lands
- Establishment of a new industrial zone
- Development of tourism
- Improvement of the city's connection with the neighbouring cities

The Piccinato plan highlighted the conservation and revival of the traditional texture and underlined that the new constructions should follow the compatible architectural style and colours with the existing one (Kaplanoğlu, 2008: 81). During the implementation process, Kapalıçarşı was covered with a new material composed of short timber hipped roofs and the superstructure of Bakırcılar Çarşı was replaced with reinforced concrete vaulting. The shops in the area were renewed keeping the three-storeyed building type, reconstructions and completions with reinforced concrete technique on the original foundation walls which were accessed through basement walls that became visible after the fire. He also demanded to improve the cultural tourism by removal of 'squalid' houses, which some of them could be accepted as traditional, built around major monuments of Bursa, like Yeşil and Yıldırım complexes. However, this application caused in loss and change of traditional texture in many neighborhoods.

[29] It is known as a master plan with 1/4000 scale (Vural, 2008: 98).

On the other hand, that transformation continued to be seen in other districts, like Inner Citadel, by construction of new and dense multi-storeyed buildings although they are incompatible with their surroundings. For instance, Orta Pazar Street, known as the most important transportation axe in the Citadel from the Byzantine era, is still being used but was broadened. The most enduring change at the north part of this neighbourhood is the construction of a hospital complex, which is composed Memleket Hospital, Tuberculosis (*Verem*) Hospital, Military Hospital and State Hospital (Özdemir, 2009: 157), in 1960s, Following its settlement at this historic area of the city, which would be designated as archaeological site later, which results in permanent changes along the street with high storeyed apartment blocks were built along this major street and the existing buildings started to be used in different incompatible needs in relation with the hospital. Consequently, all physical and social character of this District was transformed.

In addition to infrastructural and planning problems started to arise in the city centre which was not previously imagined before that rapid change, squatters became wide spread. As a result of this, 'The Urban Planning Office' (*Bursa Nazım İmar Bürosu*) was established in 1970 in Bursa for fast realization of planning activities. Meanwhile, the planning and conservation regulations were changed by the effectuation of the first conservation act of Turkish Republic, no: 1710 Historic Artifacts Act (Eski Eser Yasası), in 1973. This act introduced the term of 'historic site', in addition to the 'historic artifact' to the field of conservation (Şahin Güçhan, Kurul, 2009: 29-30). The destruction in the historic sites of Bursa due to dense housing continued until this act take effect.

Upon the request of the Office and Ministry of Public Works and Settlement, 'Bursa City Master Plan' (scale: 1/25000) was prepared and approved by collaboration of Bursa Master Plan Bureau and the Ministry of Public Works and Housing in 1976[30]. This plan was approved in 1978, while construction plans in the scales of 1/5000 and 1/1000 were prepared. According to this plan, communal housing zones were placed outside the city and therefore, new neighbourhoods like Beşevler, Ataevler, and İhsaniye started to develop in the west of the city which today form the Nilufer District (Tarih İçinde Bursa, 1989: 86).

While taking decisions on listing of cultural heritage, the High Conservation Council (GEEAYK) also concerned to the destructions in Bursa, while deciding that historic sites should be conserved in line with Piccinato's plan in order to provide sustainability of their traditional tissue[31]. In the meantime, Bursa City Historic and Natural Sites Transitional Period Conservation-Development Plan and Decisions were requested to be prepared by the project team composed of experts from the Municipality of Public Works and Housing, the Ministry of Culture, the Middle East Technical University, Department of Architecture and the Bursa Municipality[32]. By this decision, incompatible new constructions within the project area were also demanded to beestimated.

New Regulations and Legalized Transformation

After the pass of 'Law of Conservation of Cultural and Natural Properties' no: 2863 in 1983, the decision making mechanism that played active roles in urban conservation decisions and implementations changed, the responsibility of preparation and implementation of urban conservation plans transferred to local authorities, therefore, *centralization* was replaced with local scale approaches, that is *regionalization* (Şahin Güçhan and Kurul, 2009: 31).

Although incomparable with the construction activities that they indulged in, local authorities made important contributions to the conservation of city's cultural Properties in Bursa from the first Municipality Organization, which was founded in the last years of 19th, century to present. Especially after 1980s mayors give immediate or gradual support to the conservation activities, and therefore became important actors in the conservation history of Bursa. Ekrem Barışık (1982-1989) is accepted as the most favorite and consiouss one as controlling not only the conservation plans and projects but also providing public consciousness in urban conservation.

However, in this period, the historic character of the city continued to change in early 1980s. *Opening of Haşim İşcan Street* can be the best example to describe results of a transformation activity since dividing a residential area, in which 19th century houses were indicated, at the north side of historic commercial center (Figure 7). As drawn by Kazım Baykal, in the city map dated to 1960s (Figure 8), Reyhan and Doğanbey Neighborhoods, in which traditional houses and mesjids of Eraly Ottoman period indicated, organic traditional texture was still legible since this street was not opened yet. Besides, As a result of this division, this area, currently named as Reyhan and Doğanbey Neighborhoods, has lost its unity in both spatial and functional aspects, which also results in transformation in not only physical but also social character. In fact, this new road has become one of

[30] This information is taken from an unpublished report prepared by Bursa Municipality, from the private archive of Emre Madran, in 1978.

[31] GEEAYK: A-1162 / 12.05.1978

[32] GEEAYK: 10662/13.10.1978

the major factors causing regeneration and transformation projects that just applied within Doğanbey Neighborhood, which is still criticized by the NGOS and related experts in urban planning.

In 1990s, a planning approach based on new construction demands and infill housing were decided to be implemented in empty or abandoned building lots in the historic city centre. Accordingly, traditional houses, which are about to collapse in the historic commercial centre and Muradiye District, were decided to be collapsed after their measured drawings were taken, and then new construction projects could be implemented by the approval of Conservation Council. However, this approach has made many historic buildings to be destroyed legally and caused historic areas to lose their traditional character in time, which is accepted as the first step of urban transformation. For instance, an 'underground car-parking project' was approved to be built behind the Ahmet Vefik Paşa Theatre in 1995[33], whereas the projects area is also located within the boundaries of Hanlar District, including historic commercial buildings from Ottoman Classical era (Figure 9).

Figure 7. Unstoppable transformation by the opening of Haşim İşcan Street (from 1980s to 2000s) (www.wowturkey.com)

[33] BKTVKK: 4169 /12.03.1995. This project was reapproved by the decision no: 4988 / 02.03.1996.

Figure 8. The map prepared by Kazım Baykal, which shows the urban development in 1960s (Bursa, ?: 82-83)

Figure 9. Remains of historic monuments, demolished during construction of an underground car-park at the rear side of Ahmet Vefik Paşa Theatre, in Hanlar District (source: archive of Bursa Municipality)

Moreover, previously approved conservation development plans were required to be revised, in order to enhance new building constructions within historic areas. The revisions in Conservation Development Plans occurred in 1990s and expanded at the beginning of 2000s. According to the decisions taken by Conservation Councils in Bursa, it is understood that, they are mostly demanding to cadastral mistakes and functional changes in defined building lots in historic neighbourhoods of Bursa. For instance, road opening and parcel expansion works are done as plan revisions resulting in collapse of the dwellings mostly in historic city core of Bursa. On the other hand, a 2-storey construction licence given to the urban site in Alacahırka Neighbourhood, located outside the Citadel walls, was cancelled and this area was decided to be used as the Municipal Service Area, according to a Conservation Council's decision[34]. Therefore, Conservation Councils in Turkey have an essential role in both conserving and transforming historic areas.

By the acceptance of new legislations and organizational reconfigurations at the beginning of 2000s, it is observed that the bureaucratic procedures were simplified and implementations were accelerated, while the areas were transformed with the investments in urban transformation, regeneration and tourism. With the law no: 5226[35] dated to 2004, new terms such as 'Conservation Development Plan' and 'Site Management Plan' were introduced to the discipline of conservation. With the law[36] no: 5366, dated to 2005, the use of 'regeneration' was legalized, the way for plans and projects prepared for 'regeneration and reuse of deteriorated historic sites' was cleared and urban transformation projects implemented in historic sites caused permanent damages in historic tissues of cities. Hence, by the Millennium, following the new regulations on conservation issue in Turkey, new urban transformation projects were designed and implemented to provide renovation of abandoned and isolated historic areas, which caused extensive changes in traditional texture of Bursa faster than before.

With the aid of the legal influence offered to the local authorities[37], in between 2004 and 2005, the Great Municipality of Bursa has got the principle to establish a city compatible with healthy and safe conditions for sustainable historic and natural environment. In this respect, such kind of transformation projects were prepared, under the control and approval of the Municipalities, for Emirsultan Complex, Central Bus Terminal and Kükürtlü Hot Springs, at first. One of these projects is named as 'Emirsultan Urban Transformation Project', in which Emirsultan Mosque and its vicinity were declared as Urban Transformation and Development Area with the decision of the Council of Municipality (488 / 19.07.2007). According to this project, the existing residential buildings and a school building in Yıldırım District were demolished to retrieve an open area and a public square measuring 4000 squaremeters.

In addition to rehabilitation of existing recreation areas by these new regulations, there existed new public square arrangements, which can be sometimes destructive for industrial heritage located in city center. Bursa Central Bus Terminal (Kentpark) City Square Project was one of that kind of applications (Polat, 2005). This project area, which was declared as Urban Transformation and Development Area with the decision of the Council of Metropolitan Municipality of Bursa (364 / 14.06.2007), covers the Central Bus Terminal, Hocahasan, Ahmetpaşa, Çırpan, Ulu and a part of Kırcaali neighbourhoods. It was aimed to establish a new administrative and commercial centre by preparation of an development plan for the area including 'Central Bus Terminal Complex Buildings', which was drawn as 'special project area' in the Master Plan of Bursa that was prepared between 1995 and 1998.

Since Terminal buildings were constructed in 1930s, Early Republican Era of Turkey, were drawn as 'special project area' in the Master Plan (1995 – 1998). It had a historic value to be conserved as it exhibited the architecture of a period and as being the city's point of transportation from other cities until 2000s. In accordance with its location, Accessibility and presence of different means of transportation nearby and existence of a dense pedestrian axe directed to the area from different directions. Besides, it was serving various public demands while involving commercial functions, handcrafts, bureau and public services working until the application of this development plan, which is a transformation project fundamentally. Because, during the application process it was aimed to demolish entire Central Bus Terminal building complex and create a brand new public square and building mass used as mall, instead of reusing it more respectively. More

[34] BKTVKK: 8717 / 21.09.2001

[35] The Law for Amendment in the Law for Conservation of Cultural and Natural Properties no: 5226 and Various Laws, (July 27th 2004).

[36] Law for Regeneration, Conservation and Reuse of Deteriorated Historic and Cultural Immovable Properties no: 5366 (July 5th 2005).

[37] The laws which provide this authority to local administrations are mentioned as The Law of the Metropolitan Municipalities no: 5216, The Law For Municipalities no: 5393 The Law of Construction no: 3194. The Law for Conversation of Cultural and Natural Properties no: 2863 and other related laws.

importantly, after the application, the name of the square was also changed to 'Kentpark' that is the name of this new Mall mass (Figure 10). Consequently, this plan was an action which could not preserve the identity and memory values of the area and caused it to transform totally.

Figure 10. Before and after the application of Bursa Central Bus Terminal (Kentpark) City Sqquare Project (http://projeler.bursa.bel.tr/)

The urban transformation activities in the Hot-Springs Area and Tabakhaneler (Dericiler) Districts were mentioned in 'Kükürtlü Hot-Springs Urban Regeneration Project Development Plan' approved in 2002[38]. This project area was abandoned and inactive after the leather smiths were transferred to their new places, by the demand of Metropolitan Municipality of Bursa in accordance with the principles of modern city planning. After the 'clearing works' were done, the project, which was prepared by the Municipality to transform this place from an area of depression into a centre of attraction, was implemented. Besides, instead of reusing the existing leathersmith's workshops, once the leather production units, a new group of buildings would be constructed (Figure 11).

More importantly, the project area was including a factory, constructed in between 1958 and 1959, in order to be used as the first 'Washing Machine Factory (*Tolon Çamaşır Makinesi Fabrikası*). This building was revealing modern architectural style of its period (Figure 11a) and registered in 29.06.2001 by the Council for its historic value (Ayengin, Şen, 2015: 130). However, within the purpose of this project, this industrial heritage building was demolished and collapsed completely by the Municipality recently. As claimed by the recent Mayor, the authority over the project was transferred to the Housing Development Administration of Turkey, which would increase density in the area. Formation of such a dense structure above historic area, which acts as a new city centre due to the coexistence of various functions it includes, poses a risk of threat that suppresses and negatively affects both natural and urban sites located in the north of the historic city centre.

(a)

[38] The boundaries of the urban transformation and development area which were identified in accordance with the article 7e of "the Law of the Metropolitan Municipalities" no: 5216, and the article 73rd of "the Law for Municipalities" no: 5393 and within the scope of the Kükürtlü Dericiler Urban Regeneration Project Implementary Development Plan was approved by the decision of Council of the Metropolitan Municipality of Bursa no: 220 of April 23rd 2006 (The Metropolitan Municipality of Bursa, 2006 Activity Reports, p. 199).

(b)

Figure 11. The proposed urban transformation project for Kükürtlü Hot-Spring and Tabakhaneler Districts to be resued as a touristic center (a) registered historic factory building not existing recently and current status of the area (b) proposed project images of this new tourism center (www.bursa.bel.tr)

Doğanbey-TOKİ (The Housing Development Administration of Turkey) Urban Transformation Project, as the most effective one in historic city center of Bursa, was completed in six years (from 2006 to 2012) under the control of the Municipality of Osmangazi. As being involved, the old neighborhoods called as 'Doğanbey, Tayakadın, Kiremitçi and Kırcaali', have already overwhelmed by the irregular formation of urbanization, as a result of arising 'a new centre'[39] in the south of the historic city centre as a response to the high demands of industrialization. This industrialization appeared by the second wave of migration that took place after 1980 and became an area of depression, exposed to an extensive change and transformation with this project.

Since it is located on one of the heavy mass traditional housing area (Figure 12a), this project was criticized especially by the Chamber of the Architects Bursa Branch, NGOs, and people of Bursa through different instruments including the social media initially for destroying Bursa's authentic city silhouette[40]. This project yielded a new fabric formed by monotype TOKİ (The Housing Development Administration of Turkey) apartments completely different in land subdivision and mass sizes of existing two storeyed garden houses (Figure 12b). It was also claimed by the Chamber of Architects of Bursa that no proper infrastructure (car parks, sewerage system etc.) considering the population increase that will take place in the area within the scope of this transformation project, since it is aimed to produce high revenue in the heart of the commercial centre by vertical development of this new housing.

In addition to the architectural incompatibility, permission of high-rise buildings in Doğanbey Urban Transformation Area indicates the double standards in the plan provisions. Even worse than that, the existence of one school building, six monumental buildings registered by the Bursa Regional Council for Conservation of Cultural and Natural Assets and sixteen examples of civil architecture in the project area was ignored, the physical, social and economic pressures that would be applied on the historic centre by such a heavy building stock right next to the borders of the Ördekli Bath and surrounding Urban Site was not taken into account. Hence, Doğanbey Urban Transformation Project is considered as a threat risk for sustainability of both physical and social character of one of the major old neighbourhoods in Bursa, while prohibiting its transference and entirety to future generations.

In briefly, the urban transformation and regeneration projects were started to be realized after large areas, including industrial heritage buildings, were ordered to be expropriated by the municipalities and transformed to municipal service areas (MSA) or to cultural centres in Bursa. On the other hand, it is clear that 'urban design projects' intended for design of city square and open areas were extremely spread from 2006 to 2012, when they are started to be called as 'Urban Transformation Projects'. Therefore, they have been mostly applied since the beginning of the Millenium, although universal decision should be taken for conservation of cultural heritage in Bursa, as being recorded by UNESCO in 2014.

[39] This new center is bordered with the Ankara-İzmir Motorway in the north, the Haşim İşcan Street in the south, the Fevzi Çakmak Street in the west and the Osman Gazi Street in the east.

[40](http://www.arkitera.com/etiket/3740/doganbey-kentsel-donusum-projesi);
(http://www.haberler.com/mimarlar-odasi-ndan-doganbey-aciklamasi-3918512-haberi/);
(http://www.arkitera.com/gorus/237/tokinin-bursaya-tokadi).

(a)

(b)

Figure 12. Before (a) and after (b) the application of Urban Transformation Project in Doğanbey District and its vicinitiy (2006-2012) (www.wowturkey.com)

Conclusion

There are many factors effecting into the transformation of historic character of Bursa during the last one century. It is impossible to handle these major factors separately, since they are homogenously effecting transformation of traditional character of Bursa, since the middle of the 19th century.

As mentioned before, the disasters, such as earthquakes and fires, have permanently changed stability of the existing buildings and contributed to transformation of urban character of old neighbourhoods in Bursa periodically. 1855 earthquake and 1958 fire can exemplify this relation in between disasters and urban transformations in its historic core, in a hundred years period of its urban history. 1855 earthquake contributed to explode modernization activities above traditional structure of this Ottoman city; by opening new roads and by construction of new public buildings under the effect of westernization in architecture and urban planning. After a century, 1958 fire let the reconstruction and renovation of historic buildings by injecting contemporary – but mostly improper material (reinforced concrete) into traditional construction techniques within historic commercial center of Bursa.

Modernization activities done after Beneficial Reforms, started after 1860s, and urban development works done by the order of Mayors and Governors of Bursa, mostly exposed after 1960s in Bursa. Again in this hundred year's period, these activities destroyed traditional texture of the city, while permanently changing urban identity in different neighborhoods by the effects of new planning policies applied in the meantime. For instance, application of decisions in Piccinato Plan of Bursa (1958-1960) results in urban development activities supported by industrialization just invented by the local authorities of the city, while also proposing to conserve historic texture of this Ottoman city against rapid urban transformation that would enlarge by the migration.

The contribution of local authority is necessary to assess reasons and results of urban transformation activities within the control of the Mayors and the Municipalities. Whereas they aim to develop the sanitary conditions of the city by public improvements, such as new road openings, the physical structure of traditional texture can be transformed together with social lifestyle in historic neighborhoods. Especially the urban transformation projects, which have been legalized since the beginning of the Millennium, are directly result in lose of the unity and authenticity of historic areas. On the other hand, Conservation Councils have an important role in blocking application of improper projects as having risk for sustainability of traditional character of historic

sites, while causing permanent changes in their physical structure. In addition, NGOs and other local associations can be voluntary in monitoring changes in historic buildings and areas.

Improvement activities done by the municipalities, such as new road openings, street rehabilitation works and regulations on public open areas, make the abandoned buildings usable with their surroundings, whereas they are mostly causing permanent changes in traditional texture of old neighborhoods in Bursa. Cumhuriyet Street, the first improvement activity applied at the beginning of 20th century, divided lots of historic monuments of commercial center to be into two parts, which makes most of them not to be used afterwards. In fact, Haşim İşcan Street, which was opened at the beginning of 1980s, started a continuous transformation process at the north side of this center, not only in physical but also social characteristic of the related old neighborhoods.

Inner migrations, arose by the industrialization, resulted in new housing demands for new building constructions as new infills in empty building lots. Besides, reconstruction of historic houses, previously documented and registered, should be accepted as the major factors which let starting transformation of unity in traditional texture of historic neighborhoods. For the case of Bursa, the influences of this implementation are observed mostly in Muradiye, Maksem, Hisariçi and Çekirge Districts, which are also the oldest neighborhoods having Ottoman settlement character[41].

More importantly, construction of transforming buildings (*trafo*) especially within the historic commercial center of Bursa could cause damage in perceptibility of townscape. Since it is also a requirement for functional reasons in the center, the Conservation Council has aimed to accept but to control their distribution within the center. Functional modifications required for re-use of historic buildings also change not only its original form or architectural character but also traditional view of its surrounding landscape, which means renewal of related historic area. Moreover, these modifications are implemented generally in relation with new planning policies aiming the urban development of the cities.

Consequently, Bursa has been subjected to various types of changes in both building and site scales of cultural heritage, which makes the urban transformation continuous for a century. Disasters were followed by the modernization activities in city planning, while immigration was resulting in new building construction demands in historic areas. Most importantly, urban transformation projects have made permanent changes legalized in Bursa, like other metropolitan cities in Turkey, by new law regulations being accepted and applied since the beginning of the 21st century. All these factors are negatively influencing historic urban identity of the city, as being a risk for sustainability of immovable cultural heritage of Bursa, known as one of the UNESCO World Heritage Sites in Turkey.

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[41] The original character of an Ottoman neighborhood is composed of a small square surrounding with a mosque, a bath, a coffee-house together with two storeyed houses forming organic texture (Tanman, 1996), (Cerasi, 2001).

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DEVELOPING THE STANDARDS FOR SENSE OF ENCLOSURE: AN EXPERIMENTAL STUDY IN VIRTUAL ENVIRONMENTS

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Abstract

Sense of enclosure in urban space is one of the fundamental principles of urban design and it differs by the variation in the heights of building that surrounds an open area and by the distance between buildings (or street widths). This study aims to investigate the sense of enclosure (full vs. loss of enclosure) in different urban squares. The variation in the height of buildings and distance between buildings was controlled by using virtual environments. Seven different virtual urban squares were designed using GTK RADIANT. In each virtual urban square, the ratio of buildings height to the width between the buildings varied based on the related literature. The literature suggests that the proportion of 1:1 or above produces full enclosure and the proportion of 1:4 or less produces loss of enclosure. Seventy four students studying in an urban planning program evaluated the sense of enclosure in entrance points and midpoints of each virtual urban square using a 10 point Likert scale. Results showed that, despite demographical variations, students evaluated the sense of enclosure in virtual environments similarly. Moreover, the results produced empirical evidence to define the standards for full enclosure and loss of enclosure (based on the height and width ratio). In addition, our study showed that, standards for sense of enclosure in real environments is similar to that in virtual environments.

Introduction

Architects, urban planners, landscape architects and urban designers have long been trying to measure the use value of physical environments based on measurements on the form of the physical setting (such as spatial configuration of buildings). How well the physical environments are designed influences user's behaviour. People tend to stay in places they like and they avoid places they dislike (Nasar, 1992). The reciprocal relation between environment and behaviour has been investigated via studies on environmental perception. Researchers often use computer simulations to understand how people perceive the urban space (Toet and Schaik, 2012; Nasar, 2008). Thanks to the technological developments, researchers can gather data via VEs easily. Such VEs may look like realistic environments. Moreover, researchers can control the physical environmental characteristics in virtual environments. Given that, this study used VEs to understand people's environmental perception in general, and sense of enclosure in particular.

Schulz (1976) described *enclosure* as boundaries of openings of a built space and landscape. Enclosure is also defined by Ewing and Handy (2009) as "a room like outdoor space surrounded by vertical elements; buildings". They argued that the buildings are the "walls" of an outdoor room. They defined building facades as "street walls." Stamps's (2005) argued that people comprehend the surroundings in enclosed spaces better than in any other place. People's ability to see to the boundary (and the potential threats) in fully enclosed spaces is better than that in spaces of loss of enclosure.

The purpose of this study is to investigate the sense of enclosure in different "building height" to "the width between the buildings" ratios. We aimed to answer the following questions:

1. How the sense of enclosure varies by differences in physical environmental characteristics (the ratio of building heights to width between buildings)?
2. Is the standards in the literature related to sense of enclosure in real environments apply to that in virtual environments?

Despite the methodological limitations (small sample size), this study reveals the importance of using virtual environment to develop objective measures of spatial enclosure to design better environments.

The standards of Spatial Enclosure

Since the 1960's, the standards about the full enclosure and loss of enclosure in urban environments have been investigated. The perceived spaciousness and enclosure have been measured via building heights that surrounds an open space and distances between buildings in that open space.

Spreiregen's (1965) measured the ratio between "building facade height" and "frontal field of view width" and argued that the following ratios provide the sense of full enclosure, threshold enclosure, minimum enclosure, loss of enclosure:

- Full enclosure (ratio= 1:1)
- Threshold enclosure (ratio= 1:2)
- Minimum enclosure (ratio= 1:3)
- Loss of enclosure (ratio= 1:4) (Figure 1, left) (Table 1, left).

Hedman and Jaszewski's (1984) measured the ratio between "street wall height" and "street width" and argued that the following ratios provide the strong spatial definition, sufficient spatial containment, weak sense of space, claustrophobic space:

- Strong spatial definition (ratio= 1:1)
- sufficient spatial containment (ratio= 1:2)
- Weak sense of space (ratio= 1:4)
- Claustrophobic (ratio= 3:2) (Figure 1, right) (Table 1, right).

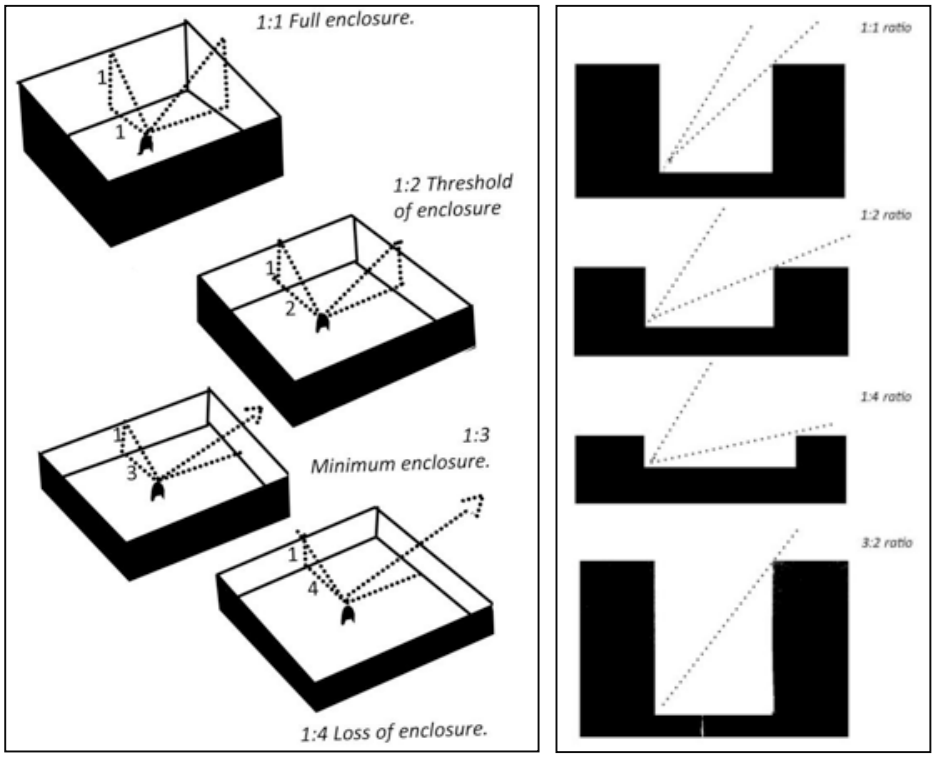

Figure 1. Enclosure definition of Spreiregen (1965) on the left and Hedman and Jaszewski (1984) on the right.

Based on these definitions we created virtual environments in which the ratio between "building height" and "the width between buildings" vary as 3:2, 1: 1, 1:2, 1:3, 1:4, 1:6 and 1:8 ((Figure 2 and Table 1, middle).

Spreiregen (1965)		Experiment		Hedman and Jaszewski (1984)	
Definition	Building facade height to frontal field of view width	**Building height to the width between buildings**	**Definition**	Street wall height to width	Definition
		3:2	**claustrophobic**	3:2	claustrophobic
Full enclosure	1:1	**1:1**	**Full enclosure**	1:1	Strong spatial definition
Threshold enclosure	1:2	**1:2**	**sufficient spatial containment**	1:2	sufficient spatial containment
Minimum enclosure	1:3	**1:3**	**Weak sense of space**		
Loss of enclosure	1:4	**1:4**	**Weak sense of space**	1:4	Weak sense of space
		1:6	**Weak sense of space**		
		Less than 1:8	**Weak sense of space**		

Table 1. Enclosure ratios used for the experiment and existing literature.

Procedure

The virtual models of urban squares; where the ratio between "building heights" and "the width between buildings" vary, was modelled via GTK Radiant and experienced in QUAKE III ARENA, a computer game engine. This three-dimensional computer-modelling program produces perspective views through the simulation (Çubukçu, 2011).

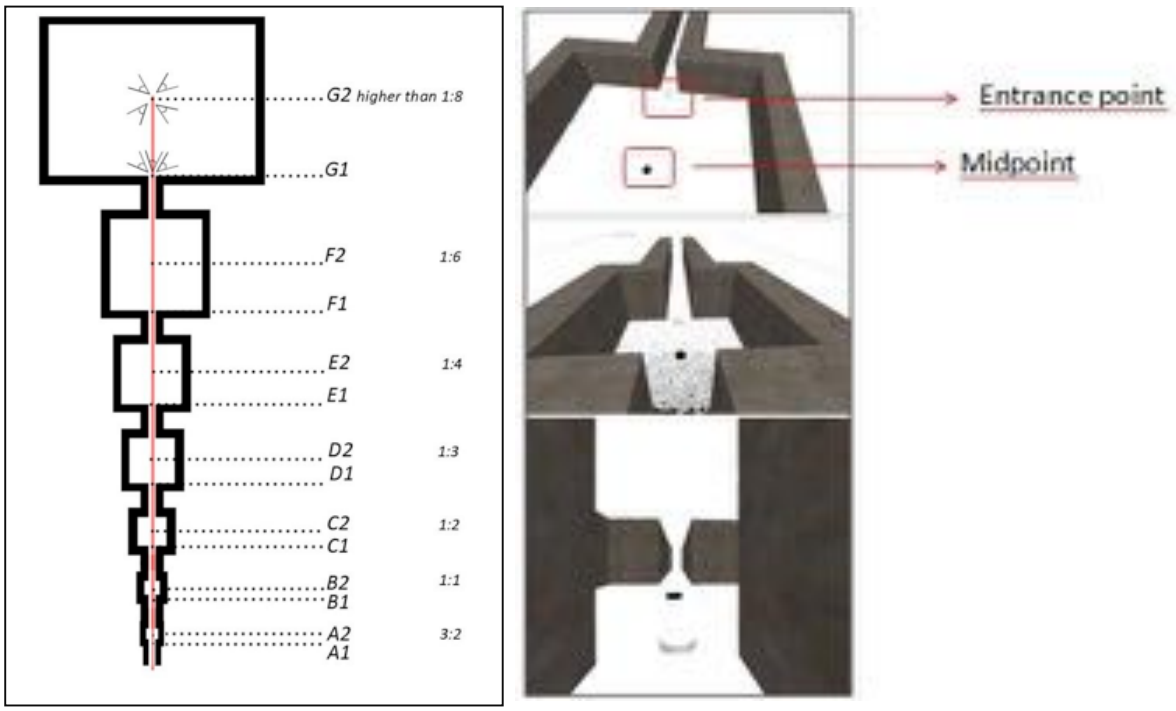

Figure 2. Test plan covering 7 zones.

Total of 74 students; who were studying in the City and Regional Planning Department of a Turkish University, volunteered to participate. Students were from 4 classes (20 1st graders, 20 2nd graders, 25 3rd graders and 8 4th graders). They were asked to watch an exploration in a virtual environment in their spare time in a computer laboratory where they study. The route in the virtual environment passes through 7 urban square simulations. For all seven 7 virtual urban squares, participants were stopped in two locations (at the edge and at the middle of the square) and were asked to evaluate their sense of enclosure. Thus, each participant made 14 evaluations, at 14 locations, in 7 virtual urban squares (A1, A2, B1, B2, C1, C2, D1, D2, E1, E2, F1, F2, G1 and G2) (Figure 2):
The order for presenting seven squares to participants varied in two ways:

1) 2nd and 3rd grade began from fully enclosure area lasted with minimum enclosure area; A to G
2) 1st and 4th grade began from minimum enclosure area lasted with fully enclosure area; G to A.

Participants explored the virtual environment passively during the test. They watched as the researcher followed a predefined route which passes through all these seven urban squares. The researcher stopped at 14 locations and asked students to fill the survey form which asks them to evaluate the sense of enclosure at the point where they stopped.
Student's ages were ranging from 18 to 29. (Mean: 21.39; S.D.: 2,226). There were 30 male and 44 female subjects (1st grade; 10 male and 11 female, 2nd grade; 13 male and 7 female, 3rd grade; 3 male and 22 female and 4th grade; 4 male and 4 female).

Questionnaire

A short questionnaire was used to get information about grade and gender of the participants. Participants were informed for 3 minutes about the survey. The sense of enclosure at each point was evaluated on a 10 point likert scale, which included a graphical expression to represent the highest and lowest sense of enclosures. Participants were asked to watch the route the instructor took and fill the survey when the experimenter stopped along the route. The experimental session took between 10 and 12 minutes for each participant.

Figure 3. 10 point Likert Scale to evaluate sense of enclosure.

Results

We analyzed the results in two parts. First, we investigated whether the participant's sense of enclosure varies when the ratio between "building height" and "the width between buildings" differs. Next we analyzed whether differences in demographic characteristics (gender and experience in design education) produces differences.
First, the results showed that, the participant's sense of enclosure varied as the ratios between "building height" and "the width between buildings" differed (Figure 4). The sense of enclosure increases as the ratio "building height" and "the width between buildings" decreases, or as one moves from Zone A (3:2) to Zone F (1:6) (Figure 5). This is parallel to the findings in the literature. Hedman and Jaszewski (1984) defined the ratio of 3:2 as "claustrophobic", and Spreiregen (1965) defined the ratio 1:6 as "minimum enclosure". Our results provided empirical support to these arguments. However, on the contrary expectations and to the findings in the literature; Zone G (less than 1:8) is perceived as enclosed as Zone C (1:2) and Zone D (1:3). In other words, when the ratio was less 1:8, people evaluated the environment as providing sufficient spatial containment,

rather than sense of weak enclosure. This unexpected result may have been produced due to the methodological shortcomings. Zone G was too dark and participants may have failed to comprehend the borders in the open area and they may have thought that the area is smaller than it really is.

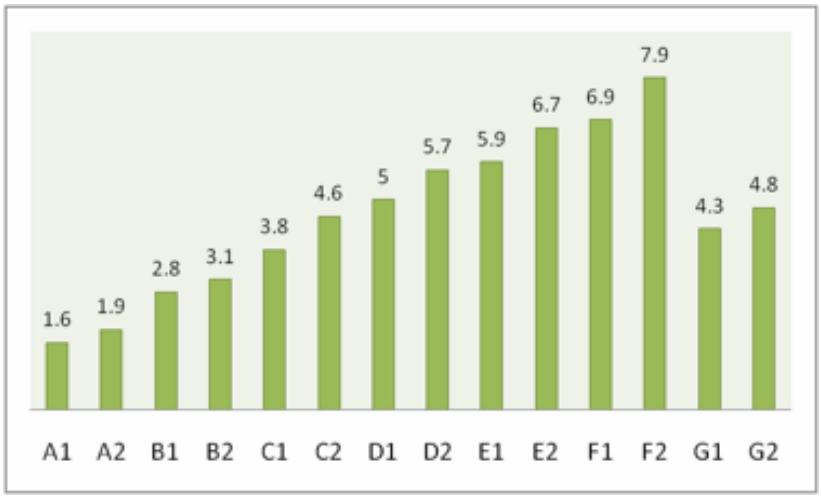

Figure 4. Mean sense of enclosure at each decision point.

Results also showed that, in each zone the sense of enclosure did not change by the locations where the evaluations were made (at the edge of the square or at the middle of the square) (Figure 5). In other words, evaluations for A1 is similar to that for A2, and evaluations of B1 is similar to that of B2 and so on.

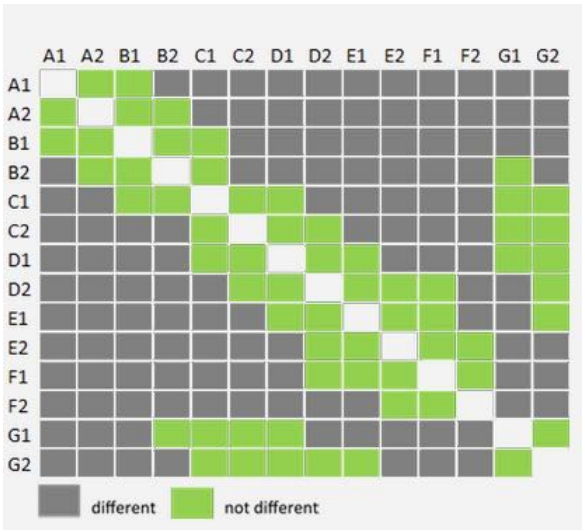

Figure 5. Similarities and differences in the sense of enclosure at each decision point (Benforroni Post Hoc Test results for ANOVA)

Next we compared whether experience in design education influences student's evaluations. The mean sense of enclosure ratings for each grade was compared. According to results, 3rd grade student's ratings of sense of enclosure were higher than 1st, 2nd and 4th grade student's ratings (p=0,00, F=13,012, df=3) (Figure 6). Third graders tend to gave higher scores than their peers. However, when the 3rd graders and 1st, 2nd and 4th graders evaluations in each setting were compared separately, similar results were achieved as it was for the full sample. In other words, sense of enclosure increases as the ratios between "building height" and "the width between buildings" decreases for both 3th graders and for 1st, 2nd and 4th graders (Table 2). The statistically significant differences between settings were also similar (Figure7).

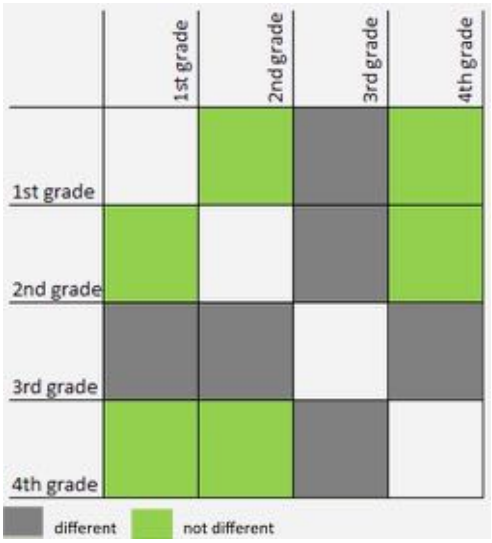

Figure 6. Similarities and differences in the sense of enclosure as experience in design education varies. (Benforroni Post Hoc Test results for ANOVA)

	Experience in Design Education		Gender	
Decision Point	**3rd graders (n=25)**	**1st, 2nd, 4th graders (n=49)**	**males (n=30)**	**females (n=44)**
1	1,64	1,592	1,633	1,591
2	2,4	1,755	1,867	2,045
3	3,08	2,673	2,767	2,841
4	3,76	2,878	3,067	3,25
5	4,4	3,531	3,533	4,023
6	5,76	4,061	4,333	4,841
7	6,04	4,551	4,567	5,386
8	6,92	5,102	5,367	5,955
9	6,76	5,51	5,8	6,023
10	7,96	6,163	6,533	6,932
11	8	6,429	6,767	7,091
12	9	7,327	7,567	8,114
13	4,96	3,918	4,167	4,341
14	5,44	4,449	4,267	5,136

Table 2. Mean scores for sense of enclosure at each location by gender and by experience in design education.

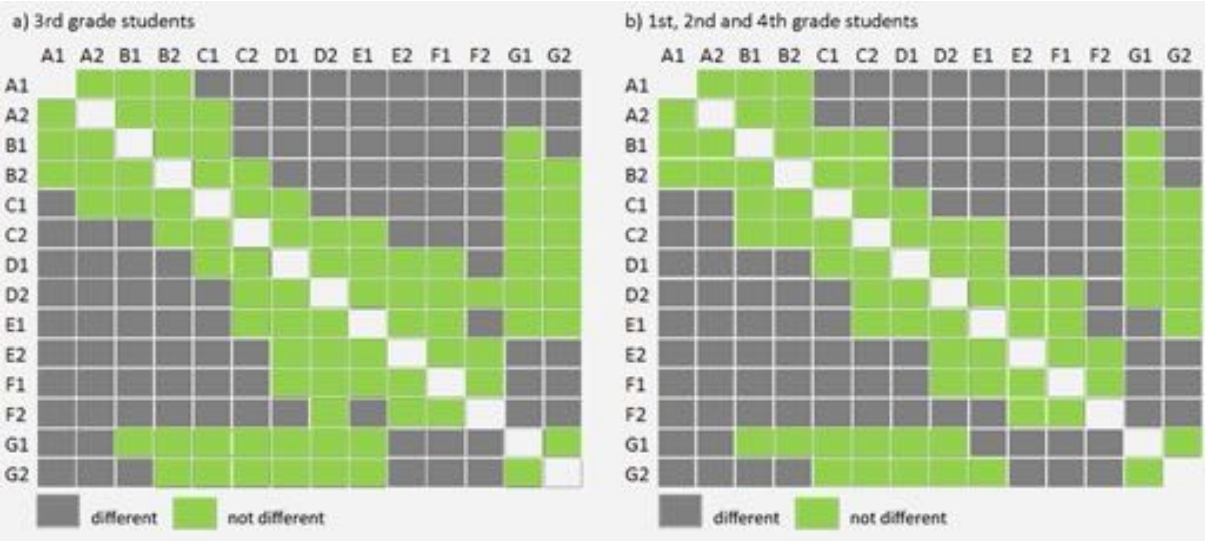

Figure 7. Statistically significant difference at points of interest for 3rd grade students and 1st, 2nd and 4th grade students.

Finally we compared sense of enclosure between women and men. Results showed that females tend to give higher scores. However, when female's and male's evaluations in each setting were compared separately, similar results were achieved as it was for the full sample. In other words, sense of enclosure increases as the ratios between "building height" and "the width between buildings" decreases for both females and males (Table 2). The statistically significant differences between settings were also similar (Figure 8).

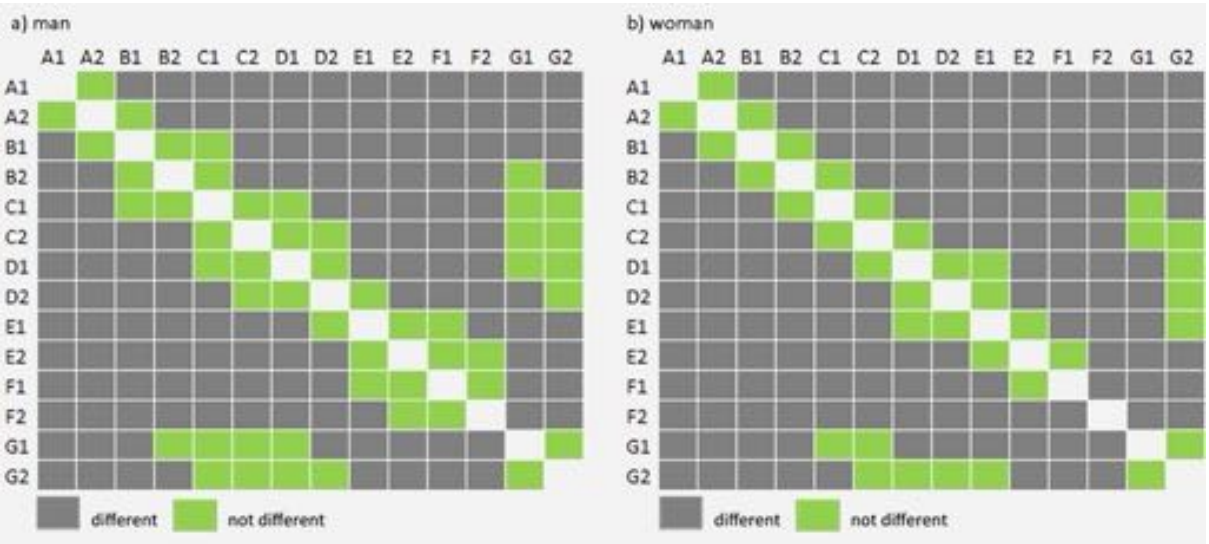

Figure 8. Statistically significant difference at points of interest for females and males

Discussion

In order to investigate the sense of spatial enclosure in various urban forms 7 different virtual environments (to simulate an urban square) were created. The ratio of "building height" to "width between buildings" differed in each virtual environment. The thresholds for the ratios were specified based on calculations of Hedman and Jaszewski (1984) and Spreiregen (1965). Results showed that, perceived enclosure increased from the ratio of 3:2 to ratio of 1:6 in parallel to what the literature suggests for real environments. Results remains the same when demographical differences (gender and experience and experience in design education) are taken into account. For example, for both females and males, sense of enclosure increases as the height / width ratio decreases (as it did for the whole sample). The findings provide support that virtual environment is a promising tool to investigate the reciprocal relation between human behaviour and physical environment. The standards for sense of enclosure in virtual environments are similar to that in real environments. The findings have applied value for urban designers and planners. They can design better environments to fit to user's requirements.

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LE VIRAGE, AN INNOVATIVE URBAN LABORATORY IN MONTREAL

JONATHAN CHA

ABSTRACT

The presentation will present the design process of Le Virage. Le Virage is located in Outremont borough in the central core of Montreal on a land loaned by the University of Montreal. The thinkers behind this unique project are MTL ville en mouvement (Bruno Jobin and Jonathan Cha), a non-profit organization which goal is to develop innovative solutions in urban design and initiate a conversation with citizens through a numerical meeting space. It consists of seven remodeled and transformed containers reminiscent of past rail yard hosting a new and emerging Research-Creation city. Our installation recalls the Renaissance workshop or evokes an Industrial Villa Medici. By creating, manufacturing and experimenting stories, performances, projects and urban practices, the purpose of Le Virage is to bring together artists, researchers, professors, students, professionnals and citizens in an interdisciplinary quest to exhibits and confront views on the city and its environment. Le Virage is an urban laboratory, an experimental place that produce, presents, debates ideas and projects from various fields, from literature to architecture, from art to landscape architecture, from mapping to urban design. It aims to become a local, national and international venue for enthusiasts, thinkers and doers of the City. Urbanity, innovation and creativity will be synonymous of Le Virage, an unavoidable Urban Catalyst, a transforming agent of the city.

Keywords: Urban Laboratory, Research-creation, Containers, Urban Catalyst

THE CITY/ UNIVERSITY DUALITY: SPATIAL IMPACT OF UNIVERSITY CAMPUSES ON CITIES

AMIRA ELNOKALY, GLEN MILLS, NASTARAN NAMVAR

ABSTRACT

Urban space transformations can include direct changes to the physical components of the city and these changes integrate with changes to the social composition and socio-cultural dynamic of the community itself. A key inter-relationship pertinent to spatial-cultural dynamics in many UK cities is the physical comparative between the university and the city.

This paper discusses the spatial impact of the university of Lincoln campus and the urban space on the city of Lincoln in United Kingdome (uk). Lincoln is a historical cathedral city, in Lincolnshire, one of the UK's largest counties in the East midland. The city is rich in history and architecture, which has it is origin in pre-Roman times. Lincoln is well known for its well-preserved Gothic cathedral and its historical castle and cathedral centre in the Bailgate and Steep hill area.

The University of Lincoln (UoL) has its origins in 1861, originally situated in Hull a 30 miles' city away from Lincoln, the new university moved to its new main campus in Lincoln in 2001.Opened by Queen Elizabeth II, the University's main campus is on the Brayford pool and was the first new city centre campus to be built in the UK for several decades.

University growth is not just about campus development, it is also about driving development in towns and cities. Universities are often the heart of a town or city and UoL as a case study provides a great example of how university campus transforms the socio-economical spatial environments of a city. These transformations are reflected in the spatial integration and connectivity between the campus and city.

The paper aims to identify key socio-spatial relations between the University of Lincoln and Lincoln city. The paper concludes Space Syntax techniques are used as a basic method for investigation and analysis. Used to show that the spatial configuration of the city is influenced by the campus and vice versa.

Keywords: city, campus, spatial transformation, social composition, Lincoln, UK

A STUDY ON THE COMPUTERIZATION CONSTRUCTION ABILITY BY A SPECIAL-PURPOSE AREA AND DETERMINANT OF SIZE BY BUILDING USAGE

SUNWOO PARK, YOUNGCHAN YOO, JONGHO LEE

Sunwoo Park, Senior Researcher, KICT, **Youngchan Yoo,** Senior Research Fellow, KICT, **Jongho Lee**, Researcher, KICT

Abstract

The administrative process of Korean city planning is stipulated by the strong central law: the Basic Land Act, and is regulated by the special laws for each project and the ordinances of local governments. In principle, the National Land Basic Law provides guidelines for urban development and strengthens regulations in special laws and ordinances of local governments.

From a policy point of view, Korean urban development has limited its scope and scope of usage of urban buildings after using spatial limits. Zoning restrictions are based on the limitations of the National Land Planning Act and the Building Act. In Korea, the land planning law divides the use of the land into 24 districts and 4 zones to restrict 21 regions and sizes. Zoning is the nature of the guidelines for the construction of buildings, the reason of the complex social needs of modern society and the building cannot accommodate the needs of the purpose through land use regulations. Basic Law defines the details of the development city and construction of buildings. However, in order to reflect the characteristics of the region, the government delegates a certain amount of authority to the authorized persons in the area to strengthen or relax the regulations.

The construction of building through the use of local areas is appreciated in terms of being able to utilize the land effectively. However, for those who want to build a building with a small amount of land, it takes a considerable amount of time and money to solve this problem. In order to simplify this, we have built a system based on the Internet. Based on the information of the existing use area information, the system informs the user of the usage and maximum size of the building which can be built at the corresponding address, thereby promoting the development. In order to construct the system, the keywords that restrict the use area, the use of the building and the scale were extracted from the law and made into a database.

Introduction

Korea is one of the fastest growing urbanized countries in the world for the last 50 years. In the process, many problems faced by the indiscreet development of cities without guidelines were faced. As a policy measure to solve these problems, the "National Land Basic Law", which regulates the administrative development of the city, divides the plans for city development from a policy perspective and establishes policies and basic plans for development. Through these policy steps, the government aims to provide guidelines on basic matters and to develop the details in consideration of local characteristics.

For the priority development of the plan, Korea has adopted the use zone as a policy that restricts the use and scale of buildings by dividing the city into specialized zones. The use area should be preceded by the establishment of standards for the use and scale of buildings. Also, because there is a limit that cannot apply the regional characteristics collectively, many delegations are delegated to the regulations of the local governments to induce balanced development.

The development of the city through the use of a localization system is recognized in terms of effective management of the land. However, for those who want to build a building with a small amount of land, it takes a considerable amount of time and money to solve it. This problem has led to the development of passivity and has had an adverse effect on efficient development.

