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ID 1533 | AN OUTPUT OF PARADIGM-SHIFT IN URBAN PLANNING: "RESILIENT TRANSPORTATION" AND EXAMINATION ON CITY OF ISTANBUL

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ABSTRACT : Throughout the history, urban planning experienced several changes and developments with the light of economic, politic, demographic, social and environmental characteristics of existing time period and effects of these features on society. An example of these developments is the emergence of the idea of seeking a comprehensive and multi-faceted solution to the negative situations of cities in the early 1990s in the context of "sustainable planning". The question of how our cities will react in the face of adverse conditions has become a matter of debate. The focus of this debate lies in the fact that cities and the inhabitants of the city struggle with sudden changes and threats.

Aim of this study is determination of necessities for integrating urban transportation with urban resilience concept and examination of basic approaches for this integration method. One of the most important subject is identification of policies and scenarios in so that resilient transportation concept works with urban transportation system in harmony and reflection of this harmony to city as a whole. In addition to this, the determination of working principles integrated with different disciplines (social sciences, economic sciences, etc.) and the inclusion of macro and micro scales into urban planning are among the topics to be elaborated. Finally, on the Istanbul city, analysing existing potentials and possibilities in the context of urban transportation and making of policies, scenarios and solution alternatives are discussed on the city of Istanbul.

KEYWORDS: Resilient Transportation, Urban Resilience, Disaster Management, Sustainable Development

1 INTRODUCTION

Most of us know that research results which are carried out upon features of our planet are not positive. In recent years, policies and scenarios are being created for this issue and comprehensive solution and planning approaches are being developed. Cities are key point that has to be regarded mostly. More than half of humanity lives in cities according to World Bank data and urban areas are growing day-by day. one of the most important reason behind this issue is urban areas offer much more opportunities than rural areas. Concentration of population leads becoming more vulnerable and diminishing struggle power of cities against possible global threats and sudden changes.

Industrial cities which started to emerge and organize in the first half of 1800s in England can be shown as an example. Rural population fronted towards to urban areas with the changes in means of production and usage of machine power. This situation is accepted as "paradigm-shift" and it caused to accumulation of population in urban areas. As a result of this tendency epidemic disasters, air pollution and irregular urbanization started to emerge in industrial cities.

After this date, urban population has grown rapidly and settlements started to consist both in inner urban areas and periphery. necessity of making important renewals and developments is revived considering negative effects of rapid population growth and global threats (natural disaster, economic crisis, global warming, etc.). Sustainable development emerged in second half of 1900s as a purpose of ensuring balanced development with providing coordination of economic, environmental and social subjects. This new concept is accepted as "paradigm-shift" in urban planning context. Main discussion of sustainable development is progressing in the frame of "space". Environmental carrying capacity, capital of environment have a meaning when they are associated with "space" that has specific culture (Karakurt Tosun,2009). City is a key point for ensuring sustainable development and improvement because it contains many dynamics for ensuring improvement. Evaluation of these dynamics in long term effectively is possible with enabling of resilient urban system. Entire system is named as urban resilience and cities in which these systems are implemented are named as resilient cities.

Definition of resilient city is coordinated and comprehensive struggle system of cities with their dynamics and different actors against all kinds of threats(natural disaster, economic crisis, etc.) in physical, environmental, social and economical framework.

1.1 RESILIENT TRANSPORTATION CONCEPT AND BASIC PRINCIPLES

Resilient Transportation is a concept which emerged as an output of paradigm-shift in urban planning in 1990s. It is defined that comprehensive spatial, physical, economic and social studies in order to create defence mechanism and adopt all kinds of negative conditions and sudden shocks that cities experienced.