In this study, it is possible to construct the system through a homepage as a way to efficiently transmit the information about the use and the size of the building determined by the policy of urban development to the requestor. For the service, the database was constructed by extracting keywords based on laws and regulations related to the use area, laws and regulations related to the use of buildings, and laws related to the size of

buildings. This database will be used in conjunction with existing systems to provide users with a maximum value of the use and scale of buildings that can be built on the site.

Restrictions on the use and size of buildings according to usage the area

In Korea, the National Land Basic Act, which is a statute that is a guideline for urban development planning, is in place. The National Land Basic Act is a law establishing basic matters concerning the establishment and enforcement of plans and policies concerning the city. It requires the development of individuality and independent competitiveness according to the regional characteristics. To this end, the policy scope of the plan in the definition and division of the Article 6 National Territory Plan is divided as follows:

Classified	explain
Comprehensive national land plan	A comprehensive plan indicating a long-term direction for development of the national land, covering the entire area of the national land
Do comprehensive plan	A comprehensive plan indicating a long-term direction for development of the jurisdictional area of a Do or a Special Self-Governing Province, covering the entire area of the relevant region
City/County comprehensive plan	A plan indicating the basic spatial structure and a long-term direction for development of the jurisdictional area of a Special Metropolitan City, a Metropolitan City, a City, or a County (excluding any County in a Metropolitan City), covering the entire area of the relevant region, which is formulated for land utilization, traffic, environment, safety, industry, information and communications, health, welfare, culture, etc. as a part of an urban plan under the National Land Planning and Utilization Act
Regional plan	A plan formulated in order to achieve the objectives of special policies in a specific region, covering the entire area thereof
Sector plan	A plan indicating a long-term direction for development of a specific sector, covering the entire area of the national land

Table 1. Article 6. (Definition and Classification of National Land Plans**)**, the Framework Act on The National Land

The comprehensive national land plan should include a basic and long-term policy direction for the matter. The Comprehensive Plan should also include the future prospects for the matter, as well as the infrastructure and use of the infrastructure. City/County Comprehensive Plan shall include the City Compartment Plan established by delegating to the National Land Planning Act. The regional plan shall be established when it is recognized for maintenance or development that meets local characteristics. The divisional plans can be established and modified within the range not to conflict with the contents of the national land plan.

Classified	Contents
Comprehensive national land plan	1. Matters concerning the current status of the national land and the outlook of any changes in the given conditions; 2. Matters concerning the basic ideas for national land development and the establishment of desirable future images of the national land; 3. Matters concerning the improvement of the spatial structure of the national land and a direction for sharing the functions by region; 4. Matters concerning policies for the balanced development of the national land and concerning the fostering of regional industries; 5. Matters concerning the elevation of national competitiveness and the expansion of the infrastructure of the national land forming the basis for nationals' living; 6. Matters concerning the efficient utilization and management of national land resources, such as land, water resources, forest resources, and marine resources; 7. Matters concerning the creation of living conditions, such as housing and water supply and sewerage systems, and the improvement of the quality of life; 8. Matters concerning the prevention of flood damage, wind damage, and other disasters; 9. Matters concerning the rational utilization and management of underground spaces; 10. Matters concerning the conservation and improvement of national land environments for the sustainable development of the national land; 11. Other matters incidental to subparagraphs 1 through 10.
Do comprehensive plan	1. Matters concerning the analysis of current status and peculiarity of the region and concerning the outlook of any changes in internal and external conditions; 2. Matters concerning objectives and strategies for the regional development; 3. Matters concerning the improvement of the region's spatial structure and directions for sharing the functions within the region; 4. Matters concerning the construction of the infrastructure, such as transportation, logistics, and information and communications network; 5. Matters concerning the development, conservation and management of resources and environments within the region; 6. Matters concerning the utilization of land by purpose and its planned management; 7. Other matters required for the sustainable development of the Do, which are prescribed by Presidential Decree.
City/County comprehensive plan	Urban and County planning established in accordance with the「National Land Planning and Utilization Act」
Regional plan	1. Seoul Metropolitan Area development plan: A plan formulated in order to induce the decentralization and reasonable arrangement of population and industries excessively concentrated in the Seoul Metropolitan Area; 2. Metropolitan zone development plan: A plan for making a broadly-based and systematic development of such areas as a Metropolitan City and its vicinity, industrial complexes and their surrounding areas, and areas where many cities adjoin each other and form a single living zone;
Sector plan	(1) The head of a central administrative agency may formulate a sector plan as to his/her competent duties, covering the entire area of the national land. (2) Where the head of a central administrative agency intends to formulate a sector plan under paragraph (1), he/she shall reflect the contents of the comprehensive national land plan in the sector plan and ensure that his/her plan shall not be in contradiction to the comprehensive national land plan.

Table 2. Contents of each phase plan

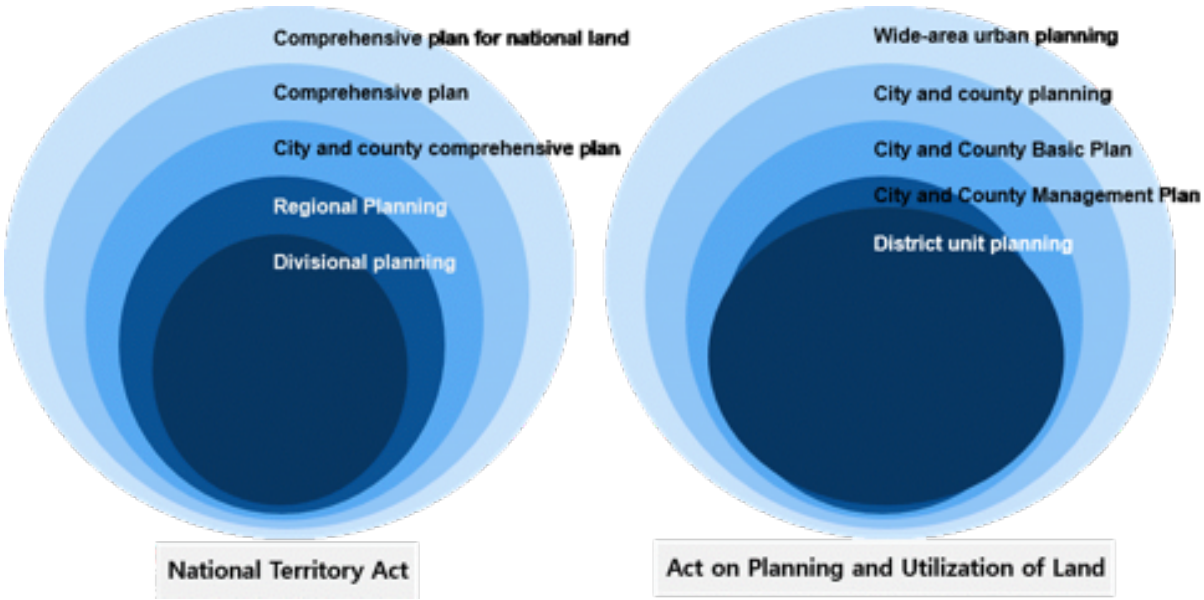

Figure 1. Comparing Urban Planning Scope of the National Land Basic Law and the National Land Planning Act

The urban municipal plan, which is included in the City/County comprehensive plan of the National Land Basic Law is a plan for the spatial structure and direction of development for the jurisdictions as part of the plan based on the National Land Planning Act. The urban municipal plan is a plan for land use that is established for development, maintenance, and conservation in the management plan through the basic plan. For some areas where the urban municipal plan is established, the district unit plans are separately established to reflect regional characteristics. At this time, the urban municipal management plan defines the usage area system, and the usage area system is divided into the usage area.

Usage area uses land use and the use of building, building coverage (we say the same as follows in "building law" Article 55), floor area ratio (say the floor area ratio of Article 56 of the "Building Act" to be used economically and efficiently, and to promote the promotion of public welfare. Usage the area is used for strengthening or alleviating restrictions on the use of the land, the use of the building, the coverage rate, the floor area ratio, the height, etc., thereby enhancing the function of the use area and promoting beauty and scenery. It is the area to decide by planning. Usage area is intended to prevent the disorderly spread of the city area by planning to strengthen or alleviate the restriction of the use area and the use area of the use of the land and the use of the building, the use rate of the building, It refers to the area determined by the city/county management plan for comprehensive adjustment and management. According to the National Land Planning Act, the use of land is divided into 21 regions, 24 districts, and 4 zones, each of which limits the use and size of buildings.

21 regions	24 districts	4 zones
1. A class I exclusive residential area; 2. A class II exclusive residential area 3. A class I general residential area 4. A class II general residential area 5. A class III general residential area 6. A quasi-residential area 7. A central commercial area 8. A general commercial area 9. A neighboring commercial area 10. A circulative commercial area 11. An exclusive industrial area 12. A general industrial area 13. A quasi-industrial area 14. A green conservation area 15. A green production area 16. A green natural area 17. A conservation management area 18. A production management area 19. A planning management area 20. An agricultural and forestry area 21. A natural environment conservation area	1. A natural scenic district 2. A waterside scenic district 3. An urban scenic district 4. A central place aesthetic district 5. A historical culture aesthetic district 6. A general aesthetic district 7. A tallest height restriction district 8. A lowest height restriction district 9. An urban disaster prevention district 10. A natural disaster prevention district 11. A historic and cultural environment conservation district 12. An important installation conservation district 13. An ecosystem conservation district 14. A school facility protection district 15. A public facility protection district 16. A harbor facility protection district 17. An airport facility protection district 18. A natural settlement district 19. A collective settlement district 20. A residence development promotion district 21. An industry and distribution development promotion district 22. A tourism and recreation development promotion district 23. A complex development promotion district 24. A specific development promotion district	1. Limitations on construction in development restriction zones 2. Limitations on construction in urban natural park zones 3. Limitations on construction in urbanization-coordination zones 4. Limitations on construction in fishery resources protection zones

Table 3. Use of the National Land Planning Act Category of regions and districts

In addition, the city and county management plan not set forth in the National Land Planning Act is set by the Basic Law on Land Use Regulation. Regardless of the name, such as the area, district, area, area, complex, city, land that is limited to the use and preservation of the land, such as restricting development activity or receiving authorization or permission related to land use (land which is connected with the land, (Hereinafter the same shall apply), as referred to in each subparagraph of Article 5. Construction restrictions on the areas, districts, and districts set forth in the Framework Act on Land Use Regulation are stipulated by the relevant laws and regulations, and the range is very large and there are many exceptions.

Regions, districts, and districts that are politically determined by these steps limit the use and scale of buildings in the law. In this process, it is necessary to consider the buildings for each use classified in Table 1 of the Enforcement Decree of the Building Act. Therefore, after considering the limitation of the buildings and scales used in Table 1, it is possible to construct according to the usage area. Attached, Table 1 divides the purpose-built buildings into 29 uses. (See Table 4) The classification system of the use of this building is applied equally to all laws and regulations of Korea and it must be applied in the construction.

1. Detached houses; 2. Multi-unit houses; 3. Class I neighborhood living facilities; 4. Class II neighborhood living facilities; 5. Facilities for cultural activities and assembly; 6. Religious facilities; 7. Commercial facilities; 8. Transportation facilities; 9. Medical facilities; 10. Education and research facilities; 11. Facilities for the aged and children; 12. Training facilities; 13. Sports facilities; 14. Business facilities; 15. Lodging facilities; 16. Amusement facilities;	17. Factories; 18. Warehouses; 19. Facilities for storage and treatment of dangerous substance; 20. Facilities for motor vehicles; 21. Facilities for animals and plants; 22. Resource recycling-related facilities; 23. Correctional facilities and military installations; 24. Facilities for broadcasting and telecommunications; 25. Facilities for power generation; 26. Cemeteries and related facilities; 27. Facilities for tourism and relaxation; 28. Funeral facilities; 29. Facilities for recreation;

Table 4. Classification of buildings by use according to Table 1 of the Enforcement Decree of the Building Act

Necessity of computerization of relevant laws and regulations to usage of the area

In the situation where the use and size of the buildings are determined according to the National Land Planning Act and the area and district under the Framework Act on the Regulation of Land Use, the part of building on the land owned by the general public must be assisted by experts. This may lead to the problem that the parties do not know the limits of the usable size of the building and the size of the building(see Figure 2).

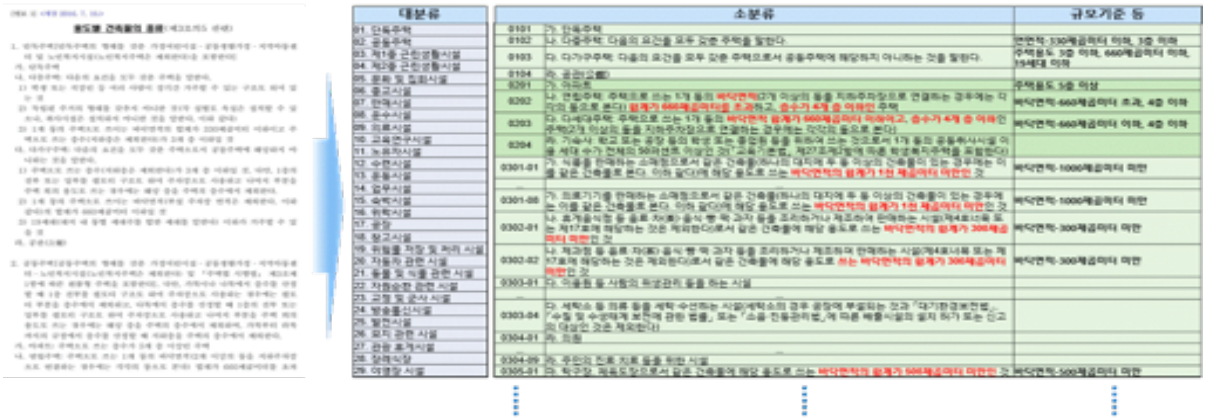

Figure 2. Classification and Scale Standard Extraction Method for Computerization of Table 1 of Enforcement Decree of the Building Law

To cope with these problems, we have developed a system to provide public services to inform the general public about the maximum use of buildings that can be built on their land. This system was led by the government, and the database was constructed by computerizing the laws and regulations that divide the usage area and the usage type. In this database, we will develop an algorithm for the result desired by the user and provide services.

In order to construct the database, the uses of the buildings are classified as much as possible and the size of each use is written in the form (see Figure 3).

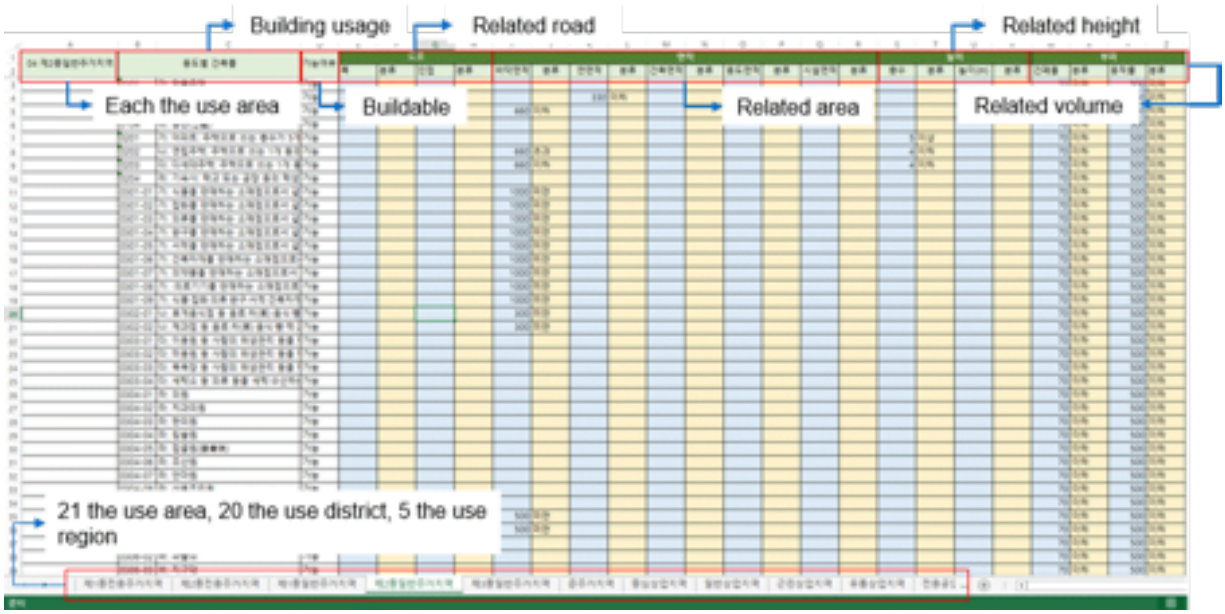

Figure 3. Based on form related to the scale of items by the building usage

The items to be applied according to each application are the road (width, the length adjacent to the ground), the area (total of floor area < included sum>, total floor area <included sum>), height(stories, in meters), and volume (coverage ratio, volume ratio). This item was created by taking into account the items that are restricted in the use area(see Figure 4).

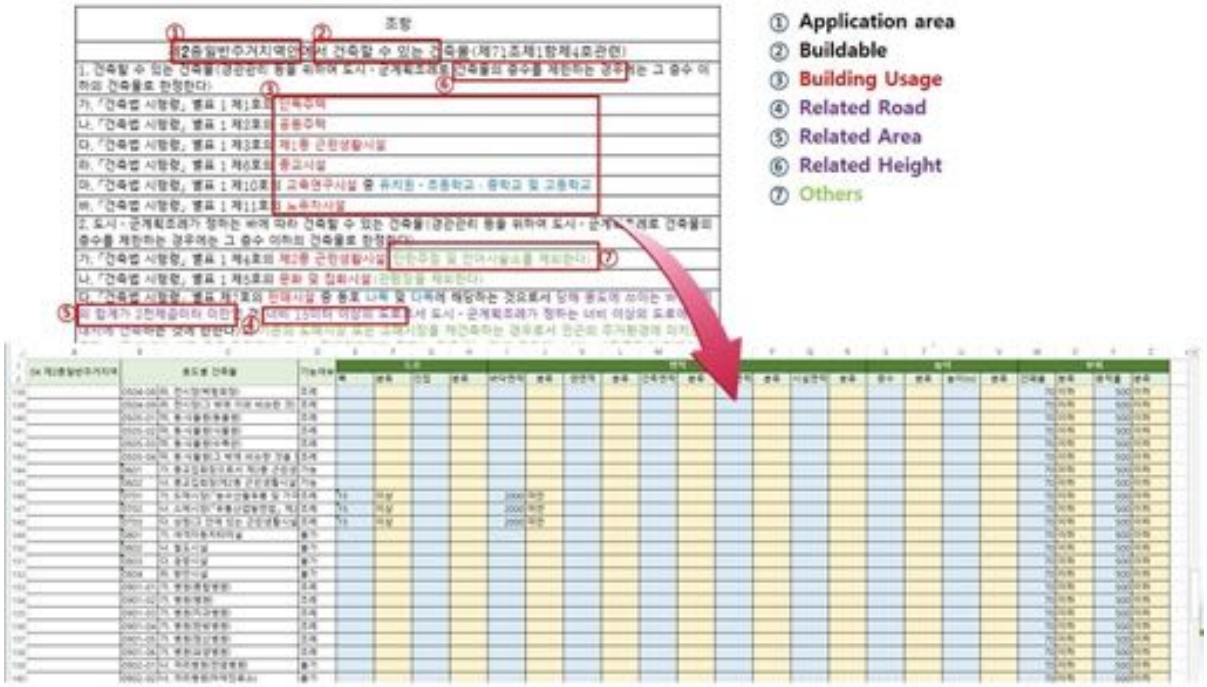

Figure 4. Creation of a DB based on the National Land Planning ActThe written form was constructed using the number of local districts as determined by the National Land Planning Law, the use zone, the usage zone and the land use regulation basic law, and the database to which the ordinance delegated by the Land Use Planning Regulation Act and the Land Use Regulation Basic Law were applied. (See Figure 5)

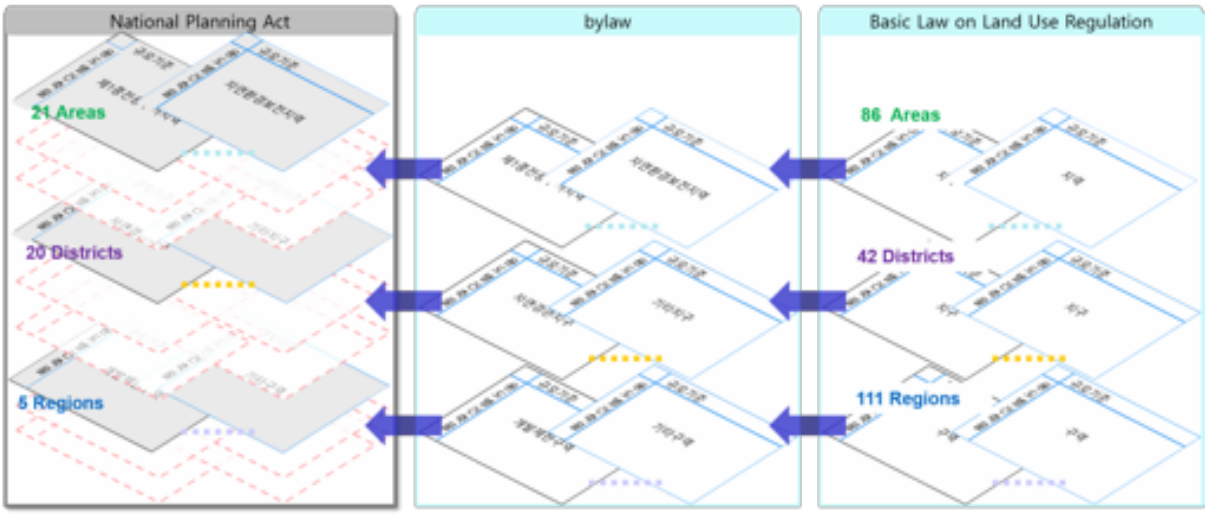

Figure 5. Steps to build the database

In Korea, a system is provided to provide information on the use area of the corresponding lot according to the lot number. The service is provided free of charge by the government and is encouraging the use of the system. Since the service should be based on the information of the use of local areas, it is linked with the external system using the open API of this system. It is a service process that provides the scale of the application by selecting the use of the building in the database (see Figure 6).

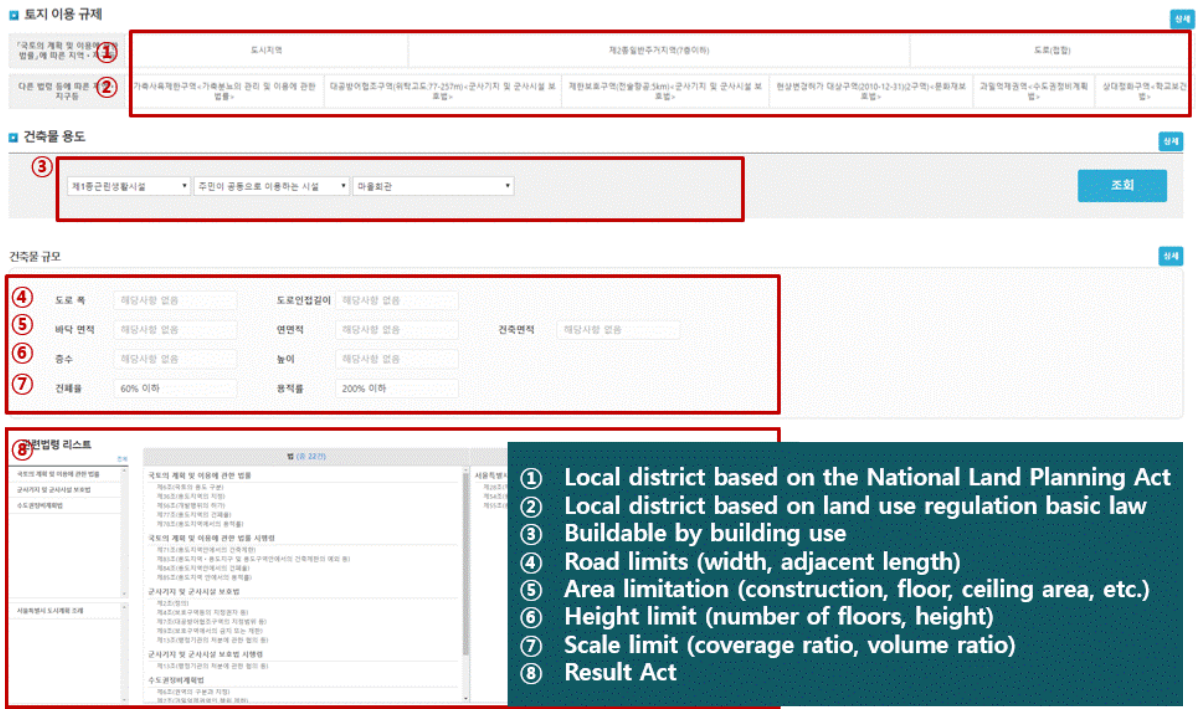

Figure 6. Service delivery process

Future research and supplement

This service is currently focused on implementation and is in the testing phase. The problems identified in the test phase are the different parts of the building and the various variables depending on the statute. Due to the nature of the law, there are different uses and scales that can be built depending on the situation in the same use area. In particular, if a district plan is to be established, which is a higher plan than the use zone, it is necessary to follow the purpose and size of the district unit plan. However, since the management of the district unit plan is managed by the basic autonomous entity, In addition, since the general public is more important in the use of buildings according to the industry than the classification of the use of buildings, the following supplement is needed.

First, we are in the process of the convergence of the classifications of buildings according to the usage standard in Table 1 of the Korean Standard Industrial Classification Table and Building Enforcement Decree.

Second, the plan of the district is reflected in the system and the feasibility of the service is examined.

Third, we examine the possibility of computerization and application to databases of other features such as exceptions, restrictions and mitigations.

If the above complement is completed, the utilization of this system with public character is expected to be increased.

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THE ROLE OF COMPUTERIZATION AND KNOWLEDGE-INTENSIVE PRODUCTION AS DRIVERS OF CHANGE IN CITIES

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Abstract

Production, labour market and urban growth have been sharing an intricate connection with each other for centuries. From the guilds of Medieval Ages to blue collar labourers and capitalists of 20th century, actors composing the labour and their qualities caused limited or wide-ranging alterations on cities through their economic activities. In this regard, a trend has been in the progress for almost three decades now, as our cities have been playing a pivotal role in a production mode based on knowledge which was identified to be pivotal in production as early as late 19th century. However, another century had to pass before it became a highly sought-after input. As it gained such an importance, transformations led by knowledge have come to be experienced not only in economy but also in cities, especially starting with the 90s. Starting with that last decade of 20th century, urban space came under the influence of knowledge in production which was amplified with the advancements in ICT. Knowledge gained so much importance as an input, new set of values and communities arose in parallel within cities to foster origination of it as well as creativity. Additionally, computerization boosted those effects in labour market by complementing a few skill categories previously attributed to human labour and advancing a skill polarization, which meant reduced demand for middle-class tasks and jobs. As a result of this, various theories explaining the results of these changes on cities flourished. As one such, Florida (2002) came to identify a segment within urban societies he calls as Creative Class, formed out of artists, researchers, professionals with varying backgrounds, whose common point was that they employed creativity in what they put forward as an output. These outputs, either goods or services, provide high value added returns which was subsequently translated into high growth for cities with such people. In the light of such prospect of growth, many cities and their governing bodies around the world have set their aims towards becoming creative cities. This study aims to provide a detailed perspective on the evolution of creativity and knowledge based changes taking place in cities especially since 90s, by using Creative Class and Creative City approaches as the central theories in explaining the spatial aspect of the study. Understanding the roots lying behind this utilization can empower the understanding on how future trends such as Internet of Things (IoT) and Industry 4.0 may alter the current connections among labour market, knowledge and urban growth, meanwhile, revealing the nature of necessary policies that correspond to them.

Introduction

Humanity has long used knowledge in order to boost productivity in various economic sectors ranging from agriculture to crafting. It was Marshall who has increased awareness of its role in production as he underlined knowledge as "*the most powerful engine of production*" (1890, p. 84). However, its primary role as a factor of production came to be realized after almost a century. In parallel with the increasing role of technological change, knowledge bolstered its importance over the years. Today, it is considered to be the driving force behind advanced economies by being a decisive input in adding high-value to a good or a service (Drucker, 1993; Rodrigues, 2003; Powell & Snellman, 2004; Carlaw et al. 2006). The economy resulted from this use is defined as "*production and services based on knowledge intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence*". (Powell & Snellman, 2004, p.401).

This accelerated pace and rapid obsolescence is to be found everywhere from human labour to urban space. While knowledge may not have been a primary factor in the shaping of cities and their components historically, still, there were partial effects; in turn, urban space has had effects on its growth as well. This interrelation has been documented by various studies in terms of increasing interplay among qualities of human, knowledge and urban space (Storper, 1995, pp. 221-256; Florida, 2002; Castells, 2010, pp.407-453). The study will evaluate this process with the addition of machine labour to that interplay and make arguments on how urban space can empower human labour in terms of creativity, in the face of computerization process.

In this context, first part of the study will consider several transition periods in utilization of knowledge, how its mobility has undergone changes over the decades and when did machine labour entered into the equation.

Meanwhile, a link between these topics and changes on urban space will be established at the same time. Afterwards, following three sections will be examined under the themes of labour, urban space and knowledge respectively. Therefore, secondly, the ongoing period starting from 90s to current day will be analyzed in detail in terms of changes in human labour through computerization. This will establish the foundations of the third section in which a link between computerization processes and creative class theory will be established. Creative Class theory will also be succinctly examined and evaluated in the light of its shortcomings. Lastly, in the light of these shortcomings, a more detailed approach to creative class theory will be taken through its evaluation with knowledge base approach. Finally, an evaluation on both high skill workers and low skill workers mention will be provided on the inequality creative class creates and what can be highlighted in terms of urban policy to empower them.

Historical Perspective on Usage of Knowledge and Changes in Urban Space

Competition and collaboration between machine and human labour in production on a large scale can be traced back to transition period from artisanal craft to emergence of assembly line during the Industrial Revolution (Drucker, 1993). There were benefits for some and losses for others in labour market since then and those on the losing side have naturally fought against the tide through protests or riots (Desmet et al., 2012). However, this interplay between machinery and human labour constantly increased in scale since then, which has been and will be subject of many disruptions in the society (Frey and Osborne, 2013).

Advancement of machinery led human labour to find new work fields to utilize abilities yet to be accomplished by machines. In other words, every time there was a major development in mode of production, human labour has undergone changes as well (Frey and Osborne, 2013). In the face of increasing productivity of machine automation, knowledge has been the most powerful edge human labour possesses: Artisans protected their craft secrets and transferred it to only a few; capitalists and inventors brought components of that knowledge to unskilled masses in assembly line during Industrial Revolution; blue collar workers managed automated machinery while white collar workers managed substantially increased information flows during the period of Keynesian economies; finally, ICT workers and managers use knowledge to produce more knowledge today (Drucker, 1993; Frey and Osborne, 2013). In turn, urban space and perspective towards it has undergone changes as well over the years (Weber, 1909; Marshall, 1920; Lucas, 1988; Porter, 1990; Florida, 2002, 2005). Now, in the wake of advancing computerization in production, human labour and urban space it resides in face new opportunities and challenges.

Knowledge, and its systematic uses identified today, is intricately connected to the evolution of technology: The connection is strongly highlighted with radically increasing use of computerized processes in production as their acquisition became a form of transmission of technological knowledge. Its use in production affected cities on a large scale and these effects have been much more visible during important transformation periods since the Industrial Revolution (Marshall, 1920; Desmet et al. 2016). As the early adapters of automation, cities of Western countries experienced these effects early on.

Before the Industrial Revolution, production was reliant on artisan guilds in these countries and, spatially, the members of these guilds were concentrated in a few cities to benefit from largest market size possible at the time (Desmet et al., 2016, p. 13). Moreover, as the production units were smaller in size and many in numbers, access to water as an energy source was another factor in location decision (Marshall, 1920, p.431). Therefore, this would mean that as long as there was an opportunity to utilize water-power, a unit could be located anywhere with regards to its access to a market. Dispersed form of small production units within the reach of a market was feasible for the business-owners of the time.

As the knowledge accumulation increased as a result of steps taken in the fields of education and science in support of advancements in technology (Drucker, 1993), various kinds of machinery were invented to be used in production. Despite the partial backlash in the form of riots (Desmet et al., 2016) it was ultimately beneficial to employment of low skilled masses compared to a few artisans (Goldin and Katz, 1998). Inevitably, this technological change in labour market was responded with a change in urban space.

On the spatial level, strict regulations of artisan guilds in few marketwise favourable cities before the Industrial Revolution led to the formation of new industries in the form of factories away from such cities and rather in previously rural towns away from those guilds' influence, as in Manchester example in UK (Desmet et al., 2016, p.13). Meanwhile, agglomeration of factories and their relation with knowledge was underlined by Weber (1909) and Marshall (1920): While economies of scale has drawn major attention in Marshall's seminal study (1920), he had also identified the existence and importance of knowledge flows agglomerations enable. Workers crowded into places close to factories; land uses got strictly separated unlike its previous, tangled form (Florida, 2010, p. 30).

Technological advancements in mode of production increased in quality and quantity in the aftermath of Industrial Revolution and the resulting automation led to the augmenting skilled workers' jobs while replacing the unskilled (Frey and Osborne, 2013, p.10). New information generated as a direct or indirect result of increased productivity required new workers to management and utilization of it as well; therefore, white collar jobs emerged for rising information and service sectors (Drucker, 1968; Goldin and Katz, 1998).

Under Fordism principles, workers experienced increase in their income along this increased productivity and, in turn, this enabled them to make consumption based preferences on urban space. Thus, suburbs have become the highlight of this era as a response to these preferences especially in U.S. where Fordism was strongly adapted (Florida and Feldman, 1988). Moreover, decreases in prices of commodities as well as increasing wages of workers established a distinct consumer culture which led to the significantly increased number of shopping malls especially in U.S. but also partially around cities of European countries (Moretti, 2012, p.21).

In the aftermath of both World Wars, falling prices and increasing wages in the context of welfare-state led companies to seek out cheaper labour which paved the way for globalisation (Massey, 1984; Leslie and Rantisi, 2012). It was then that knowledge has started to become strongly valuable in labour market to produce and evaluate new knowledge. This led to the development of viewpoint on human capital in parallel with the growing emphasis on technological knowledge (Lucas, 1988). Alongside human capital, innovation came to be actively sought in production processes rather than focusing on manufacturing bulky, physical goods which were favoured in the past (Moretti, 2012). On the production side, technological knowledge, change and growth have been identified as components of endogenous growth theory (Romer, 1990). This revelation has turned knowledge into the primary input within the production function in this era (Leslie & Rantisi, 2012) because it overcame the long existing perspective on diminishing returns of growth in the long run. Furthermore, unlike many other resources, technological knowledge was found to be usable by multiple agents at the same time, while limiting its use would require holding patents for it (Acs, 2002). In terms of consumption, niche preferences arose and found their response from market where symbolic value of goods came to be held in high regard (Lash & Urry, 1994; Scott, 1997).

In parallel with the labour market, urban space has also undergone radical changes with this transition as well. Factories were moved out from their central places in cities towards urban fringe. Necessity of service sector grew in parallel with the growth of economic activities and, in meeting the demand, service sector has started to co-locate in cities (Sassen, 2009). Increased global trade and following connectivity created more layers of economic activities requiring similar response from the institutions of service sector. Therefore, within the cities, service sector was formed in agglomerations to save time and cost to more efficiently answer complex business requirements (Sassen, 2009). Thereby, it can be argued that the new cities have taken shape to better accommodate the information and knowledge flows which have been ascended to global scale now. On the housing side of urban space, expectations of workers, who sought higher quality of life with suburbanization, have been given alternatives from urban transformation processes in the cities. On the other hand, this process led to the evolution of another phenomenon in the form of gentrification in which low income families have started to be displaced from more central urban areas and got relocated towards urban fringe.

We are still under the effects of this last phase. Both in production and urban space, similar outcomes arise from countries around the world. That's because labour (human and machine), urban space and knowledge form complex interactions among themselves. Human labour is being forced to undergo constant transformation due to increasingly rapid and less costly technological progress on machine and computer automation (Autor et al., 2003; Frey and Osborne, 2013; Arntz et al., 2016). Effects of this transformation is feeding the field of urban planning and policy development, as urban space has been under consideration in a relevant manner with the introduction of Creative Class and City policies since the early millennium (Florida, 2002; 2003). Last but not least, knowledge is still the primary input of the existing global economic structure and with the increasing computerization it is required of individuals to utilize and produce it as part of their economic activities in order to stay competitive in the existing labour force structure. In the following sections, interplay among each of these three factors will be pointed out to reveal what can be done spatially to empower human labour in the face of upcoming technologies that might further strengthen the existing labour market trends' effects on our cities and societies.

Labour: Computerization and Subsequent Shift in Human Labour

In the aftermath of the historical context given above, the connectivity among labour, knowledge and urban space has peaked during the 90s. Sometimes used synonymously with digitalization or automation despite differences, computerization is an advanced form of automation process to substitute human labour on the basis of tasks or even whole occupations (OECD, 2016). Computerization became a significant factor in overall

economy especially during the 90s. As a result of significantly reduced costs per computation between the years 1980-1990 (Nordhaus, 2007) the ICT sector's growth spiked. In turn, this amplified the amount of information generated thanks to the higher productivity levels. In the face of this rise, management of the information and knowledge was highlighted which was resulted in the emergence ofmanagement sector.
However, the emergence of new work fields and jobs were one-sided in its benefits as it was mainly beneficial to workers with better educational background (Autor et al., 1998). In that regard, some segments of the labour force found opportunities to expand or improve their skill sets by this process, in other words up-skilling (Vallas & Beck, 1996). On the other hand, much more amount of people have been on the losing side of this trend as their jobs are being substituted in this trend due to the computers' higher productivity compared to human labour (Kristal, 2013).
The substitution of human labour through computerization has mainly affected the middle class jobs. The reason behind their disappearance has been underlined by analyses on tasks that compose a job. In this regard, Autor et al. (2003) proposed a task model which groups tasks into two groups as routine and non-routine ones. Routine tasks are composed of accomplishing repeating action or actions whereas the latter requires taking different courses of action for each unique context faced. Building on top of these classifications, there have been also two more classifications added by Autor et al. (2003): manual and cognitive. In this extent, jobs composed of routine tasks have been found to be more susceptible to be replaced in the labour market (Autor et al., 2003; Charles et al., 2013) (Table 1.).

	Routine Tasks	**Non-Routine Tasks**
	Analytic and interactive (Cognitive) tasks	
Examples	Record-keeping Calculation Repetitive customer service	Forming/testing hypotheses Medical diagnosis Legal writing Persuading/selling Managing others
Computerization Impact	Substantial substitution	Strong complementarities
	Manual tasks	
Examples	Picking or sorting Repetitive assembly	Janitorial services Truck driving
Computerization Impact	Substantial substitution	Limited opportunities for substitution or complementarity

Table 1. Predictions of Task Model for the Impact of Computerization on Four Categories of Workplace Tasks
Source: Autor et al, 2003, p.1286

However, the case has also found to be not so clear-cut. Indeed, the statement of Keynes stands unchallenged even after decades: "*The increase of technical efficiency has been taking place faster than we can deal with the problem of labour absorption*" (1963, p.358). While the task model studies of early millennium had foreseen jobs with non-routine manual tasks, such as truck driving, to persist in the face of computerization, Google was able to conduct real world experiments in such technology with its own car brand, recently named "Waymo", on roads in 2015 (Waymo, 2017). In parallel with this example, many other tasks in the similar category have also been argued to be open to computerization as well (McAfee and Brynjolfsson, 2011; Frey and Osborne, 2013).
The reason why have been the advancements in the various fields of data gathering and interpretation by machinery (Frey and Osborne, 2013). First and foremost, data is being gathered through novel ways, and rapidly, which are radically different even compared to 10 years before as the comparison between conclusions of these studies reveal. In turn, storage capacities as well as capability to interpret the data gathered progressed significantly. As a result of these developments, gathering huge amounts of complex data, called Big Data, became possible. On top of this process, machine learning technology enabled software of devices, robots and other means of machine labour to carry out interpretation of these complex data more effectively than humans could do.
The trend highlighted above is being expected to increasingly continue (MGI, 2013). Then what are the options for human labour? The studies have been consistent in designating one task field yet to be under the threat of computerization: Cognitive, non-routine tasks. Instead of substitution, the computerization is argued to complement the jobs with such tasks, in other words, those who work in such jobs will benefit from up-skilling

as occurred in the past (Vallas & Beck, 1996) meaning they will be able to do their jobs much more effectively and more expressively. In that regard, Frey and Osborne (2013) categorize tasks that they argue to persist into two: Creative Intelligence Tasks and Social Intelligence Tasks.

However, there are those who do not benefit from this process as well which raises an issue of inequality (Acemoglu, 1998). As a result of those projections, the common point revealed was that there is a skill polarization in the society (Autor et al. 2003; Levy and Murnane, 2004; Frey and Osborne, 2013; Kristal, 2013). Those within the middle class jobs, which were intensively consisted of white-collar routine tasks, have been on a shift towards either side of the spectrum. This polarization is happening based on their ability to carry out either creative intelligence tasks or social intelligence tasks. In other words, high skill knowledge-intensive jobs or low skill service sector jobs (Figure 1.).

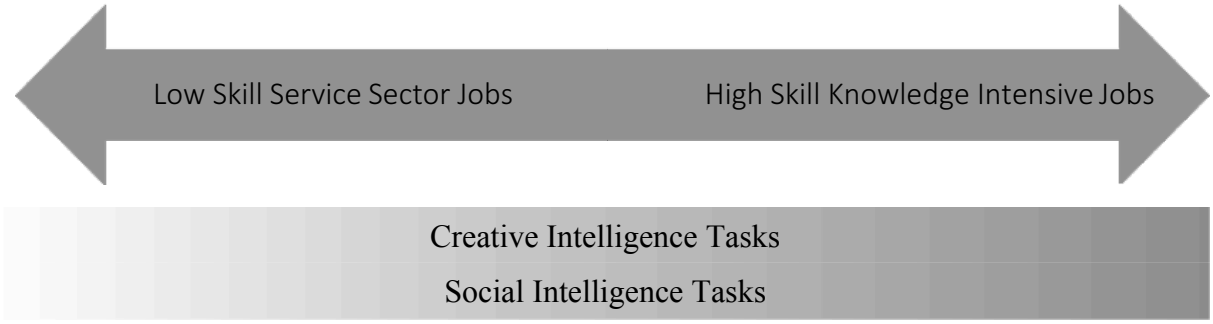

Figure 1. Skill Polarization in Labour Market on the Basis of High Return Tasks as a Result of Computerization
Source: Adapted from Frey and Osborne, 2013)

Computerization is a crucial component in the transformation of labour market in the 21st century. Human labour is and will still be employable for the near future although not even cognitive tasks are guaranteed to be safe from automation (Frey and Osborne, 2013, p.19). As long as these conditions are sustained, the existing context makes it logical to argue for growth to take place in cities with the presence of people that can utilize creativity, a scarce and valuable resource, in their jobs. Therefore, based upon these projections, creative class and city discussions will be used to examine the changes taking place within the cities while also highlighting the theory's shortcomings beside its suitability for the issue at hand.

Urban Space: Creative Class, Cities and How They Foster Creativity

During the 90s, a new form of economy was born out of policy steps taken according to globalization. The new economic structure was characterized by high technology industry; labour force with high skill qualifications and mobility; entrepreneurial spirit (Thrift, 2001, p.414). Knowledge, innovation and creativity are attributes strongly associated within each of these constituents and their less reliance on large and numerous physical means of production made it possible for small firms and even individuals to become as valuable as large corporations can be in the knowledge economy. This new economic system was called "new economy" during the late 90s, marking a transition into a knowledge based economy.

Following the offshoring of manufacturing and increasing computerization, human labour came under transformation in terms of using knowledge, innovation and creativity noted above. Thus, sprouting from the roots of human capital theory, discourses based on these terms turned out to be highly researched themes among the 21st century urban growth theories. Florida (2002), in that regard, introduced creative class theory based on the presence of creativity in the occupational level. In terms of urban space, the theory argues that the amenities a city possesses are significant determinants in drawing creative population towards that city. Moreover, creative people are also argued to be drawn to similar people, leading to creation of creative clusters in a city. Later, creative class is argued to be followed by businesses to benefit from these high skill workers. This strongly signals a common approach with Drucker's early insight (1958) as to how businesses in knowledge economy operate: Rather than people following businesses wherever they are as in the past, businesses follow people.

The theory has been a hot-topic since its conception in 2002 as it has been further evaluated (Florida, 2005; Helbrecht, 2004; Mellander and Florida, 2007; Kratke, 2011) or criticised by other studies (Markusen, 2006; Scott and Storper, 2009). Despite the critics, the evaluation of the creative class theory from the contextual background given in this study verifies its perspective due to increasingly advancing computerization requiring human labour to invest itself in dealing with novel jobs. Although computerization is expected to further enhance the skills of this class (Autor et al., 2003) they still have to keep up their creative edge that signifies

cognitive, non-routine characteristic. To that end, interaction with the other members of the class is considered to be an important source of creativity (Kratke, 2011, p.13; Frey and Osborne, p.26). In turn, this creativity paves the path for urban growth to take place through increased innovative activity in knowledge intensive sectors.

However, the way the theory envisions interactions among the creative class has also drawn criticisms. The theory does not go into detail on what basis interactions take place and argues that they simply occur by the spatial concentration of the creative class (Scott & Storper, 2009). In order to develop more sophisticated approaches towards creating spaces for empowering creativity of this class, clarification on its members is required. Florida categorizes creative class into super-creative core and creative professionals based on intensity of creativity within their occupations which also signal their contribution to the local economic development. However, these economic output-based categories of Florida still do not provide the required clarity on what kind of interactions members within these categories have with each other. Therefore, the theory will be expanded with the knowledge base approach established by the literature on knowledge based urban development.

Knowledge: Knowledge Base Perspective towards Creative Class and Cities

The lack of clarity regarding the interactions creative class establish with each other poses that there is a need to seek out different common foundations among the wide range of members its categories cover. These foundations will be established on the basis of which knowledge they utilize for their economic activities. In order to accomplish this, knowledge base approach can be undertaken (Asheim and Gertler, 2005; Asheim, 2012) as "*the nature of interactions relies primarily on the knowledge base.*"(Carrincazeaux and Coris, 2011, p.271). While Asheim (2012) expands the creative class theory with these knowledge bases to provide further insight on regional economic growth, this section of the study will focus more on the effects of this expanded form of theory on urban space. This will help to further investigate how cities can better facilitate different types of knowledge production processes of such groups in urban space which, in turn, will bring economic and spatial development. "*The super-creative core"* represents the most knowledge-intensive occupations in that regard. Therefore, their members can be more clearly discerned based on which knowledge they mostly utilize and produce.

	Knowledge Bases for Super-Creative Core		
	Analytical Knowledge	**Synthetic Knowledge**	**Symbolic Knowledge**
Main Actors	Researchers	Engineers	Artists, Designers, …
Knowledge Type	Codified > Tacit	Tacit > Codified	Tacit
Source	•Scientific knowledge from universities and their linkages	•Applied science •Customer & Supplier Interaction	•Everyday culture of specific communities •Face-to-face interaction
Spatial Necessities	Less proximity and externality relationship	High proximity and externality relationship	Strongly local

Table 2. Typology of Knowledge Bases and Their Respective Dynamics
Source: Adapted from Asheim, 2012

In order to foster urban growth in a city, creative city policies can be further diversified through these categorizations (Table 2.). Analytical knowledge is associated with scientific knowledge which is undertaken by researchers and their affiliates. As scientific knowledge is mostly in a codified nature, it is in the interest of any researcher to be linked to the mobility of knowledge on the global scale in order to catch up with the latest advancements (Asheim, 2012, p.7). Therefore, ability of urban space to accommodate interactions in this context can be based on uses that increase global connectivity.

In that regard, considerations over urban space may include, but not limited to, accessibility/presence of airports; availability of spaces for global knowledge spillovers which accommodate conferences, workshops and other activities along with Florida's "*tolerance*" as an urban culture to benefit from diversity as a major contributor to creativity (Florida, 2002). Physical proximity among units is considered to be of less concern. Moreover, the type of development occurring in the extent of this knowledge base can be argued to erode boundaries between production and consumption spaces. The global connectivity through Internet is now also

available in leisure spaces such as cafes, public spaces and similar uses which lead to use of such spaces for production purposes as well.
Synthetic knowledge is attributed to value chains which include customer and supplier interactions. Asheim (2012, p.9) argues that Florida did not consider those who draw from this knowledge base but rather those who utilize analytical and symbolic ones. Considering this group in the light of this argument, it is argued that the preferences of this group differ from the other two as they gain their knowledge through solving problems of suppliers and customers (Asheim, 2012, p.9). This requires knowledge of local preferences which would be in the form of tacit knowledge. Therefore, presence in the locality benefits the growth and utilization of this knowledge base.
Finally, symbolic value involves high amount of tacit knowledge. It displays strongly local characteristics not only in its consumption but also in its production as well. Compared to the earlier two, educational attainment is not a decisive factor in the designation of quality of workers this time. In regards to this issue, interaction with other members that use symbolic knowledge base, which is as important as having skills, holds great significance to flourish creativity through collaboration (Asheim et al., 2007).
The common point for all actors from each knowledge base is that their creativity stems from some kind of interaction. Therefore, as interaction is crucial for their activities, agglomeration of relevant land uses in space can also provide externalities in the forms of face-to-face, daily life interactions. In parallel with this, density has been argued to intensify the amount of interactions as well (Florida, 2010, p.54; Glaeser, 2011).
Special emphasis should be given on the interaction between actors with different knowledge bases. One type of definition of creativity is producing a unique knowledge by combining two different types of knowledge (Kratke, 2011). Moreover, "the jostling of many different professions, and different types of people, …, is essential to the creation of things that are truly new." (Florida, 2010, p.60). One example can be given as the role performative arts have played in establishing managerial and ICT communities during the late 90s (Thrift, 2000).
Based on these points, it can be argued that interaction among different knowledge bases may have greater returns in terms of creative outputs. Therefore, on the path towards creating interfaces among these groups in terms of space for their interactions to occur, erosion of boundaries between production and consumption spaces can be argued: The leisure uses such as cafes or restaurants are being used as pleasant gateways to internet to carry out knowledge production or other business activities outside workplace and home. Public parks are also argued to be counted towards fostering diversity in communities by their safety and casual attributes (Low et al., 2009). More novel examples, such as co-working spaces, are also being argued to improve knowledge workers' creativity as well as motivation over their work (Spreitzer et al., 2015).

Low Skill Workers and the Inequality of Creative City

On the other side of the spectrum, automation of jobs has been argued to lead to mass unemployment: Frey and Osborne project that 47% of the U.S. jobs are going to be automated in the near future (2013). This context makes creative class approach questionable in terms of skewed distribution of urban resources in favour of creative class. The theory's lack of explanation about overcoming inequality it breeds points to a shortcoming in that regard. Standpoints such as increasing wealth of creative class could also mean increasing service sector jobs for the remaining population (Florida, 2010; Moretti, 2012, p. 58) have not been reducing inequality as new ways are being questioned (Florida, 2017). It is at this point, labour studies over computerization with their insight on the nature of jobs and their possibility of automation help to understand the standpoint of disadvantaged segments of the society and identify required steps to be taken on the urban space in order to empower them.
In the case of these workers, not only the labour market but also various urban phenomena occur against the favour of the latter. Service sector jobs are argued to form agglomerations in urban space (Sassen, 2009, p.53); however the problem is the location these jobs form those agglomerations in a city and how these service workers may access there. The creative class, as the high skill and high wage segment in the society, is argued to spend more on personal services (Moretti, 2012, p.35) which present market opportunities to their low skill counterparts to exploit. For them to take advantage of this opportunity, an important factor they need from their city is better accessibility. In an economic structure in which mobility is crucial to benefit from existing employment or business opportunities (Florida, 2010, p.14), accessibility in terms of spatial formation of a city, district or a neighbourhood as well as services like public transportation is held in high regard (Pinoncely, 2016, p.7).
Beyond low accessibility, an even worse outcome for these groups is gentrification. Even in more detailed cases where ethnic differences are involved, urban transformation has been seen in the light of connecting these groups with the rest of the society and labour market; however they also became questionable in terms of

their real beneficiaries (O'Connor, 2010, p.53). The displacement of these economically disadvantaged groups towards remote places on urban fringe effectively isolate them from any opportunities they are expected to identify and develop upon at the first place. Therefore, decisions along this line are more detrimental than ever before for the well-being of these groups in the 21st century in which mobility is essential.

Conclusions

Historically, technological change has not always been substituting human labour on major scale; however, for the last three decades it has exactly been on the path to realize this and displace human labour (Frey and Osborne, 2013). Computerization, in that regard, has been increasingly polarizing labour market by shifting previously middle class people towards high skill knowledge intensive sector jobs or low skill service sector jobs (Kristal, 2013). These jobs are projected to persist against the trend of automation longer because creative and social skills can still put human labour ahead of machine one (Frey and Osborne, 2013).

As a result of growing urbanization, theories on urban space have also been developed according to this trend on labour market. Creative Class (Florida, 2002) has been drawing increased attention from both academia and local governments since its conception. However, its passive stance on understanding diffusion of creativity among the members of creative class leaves room for growth in literature. In that regard, knowledge base approach details creative class and provides deeper understanding on the creativity which is argued to bring growth. In that regard, the nature of interactions creative class undertakes was put emphasis on as the response to boost creativity (Asheim, 2012).

On these foundations, some suggestions can be made on urban policies and interventions to empower human labour against computerization trend. On the high skill workers' side, emphasis was given on the role of interaction and from it, suggestions have been advanced: First, increasing density for increased amount of interactions; second, creating interfaces such as cafes, public parks and co-working spaces for interactions among different knowledge bases to take place. These interfaces can be in the form of leisure spaces and public parks as well as new ones like co-working spaces. On the other hand, low skill workers were briefly evaluated with respect to not only skill polarization but also for the persisting inequality criticism of creative class theory. Inevitably, education is the primary solution for all economic insufficiencies; however, their needs were succinctly evaluated to highlight potential urban policy or spatial intervention areas that can be focused on. In this context, accessibility to job opportunities was highlighted; while also underlining the impact of gentrification on these workers connection to labour market.

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INTANGIBLE CONNECTIONS: THE RULE OF VIEWSHED ANALYSIS IN THE REDEVELOPMENT OF A DISMANTLED RAILROAD AND ITS LANDSCAPE

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Abstract
This paper aims to examine the rule of viewshed analysis in the redevelopment project of a dismantled railroad serving the territory of L'Aquila and surrounding municipalities, in the north western territory of Abruzzo, Italy. The project, centered on the infrastructural recovery, fuels the reactivation of a wide border area, to be considered a gate to Abruzzo region, revealing unique scenarios and relevant landmarks. The morphological features of a mountain territory crossed by the infrastructure and its landscape richness in terms of naturalistic, archaeological, historical values led to consider the potential of a visual interaction aiming to a wider system of material and immaterial connections. Recording these elements and turning them into datas to be processed was the first step towards an inclusive territorial network. The tool of Viewshed Analysis, generally used to evaluate the environmental impact of extensive constructions such as infrastructural interventions, reveals its potential within a different branch of site evaluation and landscape planning, contributing to a territorial retrofitting project.
Keywords: viewshed analysis, dismantled railways, landscape design, slow mobility

Introduction
Viewshed analysis, run by all GIS softwares, is a widely used tool able to build visual simulations based on inter-visibility between two points, processing spatial datas by means of three main methods of computation: lines of sight, viewshed and visibility. In the preliminary stage of landscape and infrastructural design, among the environmental impact assessment tools, viewshed analysis plays a crucial role to investigate how a planned intervention on a given site can be perceived from the surrounding areas. (O'Sullivan &Turner, 2001). This step is fundamental to verify the feasibility of a project, by checking if an architectural object or a large infrastructure would produce a negative impact on the environment. It is the case of wind farms, roads and highways, landfills and wide systems with the power to modify vaste areas. The potential of such an analysis made it a mandatory requirements within the Italian regulation system. It is included in the landscape compatibility assessment tools in order to evaluate the visual impact when new infrastructures, buildings or large technological installation have to be built in open areas. Whether landscape transformations are involved in a project, viewshed analysis is the proper and necessary calculation "*to allow compatibility and adequacy of any solution towards the environment*"[42]
Further implications of the above methodology revealed it to be suitable for several purposes, such as investigation and decoding of historical landscape systems and reading of large archeological settlements layout. De Montis and Caschili (2012) provide an example with their thesis about inter-visibility systems of Nuraghes settlements, carried out by means of a quantitative approach including GIS based viewshed and complex network analysis.
Additional experiences revealing the versatility of viewshed can be found in Tuscany landscape mapping for the PIT (a territorial orientation plan), including the specific section Visibility and Perceptive Elements. The section is a regional-scaled visual simulation, where only soil morphology is taken into account, and datas about orographic characters are provided. The resulting map constitute a database, the datum Tuscany soil, to be interpreted and used both for environmental impact assessment and for peculiar purposes of landscape mapping (PIT Tuscany Region, 2015). After these considerations it is understandable how viewshed can not be considered just a preliminary assessment methodology, but it rather appears as a proper design tool, with the

[42] Decree of president of Council of Ministers, 12 December 2005 "*Individuation of necessary documentation to assess landscape compatibility of proposed interventions"* according to the paragraph 146, section 3, Code of Cultural and Landscape Heritage, Legislative Decree 24 January 2004, n. 42 (G.U. January 31st 2006)

potential to be used in the advanced stage of landscape design. The above statement is moved considering that the criteria used to assess the visual disturbance of a wide intervention on landscape can also individuate meaningful landmark and related sights to be preserved. Whereas, in the first case, disturbance produces an environmental impact to be evaluated and solved, in the latter we obtain a clear pattern of unique sights to be restored or protected. In the current dissertation, this thesis is carried out by assigning to viewshed a crucial role in the individuation and selection of valuable areas to be included in the ultimate project. The keystone to support this decision is the need to sew a fragmented territory up by means of an infrastructural recovery, including a multilevel network of sensory, perceptive and visual paths. The focus on visual connections derives from the particular orography of the datum, offering large open spaces and narrow slopes, challenging elements to anchor the renewed infrastructure to the territory.

Landscape. Tangible and intangible connections

Extending to the whole range of senses the Brighenti (2012) consideration about aural perception, the border between different sensory awareness while experiencing a path never coincides: visual, aural, tactile and olfactory contamination contribute to define the experience of a landscape in a series of overlapping without any sharp edge.

As an example, a user could be immerged in a soundscape, characterized by auditing patterns produced by human activities or natural elements along a path, whereas sound sources are far or screened off, thus missing the correspondence between the visual perception and the aural dimension (Pecqueaux 2012). On the other hand, the visual perception could include valuable and unique artificial or natural elements, too far to produce any further sensory contribution, but necessary to provide a unique, silent background or an opening towards the landscape. Furthermore, the identity of a landscape and its recognisable traits are deeply connected to its visual marks, offering a clearly distinguishable reference systems for the observer. This appears evident in the historical landscapes, where built heritage becomes part of a territory as well as the natural elements (mountain reliefs, churches in the landsides, or the profiles of minor fortified medieval towns standing upon hills have the same importance to an *internal* observer)[43].

The railroad recovery

Planning the redevelopment of L'Aquila-Capitignano railroad, the former role of the infrastructure upon the served territory has been shifted to a higher level, responding to modern issues of mobility. The early railway dating back to 1920 (L'Aquila City Archive) was merely functional to transportation requirements, and its layout was responding to specific morphology of a mountain territory[44]. In a mutated scenario, within a territory gradually included into National Parks and Protected Areas on one side and the growth of the city of L'Aquila on the other side, new mobility issues have to be considered and solved. In the particular case, the slow growth of urban suburbs and small industrial and commercial areas along the main infrastructural axis from L'Aquila to Alto Aterno localities shows an increasing motorized traffic and the consequent loss of attraction for pedestrian and not motorized users, in response to road disturbance and fragmentation of natural areas[45].

In this scenario, the preexistent 32 kilometers of railtrack provide the underlying substrate for a slow mobility branch to connect the city's pedestrian itineraries (L'Aquila City PUM2012) and the National Parks' trails, according to the paradigm of greenway declined as a versatile ecologic corridor endowed with cycling and pedestrian paths (Little, 1940). In order to extend the intervention to a wide scale it is necessary to consider the whole system including infrastructure and its background, and to study it by means of a territorial analysis,

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[43] Kevin Lynch, *Site Planning* (1962) Lynch considers site planning as an intermediate process including architectural design and territorial planning, on the fine line between architecture, engineering, urban planning and landscape design. The Chapter "*The sensed landscape and its materials*" investigates the relation between observer and the landscape, the modalities of space internalization and interpretation by means of visual and conceptual constituents. The dissertation is based on the assumption that sensory quality of a place is the result of interaction between its shape and the observer whole perception.

[44] L'Aquila-Capitignano railroad was planned as a branch of the ambitious project of a Transappennine Railway joining Adriatic and Tyrrhenian regions, from Rome to Giulianova, at the endo of XIX th century. The infrastructure was never completed, and the built branches were later included within local service routes. The branch connecting L'Aquila and Capitignano, after years of delay, was finally built to serve the peat mine in Campotosto, adjacent to Capitignano, The line operated from 1922 to 1933, when mining activities ceased and dams were built to create the existing artificial lake (L'Aquila City Archive).

[45] The road system of L'Aquila partially retraced the railway on the urban and periurban areas , joining the Regional Highway RS260 in San Vittorino. The resulting landscape fragmentation and reduced permeability influence the users perception of as well as the wildlife behaviour (Clevenger,Wierzchowski 2013).

enlightening criticalities to be solved and peculiarities to be fostered for each involved municipality. This step is accomplished by means of Places and Landscape Chart papers, providing the information about landmarks and landscape values, hazards and vulnerability, protected areas, territorial and infrastructural layout to be analyzed and processed. European and Italian examples of territorial projects have already shown the importance of a network of tangible and intangible connections between different landscapes, endowed with unique characteristics contributing to create a series of thematic paths for the users, at a regional scale. This growing interest is shown in the Landscape Character Assessment Guidance for England and Scotland, or Landscape Observatory of Catalunia and the Italian example of Delta del Po (Tosi, 2009).
When the paradigm of network acts at a human scale by means of slow mobility solution used to reconnect the territory, the user becomes an active learner engaged in decoding the landscape, reading it as a text to be comprehended and, potentially, changed by action (Stables and Bishop, 2001).
In this perspective, the redevelopment of a single element is turned into the spark to fuel a sequence of good practices: slow mobility development, public transportation increase, touristic attraction, economic benefits for the minor urban settlements, demographic growth in the rural and mountain areas with consequent preservation of local identity, protection of built heritage and landscape by means of interpretive planning strategies (Curthoys and Cuthberson). The elements outlined above motivate the proposal to create a multilevel connections system, including sensory paths to involve the immediate perception and lines of sight to develop a mutual sense of belonging between infrastructure and landscape. The starting point to create the proposed network is to individuate meaningful bonds between the linear mark represented by the track and the farther surrounding areas. Whenever there is not a physical link, it is still possible to strengthen the intangible essence of a visual relationship, enhanced by the peculiar layout of the track and the morphology of urban and suburban areas, from L'Aquila throughout Amiternum valley up to mountain locations in Capitignano. The following paragraphs will show the analysis process and the graphical elaboration of resulting datas.

Viewshed Analysis. Meaning and finality

In infrastructural design, civil engineering and environmental engineering, viewshed analysis is a common methodology to assess the visual consequences of a soil surface modification. As an example, the procedure allows to verify whether a modification taking place in a narrow valley could be seen in the limited space around, up to the summit of the reliefs, or, conversely, a transformation operating on a high ridge will be perceptible (net of obstacles to the eye, such as buildings or forests) from any points in the territory where the ridge is the boundary. Analysis, performed by a GIS software, is an algorithm-based function, estimating the height difference between two given cells and the continuity of the corresponding line of sight. Cells are divided into *viewpoint* and *target*, the observer position and observed location respectively. *Lines of sight*, the visual connection between the cells, represent the core elements for the visibility area to be defined. After data processing, it is possible to individuate areas or points from where a given modification can be noticed. A Digital Elevation Model (DEM file) [46] containing spatial coordinates is processed using a Geographic Information System (GIS) software.
Datas are set in a series of preliminary operations on the DEM file :
- Creation of a viewpoint array
- Creation of a target array
- Possible addition of further values corresponding to the height of both observer and target elements

After completion of the preliminary settings, analysis steps include:
- Lines of sight calculation
- Viewshed calculation

When a line of sight intercepts a third cell between observer and target, it is automatically not included in the viewshed calculation.

The Case Study Analysis

Referring to the given territory, viewshed analysis has been turned into a tool to individuate the remote visual connections between the rail path and its surroundings.
Looking like a white corridor hidden in the slopes of Appennines mountains, the track is hard to be perceived

[4] DEM file indicates a DTM (Digital Terrain Model) or DSM (Digital Surface Model). It is generally visualized as a vector based TIN (Triangular Irregular Network), measured and considered a primary DEM, or a raster (squared grid), computed and considered a secondary DEM (Toppe, 1987).

from short distances for an observer moving through narrow gorges, whereas forests and orographic features create natural screens (fig.1).
Under these conditions, to define the landscape potential of the route, an examination of long distance perception was necessary.

Fig.1. Clockwise. Ortophoto charter showing the 32 km track from L'Aquila (southeast) to Capitignano (northeast).
A scarcely perceptible branch is highlighted, in the municipality of Cagnano Amiterno, San Pelino area.

The arrow points a visual wing from the adjacent Regional Road, SR260 showing the arboreal screen and the scarcely readable path at the base of the relief in the background.

Methodology

ArcGIS system has been used to process the data about soil morphology, infrastructure networks and valuable areas or landmarks individuated on the studied region.

Input datas

DTM file. It is the 3D raster cartography provided by Regione Abruzzo [47] (fig.2).

The path. Represented on the orthophoto chart by means of a broken line and then discretized in a raster of points. Points have been placed at a mutual distance of 500 mt. (fig.3)

Viewpoints. Raster points, identifying historical, archaeological and architectural landmarks within the range of the surrounding reliefs. They define the visibility basin around the path. (fig.)

Additional values. Used for the heights assigned both to viewpoints and targets. The chosen value for height was 1.8 mt, corresponding to the observer view.

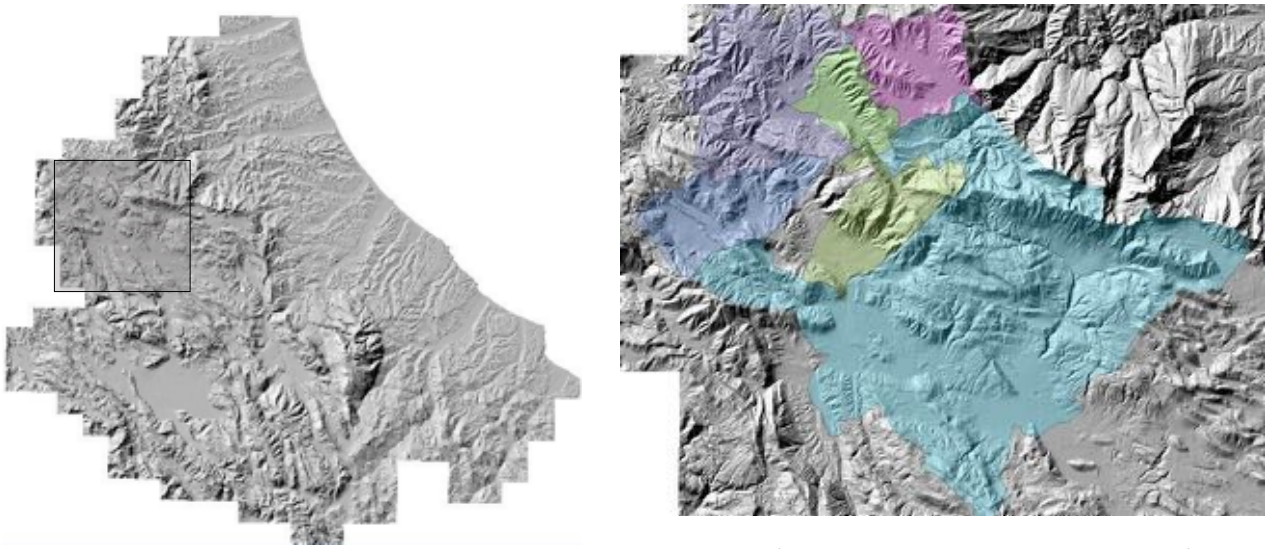


Fig.2. DTM raster support of Abruzzo and selection on the studied areas (source: geoportale Regione Abruzzo) [48]

Analysis

Spatial analysis was run using the ArcGIS software, by means of viewshed analysis tool. In the ArcGis 10.1 release for the Italian Service Pack, viewshed analysis is part of *"3D Analyst"* tool, within the *Arctoolbox menu*. Intervisibility defines, for each raster cell, the visible cells of a preset array. The data processing on the studied land surface individuates the visible areas corresponding to each given viewpoint. In the particular case, since valuable landscape elements are both internal and external to infrastructure, informations have been processed in two directions:

a. From the external locations (viewpoints array) to the track (target array)

b. From the track (viewpoints array) to the territory (target array)

Running the analyses for each input raster file, the resulting grids are classified according to visibility/invisibility of each point; viewshed reports all the cells that can be viewed from one or more observation point, by the two given directions.

[47] Characterized by a fine toposcale and a 5-50 mt resolution, the common topographic data sources for this DTM are aerial photography and existing topographic maps (at scales from 1:5000-1:50000) for contour and stream-line datas, whereas for surface-specific points the most common source is a GPS ground survey.

[48] The studied districts correspond to the municipalities of L'Aquila, Pizzoli, Barete, Cagnano Amiterno, Marana, Montreale,Capitignano.

a

Fig.3. Broken line (a) and corresponding discretization (b) of the rail track on the ortophoto (aerial photography maps)

Output

Two elaborations were processed, considering the path to be used as a *lookout*, and the path as an *observed object* from external locations. In the viewshed binary implementation (Fisher, 1996) the resulting output file shows two numerical values to be interpreted: "1", corresponding to visible cells from a given viewpoint (the location is in-view) "0", corresponding to not visible cells from the same viewpoint (the location is out-of-view) Converting the numerical output into graphic, a resulting color map is obtained. The color map gradient describes the areas according to their visibility, starting from a null value (white) an intermediate (yellow-orange) up to a high value (green).

Data interpretation

Decoding the data elaboration, relationships between landscape morphology and the emerging settlements, landmarks and road networks can be inferred. Two main distinctive factors resulted after the analysis process, corresponding to the individuation of two fruition strategies on the area of interest.

1. *Panoramic points*: the punctual locations from where railway is visible become panoramic points. They correspond to historical, architectural, archaeological and artistic heritage elements, scattered in the visibility basin.

Lines of sight depart from the external points towards the linear element represented by the railway, to be considered a target element (*fig.4*)

2. *Landscape Value:* it is ascribed to the segments of path from which the surrounding environment is more visible.

The visibility basin around the railway is drawn, cleansed of visual obstacles, and the included elements are the target objects for an observer (*fig.5*).

It is extrapolated considering the path as an observatory pointed towards countryside, mountains, historical settlements, landmarks. Panoramic points, placed on areas with higher intervisibility are highlighted; they will be used in the design stage to outline the path's peculiarities, referring to an external observer. Landscape value areas correspond to *nodes* (service buildings to restore) and track segments within the path, having a wide view on the surroundings.

They provide a crucial contribution for the project: according to their value, rest areas, landscape observatories and secondary specific functions (picnic, fitness or camping areas) will be placed. In addition, particular care will be taken in avoiding vegetation to screen off the surrounding environment.

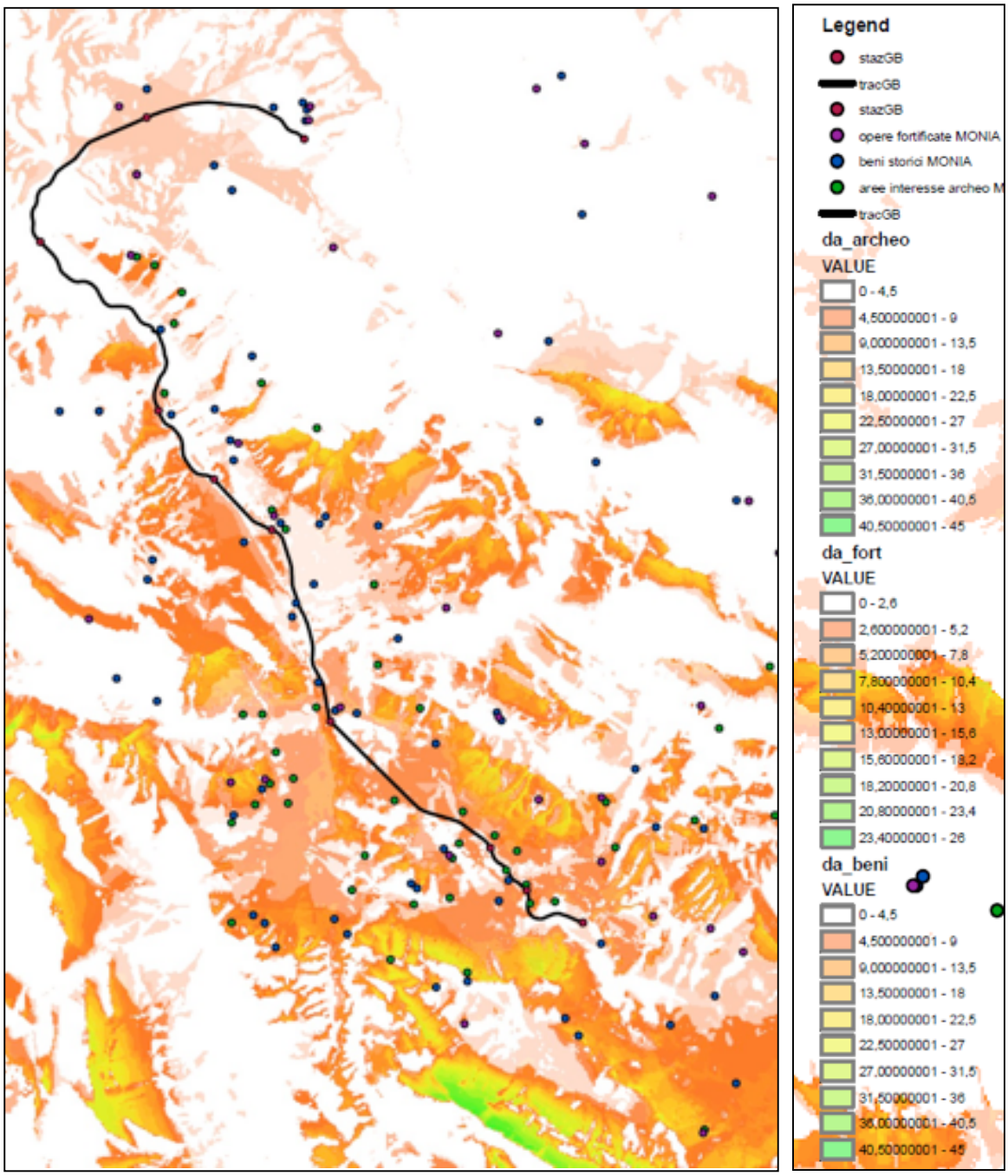


Fig. 4. Viewshed analysis graphic output. Panoramic points

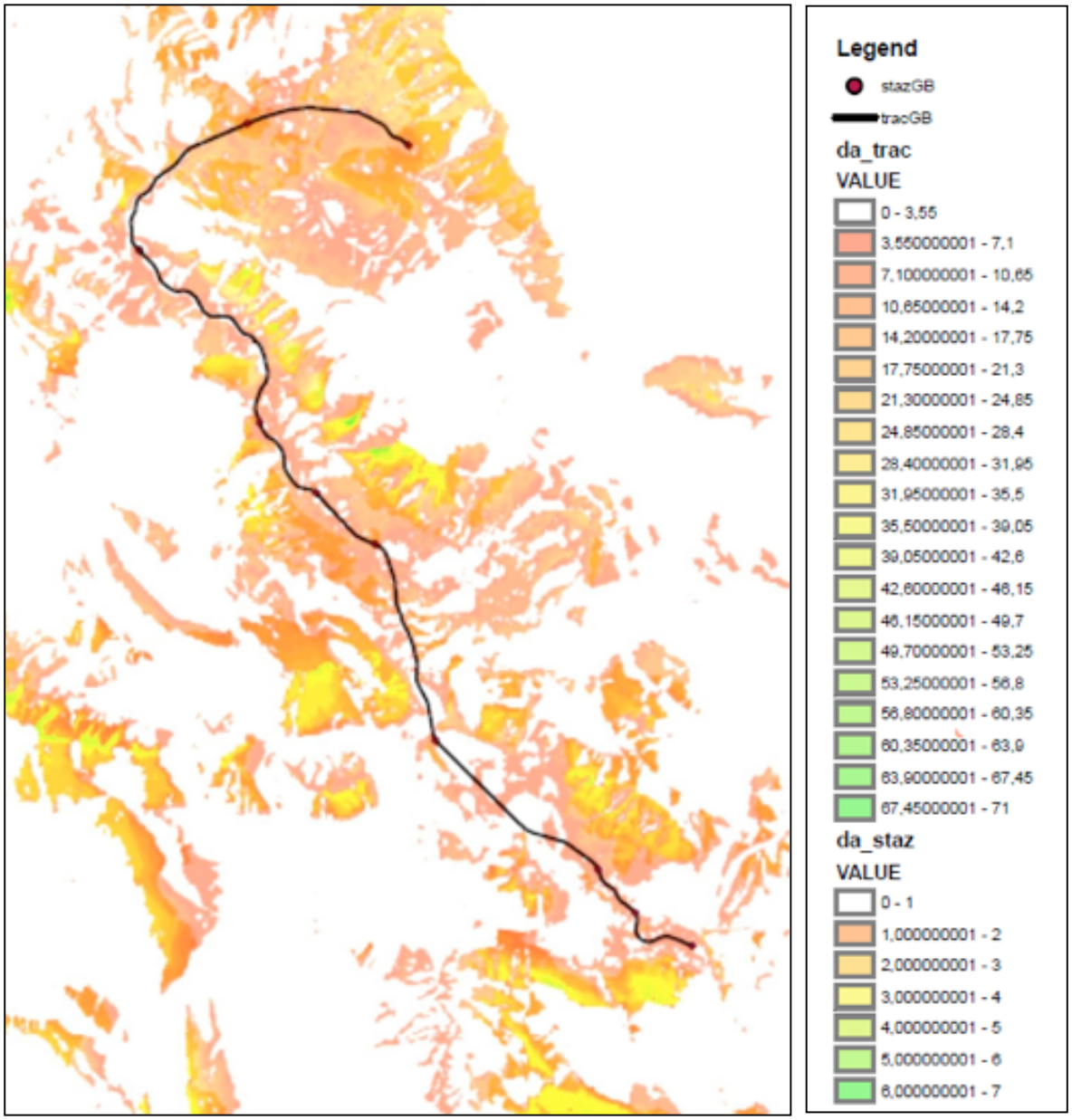


Fig. 5. Viewshed analysis graphic output. Landscape value areas

Data Interpretation

It is easy to observe the direct connection between open grasslands of Capitignano highland and the western reliefs of National Gran Sasso and Monti della Laga National Park (north) as well as between Amiternum valley and Monteluco Mountain and Pettino Mountain (fig. 6,7,8).

Harder would be to individuate the visual connection between the slopes from San Giovanni di Cagnano, Marana up to Piedicolle di Montereale, and the visibility of the corresponding segments of trail. Graphics reveal unattended low landscape values on open areas and high visibility cluster between narrow riverside and mountains' sides, to be turned into landscape quality indicators (fig.9). In the particular case we observe a hardly perceptible segment of path in the open Piedicolle field, impossible to be considered as landmark from the almost flat surrounding areas, and with a consequently low landscape value to be ascribed (fig.10).

On the other hand, the strategic position turns it into a fair observatory towards the surrounding, revealed by the second graphic (fig.11).

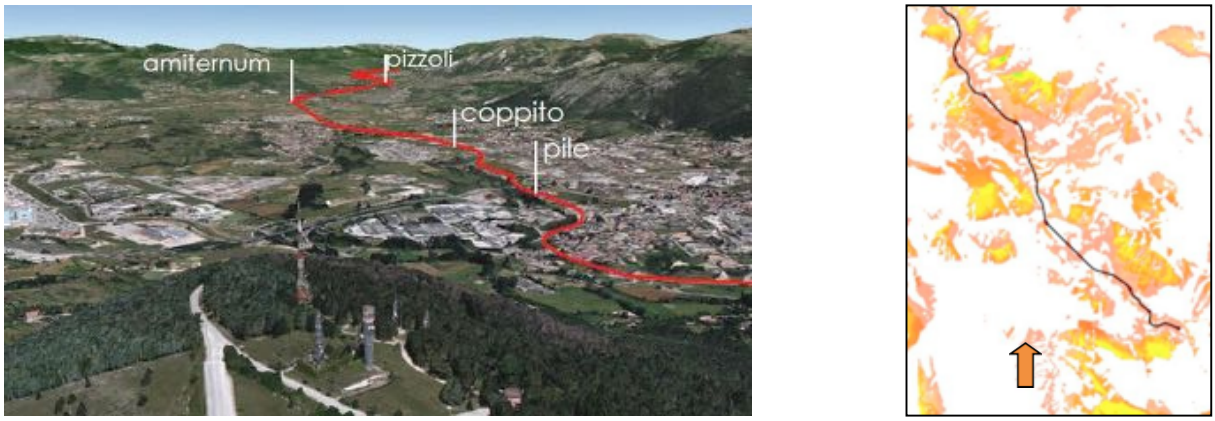


Fig. 6. Visibility basin from Monteluco (arrow). The intervisibility of path and surroudings is shown in the landscape value viewshed elaboration.

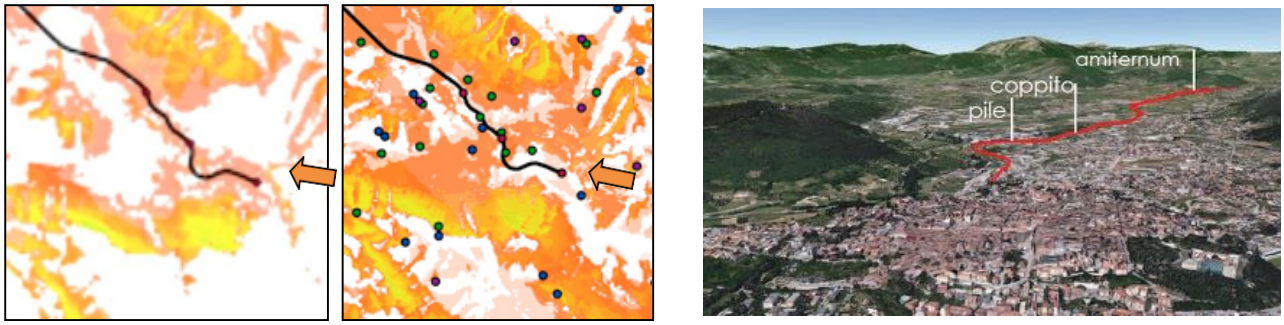
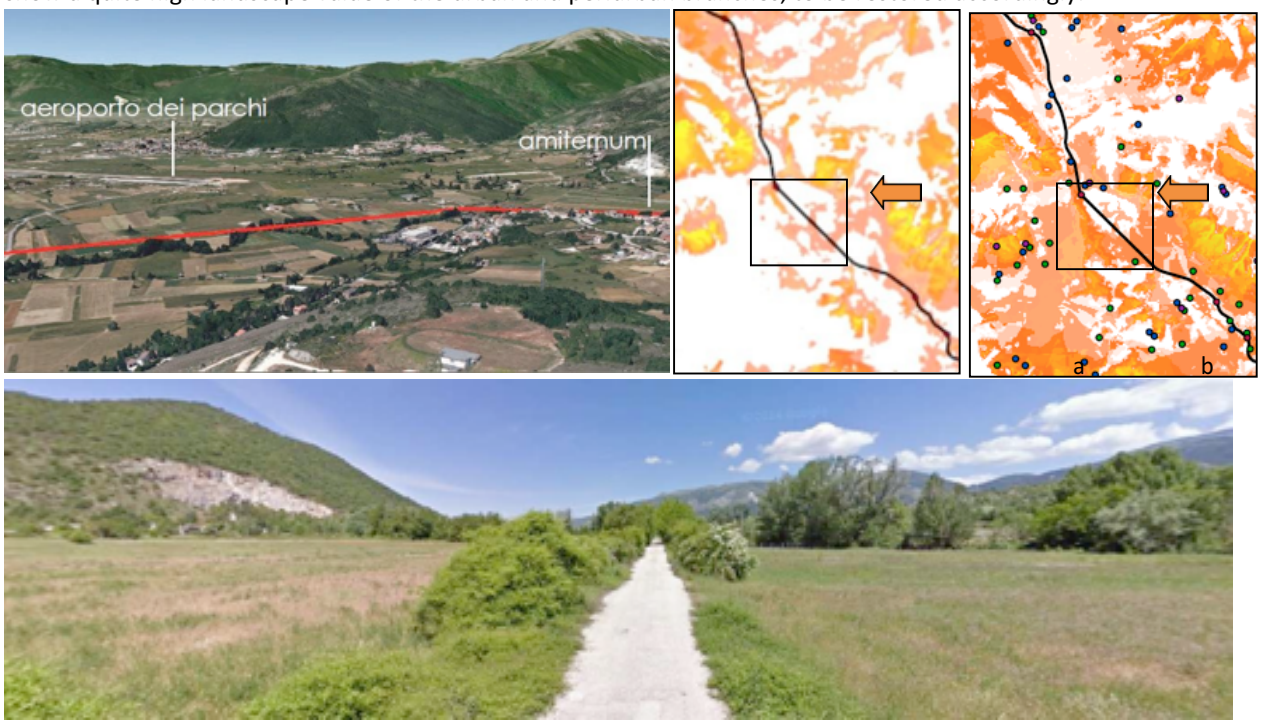


Fig.7. Visibility basin from L'Aquila, northward. Landscape value of track and panoramic points elaborations show a quite high landscape value of the urban and periurban branches, to be restored accordingly.



c

Fig. 8 . Viewshed basin from S.Vittorino relief (arrow) westward and picture from the Amiternum segment of railtrack (c). The Landscape Values Map (a) highlights a high visibility from the track towards the reliefs (yellow). On the other hand, a scarce visual relation between the Amiternum archaeological area and the path is recorded, due to the orography (white areas). The Panoramic Points (b) in the close surroundings reveal the same limitation, with a low mutual perception of flat areas. Better sights belong to panoramic points standing on the reliefs.

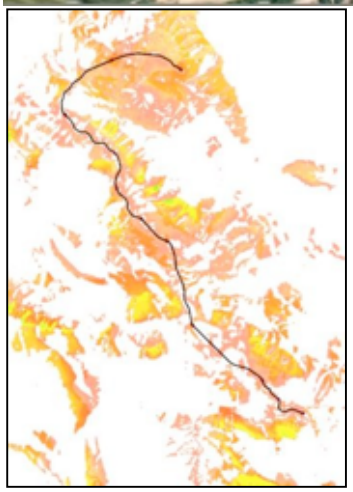


Fig. 9. Visibility from Cagnano Amiterno, southward. The landscape value map highlights the visibility basin from the track, including the reliefs of San Vittorino in the background of Pizzoli.

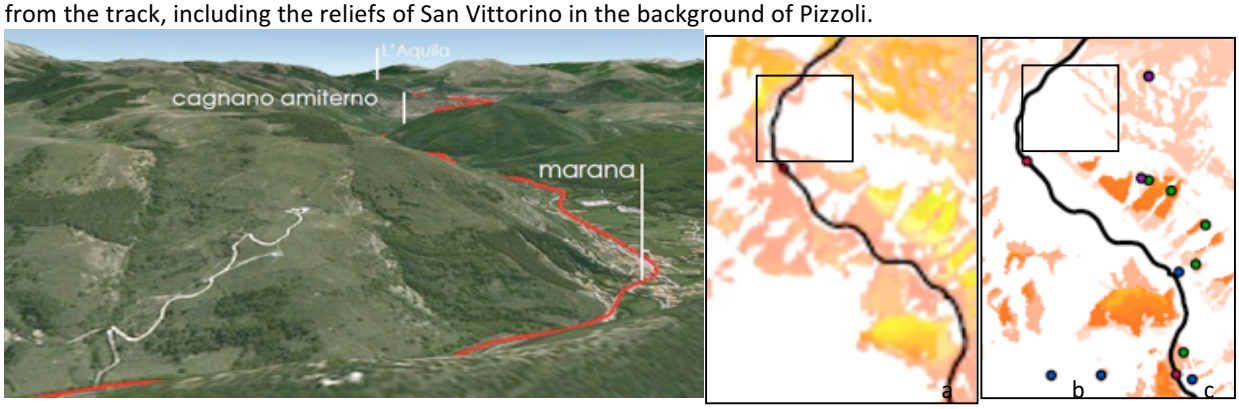


Fig. 10. Visibility on Marana branches. The Landscape Value Map (a) highlights average visibility from the path towards the close relief (orange and yellow areas). Due to slopes and arboreal screens (c), on the other hand, the track is not perceptible from the surroundings, as shown in the white areas on the Panoramic Points Map (b).

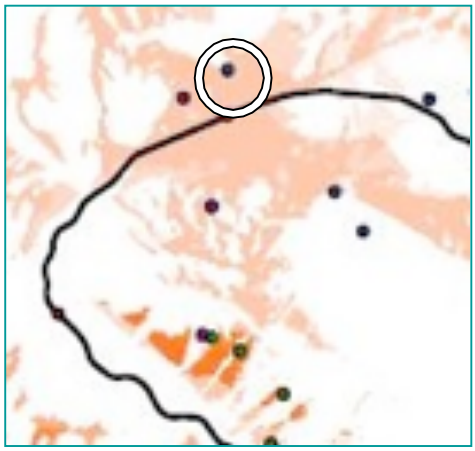


Fig. 11. The white areas correspond to a scarcely perceptible segment from the external viewpoints, when the observer is external to the path. Null results for visibility from panoramic points. The track cannot be seen from the surrounding flat grasslands and corresponding punctual elements, as shown in the picture from the highlighted point towards the track in the background.

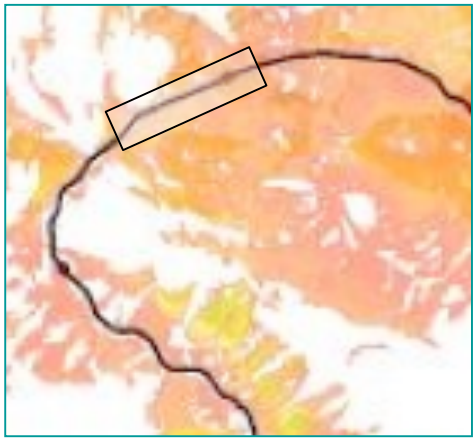


Fig.12. The same segment corresponds to a fair lookout, showing an inverted visibility color code when the observer is placed upon the path. The average results for visibility from the path towards the surroundings reveals the potential for the track to include the wide perception of surrounding open areas up to reliefs

Conclusion

The resulting data elaboration shows an incisive contribution of viewshed to individuation of hidden visual wings, increasing the visual accessibility of the landscape. Intervisibility maps as integration of viewshed results in a valid support to restore or strengthen the network of visual connections, necessary requirement to establish a contact and interaction between observer and landscape, and for further development of planning strategies aiming to restore connectivity upon a fragmented territory. All the further actions proceed only after understanding of preexisting landscape unrevealed values, to be strengthened. Beyond environmental impact assessment, an analytic tool is turned into an investigation tool to be used in a *post operam* evaluation and assessment on the existing infrastructural heritage, to be integrated in the landscape by means of new interpretation and functions. Visibility redefines the borders of a landscape project area, when orography and natural covering play an important rule: the mutual visual connections become an intangible but essential parameter, laying upon the basic substrate of a physical environment to be decoded. Rewriting on the landscape, bridging existing gaps, solving the isolation of neglected areas to be restored or rediscovered is a possible challenge, to be performed working on parallel directions of memory, investigation and analytic tools used in a transdisciplinary approach.

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Cartographic material

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THE ROLE OF COLOR IN THE PAST AND FUTURE OF THE CITY, TABRIZ-IRAN

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Abstract

Urban spaces have changed significantly in the past 100 years. Population growth and a rise in migration from rural areas since the Industrial Revolution has seen towns and cities expand at an ever increasing rate. However, architecture has expanded with the use of new materials and resources. More recently, architecture and urban design have expanded with the objective of making buildings more sustainable and also mentioned accessibility, mobility, pedestrian movements, etc. New urbanism includes several factors, but nowadays there is a common issue that called ecology. However, beside these important items and so many other factors, urban designers and architects may forget another significant factor that can be Color. According to recently ecological factors and mentioned that is really important for designers, but we should pay attention to the visual and memorial items. The first and the most eye-catching information we collect from our living environment is Color. The color in urban context can be seen in different ways. It is able to persuade different feelings and transmit variety of functions. But how can we use color when we want to revitalize the suburb? Which factors may be important to occur some colorful projects in suburb? In this study I would like to mention Tabriz, one of the old cities of Iran that located in the North West of Iran. Iran has a rich culture of ancient and Islamic architecture. Tabriz is the most populated city in the Iranian Azarbaijan and one of the historical capitals of Iran that is going to be tourism capital of Islamic countries in 2018.So in this study I try to mention the suburb according to this improvement until 2018.How color was used in the past and now how can we use in revitalized areas of Tabriz?

Keywords: Urban context, colors, visual and memorial

Introduction

Kevin Lynch (1990) noted that one of the most important factors concerning the imageability of a city is the color. The human-designed environment is all in color: streets and shops, buildings and spaces. We see it, in all its variety, in different objects and cultural products. Colors are basic elements of our visual perception and environmental experience; they are the substance of how we experience the environment. Color conveys symbolic messages. Color is much more than an aesthetic; it is part of a life-giving and life-preserving process. It is part of the terms and conditions under which human live and experience [1]."Color exists in itself, it connects thing with each other and connect things with people. "(Pieter Uyttenhoven). We are surrounded by color whenever we open our eyes. It accompanies us in diverse visual ways and is always connected with and influenced by light in the natural or human-designed environment. In nature, we see color in the light of the sky, when looking at water and landscapes. We see it in trees, stones, plants, fruits and flower (Fig. 1).

For the purpose of this study I have read through and covered existing literature and illustrated related pictures. Reviewing the related texts revealed that color has been assigned a role of identity maker in city context. It can significantly improve the aesthetic features of the city and can be applied in different scales from urban details such as windows and walls to streets, squares and districts. So many factors distinguish the colorscape of the cities but the final composition of colors remarkably affects the visitors and residents perceptions towards the place they visit and they live in.


Figure 1. Colorful Nature (Budapest, Hungry)

Place, memory and color

Memory refers to the mental process of encoding, retaining, and retrieving information (Dzulkifli & Mustafar, 2013) .As bodily subjects, we necessarily have a relationship with the places that surround us. Equally, the memories we acquire of the places we inhabit assume a value that is both immeasurable and vital. Without the memory of places, memory itself would no longer have role to play in our conscious lives. Place is all around us and yet not always fully thematized. A place is at the heart not only of who we are, but also of the culture in which we find ourselves. As invested with cultural, ecological, and political ramifications, place does not simply designate a patch of land without value. As proof, humans tend not to be indifferent to the effect place has upon them. [2].The memory in its core is a cognitive process. Cognitive psychologists discovered different design principles to enhance memory performance and in that way remembering the information. Retrieving process depends on many variables and one of them is color. Color is the most powerful stimulus for the brain. It opens up other areas of the brain and allows greater and easier learning and remembering. The information enters our brain through eyes and ears and it is stored in the so called sensory memory. But we can pay attention only to a small amount of information. Once something has attracted our attention, it moves into our working memory. The brain notices and remembers color first. Farley and Grant found out that colored multimedia presentations resulted in better attention and memory performance [3]. Greene, Bell and Boyer further explained that warm types of colors such as yellow, red and orange have greater effect on attention, compared to the cool type of colors like brown and gray. The right combination of colors is also important, because it can produce higher level of contrast. Higher level of contrast attracts more attention and better visibility which influences memory retention (Dzulkifli and Mustafar) [4].

Color in the city

The widest range of urban activities, dynamic authenticity, functional organizational openness and availability are the main criteria set for the polychromatic public space and its contents. During last few decades, tendency to use color as a form-creating instrument was increasingly present and it has been international phenomenon in culture of color. Historical documentation survey, aesthetical and psychological approach generated their expression within architectural color interpretation. Color has played a prominent part in the architecture of many lands and periods. Historical examples run a wide gamut to include Egypt, Assyria, Minoan Crete, Greece, Maya, Spain and Mexico, Persia, India, China, and medieval Italy. Most of these countries either lie in the Mediterranean area or in the prolongation of these latitudes. The logical explanation is climatic; strong sunlight tends to absorb color so that in hot countries vivid surface appear quite subdued (Wilber 1942, 18). Color, then, can not only be used to enhance the built environment and signify change, but can also serve as a profoundly powerful tool when used in urban façade improvement programs—especially as a unifying factor to the seemingly disparate disciplines of historic preservation, urban planning, sustainability, economic development, and architectural history. In the various factors which influence the character of a city, color with its "first sight" is undoubtedly a basic factor for creating a special city. As city form represents conceptual order, the plan of building volumes and spaces, city color shapes

perceptual experience. A sense of color, in fact is the most direct visual signature. “Preferences are evident in the vernacular. People select colors in their surroundings, exhibiting a taste for certain combinations and avoiding others. A collective “eye” seems to guide these choices, rather than individual inclination. “They are distinctive and self-contained, as much a part of human coding in cities as their signs and symbols” [5]. Color is a measure of a person's wellbeing. Although that is clearly a sign, it generally remains so intangible or elusive as to be largely ignored in discussions of the world around us. Color have a presence over and beyond the buildings, people, spaces and artifacts that make up the city. Not alone does color give meaning to cities but cities give meaning to color and they are signs to each other. Colors take identity from cities and also cities take identity from colors.

Factors that impress urban colorscape

As Xiamen [6] indicated there are three factors that influence urban colorscape. These are as follows:

Geography and climate: Swirnoff [5] in his book described the role of Geography as below: “Color is direct expression and represents a response of the people to the characteristics of the natural environment, to its harshness or abundance, desolation or luxuriance, relative presence or absence of sunlight. Color experience and color sense appear to be collective and vernacular expression”. In fact different geographical locations and physical environments have unique climate, and thus they will affect human beings, race, customs, and cultures as well as their taste for choosing the color of their cities. (Fig. 2)

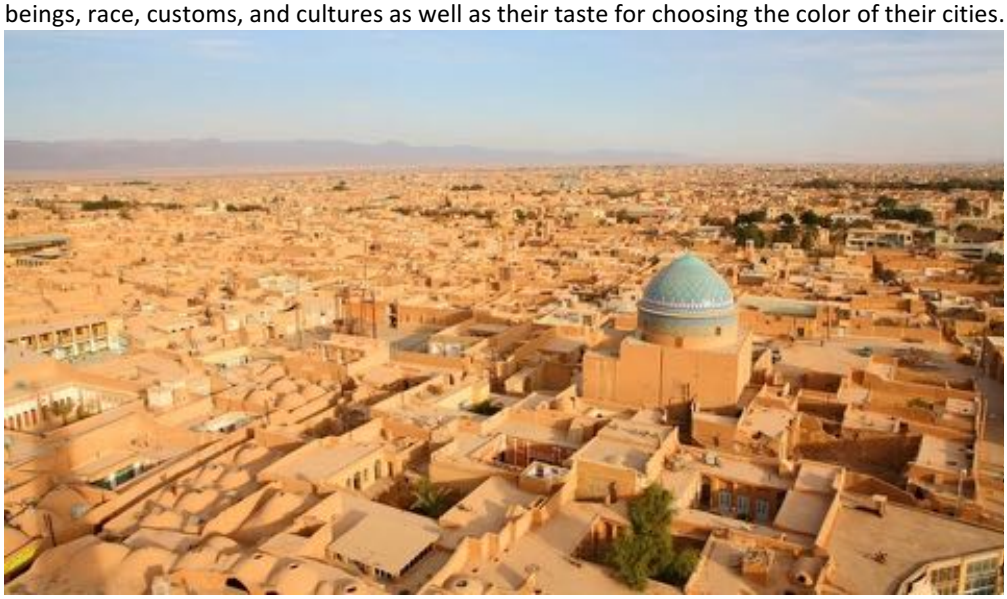

Figure 2. Selected suitable material according to climate and color of the city that created from material(Yazd , Iranhttps://pt.wikipedia.org/wiki/Hungria)

Historical and cultural context: in some cases, a color palette is so strong and has been used and recognized over such a longer period of that it becomes traditional and an important part of the culture. In such instances color becomes strongly symbolic. Towns, regions and even countries throughout history have developed a strong traditional use of color. To cut short we have to say that “the color of a city is an aspect of its history” [7].Some cases to point out are old city of Fes, Morocco, which is recognized by the range of brownish color, Jodhpur, India which is characterized by blue and the dominant color of Abyaneh, Kashan, Iran is red. (Fig. 3)

Figure 3. Abyaneh, Iran

Development of Technology: Construction material played the key role in design of colored spatial structures of the city. Most of the traditional cities, before industrial revolution, used to apply materials vernacular to their regions. The contradiction between coloristic ambiance in expansion and existing industrial methods in building technology is noticeable. The continual development of coloristic ambiance imposes the need for dynamic architectural polychrome. This request grows in proportion to desire for urbanization, which constantly changes the relation between natural and artificial elements of the urban environment in favour of the latter ones.