Figure 1 – Emergence Process of Resilient Transportation

Basic principles of resilience transportation are examined under 4 fundamental titles:

- Determination of tasks and responsibilities of stakeholders in global platform

Coordination should be ensured in both national and international platform for providing sustainability and resource of investments in regional and urban context, taking precautions for disasters, using all resources beneficially. It is seen that public institutions and local government make preparations for disaster and emergency causes. Moreover, they study to minimize risks in urban areas by using both equity capital and international support resources as World Bank (IPCD,2014)

- Providing integration of strategic and spatial plan of city in macro/micro scale that is prepared in disaster management framework to transportation master plan

Before preparing spatial plan of urban areas; basic decisions, policies and intervention methods has to be determined and strategic development plans should be prepared in macro scale.

Sustainable development which is admitted as an output of paradigm-shift brings sustainable urban concept in the process. Fundamental principles of this concept is resilience thinking and it is started to approve as new and remarkable parameter in planning of urban areas. 3 main elements become significant considering resilience principal.

- Urban structure and usage that has strategically importance
- Open spaces
- Access network

3 elements that are mentioned above have an importance separately, but network has different significance than others. Working in a harmony in a body of urban usages and open spaces has to be provided. Comprehensive access network should be created in order to ensure coordination between two of these. In this condition, a system will be established and 3 elements start to work in together.

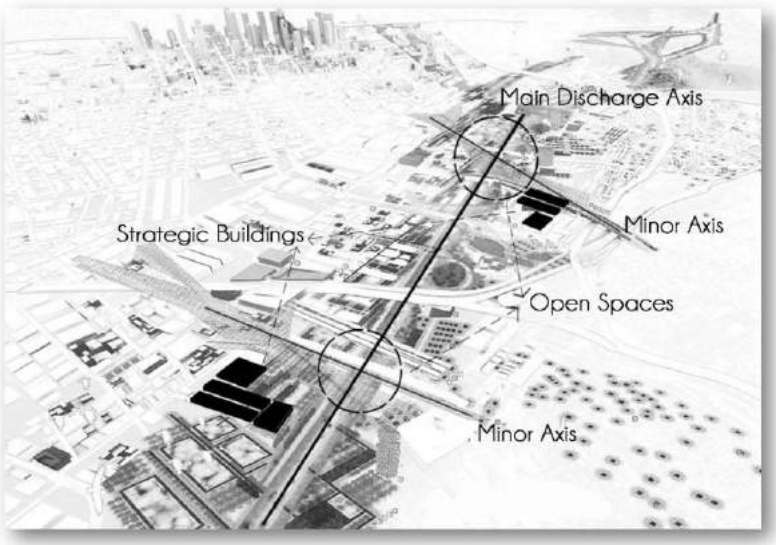

Figure 2 – Urban Elements in Context of Resilient Transportation

Access network should provide discharge people and vehicles easily and safely from assembly areas to less-risky areas such as periphery of cities. In order to do this, important discharge axis has to be determined in both existing and proposed land-use plans. In this point, these axis should be taken into consideration as determinant factor of spine while transportation master plan is being prepared. Determination of these corridors has to be done by experiments and regulations on network pattern which is defined previously. Only if demand based approach and structural characteristics of road are considered, system won't be reliable. Moreover, all axis should be regulated according to a defined hierarchy with each other and be provided continuity of them in entire network. One of the most important point is that main discharge corridors should connect major assembly areas due to having high capacity of

them. Second point is integration of minor network corridors to major axis in specified points. If these points locate in main assembly areas, it barns good solutions.

Determined axis should be designed regarding risk factors in disaster moment. These implementations are exampled as an increase in setbacks, keeping away of electricity and natural gas line from discharge axis, development in infrastructure of roads that are suitable for vehicle traffic, control of engineering structures which are on these axis. At the same time, creation of powerful access network is important so that vital food and health materials are carried to strategic areas in disaster moment.