Nowadays, with new materials, building process loses its importance compared to the traditional building with wood and stone of yesterday, but it enables constructing imposing volumes of new buildings or whole cities. The important issue is improvement of coloristic materialization of buildings. Today, natural materials are mainly used for decorative purposes, and their color does not correspond to the material used for the construction, making material's features and color unrecognizable and illegible. Cladding, and paint alike, has its function in the sense of longevity of the building, but it also functions as "clothing". It is obvious that principles of multiple fencing of live organisms from their surroundings, certain independence from constructive skeleton and internal tissues and tight reciprocal relation to the organism itself and the surroundings, the change of its color as a result of this reciprocity, represent the natural prototype for the surface of the architectural form. Architectural styles evolved within the limitations of available materials and this disciplined the form as well as the color of the buildings. As a result, the constant use of local materials and non-artificial colors produced urban settings with visual harmony.

Tabriz over time

Tabriz is a historical city located in Iran's northwestern province of East Azerbaijan.It is the capital of one of the most famous provinces of Iran, The Azarbaijan or Aturpatgan. It is the land of Azargoshnasp temple; the fire temple of the Kings and the Nobles of Iran. Tabriz, being the provincial capital of East Azarbaijan (Aturpatgan), has slightly more than 1,700,000 population and was the second largest city in Iran until the early 1970's. Tabriz has been the capital city of Iran on numerous times throughout the old history of this country. Tabriz is located in a valley to the north of the beautiful Mount Sahand. The valley opens out into a plain that slopes down gently to the northern end of Lake Orumieh, about 60 km to the west. Tabriz is 310 km southeast of Bazargan (Iranian-Turkish frontier); 159 km south of Jolfa on Iran- Aran (Azarbaijan Republic) border, and can be reached by very good roads, rail (742km from Tehran, with connections to the Europe and Moscow), and air from Tehran and other major cities. Tabriz is a rich trade center due to its location on the Silk Road throughout history [10].According to the city development map, it can be understood that the city core is formed by the river which passes through the city named Mehran River. Over the years that is developed and been wide. (Fig.4)

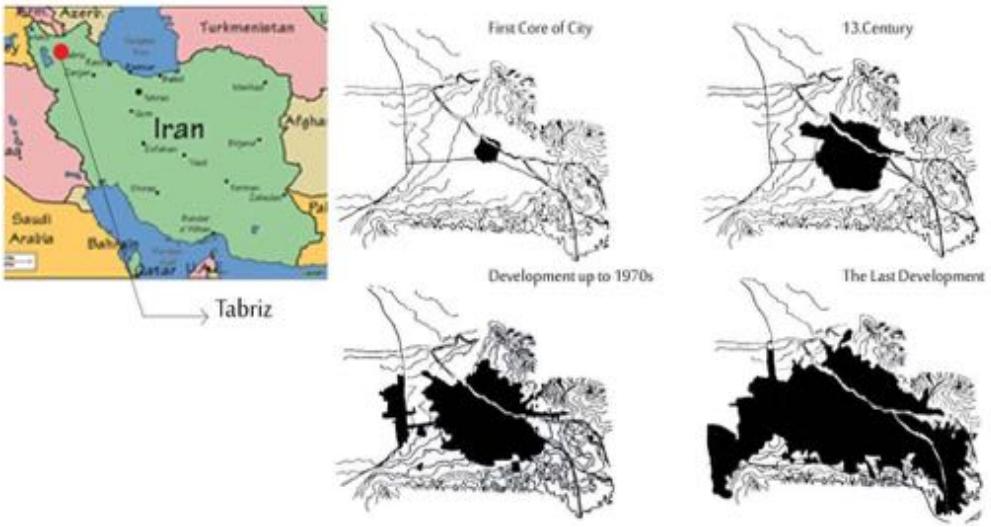

Figure 4. Location Of the city and development map

Color used in urban context

There is no doubt that the unforgettable message in the Iranian architecture has been the preservation of the multiple aspects of the buildings constructed by the Iranian architects and artists, all through ages and especially during the Islamic period. According to this city and also such Islamic cities, we can observe that the main and prevailing color in historical places are blue, brown, yellow and green. These are color that used in structure of a building. Also in Islamic buildings we can consider colorful windows which created by warm colors of glasses. By the way, if we look at thoroughly to this city, the dominant color that eye and human memory can catch it is brownish and cream. However the main point in this study is about suburb of Tabriz. By the time the city get larger and vaster. Also as I mentioned in abstract part of the paper, Tabriz is one of the historical capitals of Iran that going to be tourism capital of Islamic countries in 2018.So how about the destiny of suburb in this improvement until 2018. (Fig.5)How color was used in the past and now how can we use in revitalized areas of Tabriz? According to the literature part of this study, there are some factors that influence the color of cities. In this case we can cite the climate, historical, vernacular and cultural items that can contribute in design of city and specially the color of the city. In recently years, we have witnessed many changes in the city. Such as pedestrian movement projects, lighting projects, construction of skyscrapers, rehabilitation of the old pattern of the city, etc. But how about suburb? Because municipality didn't have enough time to rehabilitation the suburb, they wanted to paint the façade of buildings. But how and according to which patterns?

Figure 5.The suburb of Tabriz

There are lot of urban painting projects that are really successful. Such as the Favela Painting Project that was founded in 2005 by Jeroen Koolhaas and Dre Urhahn, better known as Haas&Hahn, who came to Rio armed with a bag of ideas and a small grant. Jeroen Koolhaas used his background as a graphic designer to create three-dimensional designs while former journalist and copywriter Dre Urhahn focused on concept and strategy. Their joint efforts yielded three enormous paintings, attracting attention from all over the world. (Fig.6)

Figure 6.The Favela Painting Project

"The models of chromatic solutions, which are derived from the principle of unity of the structure and color combinations, are created according to structure and volume of the architectural form" [8]. The principle of polychrome contrast facilitates overcoming the static structural segregations of an object and upgrading its visual dynamics. In that case, the architecture takes over the live influence of natural surroundings' polychrome, social cultural processes, and culture of color tendencies, i.e. it reacts operationally to the context change. The color of specific buildings usually stands somewhere in between the two opposites: polychrome contrast and shade, and geometrical shape of architectural structure. This is "combining by analogy" principle that can be applied to the individual building or the whole complex. When composing the colors of an architectural composition, one should, primarily, select the multipurpose objects, clear chromatic characteristics and suitable formations of typical contrasts. While choosing the color for immense group of buildings (regardless whether they are polyvalent or typical), exclusive attention should be focused on conditions that derive from specific spatial plan. Explicitly, changes of color must emphasize compositional meaning of spatial structures within the buildings, rhythmical principles of their spatial correlation, dimensional comparison. [9]

Conclusion

color was clearly a concern of Kevin Lynch in his unique analysis of towns and cities, he did not deal with it systematically. This was perhaps for three reasons: historical, perceptual and technical. Color was portrayed generally in the form of dramatic highlights, such as advertisements in townscapes composed largely of natural materials. Brightly colored external services, structural pylons, painted sheds and large sheets of tinted glass were yet to come when he examined the affect of color. It was these natural qualities that led people to think of conservation as being particularly concerned with the past but, as David Lowenthal has emphasized, the continuing dilemma of the present is the uncertainty of the future, Past and future attract and repel in quite different ways. We can know neither adequately, but the essential purpose of conservation is to draw from the past to inform the present so that we can build with confidencefor the future.

A conclusion can be made that the change in physical pattern of urban spaces – by transforming into polychrome spaces following the function and cultural identity – can create valuable space. The color is experienced as secondary architectural instrument that accentuates originally colorless compositional idea. Therefore, the combining by analogy principle presumes more tautological use of color, denying color as an important compositional mean in creation of artistic architectural form. Color drawings that represent contrast to relief surface can be seen on Spanish and Central Asian ceramics, Italian cathedrals' marble mosaics, and gothic Stained Glass. In seventeenth century Russia, whitewashed churches had decorative floral ornaments painted on. Sometimes, facades were decorated with painted "carved brilliant" pattern that evoked the

impression of irrational architectural form. This principle came to great expansion in the beginning of the twentieth century. The combining by contrast principle presumes more of a contradictory, energetic, transformable function of color that opposes the geometry of the structure. The directions for transformation of urban space by the use of color can be derived from the following principles:

_Harmonizing of color bearers in urban space;

_ Creating preconditions for achieving values: being understandable, emotionality, behavior;

_Achieving chromatic harmony and systematization of chromatic multitude through cultural identity of environment.

_Consider the climate and also historical values. If we pay attention to these items we can achieve that maybe make more colorful area is not suitable for such historical cities.

Countries can learn from each other and work towards making the world more stable and sustainable by forging links between scientists and research institutions globally over issues such as urban planning, heritage and architecture. But beside these items, the most important factor should be the identity of cities. So paying attention to identity may help us to make the best decision for urban planning and design and also as the aim of study pay more attention to the aesthetical design of urban spaces.

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FACTORS AFFECTING RESIDENTIAL DISTRIBUTION PATTERNS OF AL-SEEB PROVINCE OF MUSCAT GOVERNORATE, OMAN

MAHMOUD HAGGAG AND SANAA AL-SENANI, UAE University.

Abstract

Urban populations consumes built space for different purposes of which housing constitutes the largest portion household expenditure (nearly 25%). Urban residential pattern is not restricted to housing demand and supply, but is also shaped by other factors such as household characteristics, socio-economic status and, the most important one, transportation development. The household is assumed to find its location by trading off travel cost (money and time), against housing cost; and chooses a location at a point at which total cost is minimized. This paper investigates some of the important factors affecting the planning and distribution pattern of residential locations, focusing on availability and accessibility of serviced land on the one hand, and the characteristics of the households on the other hand. The study emphases transportation and land value as the main factors affecting the patterns of residential locations and characteristics of the city structure. The current trend of the residential mosaic and transportation development of Al-Seeb Province (one of the six provinces of Muscat Governorate with a highest population density) is examined. Al-Seeb was selected as a case study due to its urban phenomena caused by the modern planning approaches implemented in Muscat Governorate of Sultanate of Oman.

To achieve the aim of the study, a theoretical background of residential location patterns is highlighted, and the main aspects that affect the residential pattern are identified. Urban development of residential mosaic of Al-Seeb is examined with emphasis on transportation pattern, travel time, and land value. A field survey and interviews with stakeholders were carried out to identify the users' patterns of movement in relation to their residential locations.

Al-Seeb as a main Province in Muscat Governorate

Muscat is the main governorate in Sultanate of Oman which contains “Muscat” as a capital city. Muscat Governorate area is approximately 3,500 km^2 and includes six Provinces (Wilayats): Al-Seeb, Muscat, Bousher, Muttrah, Qriaat, and Al Amerat. The population of Muscat Governorate (1.3 million) presents nearly 30% of the total population of Oman. This figure shows that Muscat has the highest population density in the country (450 person/km^2). As a coastal fishing city, Al-Seeb is located several kilometers northwest of Muscat. As of the 2016, the population number of Al-Seeb reached 390,000 (27% of total population of Muscat Governorate) with a population density of 795 person/km^2. People preferred to live in Al-Seeb mainly because of the high job opportunities. With the high population congestion, Al-Seeb suffers from the increase of car ownership where annual average growth reached 10% (Muscat Municipality, 2010). Figure 1 summarizes vehicle classification distribution across all traffic survey sites which was conducted by Muscat Municipality in 2010. Passenger cars accounted the vast majority of traffic (77%), while all forms of public transport combined (including buses provided by private companies) accounted for about 5%. This illustrates the overall dependence on private transportation rather that public transportation. As a result, the high car ownership along with limited transportation infrastructure and lack of public transportation modes create high traffic accidents in Muscat Governorate in general and in Al-Seeb in particular. Figure 2 shows that more than 35% of the traffic accidents are located in Muscat Governorate. Moreover, the traffic conjunction is usually occurred during the rush hours alongside of the entire main spinal corridor of Sultan Qaboos Street, particularly nearby the exit of Al-Seeb; the Ministries area; and the entry into the Greater Muttrah. The main reason is that the urban activities, governmental bodies and public services are located around this corridor including ministries, hospitals, schools, malls, hotels, sport stadium, airport, parks, grand mosques, bus stops and stations, and residential zones.

To overcome traffic connection and accelerate transportation development, the Ministry of Transport and Communications, in 2014, created the Public Transport Master Plan to achieve the Oman’s vision 2020. This master plan aimed to develop a high quality and sustainable public transport system, in order to reduce car dependency and to improve accessibility, safety, urban environment and quality of life in Muscat Governorate (Muscat Municipality, 2010).

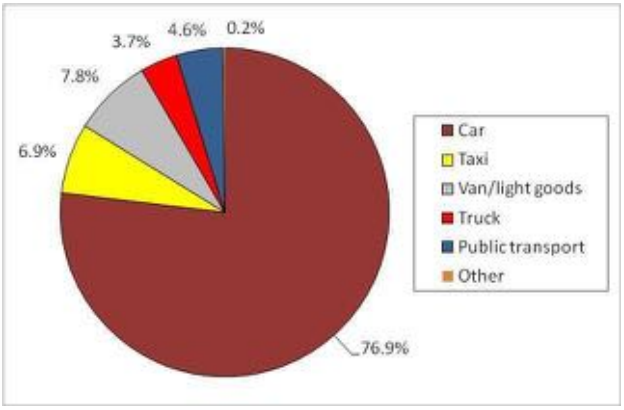

Figure 1: Average Distribution of Vehicle Classification in Muscat Governorate (Muscat Municipality, 2010)

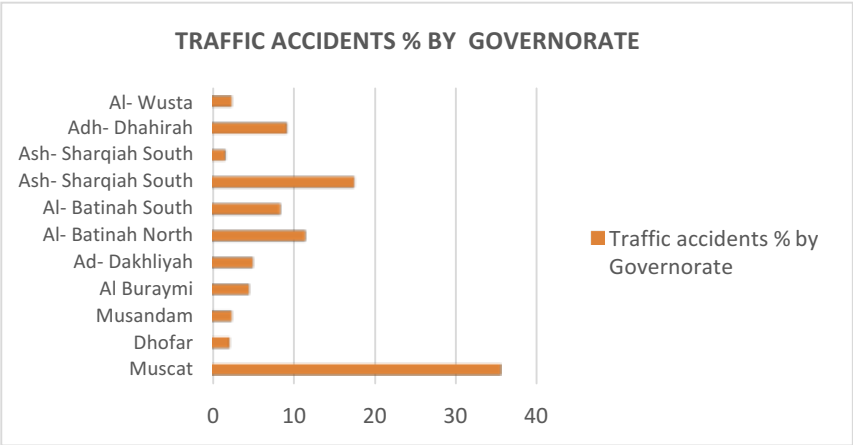

Figure 2: Traffic accidents of Oman Governorates (Adapted from NCSI, 2016)

The project was design by Spanish company and managed by Ministry of Transportation and Communication in collaboration with Muscat Municipality, Ministry of housing, the Supreme Council for Planning, and Royal Oman Police. The project was structured in three phases:

Phase 1 (1-10 years): Implement attractive urban bus system; Coordinated feeder bus services for local distribution of demand, complemented by a water transport service; Create and build up public transport demand; and Early reservation of mass transit right-of-way.

Phase 2 (10-20 years): Linear bus routes to be upgraded to LRT (Light Rail Transit): segregated, fast, high capacity rail-based; System for the highest demand east-west corridor; and feeder bus and water transport services.

Phase 3 (20-30 years): Expansion of the LRT system to Al-Mabailah (via Al-Seeb); Upgrade of Al-Amrat feeder to BRT; and Expansion of Water Taxi route to Sifah.

Currently, the available public transportation modes are only bus and taxi services. Public bus service was operated in Muscat Governorate by Oman National Transport Company (ONTC). This bus service has its own theme with red color and called “Mwasalat”. Part of the service’s infrastructure is still under construction. This service links mainly the all Province of Muscat Governorate through the main corridor of Sultan Qaboos Street. The company added daily national and international bus trips to other Omani governorates and Dubai, UAE. Taxi service in Oman is owned and managed by private sector.

Urban residential pattern: theoretical background

This section highlights the main urban structure models and urban land markets and how they can be fitted to Al-Seeb City. Three theories of urban structure attempt to describe the different growth and functional distribution patterns of a city. They also show the residential distribution pattern in relation to socio-economic household characteristics. These theories are: the Concentric Zone Model (CZM); the Sector Model (SM); and the Multiple Nuclei Model (MNM) (Putman, 1979 – Pacheco, 2010). The concept of CZM was based on the land

use distribution pattern of Chicago City. This model is based on the idea that similar activities are located at the same distance from the center of the city. Each zone would have relatively homogeneous land use (Goodman, 1978 - Pacheco, 2010). CZM assumes that a city grows outward from its center to form a pattern of concentric zones. As shown in Figure 3, the first zone, the Central Business District (CBD), is the focal point of commercial, social and civic life. It also represents the area of original settlement. The second zone is an area in transition, which is usually contain the poorest quality residence and is being invaded by business and light manufacturing. The third zone is basically an area of low-income people who desire to live within easy access of their work. Beyond this zone, the middle and high-class residential areas are distributed. This zone is followed by the commuter zone, which contains the patchy development of high-class residence associated with the fastest existing transport facilities.

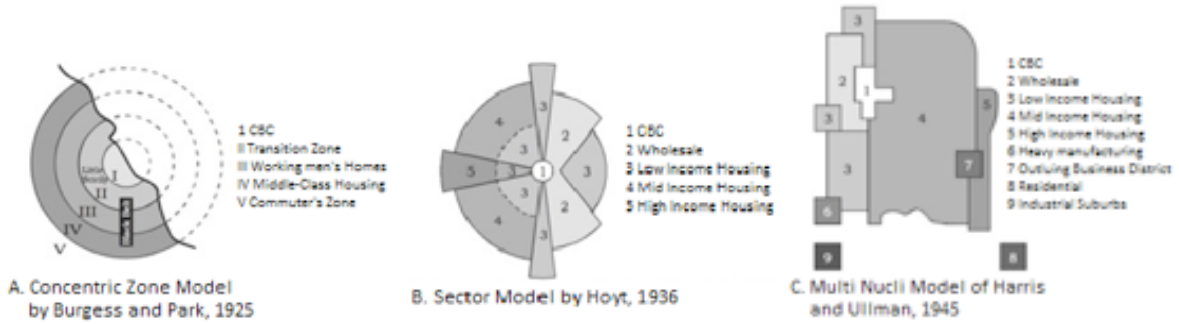

Figure 3: The Classical urban structure models (Pacheco-Raguz,2004)

The second model of city structure, Sector Model (SM), was formulated by Hoyt in 1936 after examining structure pattern of residential locations in 142 American cities (Putman, 1979 - Pacheco, 2004). The main idea of this model is that the location of residential pattern could be distributed in form of sectors or wedges. The wholesale and light manufactures are located at the opposite end of the city from high quality residential areas. Low-class residential areas are located close to the manufacturing zone. The remarkable feature of this model is the way it highlights the outward migration of high-class housing districts as the city grows. It is also clear that the SM may be extended to include all types of urban land use, with each of the principle functions occupying adjacent sectors of terrain (Figure 3).

Multiple Nuclei Model (MN), was developed by Harris and Ullman in 1945 (Putman, 1979 - Pacheco, 2004). The basic idea of this model is that cities develop around several district nuclei rather than around one center of origin. It should be noted that no particular significance is attached to the shapes of each zone. The emergences of separate nuclei are determined by factors such as; the interdependency of some types of activity that need to be close to each other; and the tendency for complementary activities to be near each other.

The three models are not completely opposed to each other. The first two models, which are based mainly upon conditions of developed cities, cannot fit all developing cities including Al-Seeb. In most developing cities, the residential pattern is almost the reverse of that proffered by the concentric zone model (HABITAT, 1981). The high-income families are willing to locate near the CBD and pay the premium in cost of tenancy, while the low-income families who cannot afford to pay any extra than is necessary are pushed to the outer edge of the city. This could be attributed to the lack of high-level of transportation and infrastructure, and therefore the excessive amount of time spent on traveling.

The urban land market theory attempts to rationalize the location of individual activities within an urban system using components of land accessibility, trade or commerce and traveling cost as major variables to influence the household's choice. The household is assumed to find its optimal location by trading off its travel cost against its housing cost, and locating to a point at which total cost is minimized. This relationship is known as the trade-off theory (Putman, 1979 - Pacheco, 2004). The basic assumption of this theory is that housing cost declines with increase in distance from an activity center, but transportation costs are assumed to rise with increase in distance from that center.

This theory was tested for Al-Seeb Province, based on observed data collected from the field survey and from Muscat Municipality and similar previous study (Haggag and Hadjri, 2005). Contributions to residential location theory that were mad by Wingo and Mills, Wingo's model focused on the way urban transportation costs affects the demand for residential land. This model assumes that the demand of residential land per household depends upon the land value and that the elasticity of demand is constant. It also emphasized the fall of

population density with the distance from the CBD when land is substituted for capital in the production of housing at locations distant from the CBD (Kivell, 1993).
The characteristics of the above residential models show that the cost of renting or purchasing land, and costs of commuting are the main factors in determining the optimal locations of residential land. The above analysis shows that the property value gradient should be affected by the land value gradient. In reference to Al-Seeb case study, the analysis of the data collection shows that the rent or the property value falls with increase in distance from the centers of activities, but at a diminishing rate. The high income families are willing to locate closer to the centers of activities in order to avoid long commuting journeys. However, the low-income families are unwilling to do so because of the direct residential cost is high and therefore they are located away from the main centers of activities. For more details see the following section.

Al-Seeb City and its residential distribution pattern

Al-Seeb is one of the large city in Muscat Governorate with a total area of 490 km^2 (Figure 4). It has the main important services and facilities such as Sultan Qaboos University, popular malls and shopping centers, the international Exhibition center, Muscat International Airport and the Festival Parks. The main corridor of Al-Seeb, Sultan Qaboos Street, includes on both sides the most services and facilities and forms the central business district and connects the six Provinces together (Figure 5).

Figure 4: The location of Al-Seeb province in Muscat Governorate (Muscat Municipality, 2010)

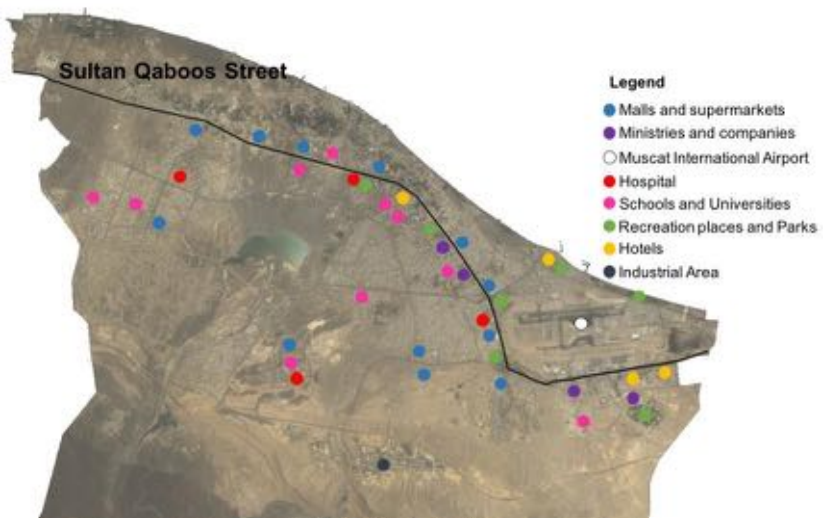

Figure 5: The varies services and spinal corridor of Al-Seeb

Al-Seeb has a unique pattern of land use that is similar to most of Omani cities. Figure 6 shows the urban development of Al-Seeb city in the period of thirty years. Residential land use was highly developed mainly around Sultan Qaboos Street as describes in Figure 5. The structure map of Al-Seeb shows that there is a strong correlation between the residential land distribution patterns to that proffered by the multi nuclei model. The residential patterns are developed around several district nuclei rather than one center of origin. As shown in Figures 7 and 8, Al-Seeb has 14 districts, the largest one, Al-Maabaylah Al-Janubiyah, has the largest population number of 5340. The shape of each district and the distribution pattern of the households determined the type of activities that need to be close to each other; the availability of residential land, and the job opportunities.

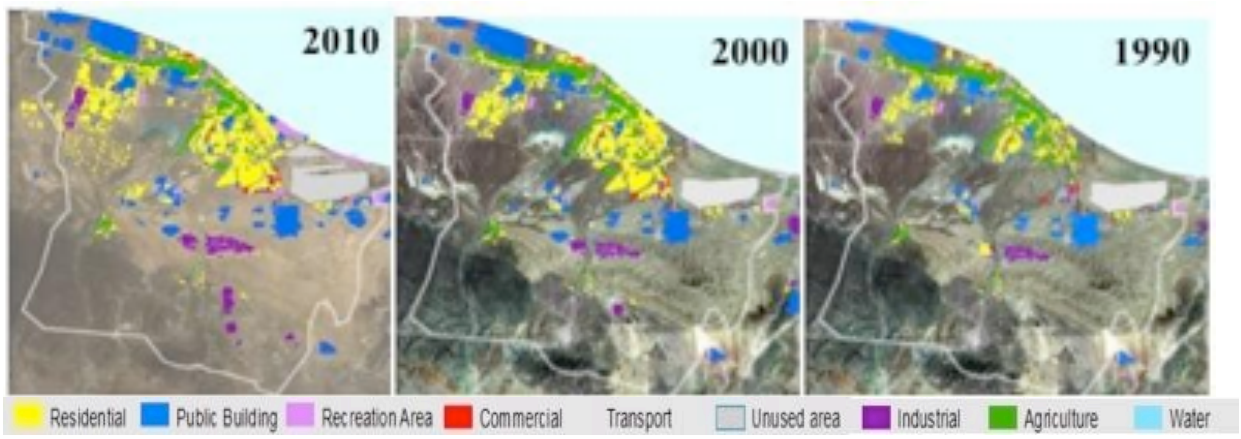

Figure 6: Land use development of Al-Seeb from 1990 to 2010 (adapted from NCSI, 2016)

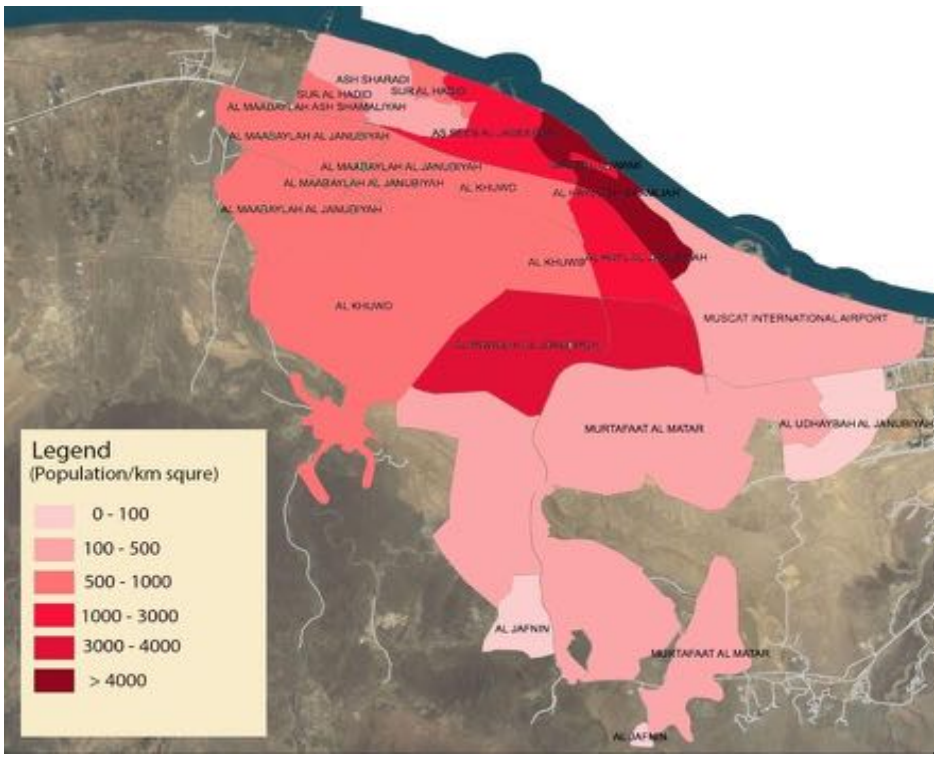

Figure 7: The population density in Al-Seeb (Adapted from NCSI, 2016)

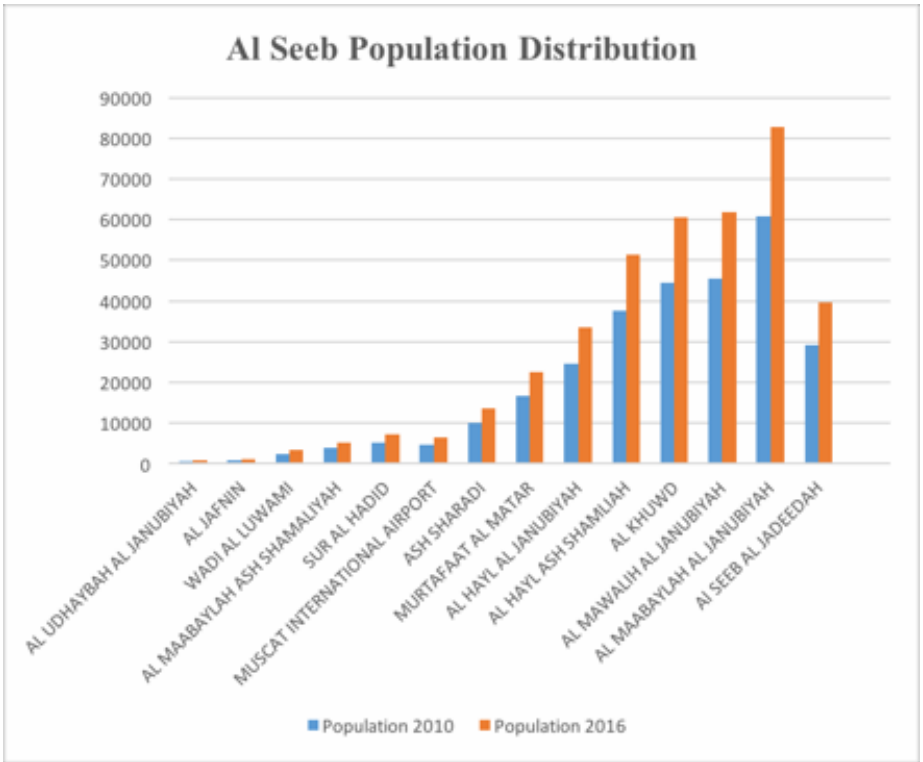

Figure 7: Changes in distribution pattern of population in Al-Seeb ((Adapted from NCSI, 2016)

Generally, the high income residential areas are located closely to the centers of activities and around the main spinal corridor (Sultan Qaboos Street). However, low-income residential areas are located on the periphery of the Province's boundary in areas with low residential densities. The high-rent apartment areas are located close to the main spinal corridor; however, high-rent single family houses are located a little further away from Sultan Qaboos Street. The study recognized four types of residential patterns; rented apartments, single family houses, popular residential lots, and large residential lots. High rented apartments are located closer to centers of activities with mixed-use unites containing commercial and residential blocks with a maximum height of 8 floors for high- and middle- income families. This area is the most densely occupied part of Al-Seeb (500-600 dwellings/Km^2). Just outside the center of activities, the residential pattern is characterized by semi-attached houses for middle-income families with an average density of about 300 dwellings/Km^2. The third residential pattern, popular residential lots, is occupied mainly by the low and middle-income families and located a few kilometers away from the main centers of activities. It is characterized by low residential density (80-100 dwellings/Km^2). The high-income family, with less members working, occupy the fourth residential type located on the periphery of the province. This sector is characterized by large residential lots with a very low residential density (30-50 dwellings/Km^2).

Conclusion

The analysis of the residential pattern of Al-Seeb Province of Muscat Governorate in Sultanate of Oman, in relation to its public transportation system, shows that the distribution pattern of the residential land is almost the same of that proffered by the Multi-Nuclei Model. Al-Seeb has developed around several district nuclei rather than one center of origin. The majority of High- and Mid-income families are located nearby and around the centers of activities and alongside the main spinal corridor of Sultan Qaboos Street. However, low-income Families tend to live away from the centers of activities, facing some difficulties, mainly, in their home-work trips due to the level of public transport development. This pattern is expected to be changed gradually with the implementation process of the proposed Public Transport Master Plan, particularly the construction of Light Rail Transit alongside the east-west corridor with feeder bus and water transport services. Therefore, residential density might decreases around the center of activities. The well-developed public transportation system and the high technology of communication will encourage high- and mid-income families, especially those with large numbers to own or live on a large area of land away from the center of activities. This

residential pattern creates a new homogenous social structure which preserves traditional and social values with the desire of low residential density.

Acknowledgement
The authors would like to express their appreciation to the College of Engineering at the UAE University for its support and encouragement. Special thanks should go to Mr. Ali Al-Hadhrami, Senior Seismic & Projects Surveyor, Geomatics Department of PDO Company, Muscat for his help in collecting data and information.

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CHARLES BRIDGE AND ITS ROLE IN CREATING THE ATMOSPHERE OF THE CZECH CAPITAL. WHO ARE THE “CREATORS”?

MARTINA HANÁKOVÁ

ABSTRACT

When visiting Prague one would not miss to cross the Charles Bridge. This Czech jewel older than 700 years connects “the Old Town“ and “the Lesser Town“. It is approximately 516 meters long and 9.5 meters wide. The bridge is formed by sixteen arcs and three towers situated on both sides of the bridge. Thirty baroque statues and sculptural groups are placed along the entire length of the bridge. However, not only these stony gentlemen create such charming character of the bridge. Apart from painters and artists, selling their paintings and products, there are five “artistic pitches“ for buskers on the bridge. Nevertheless, not everyone is allowed to perform. The buskers have to be chosen first by a special jury. The bridge is administrated by “The Charles Bridge Artists Association“ which selects the performers. This poster aims to examine these audition processes in more detail. It also discusses some possible advantages and disadvantages which busking brings to this place, supported by testimonies of buskers themselves. They are also introduced more closely as representatives of the art which has always had its special place in the territory of this important site of Czech cultural heritage.

Keywords: Charles Bridge, Prague, Busking, Creation, Artist, Conditions

INCENTIVE BASED POPULATING MODEL OF NEW SATELLITE TOWNS – ITS IMPACT ON TRANSPORTATION

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Abstract
Satellite Townships is the latest trend of town planning. In almost every metropolis globally, whenever pressure of population and employment has increased, planners have come up with satellite townships. The Wikipedia definition of a Satellite Town is; "A satellite town or satellite city is a concept in urban planning that refers essentially to **smaller metropolitan areas** which are located **somewhat near** to, but are mostly **independent of** larger metropolitan areas". So far planning of Satellite Townships is concerned, across the globe, the y are planned as separate towns which will fundamentally, or administratively be dependent on the main city but will remain independent for the daily commute of the residents. Execution of this philosophy has vastly failed. A sample sentence while searching for Satellite Town in Oxford dictionary says; "Not least of the problems is the fact that more and more of those who are employed in Dublin are being forced to live in satellite towns and commute forty or fifty miles or more to work." This indeed says that the problem is not confined within India. Be it Gurgaon, Noida, Faridabad, Navi Mumbai, Thane or Salt Lake, none have successfully grown up as independent Cities. Even though land uses are planned for independent towns, almost in all cases the satellites are acting either as place of residence for ones working in the main city or vice versa.
Newtown is a similar Satellite Township near the city of Kolkata in the state of West Bengal in India. In last 10 years, Newtown has seen huge increase in investment and growth. Whereas large parts of the CBD & Sub CBDs are developed, proportionate residential units have not come up. While commercial development has happened extremely fast and huge employment opportunity has been generated, proportionate amount of shelter has not been created. Moreover the cost of developing a Greenfield site is also added to the cost of housing making it less affordable. This has already forced many people, employed in Newtown, to accommodate themselves to distant areas. This is causing people to commute longer distance daily, making roads leading to Newtown congested. During the peak hours, all roads connecting Newtown & Kolkata are getting stalled due to heavy traffic. The situation is already alarming when Newtown has not even reached half of its population & employment capacity. Employees in Newtown are, on an average, traveling more than 30 kilometres daily to go to office and come back. Affordability is the primary reason for them not to shift to Newtown. Almost the entire public investment is being done to create or increase supply of transport however the actions to reduce the need of transport is largely neglected. It is understood that the distance between home and office is the primary cause of traffic bottleneck in almost all roads in the city. Reducing the need for transport will require no maintenance cost and will end the never-ending cycle of demand supply gap.
In this report, taking Newtown as a Case Study Area, it is tried to explore a method of shifting people close to their place of work. If majority of employees reside in vicinity of their offices, transport problems can be reduced hugely since work trips constitute the largest share in total trips. **'Incentive Based Populating Model'** is one such method where incentive & facilities to employees for residing close to their house can have much higher economic and financial return than spending the same money in capital expenditure of creating infrastructure for transport.

1.0. Background

Cities all around the world are growing at an uncontrollable speed. Urban Gross Domestic Product has the maximum share of the GDP of all the nations. The phenomenon of Rural-Urban migration is extremely strong in the Developing counties. As in case of India, decadal growth rate of rural population in India declined from 18.1% to 12.2% between 2001 & 2011 whereas decadal growth rate of urban population increased from 31.5% to 31.8% between the same periods (Chandramouli, 2011). It clearly shows that there has been massive rural-urban population shift in last decade. Naturally the cities are becoming overpopulated. Unable to take the huge

pressure of population almost all cities in the country are expanding in terms of its geographical area. Post-independence, India's Town planning has been facing the problem of ever increasing population. The entire exercise of town planning in the country is focused in creating accommodation & infrastructure for the increasing population. Almost all cities have come up with similar solutions of decentralised multi-nodal planning. This has given birth to almost a hundred satellite towns in the country in last few decades. Some of the cities have multiple satellite townships. The satellite towns in almost all cases were planned as independent towns with sufficient shelter, employment and infrastructure facilities to cater to a desired population.

In reality these towns have created more problems than solutions. It is true that with these newly urbanised areas, more housing and employments are created but these could not be spatially integrated. After creation of so many satellite towns it is seen that the length of majority of work trips in urban India has increased. In no case, a balance between growth of employment and shelter has been achieved. As a result, people residing in the main city are forced to do job in the satellite town and vice versa. With more than one satellite towns of a city, the situation is even more complicated. The city-administrations are forced to invest huge amount of money to make this long travel comfortable and less time consuming. Despite millions of dollars being invested, there has not been any significant improvement. Rather more traffic infrastructure has only prompted people to shift further and create a greater urban sprawl. It has been understood that by simple land use planning, this problem cannot be handled. There are a lot of economic and psychological factor associated with this. So far only land use or land management has been thought to be answer to this problem. The economic factor has not been explored yet. It is understood that the solution can only be achieved by reducing the need of travel by the employees or by reducing the length of travel by them. The ideal solution will be to have all employees be residing within a walking distance of their office.

2.0. The Case Study Area

New Town Kolkata is a planned newly developed satellite city on a land area of 35 square Kilometres in the north-eastern fringes of Kolkata, the capital city of the state of West Bengal in India. West Bengal Housing & Infrastructure Development Corporation (WBHIDCO), a state owned company, got the planning rights for this area after its formation and formulated its master plan keeping in mind the objective of decentralizing the major urban economic activity from the city of Kolkata and to provide a planned intervention in existing rural settlements in the surrounding areas. The figure: 1 shows the location of Newtown in terms of India.

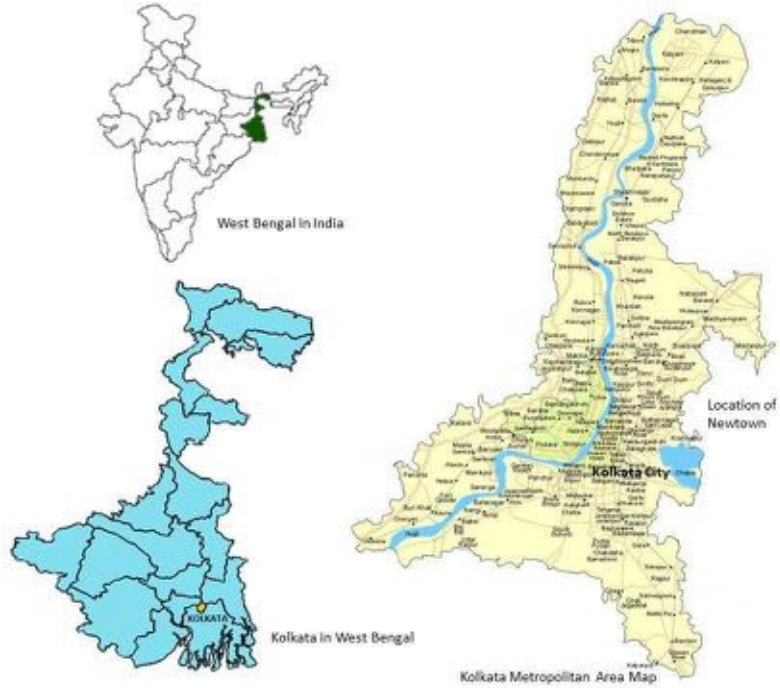


Figure 13: Location of Newtown & Kolkata in West Bengal in India

2.1. Location of Newtown:

Newtown is located towards the North East of Kolkata City and is approximately at a distance of 20 Kms from the CBD of Kolkata. Figure 2 shows the map of Newtown and its location with respect to Kolkata.

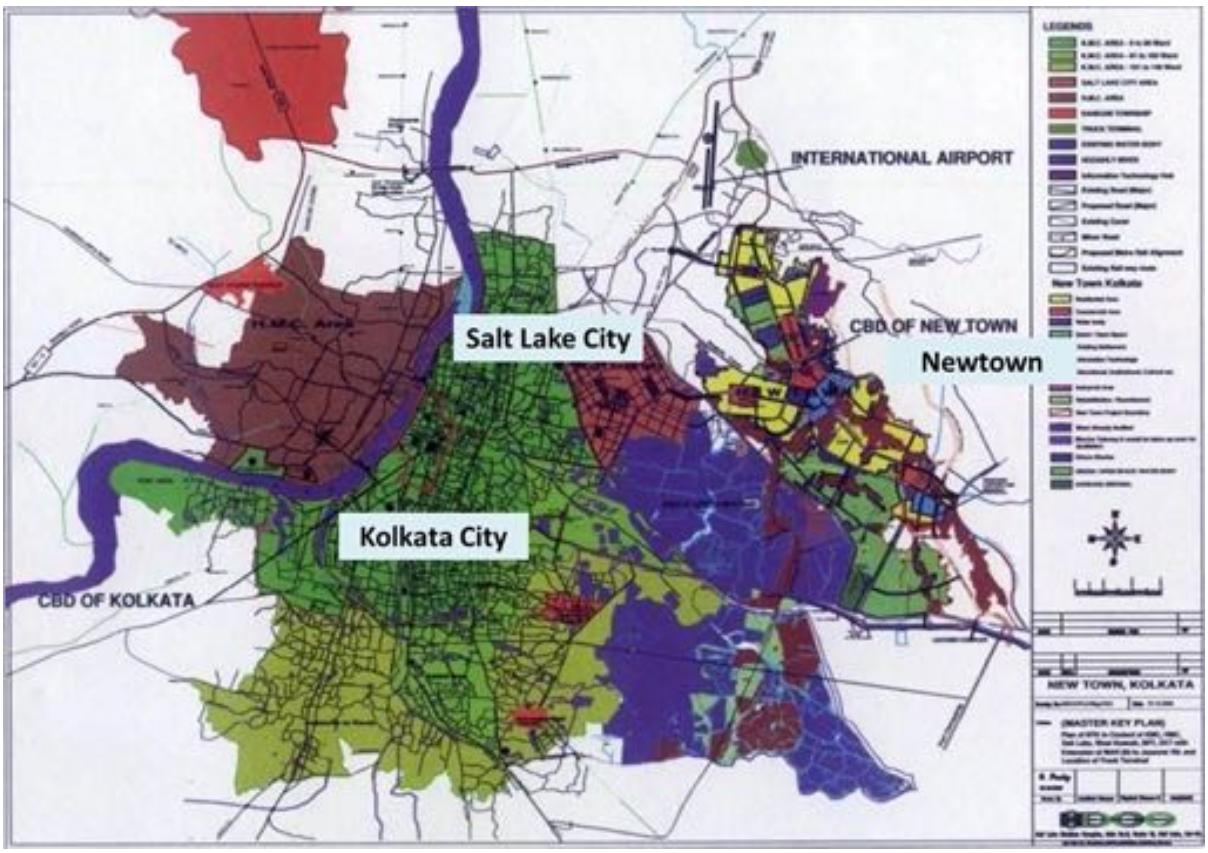


Figure 14: Location of Newtown in respect to Kolkata

As seen in the figure, Newtown, geographically, is separated from Kolkata by another satellite town Salt Lake City. Newtown comes under the administrative jurisdiction of Municipal Corporation named Bidhannagar.

2.2. Connectivity:

Newtown has excellent air connectivity since it is within 5 kilometres from the Kolkata International Airport (*Netaji Subhas Chandra Bose International Airport*). In terms of Railway connectivity, the nearest long distance railway station from Newtown is Kolkata Station which is at around 10 kilometres distance. Newtown also has excellent road connectivity. At present road based system is the sole medium of connectivity between Newtown & Kolkata. VIP Road and Eastern Metropolitan Bypass (EM Bypass) are only two roads that connect Newtown with Kolkata. A metro railway connecting Kolkata with Newtown is under implementation. The figure 3 shows Newtown's connectivity.

2.3. Demography:

As per the last published census in 2011, Newtown has a population of 6000 persons. As per estimate of local administration, in 2015 the population rose to approximately 36000 (Authority, 2016). It is assessed that at almost 42% annual growth rate the population is growing within Newtown. Considering the estimated data of 2015, 58% of the population is male. Even though Newtown is planned for an estimated total population of 10 lakhs and a floating population of 2 lakhs, at present there is a huge imbalance between these two. At present, the floating population in Newtown is approximately 80000. A shocking fact is that at present there are 60% dwelling units lying vacant within the city (Authority, 2016).

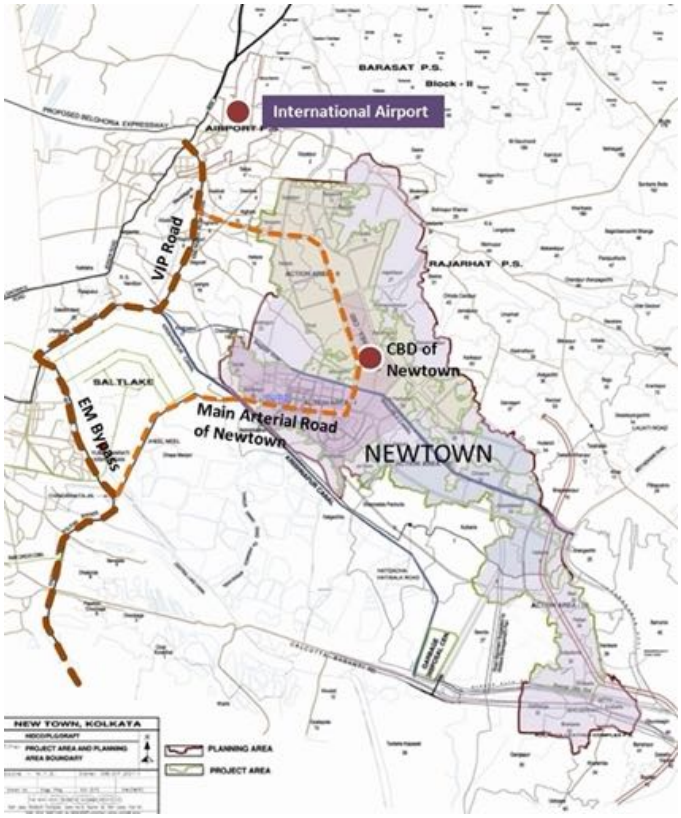
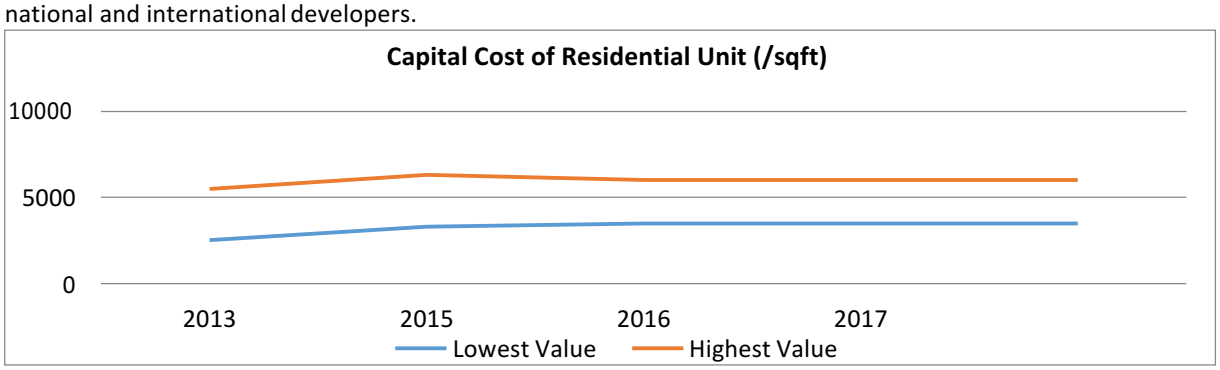


Figure 15: Connectivity of Newtown

3.0. Understanding the Problem

3.1. Residential Market:

Newtown is going through a very unusual phase as far as its residential market is concerned. At the initial stages of development of the township, homes were mostly purchased by people who were working & residing in the main city and were interested in making investment in the real estate sector. At that time there were not much infrastructure developed neither was there much opportunity for jobs. Majority of housing stock was allotted like this. With time a lot of investment happened in the commercial sector as well as infrastructure development. With all these, cost of housing also increased. Majority of the residential projects in the planned town are high rises developments. Most of the buyers for residential property in Newtown are either end users or long-term investors with a view to earn rental income. The submarket has witnessed interest from various national and international developers.



Graph 1: Yearly change in Residential price in Newtown (Jones Lang LaSalle, June 2015) (ICICI Home Finance Company, January 2012) (Jones Lang LaSalle, April 2016) (CII-JLL, 2014) (Colliers India Pvt Ltd, 2017)

Graph 1 show that with time, unit cost of residential projects has increased. There has been a constant gap between the lowest value & highest value of residential units. This phenomenon clearly indicates that there is a strong demand for housing in almost all categories. Since Newtown is a completely Greenfield Township, there has been huge investment being constantly made to develop infrastructure. This cost is added to the cost of housing. It can be understood that the rising demand is mostly generated by the employees whose offices are being shifted to Newtown. It is also understood that there have not been enough supply of housing to meet the

increasing demand which could have led to a fall of price. At the same time the already developed suburbs offer cheap housing. This situation virtually forces the potential buyers of housing to shift to distant suburbs of the city instead of residing in Newtown.

The table 1 & Figure 4 represent the data of 2015 where it is visible that even though Newtown was still lacking in infrastructure and self-identity, residential price was much higher here in comparison with other areas. The chart which covers almost all localities in Kolkata shows that other than the traditional posh locations of Central Kolkata near the CBD, Newtown was among the costliest localities in the city. hence, It has to compete with almost the entire City and its suburbs to attract people to reside there.

Table 1: Rate of average capital value of residences in different part of Kolkata

SL	Location	Average Price (INR/sq.ft)	SL	Location	Average Price (INR/sq.ft)	SL	Location	Average Price (INR/sq.ft)
North Kolkata			07	Camac Street	11000	15	Narendrapur	2100
01	V.I.P. Road	4000		Loudon Road	12500	17	Kasba	3500
	Jessore Road	3200		Ballygunge	10000	07	Theatre Road	11000
02	Dum Dum	2750		Mayfair Road	12500	09	Tollygunge	4750
03	Lake Town	4250		Gariahat Road	9000	East Kolkata		
	Sinthi More	2350		Rashbehari	6500	12	Newtown	4000
	Paik Para	3750	08	Alipore	16000	11	Salt Lake	4000
04	B.T. Road	2900		New Alipore	9750	10	E.M. Bypass	13400
South Kolkata				Jodhpur Park	5750	West Kolkata		
05	Park Street	11000	13	Behala	3100	16	Batanagar	2350
06	Park Circus	5250	14	Garia	2850			

(ICICI Home Finance Copmany Limited, 2015)

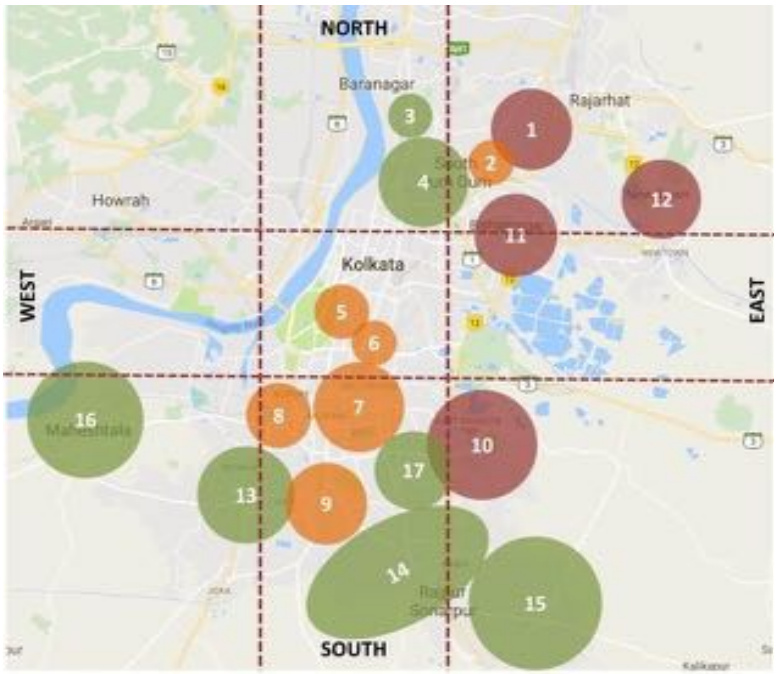
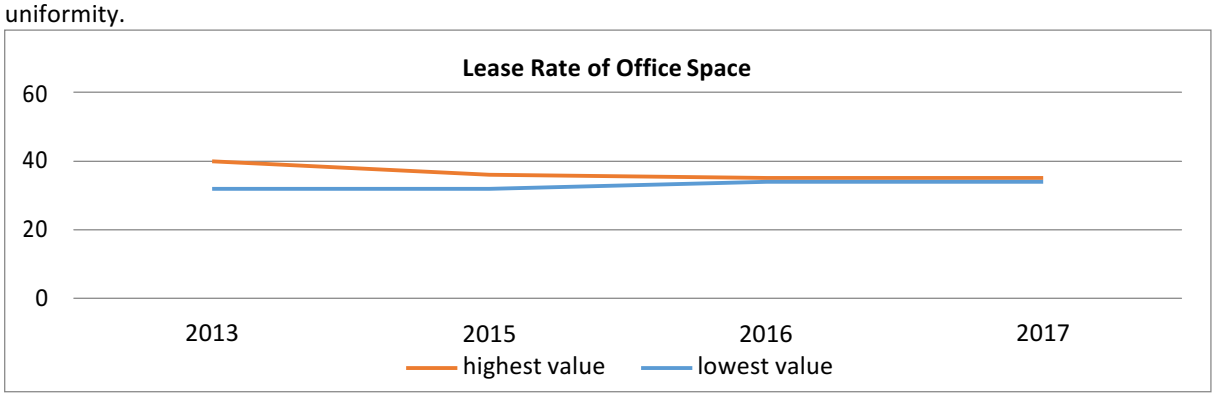


Figure 16: Map showing residential price in different location of Kolkata

3.2. Office Market

Commercial office space demand at Rajarhat is largely driven by IT/ITeS. This submarket has large IT parks and IT SEZs along with standalone office buildings. The submarket mostly has Grade-A office developments by reputed developers. Almost 40% of the total office stock of Kolkata is in Newtown which about 6.4 million sq. ft. Moreover Newtown offers space at relatively lower rents than other areas of Kolkata. Therefore Newtown witnesses demand for office space from occupiers who need large spaces at relatively lower rents in Kolkata. There has been wholehearted support from the government too. To deal with the pressure of generating more jobs and to promote the developed township, the Government has offered lucrative benefits to anybody wiling to set up office here. The following graph shows the unit rate for leasing office space in Newtown. It can be

seen that the price for high end office space has decreased over time whereas price of low end office space has increased. It indicates that there had been steady supply of high end office space and a lack of supply in case of lower end office spaces. This gap has forced builders to lower the price of their high end estate and bring uniformity.



Graph 2: Yearly change in Office price in Newtown (CII-JLL, 2014) (Colliers India Pvt Ltd, 2017) (ICICI Home Finance Company, January 2012) (Jones Lang LaSalle, April 2016) (Jones Lang LaSalle, June 2015)

3.3. Effect on Land Use & Transport

One of the two fundamental principles of Transport Planning is that travel is a derived demand and not an activity that people wish to undertake for its own sake. It is only the value of the activity at the destination that results in travel. The second principle is that people minimise their generalised costs of travel, mainly operationalized through a combination of the costs of travel and the time taken for travel (Banister, 2007). As the first principle explains, characteristics of work trips are totally governed by the place of work. Newtown, being the new employment hub of the city, has changed the matrix of work trips within the city. This has shifted the traffic in different corridors; the length of travel and time spent for it has also changed. Census 2011 data will show that the only area, in which a significant population growth in Kolkata Metropolitan Area (KMA) has been seen, is around Newtown. All ULBs and RLBs around Newtown have seen growth in population in last decade.

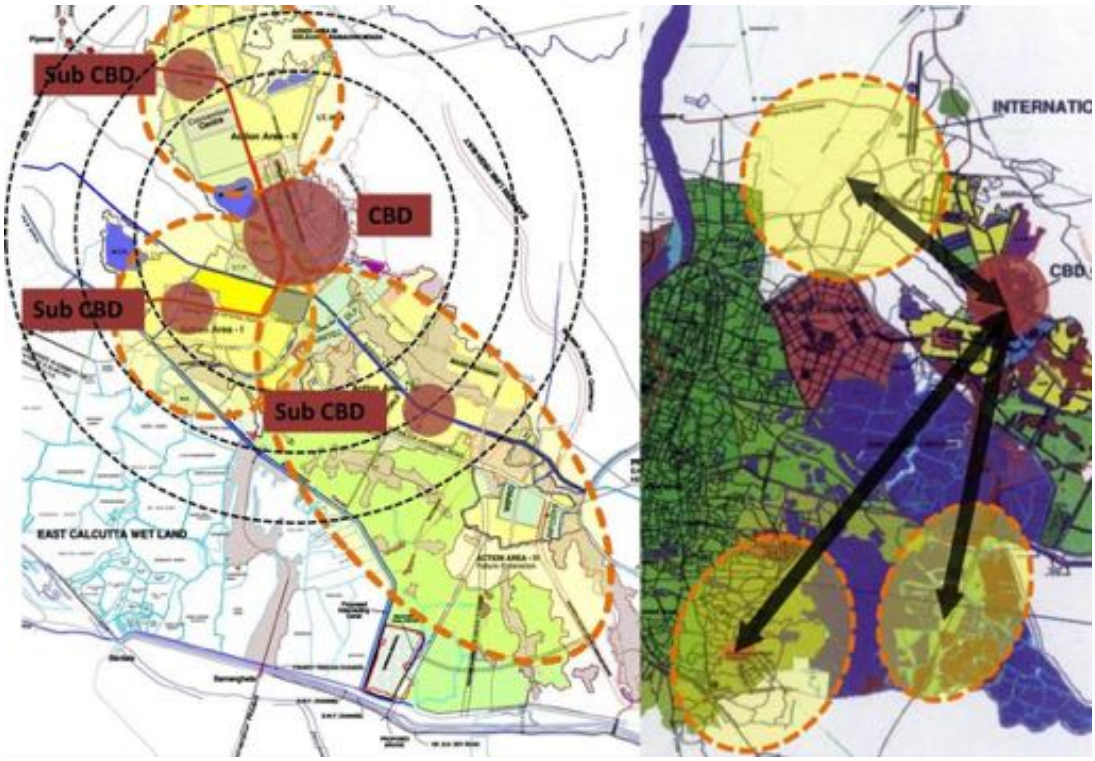


Figure 17: Pictures showing the problems happening in Land use Transport Co ordination

When there are 60% of apartments lying vacant in Newtown (Authority, 2016), people working there are staying at a place 30 kilometres away from their office. This fact is very serious in terms of transport system of the city. When a new satellite township is planned, residential and commercial land use is distributed in an optimum proportion. The land use map of Newtown (Figure 5) (Limited, 2012) clearly shows that the main idea was to create commercial and office space centrally and surrounding it will be the residential areas. However in reality it is not happening as the residential activity associated with the commercial activity of Newtown is happening at some place 20 kilometres apart.

3.4. Increase in Urban Sprawl

Natural tendency of human mind is to reduce time for daily travel between home and work. However the biggest problem in achieving this is the availability of affordable homes at a short distance from work place. Unavailability of home at affordable rate in a shorter distance from office eventually leads people to find location away from home. This eventually leads to an urban sprawl. The already developed suburbs of Kolkata City and the adjoining Municipalities offer housing at a much cheaper price than Newtown, since there is no development cost added to the cost of construction there. Naturally most people who intend to stay close to Newtown are forced to shift to these localities. Huge amount of uncontrolled development is taking place around the Municipal boundary of Kolkata city to serve this pressure of housing. The planners of have also started to think of more satellite towns just to cater to the housing need generated by Newtown.

4.0. Assessment of the Problem

To understand the intensity or the actual impact of the scenario, few surveys were conducted. An opinion survey was conducted among the people who commute to Newtown for employment and residents of Newtown who commute to Kolkata for the same. Few samples of people both residing and working in Newtown have also been taken to understand the present situation of travel within the satellite town.

- Total number of respondents: 500
- 60% of the respondents are traveling from Kolkata to Newtown, 30% are travelling from Newtown to Kolkata and rest of the respondents are traveling within Newtown.
- Modal share among the respondents: 42% use Bus, 12% use Cab and 38% use Car
- 75% of the respondents spend more than an hour per day in travelling. Among them, 25% spends more than 2 Hours. 25% of total respondents spend less than an hour.
- 71% of the respondents who are not residing in Newtown at present showed their willingness to shift to this place for better connectivity between home & office.
- 90% of respondents travel more than 12 kilometres. 50% of all the respondents is travelling as much as 25 kilometres one side to reach their office.
- 42% of the respondents, who are willing to stay in Newtown but are not staying mentioned affordability as the key factor for choosing the locality. 41% have mentioned easy accessibility to their office as the key reason to stay in their locality. Rest of the 17% chose their locality based on the facilities available.

People who did not show willingness to shift to Newtown are either emotionally attached to their present locality or house or don't see Newtown as a happening place. Few respondents have expressed concern that relocating to Newtown might cause a similar problem with their spouse's travel and mentioned that in a case where they are both doing job within Newtown, they will be shifting. The most surprising finding is that almost all the willing commuter has suggested that they will shift to public transport, bicycle or walk in case they have a house within 5 kilometres from their office. On their own estimate they might be saving $3/4^{th}$ of their present expenditure & time on travel. However, with ample opportunity of shifting, they have not yet shifted.

It is found that around 50% of the employees of Newtown use cars or cabs to reach their office. With establishment of mostly white collared jobs, usage of cars in Newtown is much higher than the average for Kolkata. With an estimate of around 60000 employees (Authority, 2016) in Newtown at present it can be assumed that 48000 of them come from outside Newtown. It is seen that the entire car fleet travelling to Newtown is reflected in the traffic data of two roads; EM Bypass & VIP Road. At present the traffic volume on EM Bypass on a regular day is 121976 PCU and the same on VIP Road is 161310 PCU (Ltd., 2008). During the morning peak period (8am – 10am), traffic on EM Bypass towards Newtown is 18784 PCU & on VIP Road towards Newtown it is 23713. Stretches of E M Bypass & VIP Road leading to Newtown were considered to understand the level of speeds on those. These are shown in figure 4. About 26% of the Corridor road length has journey speed of less than 10 km/h, for 23% of the road length, it is between 10-20 km/h and for another 23% of road length, the journey speed is between 20-30 km/h, for 3% of the road length it is between 30-40 km/h while it is above 40 km/h for about 25% of the corridor length during peak period. As it can be seen, with

merging roads, the closer one goes to Newtown the speed decreases. From the interview of the respondents it is estimated that around 40% of the employees in Newtown come to office between 9 am and 10 am which means their travel reflects in the peak hour traffic of the approaching roads.

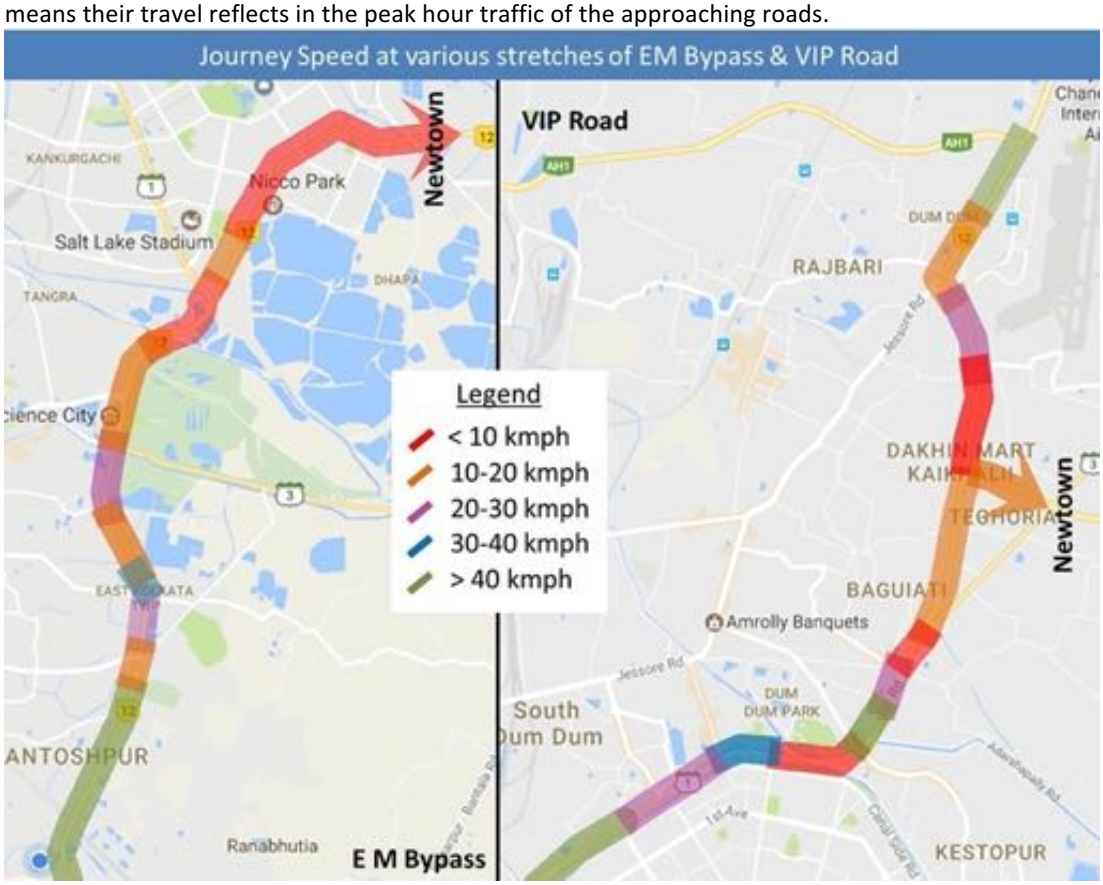


Figure 18: Journey Speed at various stretche of EM Bypass & VIP Road during peak hour

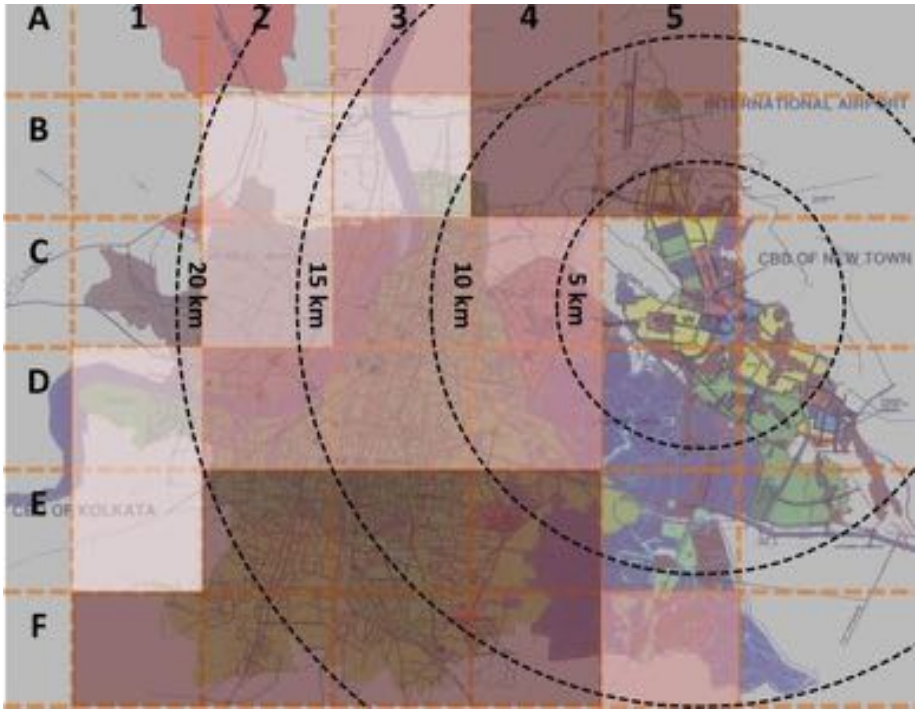


Figure 19: Origin of Work trips to Newtown

To understand the origin of different work trips in Newtown its adjoining areas were divided in a 6X5 grid as shown in figure 7. It was found the squares in far south and far north generate maximum trips to Newtown. The land price chart shown before also suggests the same phenomenon. It clearly indicates that people do not bother about the cost of travel incurred over a period. They are guided by the onetime investment required. That is why they went for a home in suburban areas even though this is costing them huge amount in time and fuel. The percentage of employees in car entering office in the same time is around 45% of the total. In that case it can be assumed that during peak hour 8000 cars which are Newtown bound travel on EM Bypass and VIP Road. This is almost 70% of the total car traffic on these two roads. On an average these cars travel 15 kms one side. It is understood that a strong market force is stopping people from staying in the township. In reply to the questions during the interview most people mentioned affordability as a primary reason. To get an idea of people's willingness towards shifting to Newtown and to get a realistic view of their chances of buying property for that purpose, an imaginary situation was created in front of them. They were asked if they receive a lump sum amount as incentive from the government towards buying new property, will they be able to pay the balance amount.

It was seen that 31% of the respondents are staying in apartments of less than 750 Sq.ft. size. The percentage of respondents staying in 750-1000 sq.ft. size apartments is 33%. The same for 1000-1200 sq.ft. ones is 19%, for 1200-1500 sq.ft. is 12% and more than 1500 sq.ft. is 5%. Basically there are three varieties of residences available in Kolkata. Apartments below the size of 1000 sq.ft. are predominantly 2 bedrooms apartment. The apartments between 1000-1500 sq.ft. are mostly 3 bedrooms apartment and the ones larger than that are more than 3 bedrooms apartment.

In table 2, the second column shows the average price of residential units of various sizes in Newtown. The third column shows the price of a similar size house in newly developed residential areas in the suburbs of Kolkata. It can be seen that there is a huge price gap in all types of residences. The primary reason for that, as already explained, is the associated cost of infrastructure development in a Greenfield city. As it was found in the interview, the people with a capital capacity of below INR 3 Million have a serious problem in getting a house in Newtown. They are large in number and are more willing to shift to Newtown than the others. It is found that 52% of the employees are staying in less than 1000 sq.ft. size apartments and are unable to shift closer to their office due to lack of affordability.

Table 2: Comparison of prices of residential units in Newtown & suburbs of Kolkata

Size in Sq.ft.	Type of Apartment	Price in Newtown (In INR Million)	Price in Suburbs (In INR Million)	Gap in Price (In INR Million)
< 750	1/ 2 Bedrooms	4.0	2.5	1.5
750 - 1000	2/3 Bedrooms	5.0	3.0	2.0
1000-1200	3 Bedrooms	6.5	3.5	3.0
1200-1500	3 /4 Bedrooms	8.0	4.5	3.5
>1500	4/ More Bedrooms	11.0	6.0	5.0

Source: Primary Survey by the author

To understand the potential number of employees who can shift to Newtown, all the respondents were grouped as per their income. It was found that their choice of residence and mode of transport are also guided by their income. The table below shows the relationship between monthly income and choice of mode of the employees. The choice of residence was also placed according to different income slabs and their affordability. It can be seen that with increase in income, usage of cars is rising while usage of public transport is decreasing.

Table 3: Comparison of Income level & Modal Choice

Monthly Income (INR)	% Users of Public Transport	% Users of Car
<20,000	60	10
20,000-30,000	50	30
30,000-40,000	35	40
40,000-50,000	15	60
50,000-75,000	15	60
>75,000	10	75

Source: Primary Survey by the author

Table 4: Affordability chart of people of different income groups

Monthly Income (INR)	Affordability for residence (INR)	Possible House size in Suburbs (sq.ft.)	Possible House size in Newtown (sq.ft.)
<20,000	20,00,000	600	-
20,000-30,000	25,00,000	750	-
30,000-40,000	35,00,000	750 - 1200	-
40,000-50,000	45,00,000	1000-1500	750 - 1000
50,000-75,000	60,00,000	>1500	1000-1200
>75,000	75,00,000	>1500	1200-1500

Source: Primary Survey by the author

As it is seen from the above three tables for almost all the employees earning less than INR 40,000 per month, getting a house in the vicinity of their office is problematic. The survey tried to understand the actual number of employees in this income slab. The below table indicates that.

Table 5: Distribution of employees in different income groups

Monthly Income (INR)	% of total number of employees
<20,000	15
20,000 - 30,000	30
30,000 - 40,000	30
40,000 – 50,000	10
50,000 – 75,000	10
>75,000	5

Combining all the above information it seems that almost 20,400 of the employees who are within the income level of INR 40,000 per month are using cars to commute to office. At the same time 70% of them which is around 14500 are also willing to shift to Newtown.

5.0. Probable Solution

Incentive Based Populating Model can be a solution to this problem. This model proposes that

"The authority will make up the gap between the price of a house in Newtown and the average price of a same size house in the suburbs of the city in form of one time Incentive to the willing house-buyer who are working in Newtown at the time of purchase. The amount of the Incentive will be reviewed quarterly, based on the trending market prices"

It is found that the government has to spend Billions of rupees in creating transport infrastructure connecting the main city with its satellites. In case of Newtown too, few billion Rupees have already been spent and will be regularly spent on managing those and creating new infrastructure. However if the same amount is spent, in form of subsidy, on closing the price gap between a house in Newtown and elsewhere, the need of all those infrastructure can be eliminated. As per present data 14200 cars can be withdrawn from the roads by investing a sum of INR 21.30 Billion in closing the gap. This will also bring around 60000 populations to Newtown which will not only populate it to the desired level but also increase the level of community development. With more population and less vacant apartment the social bonding will also develop fast. This will also reduce the pressure of housing in the low cost suburbs and control urban sprawl. The highest impact will be on the transportation system. There will be a large number of cars withdrawn from the two main arterial roads. There will be increase in speed and decrease in congestion. There will be saving in time and money. In a totality there will be less distance of car travel.

6.0. Financial Analysis

The proposal appears to be financially and economically viable as it is much less costly than the huge infrastructure. The cost benefit analysis is done on present day data. An increase of cars at the rate of 6% per annum is considered and average trip length of willing employees is considered to be 4 kilometres. It is found that at present there will be a reduction of 242861 kilometres of car travel daily whereas this reduction is projected to be 675720 daily by 2036. In present condition there will be reduction in 26985 Litres of fuel burning daily which is projected to be 75080 Litres daily in 2036. After considering saving from the value to time, fuel consumption and requirement of investment for infrastructure a cost benefit analysis is being done. Income to the authority in terms of property tax is also considered at the present rate of taxation. It was found only in the first four years there will be a negative value of discounted profit. There will be profit from the next

year. The cumulative cash flow will reach a positive value within five years of starting this program. At the end of 20 years there will be a NPV of INR 12.84 Billion at an IRR of 26%. In calculating this, the cost of pollution due to emission has not been considered which will also be a huge benefit to the city. The flowchart is presented in table 6.

Table 6: Financial Cost Benefit analysis of the Program

	All Values are in INR Million						
Year	**Total Income**	**Total Expenses**	**Net operating income**	**Discounted profit**	**Net Cash Flow**	**Cash flow for EIRR**	**NPV for Project**
2017	5797.36	21300.00	-15502.64	-15502.64	-15502.64	-15502.64	0.00
2018	6139.67	1341.90	4797.77	3965.10	3965.10	-11537.54	-9535.16
2019	6509.97	1493.53	5016.43	4145.81	4145.81	-7391.73	-5553.51
2020	6883.95	1662.30	5221.64	4315.41	4315.41	-3076.32	-2101.17
2021	7268.16	1850.14	5418.01	4477.70	4477.70	1401.38	870.14
2022	7675.50	2059.21	5616.29	4641.56	4641.56	6042.94	3411.08
2023	8107.52	2291.90	5815.62	4806.30	4806.30	10849.23	5567.37
2024	8565.88	2550.89	6015.00	4971.07	4971.07	15820.31	7380.29
2025	9052.38	2839.14	6213.24	5134.91	5134.91	20955.22	8887.06
2026	9568.94	3159.96	6408.98	5296.68	5296.68	26251.90	10121.24
2027	10117.64	3517.03	6600.60	5455.04	5455.04	31706.94	11113.09
2028	10700.71	3914.46	6786.25	5608.47	5608.47	37315.41	11889.84
2029	11320.57	4356.79	6963.78	5755.19	5755.19	43070.60	12476.02
2030	11979.84	4849.11	7130.72	5893.16	5893.16	48963.76	12893.69
2031	12681.31	5397.06	7284.25	6020.04	6020.04	54983.80	13162.68
2032	13428.03	6006.93	7421.10	6133.14	6133.14	61116.94	13300.83
2033	14223.28	6685.71	7537.57	6229.40	6229.40	67346.34	13324.11
2034	15070.62	7441.20	7629.43	6305.31	6305.31	73651.65	13246.90
2035	15973.90	8282.05	7691.85	6356.90	6356.90	80008.55	13082.04
2036	16937.26	9217.92	7719.34	6379.62	6379.62	86388.17	12841.05

7.0. Issues during Implementation of the program

The following aspects can be considered while initiating this program.

- Every employee of Newtown Area can avail the benefit in form of Incentive in capital cost of purchasing a new home within 5 kilometres of his/her office. This incentive shall be treated as additional to any other incentive or subsidy available through any Government or Non-Governmentscheme.
- The authority will finalise entitled sizes of house according to different income level. The incentive amount will be calculated for that size only. The following table gives an idea of a possible house classification.

Table 7: Entitlement of House size for different Income Group

Monthly Income (INR)	Classification of Income Group	Entitled House Size (Sq. Ft.)
<20,000	Low Income Group	600
20,000-35,000	Middle Income Group (Low)	750
35,000-50,000	Middle Income Group (High)	1000
50,000-75,000	High Income Group (Low)	1200
>75,000	High Income Group (High)	1500

- The subsidy incentive will be equal to the amount of the gap in lowest price of an entitled sized house in Newtown and the average price of a same sized house in the suburbs. The areas which are to be considered as suburbs are to be identified by the authority.
- The Classification of Income group, Entitled house size and incentive amount shall be reviewed by the Authority periodically, preferably on a half yearly basis.
- The beneficiary will be bound to stay in that house and has to prove his stay. There shall be penalty for not residing in the house. All the houses allotted in this scheme will be in lease form and will have option of transferring. In case an employee is transferred or he chooses a new job which is not located in Newtown, he may transfer the house to another employee on Newtown.

- There has to be sufficient and convenient social facilities developed in all the residential pockets of the township. Authority jointly with the builder/developer has to expedite the process so that the existing vacant apartments are filled at first. There has to be a constant increase in supply of residential units in proportion with the increase in employment
- The employees, who have availed loan for a house outside the 5 km boundary, shall be given opportunity to shift to a house within that boundary and loans can be transferred to the new property.
- In addition to this, residents of the township will be encouraged to use public transport, non-motorised vehicle. There can be additional incentive for those not using cars for travelling to office.
- If some employee starts working in an office which is within 5 kilometres from his home for which he has not taken the advantage of incentive before, he will get a property tax benefit.
- For families who have members working in other regions of the city than Newtown, shall be given least priority for availing this benefit.

8.0. Conclusion

The problem for majority of the cities in the world is its growing population and size. Satellite townships have emerged as a solution to that problem which can cater to the growing population and provide them necessary infrastructure without creating more pressure on the city core however most satellite townships did not grow as independent towns. The satellite's high dependence on the main city for shelter & jobs are creating longer journey for the workers of both the main city as well as the satellite. A study on the residential & commercial development of Newtown in India revealed similar problems. The transportation system between Newtown and its main city Kolkata also revealed that huge employment generation in Newtown and lack of housing has caused serious problems on the roads of Kolkata. It is understood that the need of longer travel by employees is only an induced pressure on the roads of city just because there is not much opportunity for them to shift in the vicinity of their offices. The survey also revealed that the main cause for that is lack of affordability of the housing. Newtown has to compete with the suburbs where already developed land with fewer infrastructures and no regulation is available and builders can offer house at cheap rate. Even though land use of Newtown was planned keeping central areas for business surrounded by residences, the actual position of the desired residences is happening at a distance of 20 kilometres. One possible solution to this problem, as it came out during this study, is convincing more employees of the satellite town to reside within the city. This is a forceful adaptation of the land use transport planning concept. It was found that if the authority goes for a cost sharing model with the willing residences and help them with incentive in form of subsidy to fill the gap in price of house so that they may reside in the township, the overall need of transport will reduce. This will also reduce the need of infrastructure and requirement of high level of investment. The financial analysis also suggests a high level of return of that initial investment for the authority. It is presumed that, by relocating more people from the main city to its satellite, there will be increase in availability of residences in the main city too. It is suggested that a central policy is formulated where authorities will be liable to give Incentive to the employees for residing within 5 kilometres of their office both in the main city as well as its satellites.

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ENFRAMING CAIRO THROUGH ITS MAPS. A CRITICAL READING OF MAPS FROM NAPOLEON'S ATLAS TO THE EARLY 20TH CENTURY

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Abstract
There is a general assumption among critical geographers and historian that making of the modern state in the late 18th century to the early 20th century went hand in hand with the development of objective and precise mapmaking tools and techniques Maps emerged as rationalizing tools of control and appropriation of land and resources, their spread is usually correlated to the increased rationalization of bureaucracies of the early modern state. The goal of this paper is to (1) test the validity of this argument in the case the making of the modern state of Egypt by looking at the maps of its capital Cairo, and (2) explore how the Cairo was cartographically represented in the late 19th century to the early 20th century to construct multiple realities that served the interest of the modern state. The study critically rereads three sets of maps that were created in the context of the birth of the Modern State of Egypt; the maps of Cairo charted by the French Expedition (1798-1800), the map of Grand Bey under Khedive Ismail (1874), and finally the maps of the *Comite de Conservation des Monuments de l'Art Arabe* (1924). The maps are situated within the social and political context of their production to understand the purpose of their making, their integration within the bigger body of accumulated knowledges about the city, and their further implications on the city. Three main purposes were found behind these maps: a tool of documentation for colonial appropriation, a tool of planning, and a tool of defining and constructing modern typologies within the city.

Introduction
This study presents a critical reading of three maps of Cairo the production of which coincided with the birth of the modern state of Egypt: (1) The maps of Cairo by French Scientific Expedition (1798-1800), (2) The Map of Cairo charted by Grand Bey as commissioned by Khedive Ismail (1874), (3) The Map of the Islamic Monuments of Cairo produced by the *Comite de Conservation des Monuments de l'Art Arabe* (1924).It aims at investigating the extents of the role map-making played to rationally control and appropriate the city for the modern administration. Three basic theoretical concepts are used to construct this argument. First is the power relations behind and within the making of the map, this concept was first proposed by J.B. Harley (1989) who considered "maps as social constructs and rhetorical texts" that required deconstructing. Second, is the concept of the "cascade of inscriptions" proposed by Bruno Latour (1998) according to which the role one map plays in the bigger cascade of accumulated inscribed knowledges about the city is questioned. And third, the way the reality of the city was constructed and presented in a specific frame that serves the interests of the state. This concept of "enframing" is driven from Timothy Mitchell's (1990) use of the same word to describe the disciplinary methods of control applied by the British colonial powers to divide, confine and enframe the inhabitants and the space. The paper first introduces these theoretical concepts and their relation to each other. Second it discusses the general assumption that mapmaking and state-making went hand in hand in the late 18th century (Harely, 1989; Scott, 1998; Crampton& Krygier, 2006; Wood, 2010; Kitchen et al, 2011; Brotton, 2013). It questions the applicability of such an assumption in a colonized state like Egypt. And finally, the study critically reads the three maps of Cairo after situating them in the context of their production to understand their implications over the city, and their dependency over each other.

Maps as Tools of Power
J. B. Harley (1989) argued that values and social constructs such as ethnicity, politics, religion, and social class heavily influenced the production of maps since early times. He proposed that maps contain social structures and power relations that are often disguised beneath an abstract instrumental space. In an attempt to understand the power behind the maps, Harley suggested an alternative epistemology for the history of

cartography that is rooted in social and critical theories rather than in scientific positivism. He claimed that cartography was never objective nor neutral. It was always a representation of *"a constructed reality"* that served the interests of its authors (Cramptom & Krygier, 2006).
Thus, maps are considered both a product of the power structures that influenced their making, and artifacts of power simultaneously. Since the first purpose of mapping is to mark territories, a critical investigation of maps requires a critical understanding of the word 'territory' and its relationship to the word 'power'. Dianne Rocheleau (2005), argues that mapping as an activity brings with it the power to name, to define, to locate, and to situate. She bases her argument upon the hypothesis that maps *"make nature visible and available to particular modes of economic and political calculus that aim at dividing this natural terrain into territories"*.

The Cascade of Maps

In his study "On Visualization and Cognition", Bruno Latour (1998) investigates what differentiates the scientific and the prescientific culture. He looks at the16th century to understand the emergence of the scientific cultures, methods, minds, and societies. He argues that the way knowledge was transformed into inscriptions that are combinable, superimposable and could be integrated in the works of other authors was the main constituent of the scientific revolution. Latour argues that the power within the inscription transcends its own body to become the power of *"the cascade of ever simplified inscriptions that allow harder facts to be produced at greater cost*" (Latour, 1998).This cascade of inscriptions is the accumulation of the modern scientific knowledge that contributed to the domestication and the disciplining of the modern mind. In other words, the power of one map is not limited to its presence as a documentation of the city at a certain moment in history but extends to the several maps, plans, and decisions that will later be based on it. The power of maps is discursive, based on a continuous flow of knowledge production and re-production. As the discipline of map-making is based on compiling and updating earlier maps or developing earlier mapping techniques, the most crucial map to the cascade becomes the first map to be inscribed as an immutable mobile.

The Concept of 'Enframing'

To enframe is a transitive verb that refers to the act of putting within a frame (Collins Dictionary). Since maps are representations of the world and inscriptions through which our understanding of the world is created. It is crucial to understand how this representation was put in a certain frame to construct certain realities. This study discusses enframing as the process of framing the city, its inhabitants, histories, and identities through its maps.
The term enframing was used by Timothy Mitchell (1991) in his book 'Colonising Egypt', to refer to the practices of the early Egyptian modern state in the 19th century to divide up and contain the population and the resources. He argued that the colonial powers applied methods that had the ability to infiltrate, rearrange, and colonise the country and its inhabitants to maintain their political and economic status. Mitchell starts his chapter titled enframing by discussing the ordinance of the Egyptian government in January 1830 to confine the people of Egyptian villages to their native districts, and to force them to seek a permit and papers of identification if they wished to travel. He argues that this act of confinement and this form of administrative control was the main feature of this era and that it had economical goals behind it. Peasants were meant to stay in their villages to make sure that the production of cotton and other commodities for the European consumption was continuous and efficient. Mitchell (1991) defined enframing to be *"a method of dividing up and containing"*. Thus, maps and mapping were central to the project of enframing in the early 19th century as spatial knowledge was required to achieve its goals.

Map-making and State-Making under the Colonial Powers

In his book "Seeing like a State" James C. Scott (1998) argues that maps are tools of making the society more legible, to arrange the population in a way that serves the classic state functions of taxation, conscription, and prevention of rebellion. And thus, maps were necessary for the making of a modern state as it brought local knowledge to its service. The critical geographer Dennis Wood (2010) has gathered historical evidence from Europe, South East Asia, and the North American British colonies to show that map making emerged as a rationalizing tool of control during periods of state blossom. He argued that the increased rationalization of the bureaucracies of the early modern states demanded precise maps. However, this type of state mapping was abridged, according to Scott, since it did not represent the actual situation but rather focused on the part that interested the official observer: *"They are not just maps, they are tools that are allied with state power, to enable much of the reality they depicted to be made"* (Scott, 1998).
In the case of Egypt, the birth of the modern state took place under the hegemony of colonial powers. The early mapmakers of Cairo and Egypt were either French or British which adds to the earlier argument multiple

layers. Thus, the earliest maps of Cairo in the cascade of its modern inscriptions included colonial orientalist interests and perspectives as well as the early state's interests and perspective. Although orientalism is a discourse that is built upon a critical reading of the constructed representation of the Orient, most of the studies that investigate the making of the orientalist image of Cairo were limited to literary production, works of art, and architecture. The maps of Cairo were rarely discussed as colonial constructs. The African post-colonial theorist Harry Garuba argues that maps and metaphors of mapping are of great significance to post-colonial studies, since *"colonialism as a regime of power was largely organized through spatiality and subjectivity: spaces to capture, subjects to control"* (Garuba, 2002). He argues that the surveillance and control of land, body, and subject was the object of colonial geographies and in securing this objective the map -as text, as model, as document and as claim- was central to its project.

The First Scientific Map of Cairo 1798-1800

The young ambitious general Napoleon Bonaparte convinced the members of the French Directory[49] of the significance of Egypt as French colony. Given its strategic location at the intersection of two vast overlapping commercial networks between the Mediterranean Sea and the Indian ocean, the Directory approved Napoleon's proposal with the dream of creating a port to connect the Red Sea to the Mediterranean Sea – that would later be the Suez Canal –. On the 22nd of July 1798, Napoleon conquered Cairo with an expedition of two wings, a military that included 40,000 soldiers, and a scientific that included 167 scientists and savants. Showing faithfulness to the ideas of Enlightenment Revolution back in Paris, Napoleon knew that a modern scientific survey of Egypt would contribute to his image as a great conqueror. The expedition's prime goal was to appropriate Egypt for colonization.

> *"Geography, topography, agriculture, hydrography, commerce and manufacture were necessary areas of inquiry for successful colonization. Specialists who could study the various ethnic populations of Egypt, and interpreters were crucial to the French conquest of Egypt. Scientists, artists, architects, and antiquaries were needed to study the natural history and cultural legacy of Egyptian civilization"* (Byrd, 1998).

Although many historians correlated the arrival of the French Expedition to Egypt as the moment where the long-subordinated Ottoman province encountered modernity, Andre Raymond argues that this encounter was liminal as the Expedition only lasted four years (July 1798-August 1801) that were full of the turbulence. The occurrence of two revolutions and multiple battles between the French, Ottomans, Mamluks, and the British army, left no time for the establishment of a modern state. Raymond finds that the effect of the Expedition could best be described as "*a slow awakening whose results could only be felt after the rise of Mohamed Ali to power"* and the establishment of the modern state. The French ended more than eight centuries of the Ottoman sovereignty, it wiped the social structures and administrations of the Mamluks, giving Mohamed Ali a clean slate to organize a new government, a new society, and a new economic system (Raymond, 2000).

The scientific expedition included scientists, engineers, artists, cartographers, botanists, and mathematicians, and many of them were young students and graduates of the new *Ecole Polytechnique* established in 1794 by the mathematician *Gaspard Monge*[50] who arrived with Napoleon to study every aspect of the ancient and modern Egypt. Although the military expedition was a failure, the scientific expedition had a lasting effect on the European culture; it marked the beginning of modern Egyptology (Peters, 2009). The magnum opus of the expedition was the 20 volumes of the *Description de l'Egypte,* acted as a tool of cultural appropriation, a tool of enframing the country by documenting it. Said (2003) regards the cultural and scientific production the start of the discourse of orientalism.

Cairo and the Savants

Napoleon arrived to a Cairo that suffered from the administrative instabilities of the frequent changes of the Ottoman governors and the power struggles between the Mamluk emirs, that left the inhabitants exhausted with high taxes and levies (Raymond, Cairo, 2000). Al-Azhar mosque that once stood as the center of

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[49] The French Directory was a committee of five members that governed France from 1795till it was overthrown by Bonaparte in the Coup of 18 Brumaire after which he announced himself the First Consul.

[50] *Gaspard Monge* was a French mathematician, the inventor of descriptive geometry, he worked on finding methods to depict three dimensional objects on paper with mathematical rigor, his works contributed to the theory and execution of map projections. Napoleon appointed him to be the President of the Egyptian Scientific Commission, and he later returned with him to France in 1798 (Godlewska, 1995).

knowledge production in the Arab Muslim world had ceased to produce original works, they worked on the reproduction of old text books, limiting their activities to commentaries on knowledge that was already produced (Richmond, 2013). Yet despite its deterioration al-Azhar was the center of the people's resistance against the French in the two revolts Cairo witnessed in 1798 and 1800. After French lost their fleet to the British in 1798, the failure of the Expedition to Syria, and the news of unrest in France, Napoleon knew that no more glory awaited him in Egypt. He silently left from Alexandria with only few trusted men, leaving the savants and soldiers under *General Kleber's* command in Egypt. Napoleon left behind the *Institut d' Egypte* that he established on the 22nd of August 1798 – almost a month after his arrival to Cairo – and modeled it after the *Institut de France*[51]. where scientists and the savants kept working till the Treaty of Alexandria 1801[52]. It was Kleber's idea to gather all the works of the scientists and the savants in one publication, yet this idea will only come to realization in February 1802. Then, Chaptal, the Minister of Interior in Napoleon's government summoned the scientists who returned from Egypt and appointed a commission of eight members to collect and publish all the scientific material for the expedition.

In the meantime, the city of Cairo preserved its dense fabric of the Mamluk and the Ottoman eras after the French who lacked to the resources to make any changes to the city. They all occupied the empty Mamluk palaces around the *Azbakiyya* lake, leaving the core of the city to its inhabitants with minor changes that were limited to Public orders of lighting the streets and regularly cleaning the roads. Aside from the constructed earth levies to control the flooding of the Nile, their contribution to the city was limited (Raymond, Cairo, 2000). However, their contribution to the cartographic representation of the city was of a great significance, marking a milestone in the history of the maps of Cairo. Although, the city had been depicted in the maps of the early European travelers and pilgrimages (The map of Niebuhr 1776), the cartographic depiction of the city was not a familiar tool for its historians and rulers. The fact that the only local popular documentation of Cairo prior to the French was *Al-khitat of Al-Maqrizi* that was a 'textual account' of the plans of Cairo, its districts, topography and history, supports this claim. The maps of the travelers displayed a very poor level of detailing as they were charted by amateurs with limited tools and resources. Yet with an army of scientists and under the leadership of genius mathematical mind like *Monge*, the maps of Cairo charted by the French Expedition showed a level of objectivity and accuracy that will only increase over the 19th century due to the continuing presence of Europeans in Egypt (Warner, 2004).

The First Scientific Map of Cairo

Although the first volume of the engravings of the *Description de l'Egypte* was presented to Napoleon 1808 and the appeared to the public in 1809, the *Atlas Geographie*[53] that contained more than 50 geographical and topographical inscriptions of Egypt was not published as it was considered a military secret till 1814 (Masson, 1997).Godlewska (1994), argues that in spite of the delay in their appearance the maps functioned as the conceptual synthesis of the *Description*. With essays referring to the maps constantly, it seemed that the maps were the primary aim of the authors and that text was only written to explain them. After 1814, four maps of Cairo were published in the first volume of the *État Moderne* covering the extents of the city and its historic core. The first map of the set was a key map, a map of scale approximately 1: 20,000 that shows Bulaq, Cairo,

[51] The French Directory established the *Institute de France* to defuse the Royal Academies and turn them into national institutions. The *Institut* included five academies: (1)*Académie des Inscriptions et Belles-lettres*, that worked on history and archeology, (2) *Académie* des Sciences Morales et Politiques, that provided the state with political and financial advice,(3) the *Académie française* that concerned itself with linguistics and literary production, (4) the *Académie des sciences*, and (5)the *Académie des beaux-arts* that included research on painting, sculpture music and architecture. The constitution of the French Revolution mentioned in article 298: "*There is for the whole republic a National Institution charged with collecting discoveries and perfecting the arts and sciences*"

[52] The Treaty of Alexandria mandated that the French Army and the scholars of the Commission and Institut would evacuate Egypt only if they submitted all the antiquities, specimens, field notes, and studies they collected at the disposal of the generals of the British army. However, the scholars fiercely negotiated to take their notes and manuscripts leaving behind the big antiquities and artifacts to be sent to the British museum (Peters, 2009)

[53] The atlas is considered the first modern scientific cartographic mapping of Egypt, as it uses Mercator Projections, indicates both the magnetic and the true North, and drawn to scale. The Atlas was indexed with statistics about the agriculture, the areas, and the population. It is considered the first comprehensive survey of the country based on a detailed indexing system.

Old Cairo, Roda, and Giza (figure1). The other three maps are all of scale 1: 5000. One showing Roda, Giza and parts of Cairo (figure2), the second showing Bulaq (figure3), and the third showing the old fabric of Cairo (figure4). The choice of the extents of the three maps and the key map, is all related to the Nile river and its changing water levels, depicting the three nuclei of the city and their relations to one another. The three detailed maps show accurate, numbered *harras*, numbered districts, annotated landmarks that include the citadel, the lakes, the main mosques, the names of the main streets and the squares, as well as the topography of the city. The lists and indexes were published in Arabic with transliteration in the accompanying text volume. In her study, "Map, text and image, the mentality of enlightened conquerors", Godlewska (1994) argues that both the maps and the scientific exploration behind the *Description de l'Égypte* were products of the Enlightenment Project. She bases her argument on the way Horkheimer and Adorno stress the extraordinary weight of numbers and empirical data in the Enlightenment thought, as they argue that whatever is not reducible to numbers becomes an illusion, a myth that should be destructed. The Enlightenment thinkers shared the conviction that the world could be controlled and rationally ordered if it was pictured and represented precisely. Godlewska (1994) finds that the emphasis on number and the instrumentality of knowledge is strongly associated with cartography, since maps assign a position to all places and objects.

The precise consistent scaling and putting together detailed maps into one bigger key map is itself an advent of rational scientific thinking. The use of a grid system, a method by which the search for an exact location of any of the numbered structures of the map can be facilitated can also be considered a sign of the Enlightenment era (Warner, 2004). The grid facilitates the process of including a single map within a set or a cascade of other maps with different scales. Moreover, these maps adopted the planar projection instead of the iconographic or perspectival view that was applied in the earlier maps of Cairo by the amateur travelers. This shift from the multiple points perspective to a top view of the planar projection goes parallel to David Harvey's assumption that by the beginning of the project of enlightenment in the 18th century, extraordinary intellectual effort was made to *"develop objective science, universal morality and law"* to document resources (Harvey, 1992). In the zeitgeist of Enlightenment, measures were made standard, and scientific methods were developed to reach a universal system by which the world can be charted.

The spirit of Enlightenment is seen again in the logical and scientific approach of this map through its accuracy of projection and extends to the process of mapping itself. Warner argues that the surveyors established a base line measured by chain, and triangulated 54 points: mosque minarets or positions located on high ground. They even divided the city into eight distinct areas; their divisions are shown on the map and follow major arteries or minaret triangulation points, that later became the references for the subsequent street-by-street chain survey. (Warner, 2004). This technical decision of how the mapping process is conduct, conveys the concept of 'enframing' again, where parameters are set to divide the city to facilitate the process of its documentation in the first place. It is worth mentioning that these eight distinct areas appeared again in *Al-Khitat* of Ali Mubarak[54] (written between 1884-1888). Nezzar AlSayyad argues in his *Ali Mubarak's Cairo,* that the *Khitat* adopted the eight districts – known as *Alathman* – as a way of defining the city (AlSayyad, 2005). The dialectics of power and knowledge manifests itself in this case where the method of enframing is passed from one inscription of knowledge to the other.