- Ensuring inclusiveness, creating awareness of society with providing co-operation in institutional context

Being prepared for disaster does not cover things that should be done only for disaster moment. Society has to be prepared for possible disaster risks before in every aspects. In this point, government and NGO's have crucial role for raising awareness and informing all category of society. This can be ensured with the help of activities and drills that are prepared in public spaces, schools by private and public institutions. This type of activities strengthen organization, coordination and communication between society and NGO's. Thus, institutional capacity will be increased as well as technical capacity. Bringing together of different occupation groups in common point with the approach of creating common idea and action.

- Providing robust, flexible, durable and contemporary physical infrastructure

Methods that are used for ensuring physical infrastructure can show differences according to climate conditions of city, threats which are exposed by city in its history. However, regarding common platform, infrastructure investments that are made in the frame of transportation have to be integrated to existing infrastructure effectively and have to minimize negative effects of possible risks. In this point, using technological and contemporary methods means being more useful in economic aspects and more durable in physical aspect for long-term. Also, beneficial usage of resources is important issue for getting much more benefit in short and mid-term (Cities, 1. R., 2016). Infrastructure practices concentrate on high rainfall ratio, flood risks and increase in sea level scenarios in worldwide (Ebinger; Vandycke, 2015). These scenarios can be exampled as:

- Healing of regions where illegal housing intensifies by taking care of connector roads, flood risks and security precaution.
- Making embankments for landslide risks, stream improvement in regions where natural precautions are not sufficient (IPCD,2014).
- Regulating highways and pedestrian ways in selected regions in which are determined as discharge axis
- Increasing capacity of drainage systems in some area where has flood risk.

1.2 EXAMINATION OF ISTANBUL IN RESILIENT TRANSPORTATION FRAMEWORK

Istanbul is the most populated and developed city of Turkey in economic and socio-cultural aspects. It locates in northern-west part of Turkey and it is enclosured by Blacksea from north, Marmara Sea from south. Istanbul contains major fault lines due to its geopolitical location. Risk factors are more than other cities regarding all of these definition such as high population, enclosure by seas, including fault lines. Determining strategies, creating intervention methods, have to be carried out coordinated and comprehensive framework with considering all of these risk factor. This section of research contains integration of resilient transportation concept into the existing system of Istanbul as well as methods and principles.

1.2.1 METHODS AND PRINCIPLES OF RESEARCH

1.2.1.1 DETERMINATION OF RISK FACTORS AND PROBLEMS

Conditions which are cause risk factor have to be defined before determination of risk factors. These conditions:

- Existence of Bosporus which divide city into two creates necessity of significant transportation projects in order to provide access between Asia and Europe continents.
- Lack of service in urban transportation due to urban sprawl.

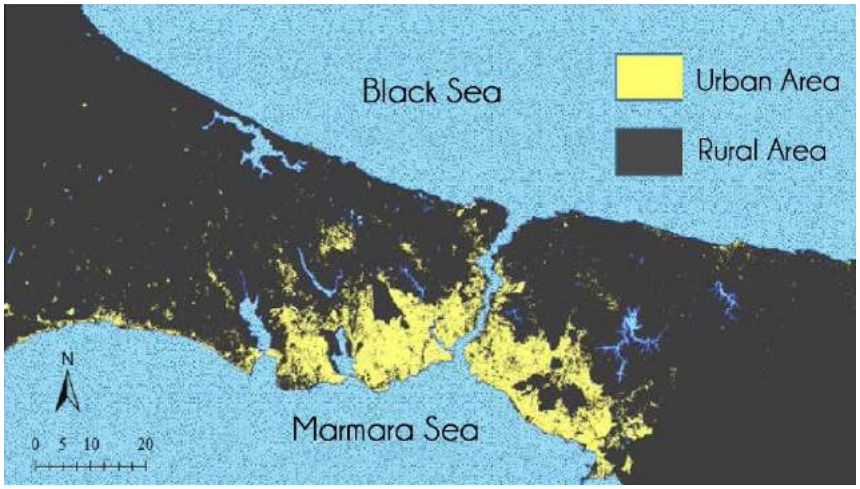

Figure 3 – Settlement Areas of Istanbul

- Existence of historical urban pattern especially in city centre causes insufficient infrastructure as well as deficiency in ensuring urban transportation services.