The Implications of the Map

Being the first precise inscription of the scientific map of Cairo, the maps of the French will later become the basis of Khedive Ismail's project to modernize the city (Raymond, Cairo, 2000). They will be the base maps for Grand Bey's plans with basic adaptation (Abu-Lughod, 1971; Raymond, Cairo, 2000). This shows the discursive relationship between the maps, it indicates how one map influenced the making of the next map that later extends to be the next plan. The maps of the French will then become planning tools, after being a documentation tools that enforced control.They also remain a precise documentation of how Cairo was before the new developments of the 19th century, a cartographic testament of the Ottoman and Mamluk city They became the first scientific maps in the cascade of inscriptions that was discussed by Latour as mentioned above.

[54] Ali Pacha Mubarak (1823-1893) was the Minister of the Egyptian Public Works cabinet and the Education Cabinet during the second half of the 19th century. Being a graduate of the first military schools established by Mohmaed Ali Pacha, Mubarak is considered one of the most prominent figures of the new emerging class of Egyptian intelligentsia that was educated in France and came back to lead the process of modernizing Egypt. His most famous work was *Al-khitat Al-tawfiqiyya Al-jadida*, a twenty-volume work that contains textual depiction of the geography, topography, and history of Egypt.

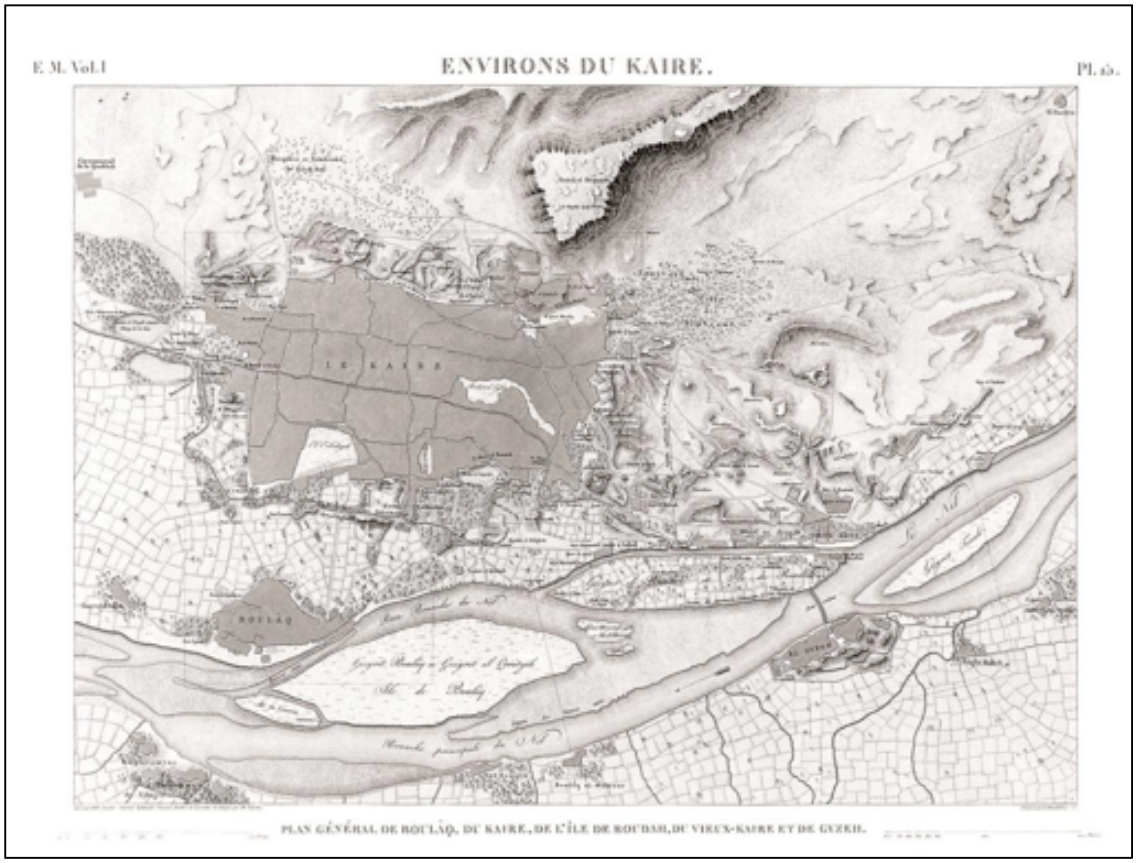

Figure 1. *Plan général de Boulâq, du Kaire, de l'île de Roudah, du Vieux-Kaire, et de Gyzeh* General key map of Bulaq, Cairo, Old Cairo, Roda, and Giza from the *Description de l'Egypte, État Moderne* I, pl. 15, 1809. Scale 1: 20,000

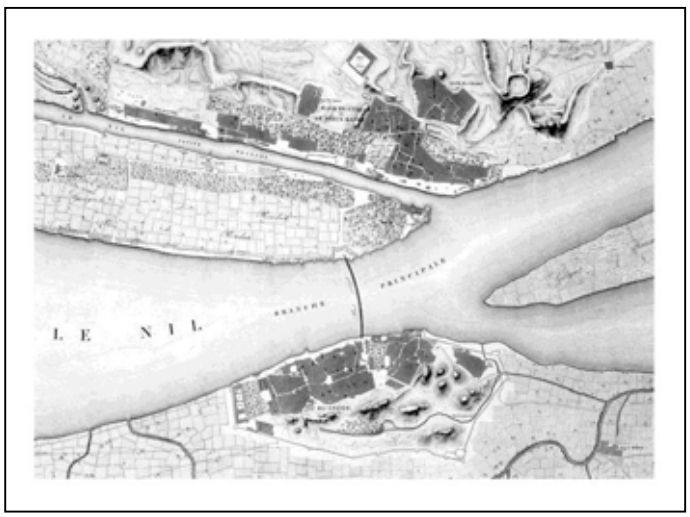

Figure 2. *Plan particulier de l'île de Roudah, du Vieux- Kaire, et de Gyzeh,* from the *Description de l'Égypte, État Moderne* I, pl. 16, 1809 (detail). Copper engraving,57 x 93 cm; approximate scale 1:5000. Source: Nicholas Warner's collection.

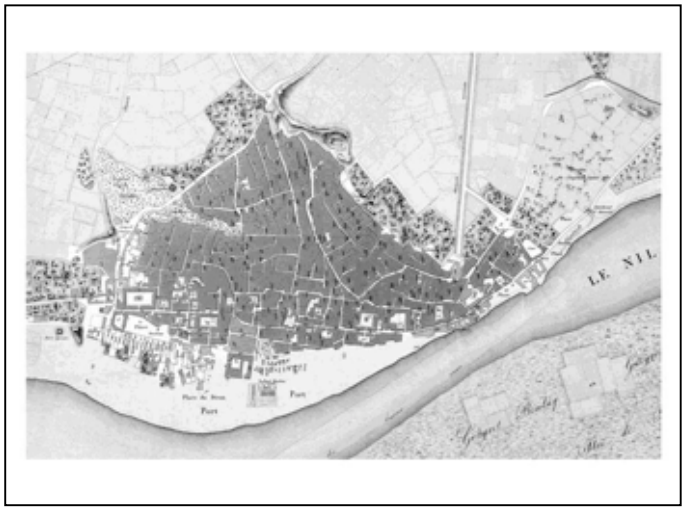

Figure 3. *Plan particulier de Boulâq, from the Description de l'Égypte, État Moderne* I, pl. 24, 1809 (detail). Copper engraving, 38 x 52 cm; approximate scale 1:5000. Source: Nicholas Warner's collection.

Figure 4. *Plan particulier de la ville,* from the *Description de l'Égypte, État Moderne* I, pl. 26, 1809. Copper engraving, 60 x 93 cm; approximate scale 1:5000. Source: Nicholas Warner's collection.

The Modern Map of Cairo 1874

Starting from the 1820s and to the late 1890s a series of encounters a new series of encounters between Egypt and the West took place. It started with the Egyptian students sent to France to study modern arts and sciences. Another form of these encounters was the bourgeoise travelers who found in the modern steamships and railroads a more affordable to see the world. Timothy Mitchell finds the most common topic of the accounts of the Egyptian and Arab travelers to the 19th century Europe to be the description of the world exhibitions. Being events were a living picture of the development of mankind is portrayed, these exhibitions were made to showcase the achievements of the nations, specifying a separate exhibit for each country. Mitchell (1991) argues that this new world of façades and exhibits, models and simulations, should be understood in relation to the wider capitalist transformation that was happening in the world, the advents of technology that introduced mass production and the need to create mass consumptions.

The Paris World Exhibition of 1867 had a direct impact on Cairo. The Egyptian exhibit had been built to simulate medieval Cairo with a winding street where 50 donkeys were transporting visitors and a royal palace where Khedive Ismail stayed in during his visit (Mitchell, Colonising Egypt, 1991). The famous *Rue du Caire* was carefully rendered to represent a chaotic and exotic image, where the visitor is persuaded that this representation is a pure reality out there. Ismail who just earned the title of Khedive from the Ottoman Sultan on the eve of his departure to the Exposition, was not pleased with the representation of Cairo as a medieval city. He has been accompanied by Haussmann and the Governor of Paris to see the works that had been conducted and those on the verge of completion to modernize the city. Ismail decided that *"Egypt should no*

longer be a part of Africa, but to be a part of Europe" (AlSayyad, 2005). He decided to invite the highest European dignitaries to the celebration of the inauguration of the Suez Canal that will take place two years later, and for that he decided to create a modern Cairo (Mitchell, Colonising Egypt, 1991). Haussmann advised Ismail to consider the road layout engineer Pierre Grand and the landscape engineer Barillet Deschamps to commission for this mission (Arnaud, 1993). However, if the earlier maps of the French Expedition were considered to be the products of the Enlightenment project, it is highly relevant to consider the maps of Cairo in the reign of Ismail products of the Early Globalism and the Capitalism Projects. This argument will be unfolded in the coming sections

The Dream of a Modernized Cairo

Pierre Grand Bey was appointed the director of the *Administration de la Voirie* and Deschamps started working on the infilling of *Azbakiyya* lake and transforming it to the first public park in Cairo (Raymond, Cairo, 2000). With the construction of the Suez Canal, the need for massive infrastructural projects like the development of the Egyptian Railways and the structuring of a massive road network that cuts through the old fabric of the city and connects to the newly designed *Ismailiyya Quarter* (Mitchell, Colonising Egypt, 1991) In her book "The Great Social Laboratory. Subjects of Knowledge in Colonial and Post-Colonial Egypt", Omnia Elshakry (2007) argues that under the reign of Ismail, Europeans at the service of the court were considered facilitators of modern European civilization. They were involved in the dissemination of Western intellectual institutions, techniques, and ideas to modernize the organization of the state and the society (Elshakry, 2007). Among them was Dr Onofrio Bey whose words below are cited by Mitchell (1991) to describe the new developments of Cairo as follows:

> *"The transformation of the city of Cairo from an aesthetic point of view requires the filling in and levelling of the waste land around the city, the opening up of main streets and new arteries, the creation of squares and open places, the planting of trees, the surfacing of roads, the construction of drains, and regular cleaning and watering and the removal of certain human agglomerations from the interior"*

Mitchell (1991) argues that besides the real and sincere cause of the public hygiene argument by which the new plan of Cairo was promoted, there were other purposes of this modern planning that happened to concide with economic and financial arguments. He considers the open well-lit streets to be of a great benefit to the commerce as much as it is for public health as they embody the principle of visibility that demonstrated its commercial usefulness in the World Exhibitions. However, with only two years between the inauguration date and the arrival of Grand Pierre Bey to Cairo, and the limited financial resources, the plan to modernize Cairo had to be limited to basic infrastructural. Ismail decided to give the plots of the new extension for free to developers who commit to construct buildings with European facades whose value is 1000 Egyptian Pounds and above (Raymond, Cairo, 2000). He also decide to insert a European style façade at the western edge of the city, where the new thoroughfares were cut to impress the European dignitaries (Arnaud, 1993).

The New Plan of Cairo 1874

To conduct his ambitious plan, Pierre Grand Bey was required to start surveying for a new map of Cairo as soon as he arrived. The available maps were of Colonel Baur Shultz in 1846 and 1858, both were merely reduced and updated copies of the 1798 maps of the French Expedition (Arnaud, 1993). Their scales of 1:25000 and 1:18000 did not offer the sufficient accuracy of details to introduce the thoroughfares in the old fabric. In 1874-six years after his arrival to Cairo- Pierre Grand assembled his map of the city based on the earlier documents and his own survey with scale 1:4000 on four sheets (figure 5). The legend of Grand's map marked only the religious buildings of important 'historic and aesthetic terms' (El-Habashi, 2001). The exact criteria by which these buildings were selected remains unclear. Other building typologies – that are currently considered of great historic value – like the *wikalas*, *hammams*, *sabils*, and *kuttabs* remained unmarked on the map (El-Habashi, 2001). One could argue, that this choice was depending on the use and ownership, as most of these buildings were domestic dwellings or services that were probably still functional and privately owned. In the meantime, mosques were public buildings. Moreover, Jean-Luc Arnaud's close examination of the map of 1874 revealed that *"this document was a project and not the actual description of the place"*. Although this was neither mentioned in the title or the legend, the comparison between this map and the more recent ones (the 1909-1912 map compiled by the Egyptian Survey) shows that some of the public spaces were never implemented (Arnaud, 1993)

The Implications of the Plan

The map of 1874 derives its significance from the scarcity of other cartographic representations of the city at this time that made this map a source for the private publisher to reproduce, given the high demand due to the rise of tourism and the inauguration of the Suez Canal. This map was surveyed by the Road Administration, that proceeded with using it as an outline map for more than twenty years. It was also used as a skeleton map for the Tanzim Service that was part of the Ministry of Public Works headed by Ali Pasha Mubarak, that drastically influenced the urban fabric of the city. This was the start of the greatest period of construction and demolition Cairo has witnessed since the developments of the Mamluks in 1300s (Mitchell, Colonising Egypt, 1991).

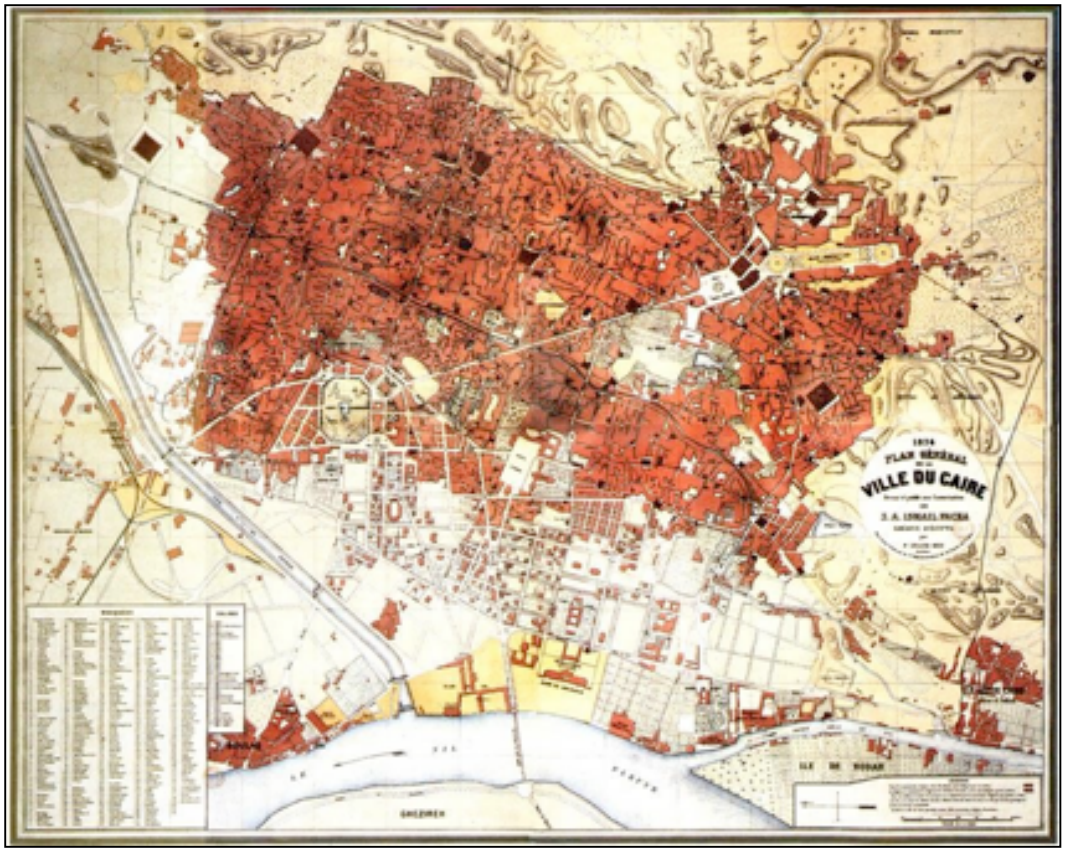

Figure 5. *Plan central de la ville du Caire 1874, scale 1:4000*

The Map of Islamic Monuments 1924

The construction of Ismail's ambitious plan risked the country's urban Heritage and financial independence. To construct the Boulevard Mohamed Ali that cuts the old fabric of the city diagonally for two kilometers, connecting Ismail New Palace *Abdin* to the old seat of the throne in the citadel, 400 large houses and 300 smaller ones, and a great number of mosques, mills and bath houses were destroyed or cut in half (Mitchell, Colonising Egypt, 1991). Moreover, the accumulated debts forced Ismail first give up the share of Egypt in the Suez Canal stocks to the British and the French and second to accept their intervention in the financial system. Inspectors were sent to inquire into the finances of Egypt and established the *Caisse de la Dette Riblique*. Finally, Ismail was sent to exile and Tawfiq Pasha his son announced his successor in June 1879.

In the meantime, British and French intellectuals were voicing their anger regarding the *"heritage in danger"* of Egypt and Cairo specifically that was deformed due to the inconsiderate 'modernization' projects of Ismail. This pressure pushed Tawfiq to establish the *Comité de Conservation des Monuments de l'Art Arabe* to preserve and protect the heritage of Egypt in December 1881 (El-Habashi, 2001).

The Heritage in Danger and the establishment of the *Comité*

Among the heritage enthusiasts, orientalists, amateur archeologists, and travelers that directed the public opinion in Europe to pressure establishing the Comite was Arthur-Ali Rhone[55], Edward Thomas Rogers[56], and Stanley Lane-Poole[57] - who all happened to be devoted Siant-Simonists[58]. The start of Saint Simonism as a policy oriented social philosophy that soon turned to a mystical religion, is correlated to the development of the railroads, steamships, and the expansion of international markets that created a disorientation of space and time (Wittman, 2010). Saint Simonians advocated projects that opened up the world to the free movement of commodities, from the Suez and Panama Canals, to the World Exhibitions. Many of them travelled to Cairo in the 1830s -along Ferdinand de Lesseps (a Saint Simonist himself) to start their project of the "*industrialization of the earth*" that miserably failed (Mitchell, Colonising Egypt, 1991). It is ironic how the first followers of this ideology pushed Khedive Ismail to modernize Cairo and then the later followers attacked him for jeopardizing what they called the "Old Arabic Monuments". One can argue -from the paths of life these intellectuals went- that their intent was not only their believe in their argument, but also their desire to be a part of a bigger project. Most of those who influenced the European public opinion will later find job opportunity in Egypt, taking the lead of newly established governmental entities like the *Comité*. They turned from bourgeois amateur collectors to founders and decision makers. This can also be attributed to the rise of 'specialty' or the character of the 'expert' within the modern positivist world. Among the founding members was Grand Bey himself which shows the conflicting approaches within the *Comite* as an institutional body. Although Grand's map/plan was among the reasons that put the *Comité* members together, they used it as the base of their Mohammedan Map, since it was the only precise cartographic document. However, they only acknowledged less than half of the buildings proposed in it as "Arab Monuments". They set more clear and detailed parameters for the properties of historic and aesthetic value worth preservation. Yet to understand this map, it is important to understand the new ideologies it promoted, and the economic implications of its inscription.

The Map of the Monuments 1924

The map discussed in this section is titled "Map of Mohammedan Monuments", was printed in 1924 and published by the Survey of Egypt on behalf of the *Comité* with scale 1:5000. It indicates three types of buildings the Fatimid and Pre-Fatimid monuments (in red), the Ayyubid monuments (in dark brown), and the Mamluk monuments (in green). Although the Ottoman monuments were shown in the legend, they appear on the map with a darker brown that distinguishes them from the rest of the built environment, they also appear in the accompanying index compiled by the architectural historian K.A.C Creswell that was constantly updated linked to numerical, chronological, and alphabetical indexes that were published separately in 1947 (Warner, 2004). This might be attributed to the fact that making the lists of monuments of the Comité was a long accumulative

[55] Arthur-Ali Rhone (1836-1910) was a wealthy amateur French Egyptologist and Arabist. He was a lead figure in the movement of the defenders of old Paris, a Saint-Simonist who dedicated time and effort to mobilize a movement to save what he defined as heritage.

[56] Edward Thomas Rogers (1831-1884) served as a diplomat in Jerusalem, Beirut, Damascus, and Cairo in 1868. He was a collector himself who after going back to England started a campaign to call for the protection of 'oriental' heritage and specifically the Cairene. He was among the first to write articles in defense of 'preservation' and 'documentation' of the heritage buildings of the city. Rogers returned to Egypt as a director of the state's properties for the Ministry of Education as well as one of the main founders of the Comite. He published two articles in 1880 in the Art Journal where he focused on mosques, cemeteries and tombs placing them in the highest priority of restoration projects (El-Habashi, 2001).

[57] Stanley Lane-Poole (1854-1931) is a British orientalist and archaeologist who has been working for the British museum from 1874 to 1892 before his arrival to Egypt. He was one of the group of orientalists interested in 'Arab and Islamic Arts' who accused Khedive Ismail for the degradation of the Arab monuments in Egypt. He played a major effective role in shaping the works of preservation through his involvement with the Comite (El-Habashi, 2001).

[58] Saint Simonists- are the followers of the political and social movement of the 1830s inspired by the ideas of Claude Henri de Rouvroy, Comte de Saint-Simon. They believed that the rapid growth of industrialization and scientific discovery will lead the society to restructure itself and abandon the traditional ideas towards the evolution of a productive society based on and benefiting the from "the union of men engaged in useful work" as the Comte described. Saint Simonists played a major role in the making of Modern Egypt, several members of the Comite des Monuments Arabes, archeologists, French and British intellectuals who had aa say in the Egyptian politics and economy were all affiliated to Saint Simonism in a way or another.

process that extended over time However, the map does not extend south to include Coptic Cairo, the Bayblon fort, and its surroundings. Instead the map included two separate inserts of the eastern and the southern cemeteries, limiting its scope to the Muslim monuments only.
The title of the map, and the use of the word "Mohammedan" to describe is worth noting. Since buildings have different meanings to different people, the representations and the interpretations of buildings are rooted in the interpreter's biases, concerns, and larger views of the world (Sherif, 1988). Although a contemporary view can find the use of such a name an intensified orientalist bias, or even an offense to the culture and legacy of this era and area, another perspective can regard it an unintentional projection of the interpreters' own view of religion. It can be derived from the understanding of the Occident of religion; since Christianity derives from Christ, maybe Mohammedan derives from Mohammed. Sherif (1988), argues that as historians assign names to situations and groups to describe them, this naming itself assigns a position, *"it fixes and preserves meaning and experience in time, and transmits it through time*". However, in this nomination one can outline an act of 'enframing', and an 'abridging' of whole entire culture and its legacy in a narrow perspective of religion.

The Consequences

Although the Comite was an advisory entity that had no executive authorities, its role in defining the 'value' of historical buildings and districts of Cairo was crucial. The Comite belonged administratively to the Ministry of Charitable Endowments 'Al Awqaf' then to the Ministry of Education in 1936, till the 1952 movement and the gradual migration of its foreign employees and finally its formal dissolution in 1961.
The map of 1924 was later updated again by the *Comite* in 1950, and republished multiple times in both Arabic and English. Among the wide spread editions-till our present day- is the 1945 Arabic translation that indicates all the buildings documented in the index with different color codes. The significance of this map stems from first its indirect effect over the urban fabric of the city. By designating the exact locations of 'monuments', Cairo's image as a medieval city was documented and intensified within the tourists' guides, maps, and travelers' memoirs. The distinction between the old city core of Cairo and the modern 19th century developments 'enframed' the city into two sections. This designation influenced the development plans of the city as well by offering planners a map of what the state acknowledges as 'monuments' that should be preserved and documented.

Conclusion

The three maps of Cairo discussed in this study represent three basic purposes of maps; a 'tool of documentation', a 'tool of planning', and finally as a 'tool of defining and branding'. Each of the three maps shows a different form of 'enframing' the city, its citizens, and properties. When seen within the purpose and the context of their production, these maps show how the same city of Cairo was represented cartographically to construct a certain image. The dependency of each map upon the earlier, shows how the dialectics of knowledge and power was crucial to the representation of the city. In other words, the relationship between these maps -that were charted by authorities that had the knowledge, tools and interest to map the city- created a 'cascade of inscriptions'. By looking at each inscription-or map- solely, one can understand how the interests of mapping authorities overlay, creating a specific image of the city. Moreover, by critically rereading the three maps and drawing parallels between them and the establishment of the modern state apparatuses related to their production/purpose, one could see how the state making and map making went hand in hand in this moment of history. The relationship between the map of the French Expedition and the *Institut d'Egypte,* the map of Grand Bey and the Ministry of Public Works and finally that between the Map of Monuments and the *Comite* shows how map-making was intervened with the making of state institutions that contributed to the knowledge production about the city and the direct influence over the decisions and plans concerned with its realities. These maps were constructed realities of Cairo with ideologies embedded in their making that resulted in different changes in the lived reality of the city.

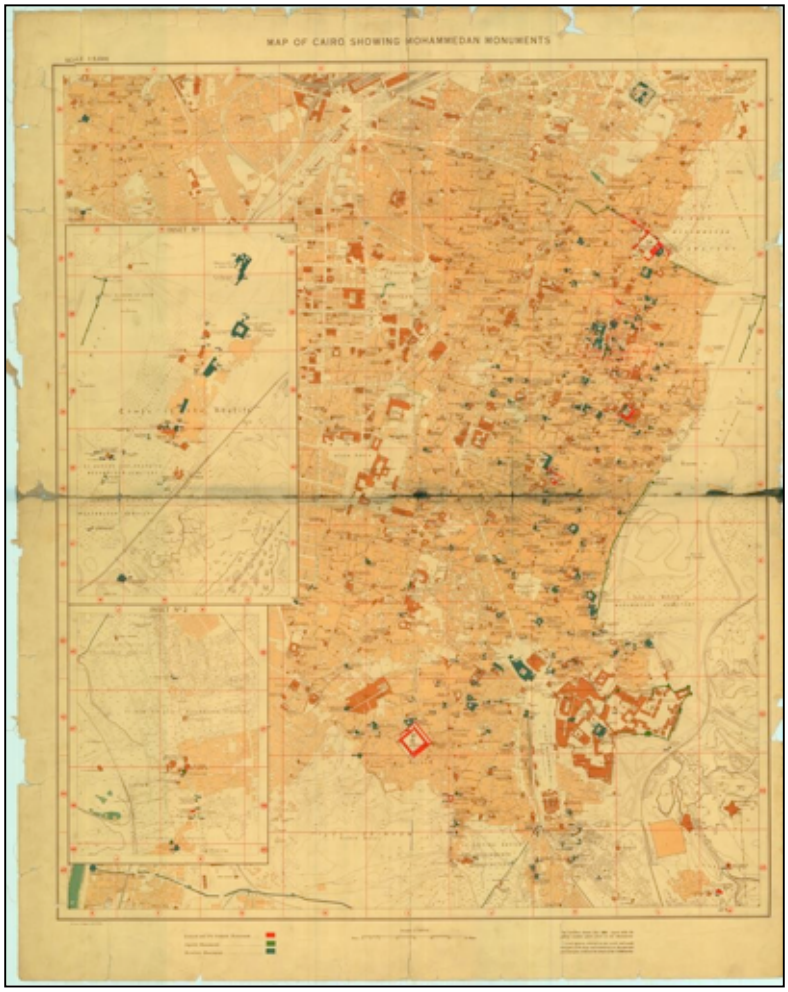

Figure 6. *The map of Mohammedan Monuments 1924*

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ECOLOGICAL PROCESSES AND THE ROLE OF LANDSCAPE INDICATORS AND METRICS IN URBAN PLANNING: EXAMPLE OF MALATYA PROVINCE AND ITS PERIPHERY

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Abstract

Cities grow uncontrollably due to rapidly increasing population and the food and accommodation problems resulting from it; as well as economic and political reasons, which lead to the devastation of natural areas and impact ecological processes negatively. This situation can be slowed down with a planning approach that considers ecological processes, landscape indicators and metrics; and can be controlled by observing the balance between protection and utilization.

The purpose of the study is to demonstrate the spatial planning approach by considering ecological processes, landscape indicators and metrics in Malatya Province and its periphery. Within this scope erosion risk, habitat function and underground water recharge analyses are carried out besides the measurement of fragmentation, naturality and diversity. Sensitive areas are detected by considering landscape elements (important natural areas, protected sites etc) and they are assessed from the perspective of spatial land use demands. The area of study is developing through north-south direction. Agricultural lands and natural areas pose a constraint to the development in the north and natural areas (there are significant natural areas in this region) pose a constraint to development in the south. The study is undertaken on 1/25000 scale.

Consequently, the foundation for a more livable environment can be laid by the implementation of utilization and protection targets based on the assessment of ecological processes, landscape indicators and metrics besides ecological sustainability and an urban development form based on holistic assessment of natural processes and elements and identification of constraints.

Keywords: Urban Planning ecological processes, landscape indicators, metrics, Malatya, Turkey

Introduction

Cities are not only drivers for socio-economic development, but also have been the centers for major environmental problems since the industrial revolution. The process of urbanization accelerated in the last century and more than half of the global population now live in urban areas (Wu 2014). This situation, along with political and economic reasons, results in uncontrolled growth of cities. This damages natural areas and affects ecological processes adversely. While urbanized lands only constitute a very small percentage of the earth's land surface (lower than 1%) (Schneider et al, 2010), the impact of urbanization is deep and wide from local to global scale. (Wu 2014). Ecological processes and landscape must be understood well and integrated into spatial planning approaches in order to reduce these impacts and provide sustainability for the ecosystem. This study aims at presenting spatial planning approach that considers ecological processes along with landscape indicators and metrics. In this context, erosion risk analysis, habitat function surface flow potential and water permeability analysis, fragmentation, naturalness and diversity measurements were conducted with geographical information systems in the city of Malatya and surrounding area; sensitive areas were identified considering landscape elements (important natural areas, endemic flora) and were evaluated in terms of demands for spatial area usage.

Material and Method

The main material of the study consists of the whole of ecological borders that encompass zoning area of Malatya city and are specified within provincial borders of Malatya which is located in Eastern Anatolia Region, between 35 54' - 39 03' North latitude and 38 45' - 39 08' East longitude (Anonym 2011). (Doğan 2016) (Figure 1). The ecological processes which are taken into account for the spatial planning approach within this study are the outcomes of landscape analyses conducted within the TÜBİTAK KAMAG Project No. 109G074: LANDSPACE -44: Landscape Character Analysis and Tourism/Recreation Evaluation in Provincial Scale. Among the analyses, erosion risk analysis, surface flow potential, water permeability and habitat function analysis were utilized.

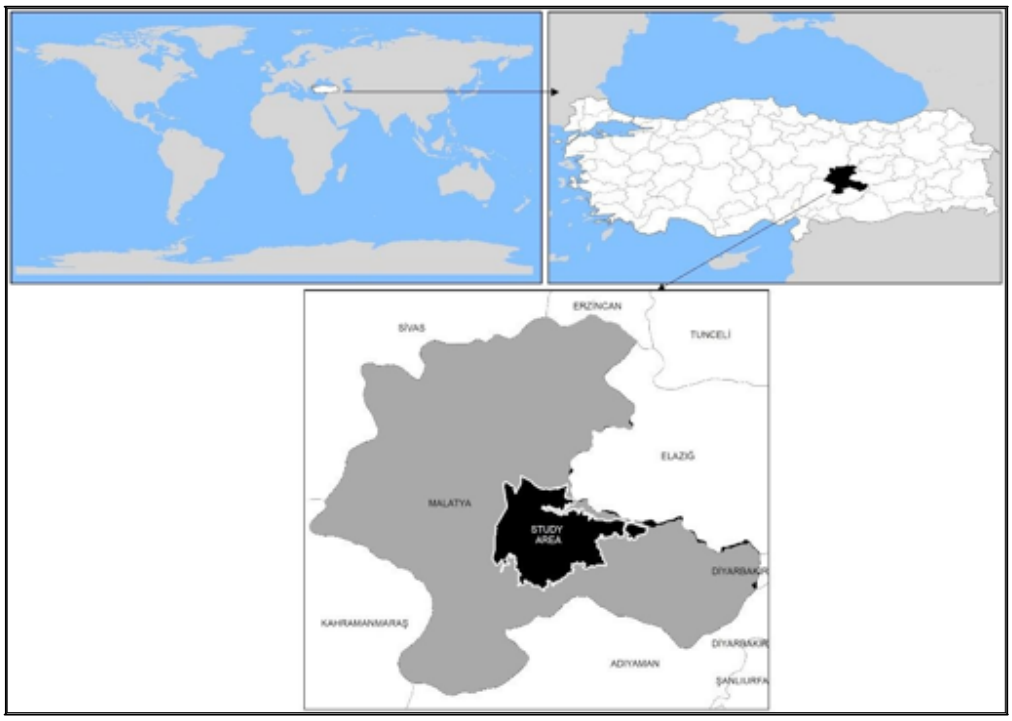


Figure 20 Location map

The analysis and landscape elements (important natural areas and endemic plant species) which belong to the landscape indicators and metrics (fragmentation, naturalness and diversity) that are considered within the spatial planning approach of this study are the outcomes obtained from Doğan's (2016) thesis; Identification and Assessment of Landscape Connectivity: Case Study of Malatya City and Surroundings.

The study aims at presenting a spatial planning approach which considers the discussed processes, metrics and elements. Firstly, sensitive areas needed to be identified to that end. In this context, while focusing on ecological processes, the areas which were very high or high were considered sensitive areas in erosion risk, water permeability and habitat function analyses. In addition, the areas which were low or very low were considered sensitive areas in surface flow potential. This was due to the fact that as the surface water flow potential decreases, the permeability increases.

In respect to landscape indicators and metrics, as fragmentation, naturalness and diversity increase, sensitivity increases as well. Therefore, high or very high areas were considered sensitive. The landscape elements included in this study were discussed based on their asset values (Doğan 2016).

In the study, sensitivity map overlay method was used. The analysis of the results ranged between 1-5 (Figure 2).

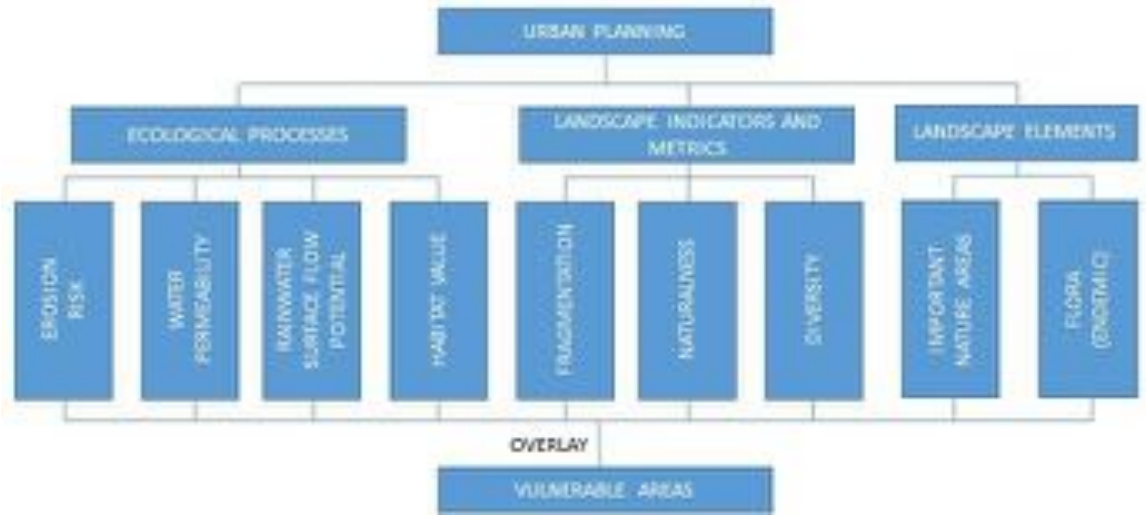


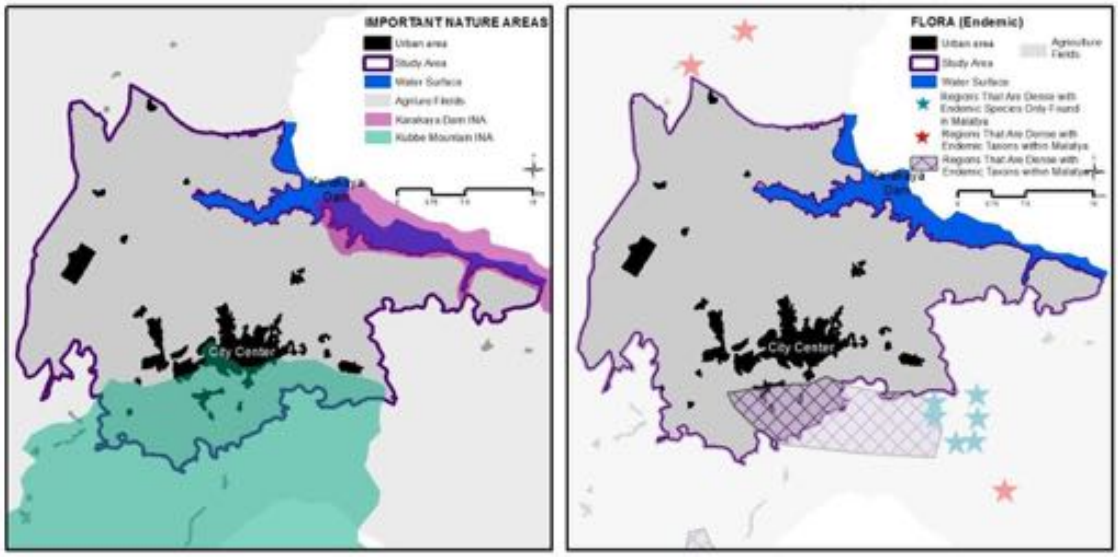
Figure 21 Flow chart

Findings

Landscape elements

Important nature areas (INA) (Figure 3a) and endemic plant species (Figure 3b) were taken into consideration among landscape elements within the scope of the study. The information regarding important nature areas were obtained from Eken et al. (2006) in numeric values. There are 4 INA in Malatya (Tohma Valley, Kubbe Mountain, Karakaya Dam, Nemrut Mountain). Two of these INAs; Karakaya Dam and Kubbe Mountain are located within the study area (Figure 3a) (Doğan 2016).

The information on endemic plant species was obtained from Karakuş's study (2016) called "Flora of Malatya City." According to the study, 436 (21,1%) of the species in Malatya city are endemic. 38 of these endemic species spread only in Malatya (Figure 3b) (Doğan 2016).



a *b*

Figure 22 Landscape elements (Doğan 2016)

Ecological processes

Among the analyses, erosion risk analysis, surface flow potential, water permeability and habitat function analysis were taken into account within the scope of the study. Among these analyses which were conducted within the scope of Landscape 44 project, ICONA method developed by the Ministry of Agriculture, General Directorate for Protection of Nature of Spain (MAPA-DGCONA; repealed MAPA-ICONA) was used in erosion risk analysis. The areas with potential erosion risk were identified in the study (Şahin et al. 2011). The results based on this method are presented in Figure 4.

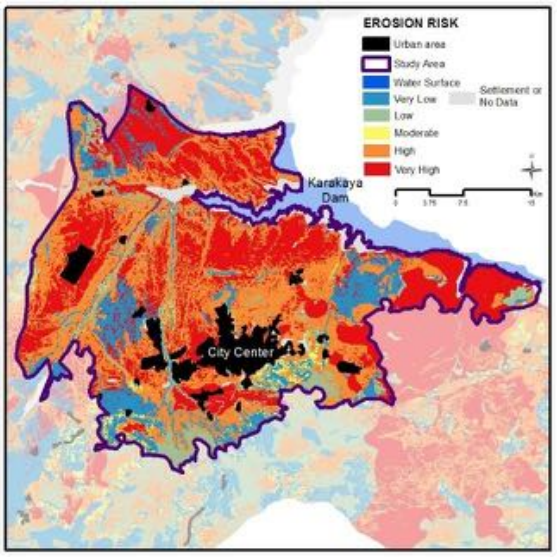
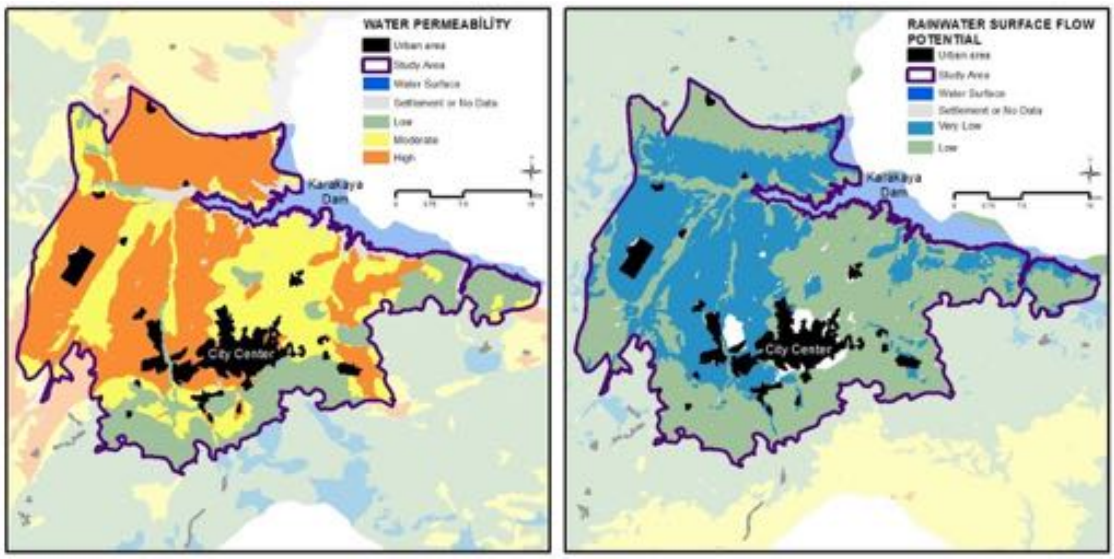


Figure 23 Erosion risk analysis Şahin et al. (2011)

Identification of areas for underground water recharge are important for the protection of habitats and for identification of the areas that ensure the sustainability of the natural cycle (Doğan 2016). In this context, spatial planning holds a central role. The study conducted by (Şahin et al. 2011) made use of two different analyses in identification of underground water recharge areas. The first one was water permeability. In this analysis, Hydrological Landscape Structure Analysis method which was developed by Buuren (1994) and applied on water basin of Regge River in Netherlands was used. The results are presented in Figure 5a. The second one is to identify the surface water flow potential. In this analysis, Surface Flow Curve Number (SCS CN) method was used. This method was developed by the USA Soil Conservation Service in 1972 for the effective use of water and land sources, and it started to be commonly used in landscape/area planning (Şahin et al. 2011). The results are presented in Figure 5b.



a *b*

Figure 24 Groundwater recharge areas Şahin et al. (2011)

The analyses for habitat value of vegetation enable interpretation for the existence of fauna (Şahin et al. 2014). Therefore, habitat function is very important for the living creatures in this study. The patch analysis was based on the study "Landscape Management, Protection and Planning Project for Bozkır-Seydişehir-Ahırlı-Yalıhüyük districts and Suğla Lake Area in the City of Konya" conducted by Uzun (2003) and Uzun et al. (2010) (Şahin et al. 2011). The results are presented in Figure 6.

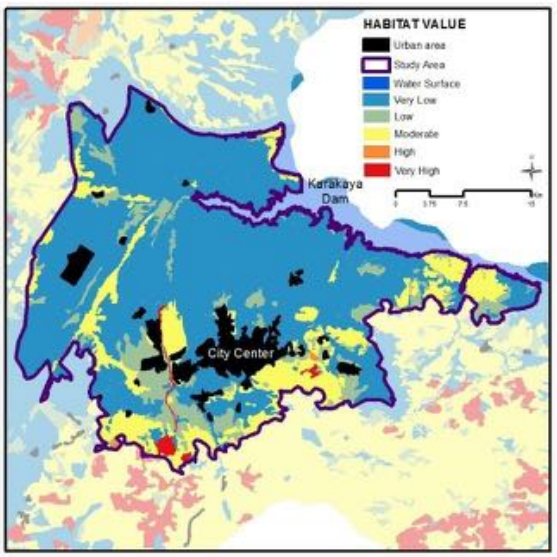


Figure 25 Habitat function analysis Şahin et al. (2011)

Landscape indicators and metrics

In the study, fragmentation, naturalness and diversity were used among the metrics. In conducting measurements regarding metrics, barriers (roads and streams) that separate patches were used in zoning and measurement results were evaluated in this scope. While the measurements of fragmentation and naturalness were conducted at the level of patch, diversity was measured at landscape level. In addition, the patches were not considered only within the identified borders but by including the whole of them in the analysis process. The reason was that the structure and function of landscape do not occur within human made borders, but within its natural borders (Doğan 2016).

CORINE land cover/land usage third degree classes were used in measurements. Accordingly, natural areas were analysed in eight classes as broad-leaved forests, natural meadowlands, bare rocks, plant transformation areas, sparse plant areas, coast-beach-sand, mixed agricultural areas and natural vegetation (Doğan 2016).

Fragmentation is a landscape process in which a patch type (for instance habitat type or land cover type) changes and becomes smaller, geometrically different and divided into more isolated parts as a result of both natural and human activities (Leitao et al. 2006; Doğan 2016). Fragmentation leads to a decrease in the total habitat areas of domestic species and results in gaps between the existing habitats. Thus, patches cannot continue to be permanent habitats for majority of the species other than those species that can survive in wide areas (Doğan 2016). The areas with the most visible fragmentation are the locations that are the most suitable for human activities (especially transportation and housing areas) (Barut 2011). Therefore, fragmentation is one of the important measurements in city planning.

Many landscape metrics are used in measurement of landscape fragmentation (Gustafson 1998, Leitão et al. 2006, Jaeger et al. 2011). These are class area (CA), percentage of landscape (PL), number of patches (NP), large patch index (LPI), mean patch size (MPS), area weighted mean shape index (AWMSI), area weighted mean patch fractal dimension (AWMPFD) and patch diversity (PD). The measurements conducted by using the mentioned data and with the help of CSB interface were analysed in four categories as follows (Figure 7)(Doğan 2016);

- Patches with no change,
- Areas with habitat loss,
- Patches with increasing and
- Decreasing fragmentation

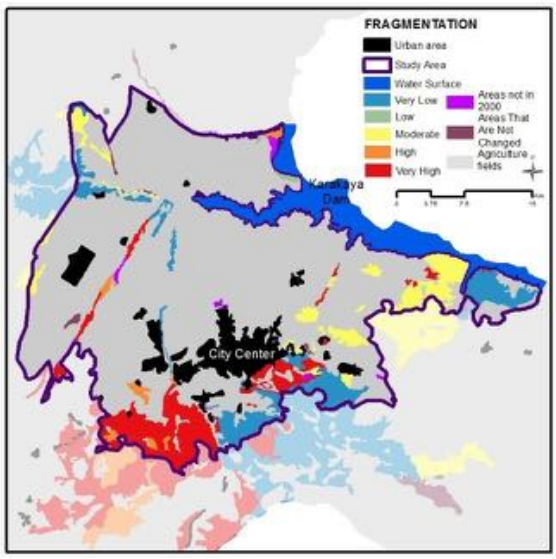


Figure 26 Fragmentation analysıs (Doğan 2016).

The concept of naturalness explains how close a perceived landscape is to its natural condition (Ode et al. 2009). As the patch naturalness increases, wild life diversity and continuity also increases. Therefore, naturalness degree is an important indicator for patches that are fragmented as a result of human activities (Doğan 2016). The metrics regarding patch shape were utilized as naturalness indicator. Because patch borders affect inter patch processes such as migration of small mammals (Buechner 1989), colonisation of wood-like plants (Hardt and Forman 1989) and maybe strategy of animals to find food Forman and Godron 1986 (McGarigal and Marks 1995; Doğan 2016). In identification of patch naturalness, mean shape index (MSI) that

measures shape's complexity was used. Computed values were categorized into 5 groups with equal intervals as very high, high, medium, low and very low (Figure 8) (Doğan 2016).

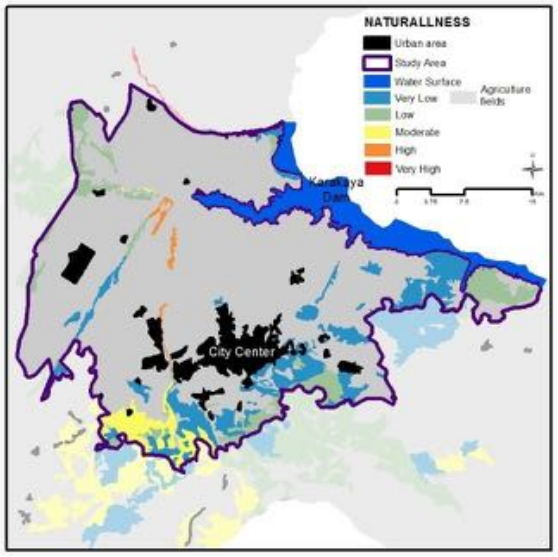


Figure 27 Naturalness analysis (Doğan 2016).

The patches which fragmented as a result of human activities reduce the diversity of species and the species face the danger of extinction. As the diversity of species increase in a patch, wild life diversity also increases. Therefore, diversity is an important indicator (Doğan 2016). Shannon who attached significance to richness component within the study used diversity index. Computed values were categorized into 5 groups with equal intervals as very high, high, medium, low and very low (Figure 9) (Doğan 2016).