Risk factors can be determined based on these 3 basic conditions. These factors are sorted in the scope of infrastructure as highways railways and metro lines; harbour and piers; viaducts and tube tunnels. Moreover, inadequacy of open spaces that is caused by high population and urbanization, effects of important transportation projects on encouraging private car usage, existence of narrow roads especially in the city centre and as a result of this situation accessibility problem is seen in city centre.

1.2.1.2 DETERMINATION OF POTENTIALS AND DEVELOPMENT PRINCIPLES OF TRANSPORTATION INFRASTRUCTURE

Potentials of Istanbul metropolitan city can be sorted as evaluation of main transportation axis (E-80&D-100 roads) as significant collective axis for disaster moment, prevalence of inner urban marine transportation as an alternative mode, studies that are carried out by chambers, existence of transfer points which enable to interchange among different transportation modes, evaluation of BRT lines as an alternative for discharging people to safe part of city. In addition, existence of grand urban parks, coastal zones and harbours act as major assembly area.

Some infrastructure regulations have to be made in order to utilize all of these potentials that are mentioned above.

- Risk factors which are determined between major and minor axis and they affect emergency case road network have to be demolished. Emergency case road network is a prior network due to providing transportation of emergency medical services, first aid materials to strategically important areas such as hospital, assembly areas (IMM, 2011).
- Traffic flow planning should be done for disaster moment and later. This study covers route planning of ambulance and fire trucks, regulation of connections which are from minor discharge axis to major axis.
- Special strategic plans should be improved for rail lines, harbours and airports so that they can serve after disaster. These areas play significant role on accepting first aid materials from transoceanic countries easily and transporting them to suffered area by disaster. Moreover, these areas are rather useful for storing first aid materials, wrecks and wastes temporarily (IMM, 2011).

1.2.1.3 DETERMINATION OF ROADS THAT ARE AFFECTED BY COLLAPSE NEGATIVELY

The road network must function after the disaster. This situation applies both to public transport vehicles using road infrastructure such as buses and metrobuses as well as to private vehicles. In addition, it is necessary to prevent the road network from being shut down for various reasons so that the emergency vehicles can perform their functions at the moment of disaster and afterwards. For this reason, it is desirable to calculate in detail the extent to which the functioning of roads can be taken in emergency situations and to plan for roads and future arrangements for urban areas as a result of the calculation. (JCA; IBB, 2002). First of all, working areas should be identified and the existing road network diagram in these areas is revealed in a stepped manner according to the physical characteristics of the road. Then, the structure of the buildings on these roads and the most important threat elements and the probabilities of destruction should be evaluated. The necessary arrangements should be made primarily in newly constructed areas and then existing residential areas.