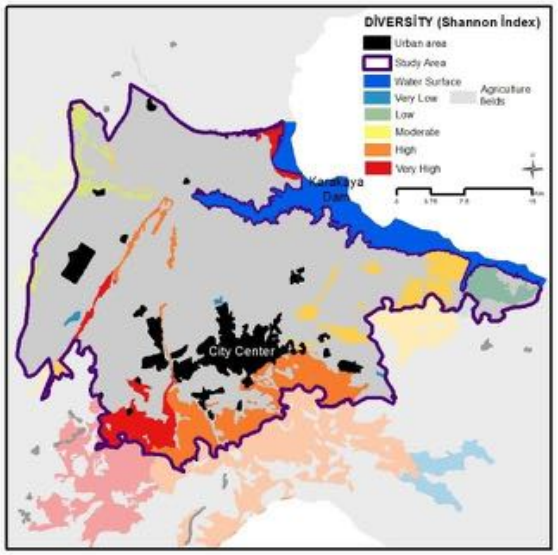


Figure 28 Diversity analysıs (Doğan 2016)

Conclusion and Discussion

The result map at the end of the study is presented in Figure 10. According to this result, the areas between Kilis River and Kamışlıtarla River, Sultansuyu stream's surrounding at the south of the city center, Tohma stream's surrounding at the north and Memikhan stream's surrounding at the east have highly sensitive areas. These areas should be evaluated especially in term of green infrastructure. In designating areas for development in city plans, the areas with low sensitivity should be selected. However, since these areas are covered with agricultural lands, structuring should be designed in a way that does not harm the agricultural texture.

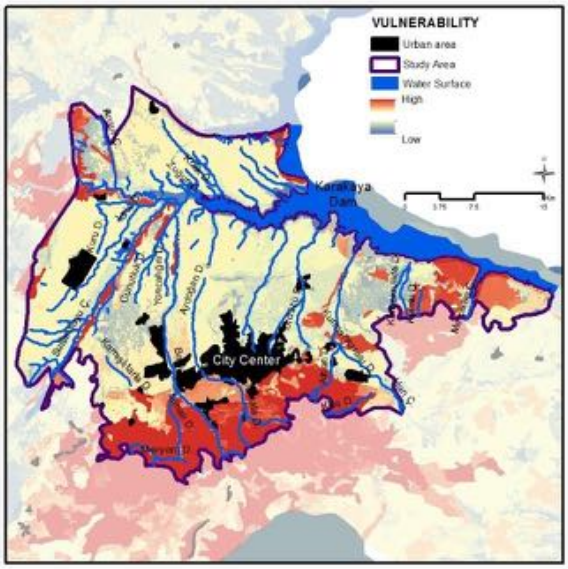


Figure 29 Vulnerable areas

In line with the scope of the study, only ecological processes, natural landscape elements, landscape indicators and metrics were taken into consideration. However, other important factors such as cultural processes (sociological and anthropological processes) and cultural landscape elements (historic and archaeological areas, cultural sites and so on) should also be considered in city planning. A city planning Project that do not consider these elements would not only damage the cultural heritage, but also harm the city's memory.

Another important factor that should be discussed in the projects for city planning is connectivity. Connectivity should be addressed in terms of both the ecology and culture. Green infrastructure plans should not include only the identification of green areas, but it should also present the connectivity (within and out of the city). Thus, the plans would enable ecological and cultural sustainability and would facilitate the creation of a healthy and sustainable area where people can meet their recreational needs. The areas designated as sensitive should have connectivity between each other and their isolation should be prevented.

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TEMPORAL INFORMAL SPACES: A STUDY OF THE INFORMAL NIGHT SHELTER AT PARK NO.2, OLD DELHI

RITU GEORGE KALIADEN

ABSTRACT

The spatial manifestations of informality have long been the subject of research. These represent a "a parallel informal attempt by slum dwellers, vendors / hawkers, new migrants, petty traders, the poor, and the middle classes to mould space according to their needs" (Parthasarathy, 2009). This study attempts to deal with a whole different set of informal spaces – those characterized by their temporal or transient nature.

Temporality and change are marked features of Indian cities. Over the course of a day, the public realm metamorphoses and reconfigures itself in a variety of ways. The multiplicity of uses and claims transforms the public realm of cities in India into a throbbing, vibrant, charged and ever-changing entity; converging the formal and informal spheres and leading to a temporally and socially complex system of use and appropriation of public space. These temporally distributed appropriations of the public realm for a variety of purposes create "temporal spaces" – social spaces that are distributed over time and geographies. Informal temporal spaces manifest in a variety of forms – informal street markets, makeshift overnight tents set up by the homeless, the temporal social space of festivals and political rallies and so on.

In Old Delhi, India - informal night shelters that cater to the homeless are one such manifestation of informal temporal spaces. Set up in publicly owned land, these spaces come into being in the evenings as shelters for the homeless to sleep after a day's work. They disappear in the mornings leaving only faint traces of their existence behind. Devoid of any permanent physical features, these informal night shelters are temporal spaces par excellence and also excellent settings in which to examine the social production of space. The present study explores the concept of informal temporal spaces as socially produced spaces. It specifically addresses the significance of informal temporal spaces in the urban fabric of Indian cities through a socio-spatial investigation of a specific case study - an informal night shelter for the homeless that occupies an open public space in the Jama Masjid area of Old Delhi.

Keywords: Poverty, Informality, Temporal spaces, India, Delhi, Homelessness, Lefebvre, Social Production of space

MAINTAINING UNIQUENESS IN GLOBALISATION: EXPLORING PROGRESSIVE APPROACH TOWARDS URBAN CONSERVATION OPPORTUNITIES IN SMART CITIES MOVEMENT: CASES OF CITIES IN INDIA

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ABSTRACT
The quest for smart cities and global environments is at enormous scale, especially in developing countries. Such opportunities are perceived as economic growth catalysts. The inevitable change that globalisation brings, is transforming cities across the world affecting its local identity. India is among the leading countries to have huge number of such rapidly urbanising cities undergoing transformation leading to monotonous modernisation.
The concern for the potential loss of unique local environments while emerging into smart global cities provided an impetus for this research. However, one has to accept this change and intermixing as it brings economic growth and depicts modernity. Therefore, emerges a need to realise ways in which the unique character of the city could be maintained and enhanced while we embrace modern values and the global – local conflict.
Historic core areas of Indian cities are integral part Indian urban landscape. They own a diverse built and cultural heritage that give them a strong sense of identity. The smart city missions raised a need to revisit old cities from a developmental perspective. The research intends to figure out ways to reinforce the original image of the city with smart city aspirations that is coherent to its historic core. The study assesses urban components that can continue to maintain the unique image of the city giving it a sense of belonging in this changing context. The research explores alternative ways in which the local identities can be strengthened that do not restrict growth and is devoid of conventional conservation practices.
For the purpose, three cases of cities in India namely Nasik, Pune and Srinagar have been investigated. Research methodology involved comparison of on-site data collection and archival records along with public interviews and mental mapping to derive components of uniqueness. Parallel case studies across the world have been analysed to re-affirm the results of the research. The study found out that natural morphological components prove significant and critical care is required while planning to avoid fragmented development. This is where natural features can be fused to link into a coherent development. In addition, historic urban structure – a result of natural morphology is a factor responsible for identity needs attention, while it can allow the desired flexibility.
Keywords: Local Identity, Urban Conservation, Sense of Place, Smart city, Globalisation, historic core areas

Introduction

Urban Design and Uniqueness of a Place

The various and most influential literature on urban design and its qualities have exemplified the importance of uniqueness or distinctiveness of an urban environment. The variety of urban design principles advocated by most of the authors in the field support the concept of uniqueness.

Kevin Lynch 1981	sense
Bentley et al 1984	Visual appropriateness
Holyoak 1985	Retain the Best
Buchanan 1988	Dialogue with context and history
Tibbalds 1998	Respect history
HRH the prince of Wales 1989	Harmony and context
Aldous 1992	Sense of place and historical continuity/harmony/distinctive character and identity

Congress of New urbanism 1996	Architecture and landscape that celebrate Local historic, climatic, ecological practices
SUN 1996	Sense of place
Evans 1997	Distinctiveness
Bentley 1999	Identity.
Mak Tat Lun, 2004.	

Definitions of Uniqueness of a Place

Uniqueness is defined as a quality of being one of a kind, for example, a place that belongs to Pune/Nasik/Srinagar and nowhere else, thus to make a sense of where it is situated. Butina Watson and Bentley (2007) argue that identity of a place that defines its uniqueness is the most commonly used concept to distinguish it from other places. "*How do we know where we are in time and space? How do we understand ourselves in the world?"*(Clifford and King, 1993) This is the precise question one would ask to differentiate one place from another to define its uniqueness. It is about places and people's relationship with them; the meanings that they give to a particular place which make it unique for them. *"To be unique is to leave an imprint, in mind or on eye*" (ibid: 21).

Components of Uniqueness of an Urban Environment

"The physical structure of the environment, the built form evolved in a particular way, the culture and geography of the place and its consequent spatial implications together contribute to the uniqueness of a place" (Hamachi, 2006:14). However, these are chiefly concerned with its physical form and the morphology. The people's perceptions of place also make a place unique, essentially, at the level of meaning. The memories and emotions associated with a place make it unique for them (Butina Watson and Bentley, 2007). The uniqueness of a place is in our mind. The image of a place formed in people's minds suggested by Lynch (1960) or the whole idea of being 'here' or 'there' advocated by Cullen (1971) supports the idea of the sense of place at the level of meaning.

Uniqueness and Associations With the Place

This identity of an urban environment has a communicational value representing social and cultural aspects. It holds meaning for the people who use it. The meanings interpreted by users may or may not be same as intended by the designer. Therefore, it is important to understand these associational values of a place if one is to reinforce the identity of that place (Rapoport 1990).

The sense of place also varies from culture to culture as it is differently perceived by people of different cultures. *"Human beings, having their roots in culture, attach meaning to and organise space and place according to their own culture. This culture (unique to a place) influences human behaviour, values and hence, the way built environment has evolved"* (Tuan, 1977: 5). The built environment thus depicts unique physical setting of that particular place with its specific culture. As suggested by Oliver (1975), the habitat is the product of traditional cultural process. Buildings, whether religious or secular, have symbolic significance of the traditions, customs and beliefs of that culture.

"Buildings and spaces which provide for simple activities and enterprises of ordinary people, strongly relate to the place through respect for local and are produced by the process of personalised thought and feeling rather than utilitarian logic, give them special meaning" (ibid:6). The question might appear to be an environmental but it is quite as much a psychological one (ibid). This implies a place as perceived by people – in the form of an image formed in people's minds due to their associations with the place or through visuals at various morphological levels.

A widening number of studies ranging from architectural (Norberg-Schulz, 1980), geographical (Relph, 1976; Sack, 1997), philosophical (Malpas, 1999) to planning and social theory (Jacobs and Fincher, 1998; Sandercock, 1998) have converged on the importance of a sense of place or identity in an urban environment. It is a part of the sense of belonging or being part of - a key quality of any good city (Lynch, 1981). A strong sense of identity, its uniqueness is said to enhance a collective sense of a place, memory and connectedness and support localisation in a globalising world. It is no surprise that the construction of place identity is increasingly identified as an objective in many urban planning documents" (Yeun, 2005:4). Depending upon studies of place identity, local distinctiveness, its emotional connect with people various approaches that can capture uniqueness have been listed down from the theoretical background study.

The image approach advocates people's perceptions through cognitive mapping suggested by Kevin lynch. It can be highly personal and may not be able define nature of the place and get restricted to a few strong visual elements. The townscape approach focuses on aesthetic and psychological perception of the public realm. It

suggests analysing the visual perception of the urban environment by the observer. However, this separates the cultural and social parameters from the physical form, which might not be the case in reality.

The morphological approach intertwines physical urban form and its evolution through history due to various natural features and social considerations in terms of street pattern, land use and architecture. It disintegrates city into various morphological components from large scale natural features like landform, vegetation, hydrology to a smaller scale man-made components like streets, buildings, and architectural elements. All these components together contribute to local identity of a place.

The cultural landscape approach is a study of interrelationship of natural and manmade landscape of the city. It studies the socio cultural factors that influence the formation of this landscape in a particular way it exists. However, with globalisation cultural parameters get diluted and may not be the utmost important criteria for modern urban identity. Culture has become a dynamic phenomenon with globalisation.

Globalisation/Smart City and Need for Changed Approach in Establishing a Sense of Place

All the approaches defined above help to capture and enhance uniqueness of a place in a certain way. However, it is important investigate these theoretical concepts on the background of globalisation and advent of smart cities in developing countries. This research intends to explore whether these approaches can lead to a progressive approach to maintain uniqueness while embracing global values or would need some modifications and combining them as necessary.

The India Smart Cities Challenge is a competition designed to inspire and support local municipal bodies as they develop smart proposals to improve residents' lives. The Smart Cities Mission aims to promote economic growth, improve governance, and produce better results for India's urban residents. Concurrently, there lies a fear of misinterpreting smart city as a global-modern-state of the art city devoid of local identity as it does not compel on any such parameters.

However, there is no universally accepted definition of a smart city. It means different things to different people. The conceptualisation of Smart City, therefore, varies from city to city and country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents. A smart city would have a different connotation in India than, say, Europe. Even in India, there is no one way of defining a smart city. (http://smartcities.gov.in) This suggests the variety desired in the proposals made for smart cities avoiding similar looking places everywhere. This is where the local identity and uniqueness of place needs to be imbibed and explored as an integral part of smart cities apart from the modernisation that comes with ‘smart city’ notion.

Smart City Mission in India and Local Distinctiveness

There are various parameters given to the cities competing for smart cities in India. These parameters formed a guideline for cities to work on. The retrofitting component gives due respect and opportunity to revive old historic cities which are undeniably integral to Indian urban landscape. Although smart cities do not focus on producing unique local environments as their prime goal, including historic core areas and accepting its immortal presence in urban fabric in Indian cities, is enough to act in the right direction and integrate this development opportunity in sensitive way. The retrofitting component demands to make existing urban fabric more efficient and liveable by infrastructural improvements that allow the core areas to flourish in modern context.

The Redevelopment and Greenfield projects are seen as renewal and extension of cities for future growth. Owing to its prescribed locations on the fringes of core areas and on immediate outskirts, these also offer an opportunity to be developed into a cohesive city model. This coherent urban development plan adhering to smart city parameters can be investigated from the uniqueness parameters. In addition, a pan-city component suggests the much hyped digitisation and technological advancement in city governance.

Such set of parameters will allow enough flexibility to explore the smart approach to city through a sensitive place making approach. Various issues of urban design such as place identity, sense of place, local distinctiveness, and unique local environments can be addressed. Innovative ideas like city branding, image building as modern counterparts of urban design for uniqueness can be investigated with this opportunity.

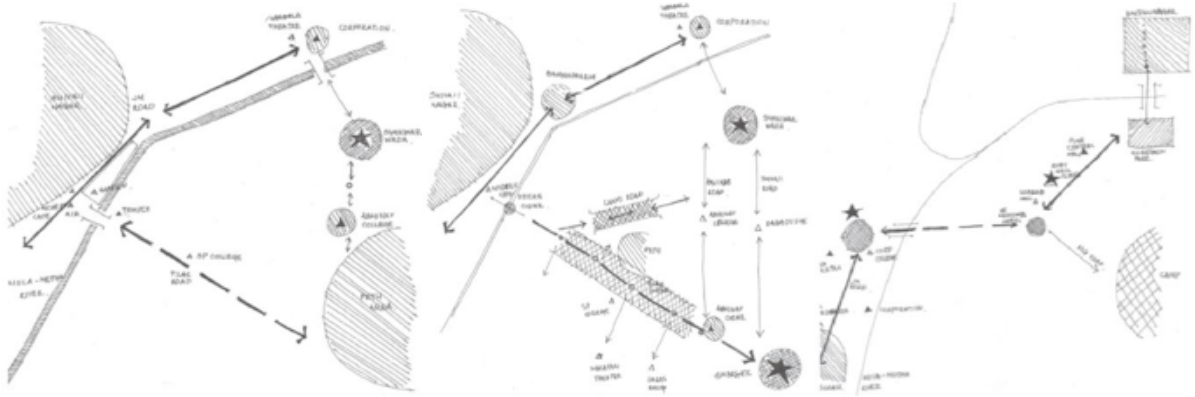
Various Cases Investigated in India

Pune – as an upcoming metropolis**,** **Nashik –** as a tier 2 city with strong religious base, **Srinagar –** as a busy capital city but breathing as a quaint town.

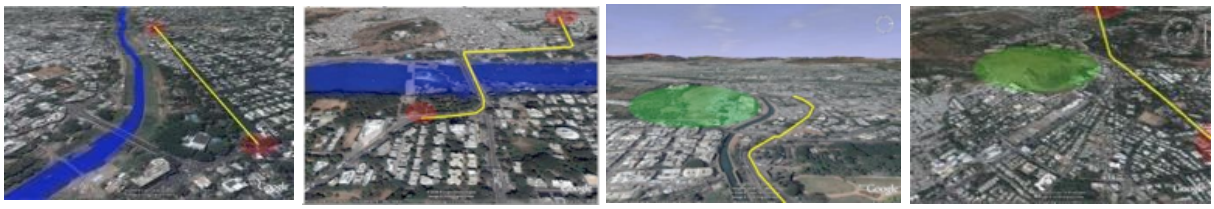
The case of PUNE – Pan City solutions for uniqueness of city beyond digital smartness (for place making and solutions of global-local city branding)

The case of Pune city in India is studied. It is on the verge of becoming a metro with its core areas rapidly transforming to suit modern needs, look and context. On the other hand its new counterparts are springing up with similar looking architecture and urban form; thus facing identity crisis. These urban extensions are rapid and do not respect the unique hill and river geography of the site. This might be a major cause for loss of identity. In addition, the migrant population influx rate is high enough to dilute the intangible cultural aspects of identity. The new residents of the city have no past associations with city while they aspire to create new ones.

In this 'half way through' complex situation, the anchors of the 'place' were identified by means of 'image approach' through people's perceptions. Public questionnaires and cognitive mapping exercise were extensively collected for quantitative sampling. This data was analysed for finding the associational values of residents of the city. The study revealed that residents take cognizance of the existing geographical components like hills, river and open spaces/vegetation which have been evident all through evolution of the city while moving through the same. This gave an indication to revive the lost identity for 'a global Pune' through broader aspect of geographical components; meaningful for migrated residents as well as old citizens.



Composite image from Mental maps analysis, Shah P.(2008)



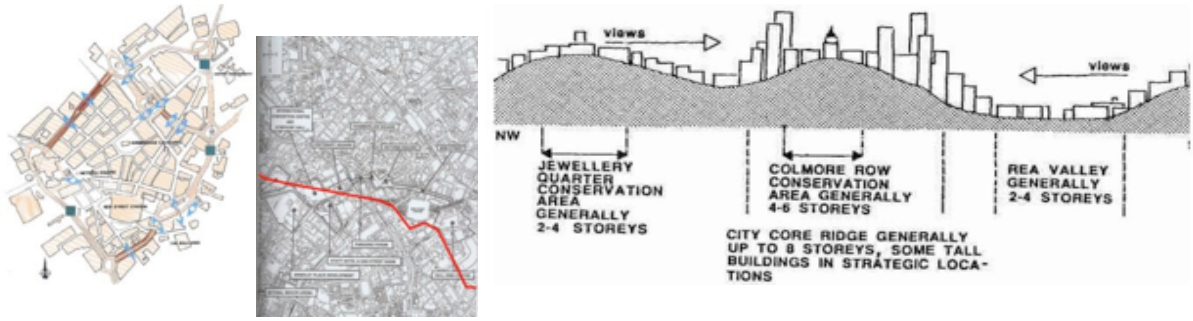
Appreciation of geographical features from Questionnaire analysis, Shah P.(2008)

Along with appreciation of geographical elements, the research finding revealed a problem of non- coherent district formations of new developments that exist in isolation today. Both these important findings suggested linking these non-coherent parts of the city through a common feature of the identity generator – the large scale geo-morphological components. This approach embraces growth and development as a result of globalisation while achieving place identity and establishing connection unique geographical setting of the city.

District formation to be linked by natural features (hills, river, open spaces - omnipresent throughout city, Shah(2008)

Case Studies for Validation of Research Findings

This led to studying similar case studies – urban design projects where geographical features have helped to link different parts of the city together as a whole and restore the lost sense of place.
The Birmingham east-west pedestrian spine route project incorporated a central pedestrian corridor integrating old and new places while linking distinct quarters of the city. Derelict city centre and disjointed quarters post industrialisation raised concerns to act upon such an intervention. Canals present within the city were integrated into this project, along with hilly terrain of the city being seamlessly assimilated. In a Multi ethnic population with no previous cultural/historic connection to the city, this new geo-cultural corridor proved as an important source of association for city residents.



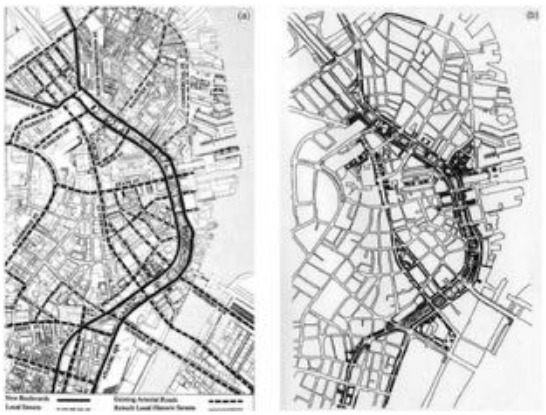
Ring road cutting core area, proposed east-west route, response to topography to access the core Shah(2008)

The **Boston emerald necklace project** is an answer to post industrialisation aftermath in the city. Loss of open spaces and alteration to topography due to new infrastructural needs affected people's psyche in a negative way. A highway laid out which disturbed the city's landscape was strongly condemned. Many study reports proved the negative impact it created on citizen's heath. This resulted in developing a green corridor all through the city and altering the highway to restore people's associations with the place through natural elements while embracing the change.

All images From Butina Watson and Bentley, (2007)

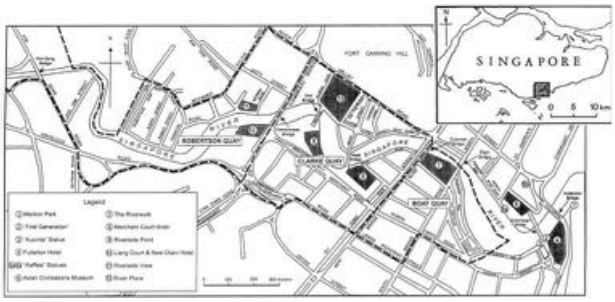
The construction of Central Artery Boston, 1954.

The derelict condition of North end neighbourhood, 1997.



Proposed street hierarchy map
Proposed open space sequence.

The **Singapore riverfront development project** is a typical example of Asian context urban setting criticised for blindly following the west and losing its identity. The global-local conflict realised the need for reviving the old while embracing the global. This project identified the river as a nexus to do so. The global aspirations of Singapore post freedom were integrated with its history of waterfront history and colonial past through a riverfront corridor belt. The modern uses in traditional set up saved the heritage to be lost in the wave of globalisation, river being the catalyst for such an endeavour associative to migrant as well as local population.



The Singapore river and its three main quays

Conserved art deco shophouses at Boat quay, with the financial centre at rear - an oasis of traditional character amidst modern, Chang el al., 2005:421

Singapore River Scene before rapid expansion of CBD, www.yipcheongfun.com

The analysis of the case studies suggests a multifunctional geo-corridor system - incorporating unique natural features of the city. This will facilitate easy movement through the city and can have associative meanings to all, contributing to overall unique character in current times of transcultural environment. Providing easy and legible access to these corridors shall ensure its vital use. Varied land uses pertaining to modern needs will have to be derived and incorporated in such environmental urban design linkage project.

The case of NASIK fringes – extension to existing city core, sensitive Greenfield/redevelopment smart city solutions

Similar to Pune Nasik is facing a fragmented growth problem due to unplanned development. Furthermore, this disregards the main parameters of building a town as in historic times. The extensions, nonetheless, are springing up as 'anywhere in the world' kind of development. A study of urban form of Nasik, Comparative analysis of old and new urban fabric, analysing the socio-cultural background of the city and topographical influences has helped to derive an urban form that is rooted to the city while acknowledging the modern needs.

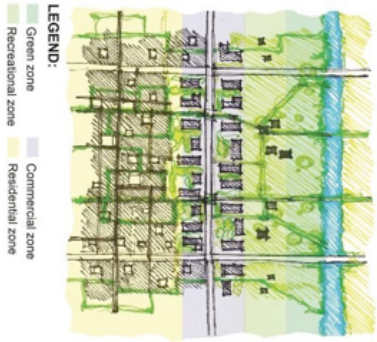
The core characteristics of town formation, mainly street pattern, relationship with river, location and hierarchy of open spaces, building-street relationship, building heights and street sections are studied in depth. These characteristics define Nasik's personality and are suggested to be integrated in modern planning. These large scale morphological components should reflect from its historic counterparts in core area. Modifications in small scale components like plot sizes, land uses; architectural style and building materials can be allowed. This kept certain amount of legibility and associations with the place and satisfied modern aspirations.

Reinterpreted in modern context the key characteristics of town building can help to develop the Greenfield proposals for smart cities rooted more in the sense of place and time rather than being only global in its approach.

Core area urban fabric Vs New area urban fabric

Streets in core area – response to contours

Streets in core area VS Streets in new area River interface in core area VS Derelict River (dumpyard) in new area



Idea of master plan – Transition from river edge to the inner core of the city

Developing street network, nodes from core area analysis,

Proposed extension to core area, All Images – Kaderi A(2009)

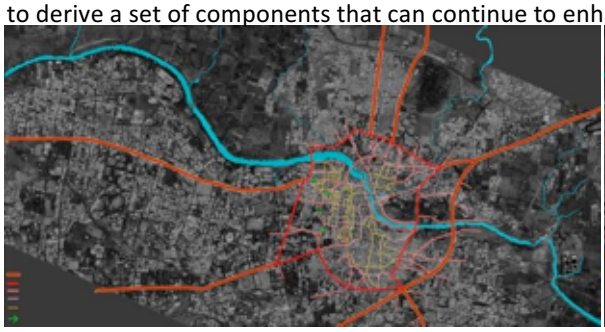
Retrofit of NASIK historic core – Revival solutions for core area

The core area of Nasik houses important religious centre and continues to flourish in insufficient infrastructural facilities. The core area showcases an ability to adapt over years through its continual existence. The retrofit component for smart city allowed reviving religious and historic core area of Nasik. The process involved identifying key issues in the core area and device innovative solutions to repair/retrofit them. Major issues of core areas are lack of modern infrastructural facilities, insufficient street widths, traffic congestion, and pedestrian-vehicular kiosk. Easy accessibility to the core area is also crucial to ensure its vital use; since bustling markets and religious precincts of the core area demonstrate potential to become major economic magnets of the city.

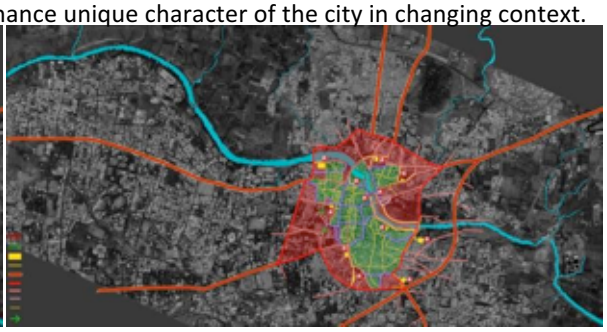
Core area – Heritage stock, unique street character – demonstrating potential to be retrofitted, 2015

Issues in core area – traffic congestion, derelict buildings, new construction with new margin rules, changing the street section and urban structure

The challenge lies in appreciating and enhancing unique character of the core area while impregnating these areas with modern infrastructure to make core areas correspond to smart city vision. The key concern in such an endeavour is - how much and what can be changed to accommodate the growth and what needs to remain intact to create the desired associative memories. This implied to study of all level morphological components to derive a set of components that can continue to enhance unique character of the city in changing context.



Nashik – core area connectivity and traffic scenario



Proposed changes in vehicular movement

Connecting core area with new city through active interface all along the river

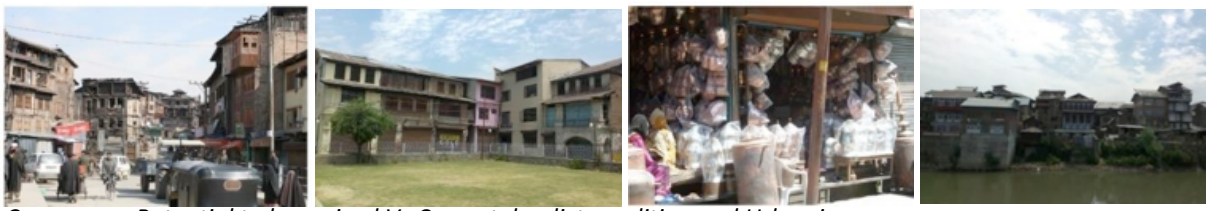
Proposals for riverfront in old and new city, and cultural nodes revival / celebration with land use change

Larger components like movement network, pattern of growth, open space network, relationship with geographical features and their impact on evolution of a town have proved as identity agents for a modern day use from the case of Pune. The urban form is largely kept intact with street pattern and its hierarchy. Certain nodes with cultural significance, landmark buildings and precincts are identified and celebrated supporting lynch's theory of imageability. Few strategic decisions like managing traffic, modification of land use are adopted to resolve current urban design issues.

As the city grew, it changed its relationship with river and the new development faced its back to the river contradictory to the core area where, in spite of being close to river, the city interacted with river in various forms. Since, geographical features like river, hills within city have proved source for achieving sense of belonging from the case of Pune, it became necessary to re-establish connection with river in new Nasik. A public interface with river in the new city area is proposed. Easy accessibility this public realm is designed from new neighbourhoods. It is intentionally designed to differ from the traditional religious *Ghats* in core areas to more recreational and leisure use. This is to suit the modern needs of smart city, while it offered opportunity to newer residents to develop connect with the city apart from religious/historic bias. The continuity it will bring from the old area to new area though river will help in battling the threat of 'placelessness.' The linkage t hrough geographical elements binds the city together to give it the desired distinctiveness.

Case of SRINAGAR – old core area of Aali Kadal – Revival and tourism potential explored

Srinagar was established on the banks of river Jhelum due to riverine transport and flourished as a merchant's town on the way of silk route. The resultant urban form and architectural typology strongly appreciated the river spine; more for practical and functional purposes than intangible associative reasons. The houses, shops, public and religious buildings were accessed from river. Interspaced *Ghats* and structures right at till the edge of water along with smaller stepped alleyways gave a unique urban structure of the town of Srinagar. The movement network through water that advocated evolution and development of town, which is now long-lost. Current vehicular movement negates the presence of river. The city lost its connection with river. This impacted the core area, which now faces a decline. However, there is no way that the earlier movement pattern can be experienced today, in a global fast moving urban life.



Core area – Potential to be revived Vs Current derelict condition and Urban issues

However, the urban life still survives in the derelict core area of Aali Kadal due to many intangible components like crafts tradition, presence of religious landmark buildings, and sustaining local markets. Reviving this movement network for modern day use like leisure, recreation and tourism can evoke a sense of pride and establish lost association with city in a newly found way while embracing modernity. Proposed heritage cruise provides easy access to core areas making it more vibrant and economically sustaining.

Earlier time – riverine transport with river as main spine, alleyways and cart roads forming the urban structure

Current situation– Vehicular transport and roads bypassing and neglecting the river

Celebrated access to river and active riverfront assuring connection with the river

Alleyways leading to river – revitalized with new use and crafts activity to ensure its vital use

o\Revival of core area depends on its easy accessibility from all parts of the city. Aali Kadal area possesses a strong urban character giving it an identity of its own. Due to tight and close knit urban structure limited scale of urban transformation is observed. This allowed small scale interventions like Façade regulations, development control, height restrictions, and material palate to be easily implemented. This helped to retain the character and enhance its uniqueness. In fact, a well-established, easily accessible, congestion free, economically sustaining and culturally vibrant core areas can be used for city branding and image building for 'global' cities with local values.

Activities taking place at Khamir, Crafts centre suggested to be developed in riverfront and alleyways of Jhelum river

Combination of traditional gandolas and motorised boats at Venice

Lighting riverfront and heritage stock at Amsterdam

Cores Areas vs Fringes/Extensions Contributing to Uniqueness – Progressive Urban Conservation Approach

The definition of urban heritage gets broadened in globalisation process and smart city mission. The heritage that anchors us to a place we belong to should be stretched beyond buildings and precincts in core areas. The unique geography of a place, its resultant urban structure, and strategies guided by the same for urban extensions, intangible cultural aspect and its diminishing impact, revealing some important intangible anchors as well - all form part of this global 'urban heritage' paradigm. The urban conservation process is extended from smaller elements of architecture and urban form to a larger scale of geography of the region and its impacts.

These elements face a derelict situation in core areas of Indian cities and needs to be retrofitted to make them suitable to modern needs. Smart city mission allowed this retrofitting, but did not compel to keep the urban structure intact and threat to historic urban structure may arise. Since the mental associations for a particular place come from the particular geographical setting and its resultant urban structure; flexibility can be allowed in terms small components like land use changes up to certain level, traffic management, material modifications and architectural character to a certain extent for facilities improvement in core areas which will have least impact on distinctiveness.

However, apart from the unique physical setting that gives it a distinct character, the socio-cultural parameters that determines the land use patterns and offers varied experiences contributes largely to local identity. This intangible character needs to be preserved, upgraded and be given a modern day meaning and facilities to continue contributing to the sense of place. Certain intangible assets that still remain in collective urban

memories of people in changing world needs to be identified and preserved. These may include certain events, festivals, crafts traditions, some culinary trails or a certain way of living that needs to be celebrated and promoted as a development catalyst.

Conclusion

It is the confluence of all the natural geographic features in a particular way for a particular urban setting that primarily gives the city its uniqueness along with other parameters like urban structure, architectural character and certain intangible cultural aspects and traditions. While these small scale parameters are bound to transform with dynamics of changing culture, aspirations for modern lifestyle, and pre-set standards of global economic quests; the large scale natural morphological components offer an anchorage and a flexible way to still adhere to the sense of place and belong to a particular place.

This can provide a lead to design urban extension projects that can follow similar urban morphology as core areas with modifications being allowed at smaller levels. The **'Greenfield'** projects defined in smart city mission statement for India can adhere to this principle of geographically influenced development of urban structure. The **'morphological approach'** for achieving uniqueness of a place best suits such Greenfield extension projects. The socio cultural consideration shall be developed according to the new intermixing global culture. This will make is associative for new population as well through **'cultural landscape'** approach.

However, the situation in core areas presents a different aspect of maintaining uniqueness. For historic core areas, the urban structure needs to remain intact. The movement network, landmarks, edges as a part **'Image approach'** for uniqueness proves valuable here. This will help to bring back the associations while moving within the core city. The **'retrofit'** of these smaller level man-made components is advocated to enhance uniqueness of the available urban setting. This approach develops from people's memories for already available urban setting and demands to strengthen the same.

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THE SYSTEMS OF URBAN OPEN AND GREEN SPACES AS SUSTAINABLE URBAN DESIGN ELEMENTS

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Abstract
The importance of open and green areas is increasing day by day especially in urban areas. due to the rapid urbanization and environmental pressures. The necessity of planning urban open and green spaces within a system and in connection with each other is accepted in the world more than a century old. In this context, scientific researches on open and green space system are increasing throughout the World. There are many models in practice such as parkway, park system, greenways, greenbelts, pathway, environmental corridors, ecological networks and green infrastructure. All of these concepts are effective approaches in the sustainable planning and management of cities. On the other hand, there is some confusion in the literature regarding similar contents are expressed by different concepts or the same terms are defined in different forms.
The primary concern of this paper is to investigate their relations with each other of the similar terminology used in studies on the open and green space system in the World. For this purpose, open and green space plans that have been applied in the world since the late 19th century have been examined.
The use of a common terminology in relation to all the assets covered by these areas together with the open and green spaces is important to reveal more qualified products at every stage of spatial planning. In this respect, it is a necessity for the comprehensive development of performance indicators.
Keywords: Urban landscape, sustainable planning, open and green space system, connectivity.

1. Introduction
According to Öztan (1968), Akdoğan (1987) and Özbilen (1991), the concept of open space is one of the important basic elements of urban pattern and is defined as open spaces or vacant spaces other than architectural structures and transportation areas (Memlük 2003). According to Keleş, the open space is defined as a determined area for agriculture and non-residential purposes (Memlük 2003). According to Saatçioğlu (1978) and Akdoğan (1987), the concept of green area is stated as the surface areas covered with or combined with plant elements of open spaces. Each green area is an open area, however, every open space could not be a green space (Gül and Küçük, 2001). The open and green areas are areas with recreational potentials that are partially or totally open to human use except for building masses (Şahin, 2012). It is also dynamic areas that reveal the identity of the city, its culture, its way of life (Özyılmaz, 2009).
The studies on the planning of urban open spaces and green spaces within a system and in connection with each other is based on this one century ago. As Frederick Law Olmsted (1903) noted, ‘‘*no single park, no matter how large and how well designed, would provide the citizens with the beneficial influences of nature. Parks needed to be linked to one another and to surrounding residential neighborhoods”* (Anonymous 2014a). In this paper, we present the sustainable urban models that have emerged since the end of the 18th century and used to define as a system with the urban open and green area elements. These are parkways, greenways, greenbelts, pathways, environmental corridors, ecological networks and green infrastructure. They are explained and examined with selected cities with practices in the World. Within the scope of these basic objectives, it was determined on relation with each other of these models with the criteria determined for this study.

2. Materıal and Methot
The materials of paper, literature related to the subject and examples of practices from the world cities. In the method of the study, in the first stage, concepts such as parkways, greenways, greenbelts, pathways, environmental corridors, ecological networks and green infrastructure, which are effective in sustainable urban planning and management, are summarized in chronological order by summarizing the basic features of these models. In addition, the practices were selected on the world cities examined in terms of content similarities and differences.

In order to reveal the relations with each other of the defined models, "evaluation criteria" were determined by through sample practices, and then each model was evaluated according to these determined criteria and a table 2 was prepared.showing relations with each other.

3. Results

In North America, the idea of linking parks to each other dates back to the 19th century (Little, 1995). The definitions of these concepts, which are important in sustainable urban planning and management and are found to be the most used in the literature, are given below:

Parkway: It aims to re-exist the rural areas which were reduced by the growing cities in urban pattern and to arrange the urban landscape. The world's first Parkway was the "Eastern Parkway" designed by Frederick Law Olmsted and Calvert Vaux in 1866. The concept of parkway began offering "enjoyable horse riding and driving" and access to "Prospect Park"as a landscaped way by these designers (Anonymous 2016a).

Benjamin Franklin Parkway: This Parkway in Philadelphia, which is about 1.5 km long, cuts across the city's grid plan crosswise and continues as far as the Philadelphia Museum of Art starting from the City Hall. Preserving the basic design of Paul Cret's 1907 plan, Jacques Gréber replaced the monumental plaza with a smaller oval, designed by Cret, on the skirts of Fairmount creating a green wedge with a wide open space extending to the city and aiming to provide a street for automobiles. This magnificent and quite large parkway has become one of the city's most iconic and admirable streets, and has become an important source of economic, educational and cultural significance for the city (Anonymous 2016b).

Figure 1 Benjamin Franklin Parkway Plan (Anonymous, 2016c).

Greenway: According to Fabos (2004), the emerge of the greenway plan dates back to the second half of the nineteenth century. This concept, which was frequently mentioned at the beginning of the 1900's, is a green network planned, designed and managed for recreational, ecological, aesthetic and historical-cultural uses (Ahern, 1995).

Greenways are linear corridors linking to natural corridors such as landscape elements, rivers, valley; used for recreational purpose canal, parkway, natural reserve areas along the railway route; cultural objects or historic settlements to each other and settlements. Pekin, 2007; Hepcan, 2008).

Greenways which priority aim is conservation and recreation, are linear systems that provide distinct advantages in terms of natural resources and on the basis of linking urban and rural areas, with regard to the transport and movement of materials / materials, species or foodstuffs (The Report of The American President’s Commission, 1987). In his work Ahern (1995) stated that greenways could be at regional and local scale; In his work on Fabos (2004) he also stated that green roads could be planned at national scale.

Emerald Necklace Greenway: This road was designed by Olmsted in 1860 to link America's urban parks with natural systems and to make these parks part of the "greenways". The purpose of this greenway approach is to connect Franklin Park, defined as emerald, with other green areas. (Between Arnold Arboretum and Jamaica Plain with Boston Garden and Common). It covers an area of about 11 km and covers an area of 5 km² and connects Massachusetts, Boston, Brookline and Cambridge. This linear park is an ecologically important urban natural area that improves the city's air quality, creating nesting spaces for migratory birds, with an opportunity for recreation in a natural environment (Anonymous, 2016d).

Figure 2 Emerald Necklace Greenway, 1867 (Fabos, 1985)

Greenbelts: Greenbelts have emerged to control intensive construction, to prevent neighboring cities from integrating with each other and to protect the characteristics of cities. They include landscapes and natural areas that are protected by the aim of protecting and enhancing natural and agricultural land. It is defined as continuity of open space surrounding settlements to limit or direct urban growth. While expressing an open space in America, it is defined as a buffer that prevents the convergence of cities in England (Little 1995; Hellmund ve Smith D.S., 2006).

Frankfurt Greenbelts: Frankfurt Green Belt area planned by a group including Peter Latz between 1990 and 1992, can be regarded as the starting point of Höchst-Schwanheim the river border. It covers an area of approximately one third of the city, 80 km wide and 70 km long. It is planned this recreational area as a landscape conservation area, unstructured and naturally abandoned has spread with a greenbelt (Anonymous 2015).

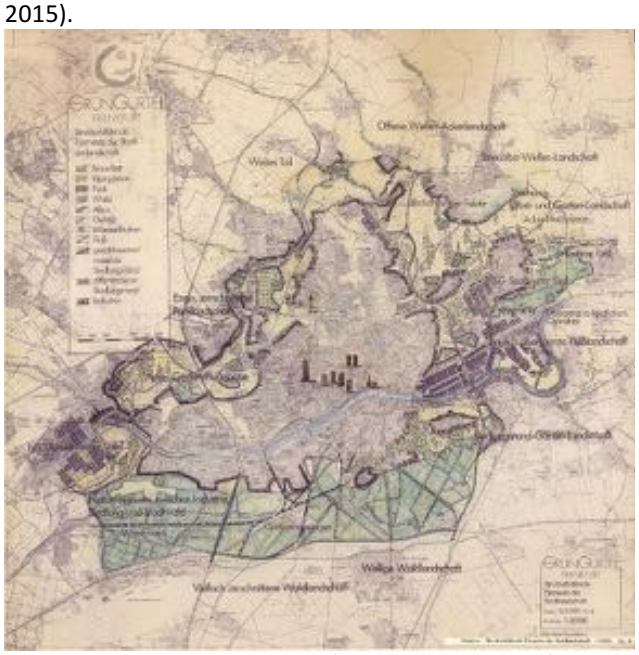

Figure 3 Frankfurt Greenbelts (Anonymous, 2016e).

Pathway: Pathways emerged in the late 1950s or early 1960s, differ from other urban pedestrian paths with some features and scopes. These pathways are completely closed to motor vehicle access . They connect the city's main recreation centers, visual focus, parks and greenbelts to residential areas and the urban area as a green corridor allowing for various recreational activities at all seasons (Şahin 1991). These pathways that are point out as a recreational road and bicycle path for transportation have included Four-roller skating or ice-skating, jogging, walking, recreation (Şahin 1991).

Ottawa Pathway System: The multipurpose pathway system for walking, running and cycling in the city of Ottawa connects parks and open spaces in the neighborhood to the central and out-of-center areas. This system provides links to "Roger Stevens Drive", "Prince of Wales Drive" and "Fourth Linear Routes", which are defined as future bike routes in the Ottawa Draft Bicycle Plan. In addition, the Ottawa City Official Plan is linked to the rural main "pathways" (Anonymous, 2016f).

Some of the criteria used to decide on this plan are as follows (Anonymous 2017a):

- Compromise with landowners that these roads pass by land

- Prioritized planning of these roads in inner regions
- Creation of full circulation
- Priority is given to roads that do not require large expenditures such as bridges to cross water channels.

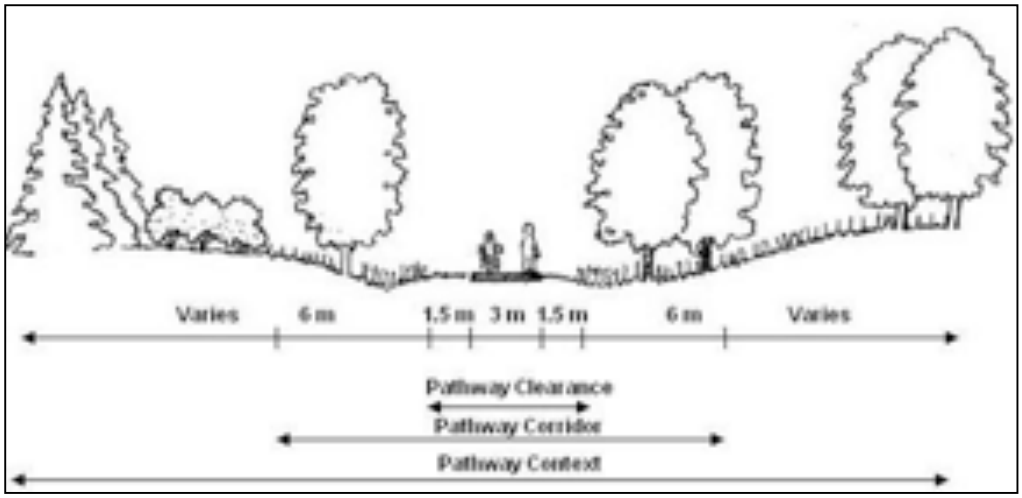

Figure 4 Canada's Capital City Strategic Regional Plan, Pathway, 2006 (Anonymous 2017a).

Environmental (Ecological) corridors: Philip Lewis identified 220 natural and cultural sources that he found intensively, particularly in rivers and corridors along major drainage areas through a mapping technique in Wisconsin at the beginning of the 1960s. This concept, which Lewis calls environmental corridors, focuses primarily on the protection of environmentally sensitive areas or river corridors (Lewis, 1996; Fabos, 2004). The environmental corridors, which are more emphasized by the corridor concept, are linear systems such as fault lines with high values in terms of natural, historical, scientific, visual and recreational features and strips of the river (Anonymous 2017b; doğan, 2012). Ecologically important lakes, wetlands, plains and forests become more valuable when connected by corridors (Anonymous 2017b).

Environmental Corridors in Southeastern Wisconsin The Southeastern Wisconsin Regional Planning Commission (SEWRPC) has mapped the main elements of the natural resource base of the Southeast Wisconsin Region. These include lakes, rivers and connected coastal areas and floodplains; Wetlands; Forest areas; Wildlife habitats; rugged terrain and high relief topography; Wet, poorly drained and organic soils and fragmented green spaces. In addition, it is mapped natural resources such as present and potential park areas, historical and archaeological spaces, natural landscapes and areas with scientific value. With these inventories in the landscape, environmental corridors have been identified which are defined as wide linear areas. These corridors are classified as primary, medium and isolated natural resource according to width, length, and the area they cover (Anonymous 2017c. Lewis's work anticipated the modern challenge of creating a more comprehensive green infrastructure networks (Austin, 2014).

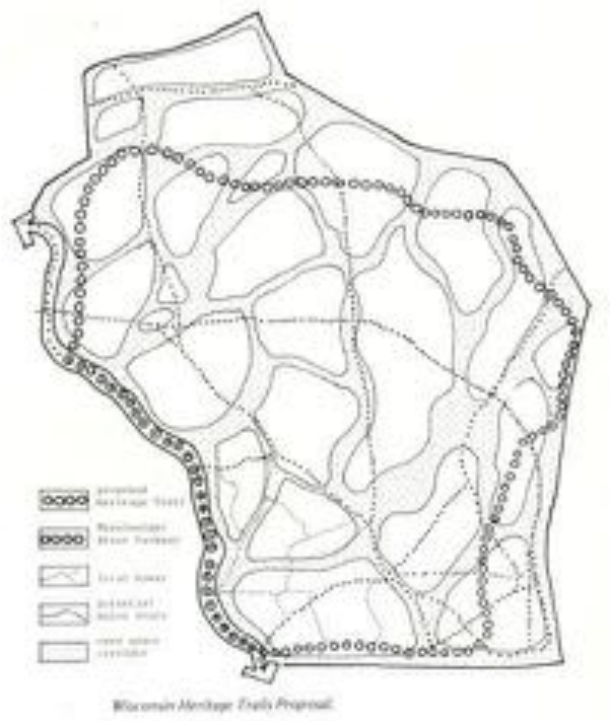

Figure 5 Wisconsin Heritage Trails Proposal (Lewis 1964; Anonymous 2017d)

Ecological networks: As stated in many sources, ecological networks have been established in order to protect and develop biodiversity, to facilitate species movement or other ecological processes, to sustain and maintain habitats in Europe. This ecological network concept, which emerged in the Netherlands in the 1970s is defined as a system consisting of core areas, corridors, buffer zones and, in some cases, development and repair areas (Hepcan 2008; Tokuş, 2012).

Corridors cause positive effects on genetics, species change (individuals, seeds, genes) and species migration (Foppen et al., 2000). Ecological corridors can also perform other landscape functions such as climate regulation and erosion prevention. According to many researchers, these corridors can be defined local or micro scale, regional or mesoscale; continental or macro scale. Jongman & Troumbis (1995) ve Bennett (1999) indicate three different corridor types as linear, step stones and landscape corridors.

Ecological corridors are often the result of human intervention in nature in Europe. Major rivers on European scale are important corridors and most of them are the backbone of national ecological network (European Centre for Nature Conservation, 2002).

Pan-European Ecological Network: The pan ecological network covering 55 countries, initiated by the Committee of Experts in 1997 and established in 2005 are initiatives for direct protection areas on the European scale. It was developed an extraordinary ecological network and living memorial landscape along the former Iron Curtain which divides the European continent for about 40 years east and west (Anonymous, 2017e; Anonymous, 2017f). According to the European Biological and Landscape Diversity Strategy, the main aim of corridors in the Pan-European Ecological Network is to provide links for species during migration and facilitate diffusion between core areas. The corridors are defined in this project as a functional connection between habitat of a species or a group species, made up of different landscapes from the surrounding landscape (Anonymous, 2017g).

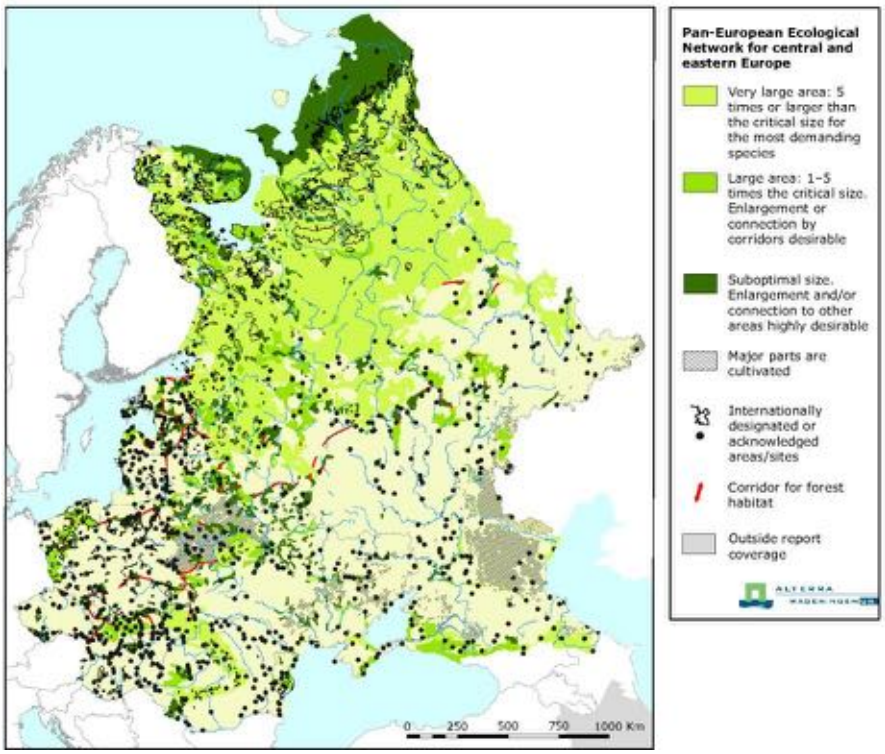

Figure 6 Pan-Europe Ecological Network (Anonymous, 2017g).

Green Infrastructure: Green infrastructure concept is a new word, but it has a history that is more than a century away as an idea. This concept accelerated by the work of Ed McMahon in the 21st century, prevents the fragmentation of habitat and provides the economic, ecological and cultural contribution to the city by ensuring that open and green areas are interconnected on the basis of the most basic feature of connectivity. Another key feature is the multifunctionality which allows for greater use of the same area ((Benedict and McMahon, 2002)

Green infrastructure approach for land use planning, designing and management, both with its multifunctionality feature offering the opportunity to benefit more simultaneously from a site, by emphasize the places where single or limited usage will be provided, and to be able to manage this situation that are often faced with housing, industry, transportation, energy, agriculture, nature protection, recreation and aesthetic use (Landscape Institute, 2013). Within the definition of green infrastructure, it can be stated that open and green space systems are designed for two main purposes (Benedict ve McMahon, 2002; Tokuş, 2012):

- Connecting parks and other open and green areas to each other,
- Prevent fragmentation of habitats and connect natural areas to contribute to biodiversity

Maryland's Green Infrastructure Assessment and GreenPrint Programme: This program founded in 1969 is one of the oldest state-funded conservation programs. It was emerged from the need of required connections between natural systems to calculate habitat fragmentation and to ensure the sustainability of biodiversity. The Green Infrastructure Assessment that based on landscape ecology and conservation biology principles, was identified approximately 2 million acres of ecologically significant areas across the state in the Maryland network. Maryland's green infrastructure providing air and water quality protection, wildlife habitat and biodiversity, basic ecosystem services such as flood damage reduction and carbon sequestration, was under increasing pressure from urban and suburban growth. The green infrastructure assessment provided the necessary guidance on the priority areas of protection (Anonymous, 2017h).

Figure 7 Maryland's Greenprint: Targeted ecological areas (Anonymous, 2017h).

Within the scope of this study, with the aim of revealing the relationships between the open and green space system models described above, basic criteria have been determined as scale, priority purpose (health, recreation, social, ecological, habitat conservation, aesthetic, historical and cultural values, economic, landscape character), accessibility, connectivity, multifunctionality and contact with nature. The definition of scale is based on the definitions of Ahern (1995) study (Table 1). The comparison of the models with each other according to the specified criteria is shown in Table 2.

Table 1. Scale definition (Ahern, 1995)

Area (km²)	**Political Units**
1-100	Municipality
100-10000	Country province
10000-100000	States small nations
> 100000	Continents and large nations

According to Table 2, It can be said respectively that emerged that Parkway in America in 1867; Greenways in America; Greenbelts in England and Canada; Pathways in Canada at the end of 1950's; Environmental corridors in America; Ecological networks in the Netherlands and Green Infrastructure in the 2000s.

When we examined scale, it is determined that ecological networks and green infrastructure could be at every scale starting from the local scale. Considering the priority objectives, parkways, pathways and greenways are more likely to be recreational; greenbelts, ecological network, environmental corridors and green infrastructure have priority in protecting ecological, habitat protection and landscape character.

Accordingly, some of the common points of these models can be mentioned as follows:

- It is based on creating connectivity and being multifunctionality.
- Whatever the scale, they provide recreational, ecological and economic benefits to the city.
- They help people to have more contact with nature.
- They contribute to the conservation of natural areas.
- They focus on ensuring the protection-utilization balance.

Table 2. The relationship between sustainable urban models

History	The forerunner or First Examples	The Concepts	Scale (Municipality, Country province, States small nations, Continents and	Priority Objectives									Accessibility	Connectivity	Multifunctionality	Contact With Nature
				Health	Recreation	Social	Ecological	Habitat Conservation	Aesthetic	Historical and Cultural Values	Economic	Landscape				
1868 USA	Olmsted ve Vaux	**Parkway** Anonymous, 2016a.	Municipality, Country province	√	√	√	√		√		√		√	√	√	√
1850-1900s North USA	Charles Little	**Greenway** Fabos, 2004; Ahern, 1995; Pekin, 2007; Hepcan, 2008; The Report of The American President's Commission, 1987	Country Municipality, province	√	√	√	√		√	√	√		√	√	√	√
1919 Europe, USA	England (Londra), Canada (Ottowa)	**Greenbelts** Little 1995; Hellmund ve Smith, 2006.	Municipality, Country province	√	√		√					√	√		√	√
1950-1960 Canada	Canada (Ottowa)	**Pathway** Şahin, 1991; Anonymous, 2017a.	Municipality, Country province	√	√				√				√	√	√	√
1960s America	Philip Lewis	**Environmental Corridors** Lewis, 1996; Fabos, 2004; Anonymous, 2017c; Doğan, 2012.	Municipality, Country province	√	√		√	√	√		√	√	√	√	√	√

1970 Europe	in Holland	**Ecological Networks** Hepcan 2008; Tokuş, 2012; Foppen et al., 2000; Jongman & Troumbis, 1995; Bennett, 1999; European Centre for Nature Conservation, 2002.	Municipality, Country province, States small nations, Continents and large nations	**√**	**√**		**√**	**√**				**√**		**√**	**√**	**√**
2000 USA	Ed McMahon	**Green Infrastructure** Benedict ve McMahon, 2002; Tokuş, 2012; Landscape Institute, 2013.	Municipality, Country province, States small nations, Continents and large	**√**	**√**	**√**	**√**	**√**	**√**	**√**	**√**	**√**	**√**	**√**	**√**	**√**	**√**

4. Conclusion

Due to the rapid increase in population, the resilience of the cities decline, thus the urban landscapes are disturbed. As a result, the open space systems around the world have been so important. The urban design models address the elements of urban open and green spaces as a system besides picturing the links among these elements. The urban design models are not only ecological but also have great social benefits which also translate them into significant tools for sustainable development. The open and green space system itself is now considered as an element. In other words, each open and green space element within the system only makes sense as a part of the whole system. Therefore, the system comprised of all linked elements or the unity can now only be defined as a single element.

The models as well as green infrastructure from the second half of the 18th century demonstrate that the open and green space elements were addressed as a system by using many terms with various aims and in various contexts. These concepts were evaluated according to the purpose they served. On the other hand, their purpose might have changed in time. For example, “greenway” as a concept was handled differently in various resources. Nevertheless, it was found that their contents resembled.

When we look at the examples of practices from the world as well as the scientific studies, we understand that green infrastructure as a concept was considered as an important tool for creating more livable cities within the above mentioned models.

The concept of "Green Infrastructure" was searched in the category of "title, summary and keywords" by using the "Science Direct" database which provides to 2159 journals mainly in the field of science and bibliographical access for the previous years.

As seen in Figure 8, the first study of this concept was made in 1995, and it is seen that number of these studies has increased steadily to 106 in 2016.

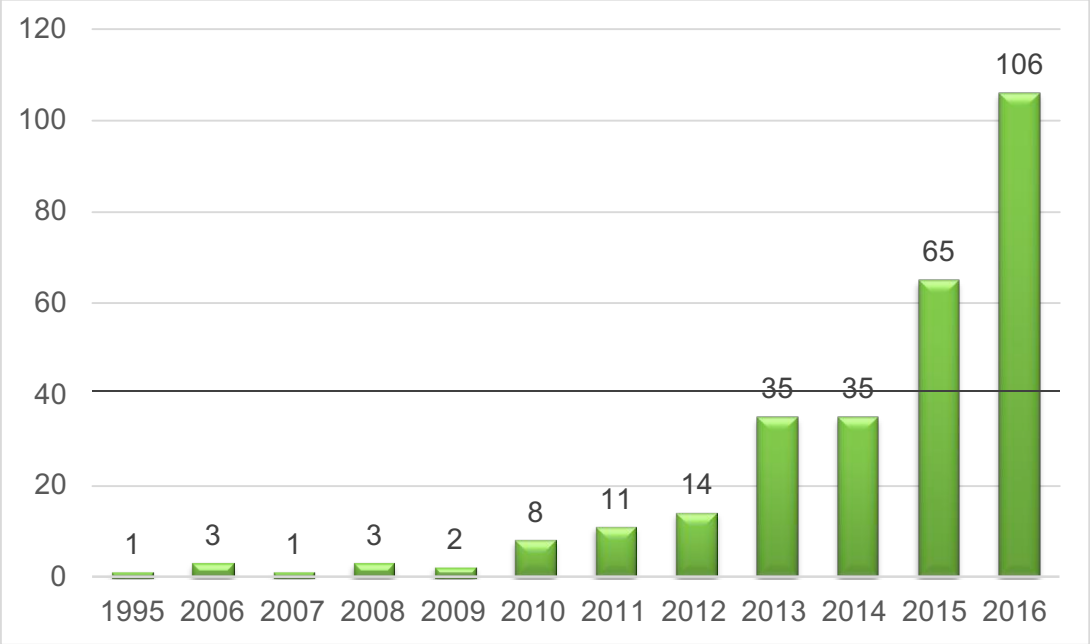

Figure 8 Number of Studies on Green Infrastructure (Science Direct, 2016).

In the context of the paper, the Green Infrastructure concept which has emerged in recent years in open and green space system models is seen as an important planning tool in the creation of more livable cities in both the examples in the world applications examined and the scientific studies, This concept which has increasingly been used around the world since 2000s includes different hierarchical order in both regional and local scale as well as all the other criteria in terms of the content. Thus, it is possible to infer that green infrastructure as a concept covers all open and green space model systems.

A common terminology of the system and its’ elements must be developed in order to produce eligible products in every phase of space planning and to increase success indicators extensively. Furthermore, standard indicators and success indicators must be prepared based on unique features of each city. The system elements must be in congruence with the size, impact radius and ecological features of a space. This system elements should be framed by criterion such as population data, area size, impact radius and ecological characteristics. Given the alterations in time and events, while looking back on past approaches we must also look forward.

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TRANSFORMATION OF BERBER TRADITIONAL PLANNING AND LIVING SPACES

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Abstract

The Algerian Southeast region was animated by a network of human settlements built according to the urban model of the Islamic medina and its traditional habitat of adobe. Various rural and urban development and transformation of planning and living spaces have recently come under the pressure of rapid urban growth. This study aims to analyze and compare Berber domestic spaces across a sample of houses from Aures valley, this region of Algeria which presents distinctive geological, geographical and historical characteristics. The study will look, first at the houses, then at similarities and differences in space configuration in order to pose questions of how this traditional architecture with its climatic and cultural solutions could be utilized or transplanted in the new urban context. The study focuses particularly on observing and analyzing different factors which influence urban life like social patterns, family lifestyle, migration which may have led to some modifications in the social structure. This attempt to analyze and compare the physical structure of Berber housing and settlements in Algeria might help to better understand the planning space organization and give us clues to the formulation of communities in the past; their culturally and climatically significant design methodology has considerable relevance to contemporary architecture. This study attempts to learn how the traditional Berber built environment may be considered as a good example of an end product of an interaction between constant elements such as the religious factors, the climate, the landscape and changeable elements such as economic, technological and industrial means, that is to say a product of a societal process.

Keyword: habitat. Social structure. Urban growth. Transformation of planning. Berber housing

Introduction

Traditional built environment is, essentially, the manifestation of the group. It is the result of a collective social code responding to basic need, shelter to ensure physical well-being, satisfactory comfort, security, while at the same time responding to society's common respect and preservation of its natural environment. The house is the center of society, a built-up space in which all the functions of society intermingle and present themselves, and in order to establish a better understanding of the habitat it is imperative to apprehend all its aspects. This research focuses on the traditional habitat grouped and perched in some agglomerations of the Aures massif; it is a vast mountainous region of around 11,000 sq. km, situated in the northeastern part of Algeria between the high plains and the Saharan borders (fig 1). The Aures massif is subdivided into Aures Chergui (eastern) and Aures Gharbi (western), and is characterized by the two deep and parallel valleys of Wadi El-Abiod and Wadi Abdi. It has a continental climate, which shows wide variation, with a very cold winter and hot summer. This study will focus on the agglomerations of Oued Abdi valley (community of Menaa) (fig 2), whose approach is to establish a typology of this type of traditional habitat, highlighting main factors and several logics that have brought about the architectural and morphological transformations. The degradation of some houses and the dilapidated of some others, due to socio-economic changes. This study examines vernacular housing forms in the Aures valley to identify common characteristics which may explain better the several factors of transformation in the domestic spaces in this region. In addition, self-builders have been utilizing foreign house-design components in their projects. This new housing is not fulfilling residents' social and cultural requirements, such as their need for privacy. New house designs are needed based on the main traditional requirements of daily life, as adapted to modern conditions.

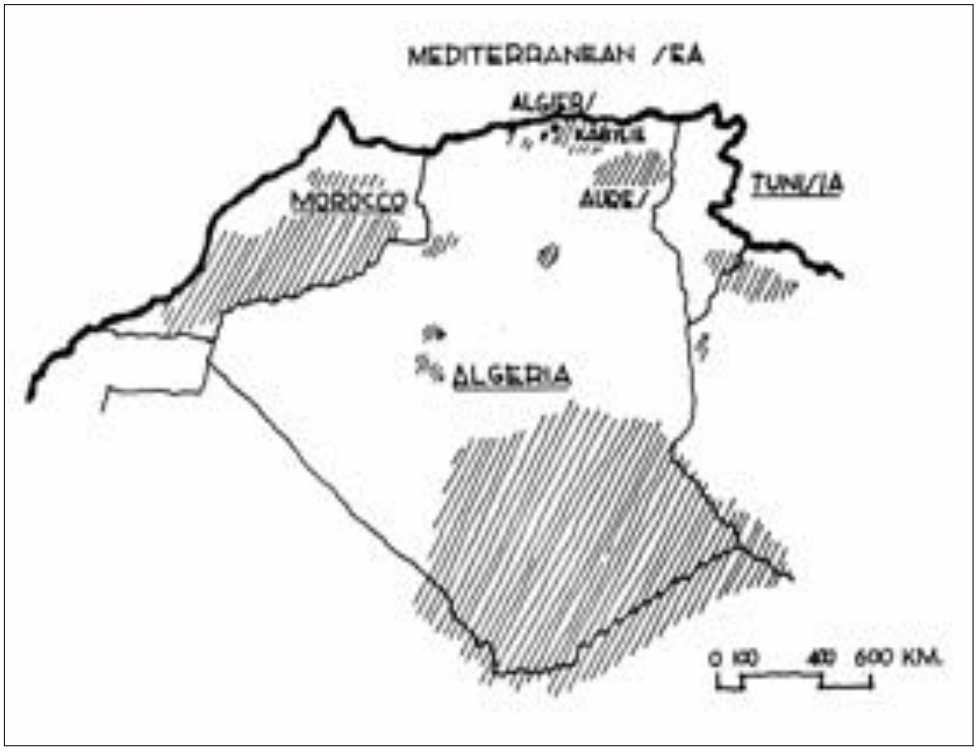

Figure 1: Map showing Berber hatched areas (drawing after Lebbal 1989)

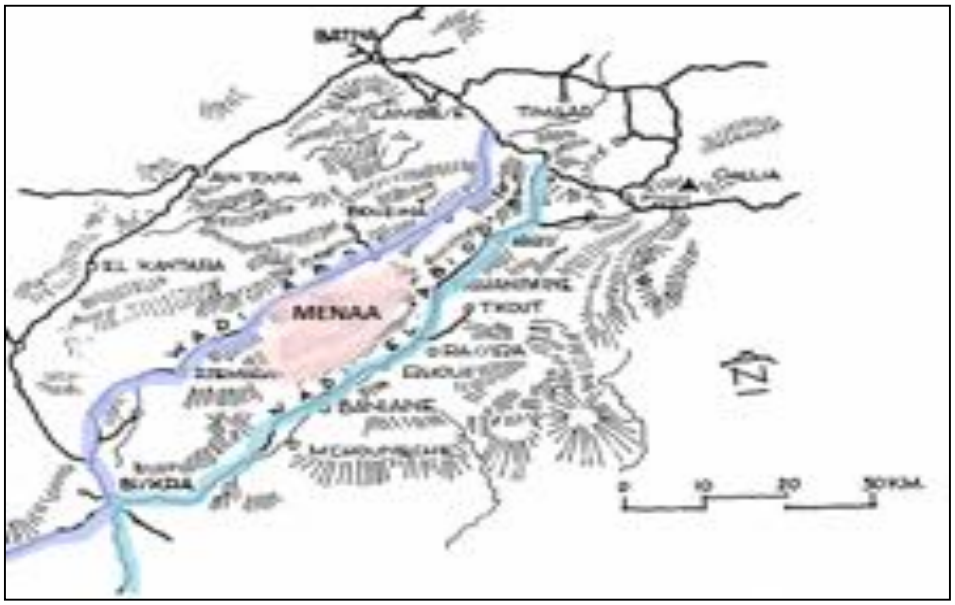

Figure 2 : localization of the study area in the Aures valley (drawing after Lebbal, 1989)

Factors of transformation berber housing forms

Environmental Factors:

According to many scholars, sociocultural factors are the principal agents influencing housing forms, while climatic and physical concerns may generally be related to change and design development. In some other cases; environmental conditions may be more influential than sociocultural factor which is the instance of Berber housing. Important factor dictating the location of Shawia settlements has been the lack of water and fertile land. This forced local population to build their villages on top of hills and cliffs in order to save lands for agriculture, as well as to protect themselves from the flooding of rivers. Formerly, this strategic position taken by the Shawia had a social and political reason during inter-tribal wars.

Figure 4: *Menaa* defensive site(By the author.2017)

Figure 3: *Warka* a typical Berber village (By the author.2017)

. The villages high up on the mountains were established for defensive purposes (fig 3). In the Aures region the houses are generally grouped in hamlets and villages. One of the most marked characteristics of these settlements is the singular unity of their architectural form. Taking advantage of the cliffside by using the rock as a back wall, the houses, punctuated by a few small windows, are tailored to individual needs. Their juxtaposition produces a remarkable effect, creating villages of real character with a harmony due to the restricted range of materials and colors(fig4), and a unity due to related forms.

The social structure

There were two different types of tribal organization in pre-colonial Maghrib. In the first case several villages inhabited by sedentary farmers formed a tribe, or 'arsh in Berber. Every tribe descended from a common mythical ancestor. It possessed a waste common territory also called 'arsh. The tribe was ruled by a military chief ('amin ul-'umana') elected every year by the council of elders, called jema'a, which was composed of representatives of the villages. It represented the highest judicial power of the tribe. During wars and political troubles many tribes formed military and political coalitions – so-called taqbilt. This kind of tribal organization was observed in Berber villages of the Kabylian and Rif types (Bourdieu 1963: 11–12; Hart 1972: 25). Semi-nomadic groups and recent sedentary farmers formed tribes with the same attributes such as common land ('arsh), military chief and sometimes council of elders (tajma'at). But its basic social unit was the faction (harfiqt in Berber and ferqa in dialectal Arabic) composed of subfractions, which in turn included several lineages, and not a village. This kind of tribe was known among the Berbers of AuresThe tribal institutions and practices played a supplementary role in the village life. They protected the village society from destructive outside invasions. In the pre-colonial period tribe had no permanent administration. Tribal *jema'a* and *tajma'at* did not intervene into inner affairs of village communities (Daumas 1853. 204). The sense of tribal solidarity of villagers was mobilized very rarely in cases of wars, rebellions and other important disasters. The Berber village was part of wider social and political communities.

The family was the basic social and cultural unit of the village and had many functions, not all of which were explicit. One of its roles is that it guaranteed the continuity of local "tradition" or cultural heritage of the village society; Berbers live and work more in the street than in their houses. Nowhere there is privacy in its modern. In most Berber settlements houses are built very closely. (Vladimir O. Bobrovnikov. 2000). In the everyday life the role of family and lineage preponderated that of the tribe. The tribal solidarity reinforced the common village solidarity. Extra lineage ties form new numerous relationships between households and individuals. It should be noted, that the peasant conception of the tribe was constructed on the notion of family as that of clan and village. That's why the names of Berber tribes include the notion "children, descendants" (*ayt* and *uld* in Berber and *beni* in dialectal Arabic) (Tillion 1938: 42–54). This kind of social and political organization of the Berbers caused a political segmentation of local society. But, on the other hand, it provided it with a strong inner autonomy based on local social and political institutions.

Structure of Berber family

Each nuclear family (parents and unmarried children) occupies one house. The interior of the house is carefully arranged so that each member of the family can preserve a minimum autonomy and proper privacy. The Berber family is a patriarchal one; its cohesion is protected and maintained by a system of matrimonial alliances and also by different judicial measures, for example the right of pre-emption, the disinheritance of women, etc., designed to conserve for the males the ownership of an undivided patrimony. It is therefore uncommon to find married daughters still part of the extended family. Yet the male descendants are expected to remain part of the family even after marriage, subject to the same paternal authority as before. The new wife for her part is considered as a means of increasing the size of the family and of tightening its ties. The head of the family lives with his wife, his sons and daughters-in-law, his unmarried or divorced daughters, his mother, and, generally, his brothers, in order to avoid either division of property or the building of new houses

House types

The traditional house "thaddart", like any vernacular architecture, is the result of human adaptation to climatic and social conditions and availability of construction materials and knowledge of their techniques. Indeed, it is a house of long ago in which everything was present: the best techniques, the most efficient dimensions, most effective, friendly, fertile and economical arrangements, where wisdom reigned and expressed itself through poetry. The traditional Berber house was a product of collective efforts: the house was *folklore*.

The Shawia settlements in the Aures are less elaborated than other vernacular houses in Algeria. Samia AJALI ,1986 described these shelters as a scattered houses here and there on a traditional rural frame; if it grouped it constitute the" *dechra"* more structured and well integrated in the environment. According to the study of Lebbal, 1989, there are many types of traditional Berber housing such as:

- Subterranean dwellings;
- Cave dwellings;
- Gourbis;

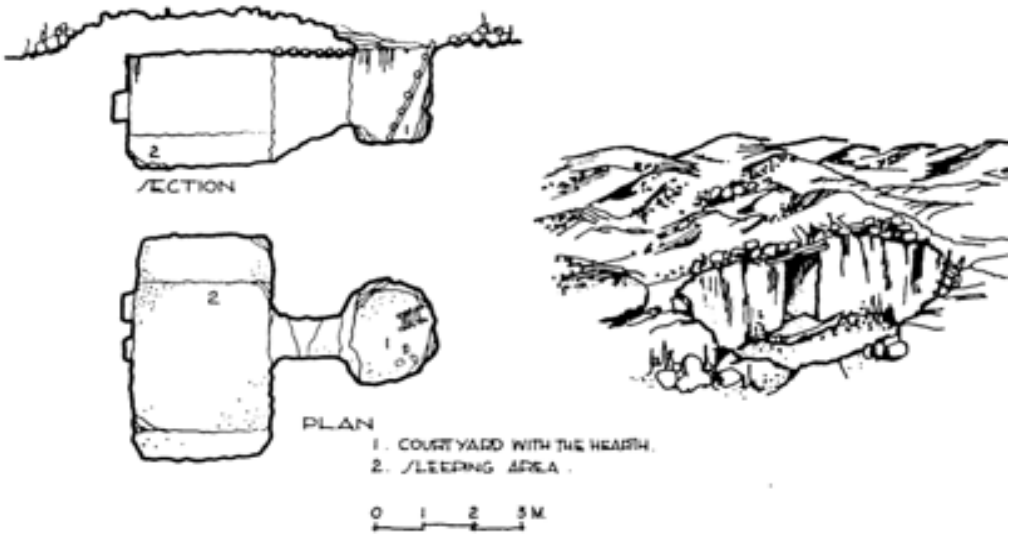

Figure 5: Subterranean dwellings (Lebbal, 1989)

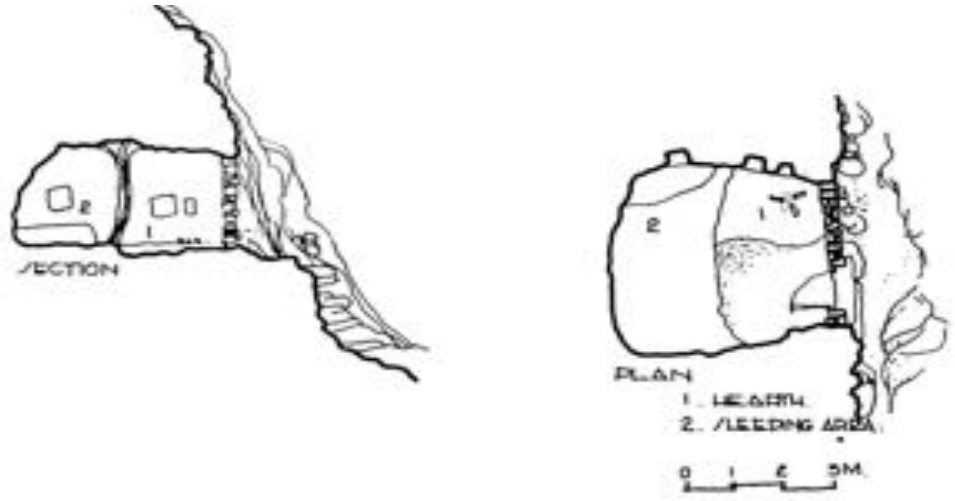

Figure 6: Cave dwellings (Lebbal, 1989)

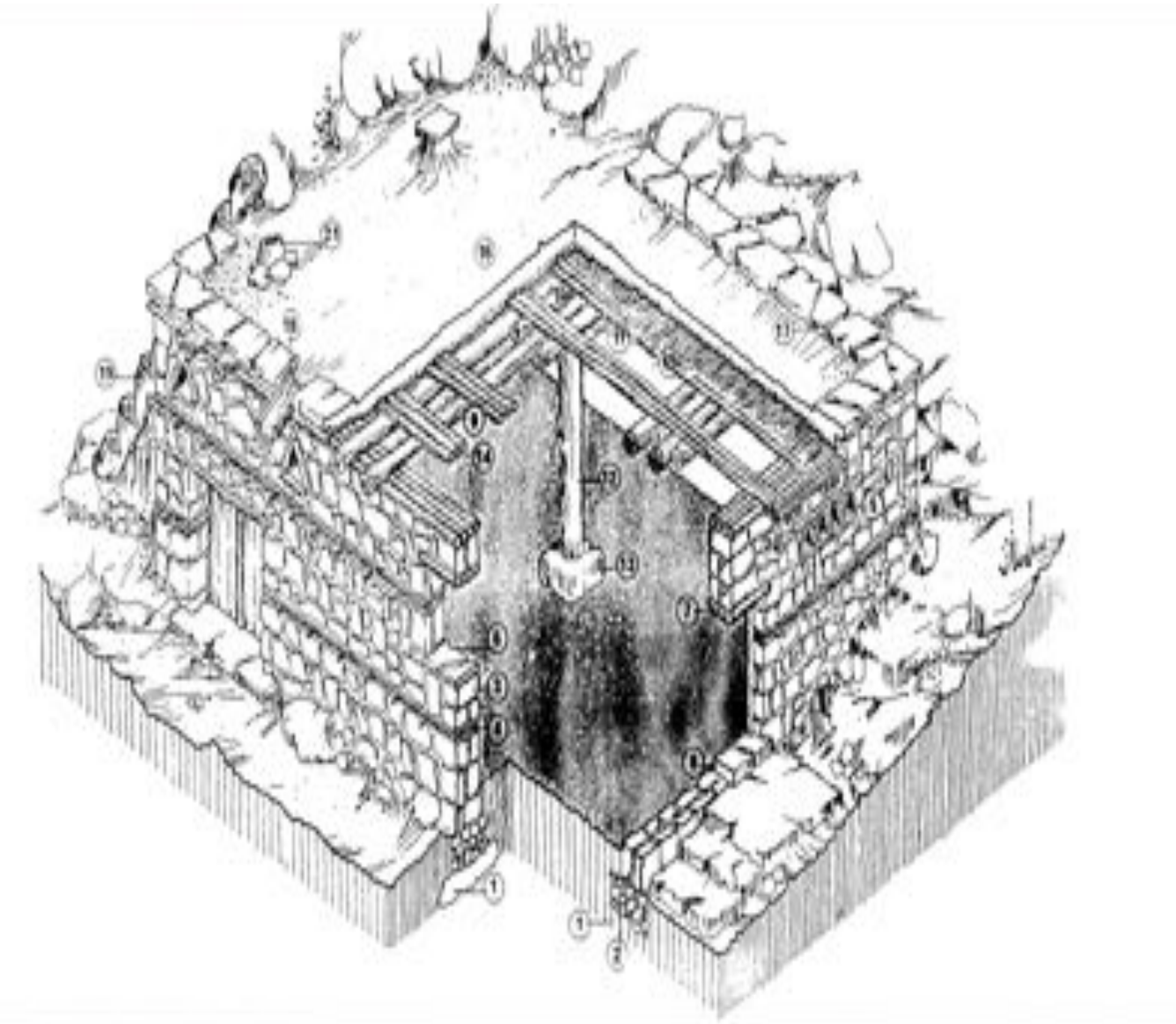

Figure 7: Details of a Berber house (drawing after Lebbal ; “Tradional Berber Architecture”;1989

1 *El-sas*:foundation
2 Footings
3 *Hidh*: bearing walls
4 *Aaqod*: lacing timber
5 *Hbabth:*openings
6 *Thaqth:* windows
7 Laatbath: lintel
8 *Laatbath*: threshold
9 *Iqundasen*: main beams
10 Roof structure
11 *Hsasat*
12 Hagidith
13*Hazruthon-Hagidith:*padstone
14*Hikhsasban*: joists
15Hijridhin: plam stems
16*Shal-n-sdhah*:terasse surface
17*Sdarath-n-sqaf*:stone border
18 *Hamizab*: rainwater spout
19 *Sellum-n-hazdasth*: ladder
20Roof protection to protect the entrance
21*Hnozrath*: opening in the ceiling

Figure 8: example of traditional Berber house (BENABBAS Moussadek,2006)

BUILDING PROCESS

In the Aures valleys, as in any traditional society, the construction of a house is a great event. It is not just the result of individual initiative; both main social groups are involved in the task, the domestic group related by blood that forms the family, in which men, women and children participate, expressing the family unity in economic and social terms, and the village group that is the community. All are called in and become involved in a mutual co-operative effort known as *'tuiza'.*

Usually the Shawia start building their houses between April and October, in order to avoid the heavy rain and snow of the winter. The task involves two distinct phases: the preparation, when the site is selected and the material is gathered and brought to the site, and then the building. The process of construction involves firstly an act of appropriation of the space, and secondly an act of transformation of the space. Generally the site is chosen as near as possible to the houses of parents or relatives, to tighten the clan. Traditionally the laying out is followed by a ritual ceremony, and the same procedure is repeated at every step of the construction. 'Religious ceremonial has almost always preceded and accompanied its (the house's) foundation, erection, and occupation (Lebbal, 1989).

Technology of building

The vernacular Shawia houses are varied in form, construction and materials from one region to another, according to a number of factors including geographical location. Local materials, such as stone; particularly for walls. Thick stonework walls are climatically advantageous; they have many important properties such as thermal capacity and compressive strength. This latter is generally much in excess of that required to carry its load. Stone is the most durable of building materials, but decay does occur gradually, and can be quite rapid in certain conditions.

Earth: this cheapest material it is used for building fences, walls, floors, roofs, and also as a plastering material. The density and thickness of earth structures are ideal for thermal insulation in hot, arid areas. In order to increase strength and control shrinkage gravel or straw or other vegetable materials are often added to the soil.

Timber: It is an important building material and a major item in traditional construction, especially for floors, roofs and the posts supporting them. It is also used for doors, window shutters, door and window frames, door locks, waterspouts, lintels, ladders, furnishings, and as linkage in both stone and earth construction; in addition to wood, constitute the basic elements of their construction.

Many Shawia houses have an uncovered rectangular courtyard of variable dimensions. Sometimes part of it is covered and used as a stable and farmyard. During the summer it is in the courtyard that the women put the fireplace, cook, and hang up the goatskin full of water. If there is no sheep pen the courtyard is used for that purpose too, and it is there that wood and manure are kept.

Domestic space's strategies of transformation

According to the investigations in the agglomeration of Abdi Valley particularly in the villages of Menaa :Tigherghar, Warka and Oughanim; we have find that the most of population immigrate out the region ,this is due essentially to the economic factor. Houses are more complex phenomena than accounts based on mode of construction or architectural style. The traditional architecture of the Aures people is a personal adaptation of a group solution. The houses erected by a particular society are of a style which has been communally worked out over several generations. They constitute a synthesis of the numerous factors controlling their social and physical organization; they respond to the socio-cultural and economic imperatives that are the characteristics of the social group. The vernacular style shows a direct participation of the inhabitants in the creation of their homes, which reflect the expression of their personal and social needs. The appearance of the Aures settlements has, however, considerably changed, with several western-style houses being built and several traditional ones falling into ruin. Nowadays the potential of indigenous planning and building methods is being neglected. Traditional architectural forms are being progressively destroyed due to contact with the 'modern world'.

The interpretation of the information collected on the urban compositions of the study area, macro-structure and microstructures, as well as the socio-economic dynamics of Valleys of the Aures give an image on the region. It made it possible to particularities of the study area and to recognize its specificities. Recognition of structures and dynamics of the Aures massif and their relations with the Plans. The interpretation can be done in terms of:

- Plans and interior domestic spaces;
- Technology of building ;
- Materials and techniques used in construction;
- Types of and dimensions of opening;
- General landscape and urban background of traditional Berber villages

Figure 9: Transformation of domestic spaces functions and the addition of several modern spaces and exclusion of animals from the interior space of house. (Benbouaziz .A, 2011. P 257)

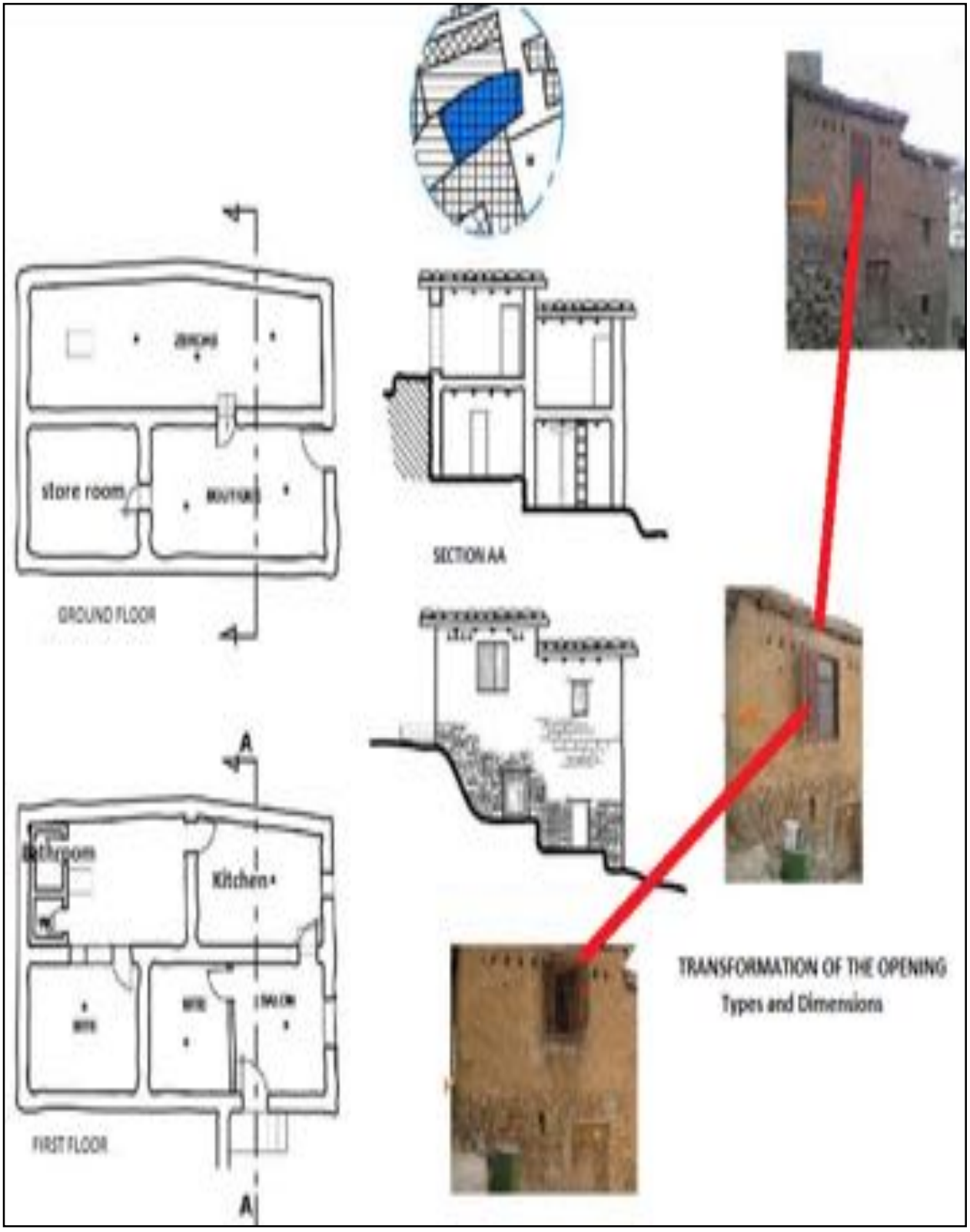

Figure 10: Evolution of dimensions and forms of openings: windows. (Benbouaziz .A, 2011. P239)

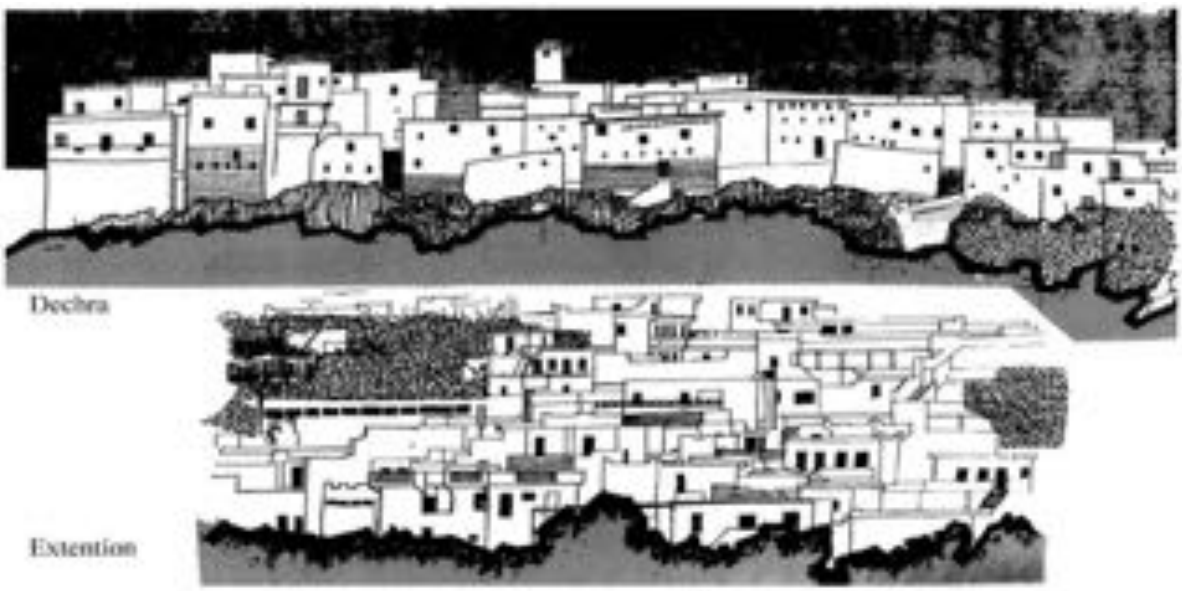

Figure 11: transformation in the urban landscape of Menaa. (BENABBAS Moussadek, 2006.P 219)

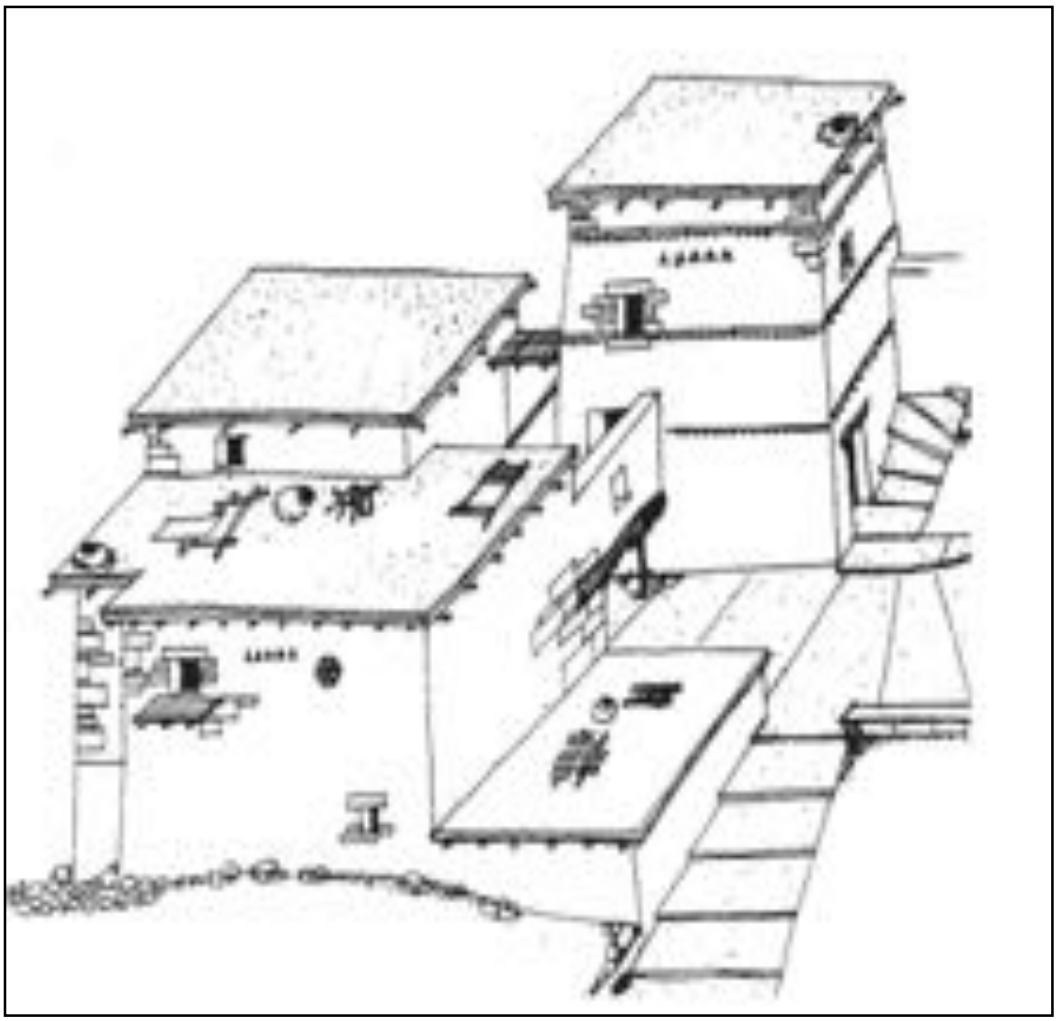

Figure 12: drawing of a typical traditional Berber house at Abdi valley (BENABBAS Moussadek, 2006.p 165)

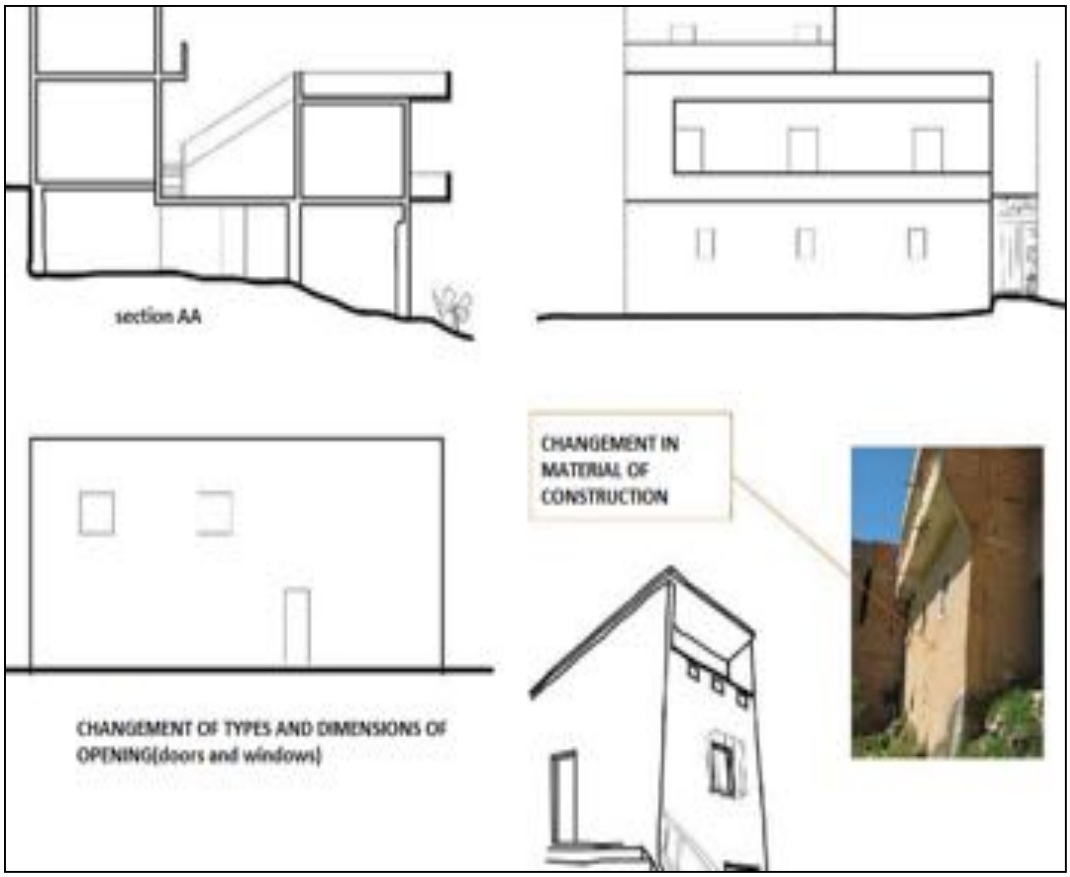

Figure 13: Example of external transformation by the use of new material which is not local at Menaa
(Benbouaziz .A, 2011. P 252)

Conclusion

The traditional architecture of the Aures people is a personal adaptation of a group solution. The houses erected by a particular society are of a style which has been communally worked out over several generations. They constitute a synthesis of the numerous factors controlling their social and physical organization; they respond to the socio-cultural and economic imperatives that are the characteristics of the social group. The vernacular style shows a direct participation of the inhabitants in the creation of their homes, which reflect the expression of their personal and social needs. Traditional habitat is the simplest form of living, a profound lesson, elaborated with local materials and techniques, expressing the values and cultures of each society.

The appearance of the Aures settlements has, however, considerably changed, with several western-style houses being built and several traditional ones falling into ruin. Nowadays the potential of indigenous planning and building methods is being neglected. Traditional architectural forms are being progressively destroyed due to contact with the 'modern world'. They are being replaced by western methods, often irrelevant to local conditions and needs. The indigenous architecture of the Aures constitutes a unique heritage. Definite steps should be taken to preserve it, at least in part.

Through all the Aures, the deep changes which the Auressien society undergoes since independence, are expressed by a spectacular transformation of the area (macro- structure), right through, in this vast mountainous mass, one sees a deeply faded vernacular architecture, sometimes with the state of ruin, and an emergence of new forms in the space. It is a significant upheaval in the socio-economic dynamics which is reflected on the physical structure of the environment under the pressure of the economic transfers and social problems, villages, (Micro-structures) when they are not abandoned to the profit of the urban poles, are deeply transformed, modified by a population in search of models, a population influenced by two different cultures its endogenous culture and exogenic civilization(Benbouaziz. A, 2011). These micro-structures, often called “Dechras”, are particularly revealing of this cultural duality and the absence of references. The accession to ‘modernity’ passes here by the assimilation of an unsuited “conveniences”, even

sometimes not in use. In fact, it is the reproduction or the naive transplantation of a model imported without a doctrine of integration.

Despite the apparent modernism of the Algerian urban population; Algerian society at large still traditional in social practices. This explains the need for new housing designs which are adapted to contemporary needs, but which still express the principal traditional requirements of daily life. Self-built housing, primarily the architectural expression of middle-income groups, has failed nowadays to address these two needs adequately. Such housing in the Berber massif is neither unique nor appropriate to Algeria. More forms of housing are likely to be developed in the near future, as Algerian look for a new typology that will better balance their requirements.

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