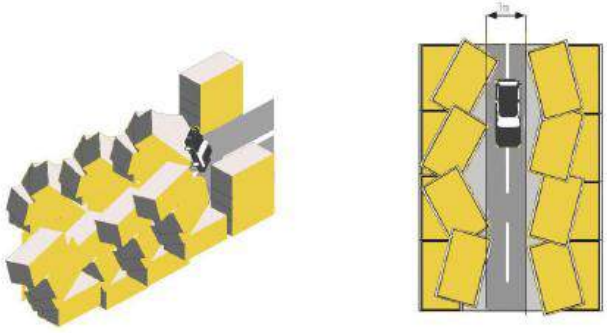

Figure 4 – Road Conditions Before and After Destruction

1.2.1.4 EXAMINATION OF EFFECTS ON BRIDGES & VIADUCTS

City of Istanbul needs several engineering structures because of topographic features and properties of existing transportation infrastructure. Most important engineering structures are bridges and viaducts in the context of disaster resilience and these are significant elements for transportation network. That's why, they links main axis which connect strategic buildings. Main axis have great importance for discharging people and vehicles from disaster area both in disaster moment and after, providing flow of disaster recovery and continuing all kinds of urban activity. Special protection and recovery practices should be made for bridges and viaducts that are significant elements of main axis because impairment possibility is pretty high for them. Even if deterioration of bridge structure is seen as just a point in transportation system it will be resulted in problem of maintaining system performance (JCA; IBB, 2002). Bridges and viaducts that are under risks are classified as major and minor according to disaster prevention report of Istanbul Metropolitan Municipality and Japanese International Cooperation Office. These classification is shown below.

1.2.1.5 CLASSIFICATION OF TRANSPORTATION NETWORK AND ENSURING INTEGRATION WITH OPEN SPACES

Strategies to be developed under this title can cover the entire city as well as appeal to a specific area. The important point is that the potentials determined in the previous phase should be evaluated effectively, the risk factors should be minimized as much as possible, and the problems should be solved. If Istanbul city is considered in particular, the development of strategic structures, increasing the number and quality of open spaces and establishing an effective access network is the starting point for a solution scenario. Because the coordination of these 3 elements both within themselves and among themselves provides an opportunity for the healthier, more effective and more resilient interventions to be carried out in the next phase. For example:

- Regulation of existing main transportation axis (D-100, E-80, Anatolian Highway, etc) and proposed ones which are determined in preparing process of urban transportation master plan as providing access in disaster moment effectively
- Determination of discharging corridors that has the characteristics of minor and collector roads which connect with main transportation axis in specified points.(Barbaros Avenue, Büyükdere Avenue, Şile Highway, Bağdat Street, etc.)

- Preparation of hierarchical system of open spaces, urban parks, university campuses, military zones (ITU Ayazağa Campus, Istanbul Urban Forest, Beşiktaş Square, etc.) in themselves and providing function of these elements with established access network in harmony and effectively
- Making necessary practices in order to strengthen access network inside historical urban pattern (Eminönü, Fatih, Balat, Beyazıt, etc)

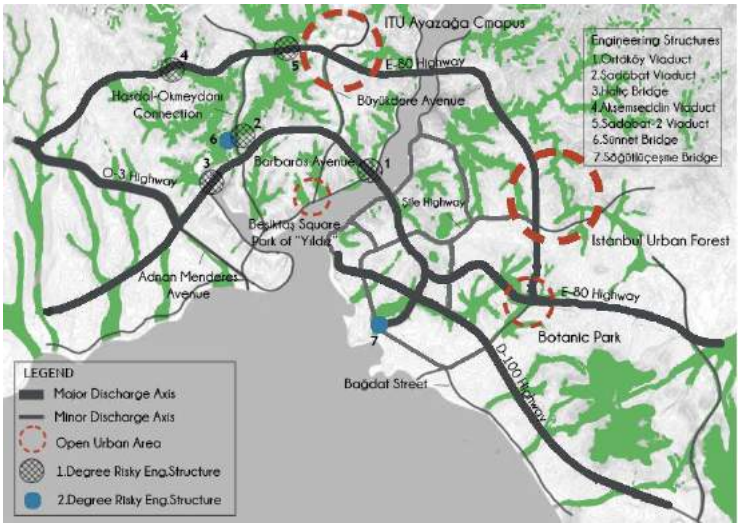

Figure 5 – Transportation Network Classification, Green Areas and Risky Engineering Structures

2 CONCLUSION

Since the past, the cities have been formed by the gathering of the communities of the people that the geography that they are in and ,in time, providing the needs and ownership of people is shaped by social and physical conditions. All of these have developed in the process, within the framework of complementary events and within the framework of causality. This development has continued for centuries, and as a result of these important events, different perspectives have been developed and, in other words, new dimensions, concepts and elements have been added to the urban planning process. Sustainable development that emerged as a product of this process has brought new concepts together. Among these concepts, urban resilience is one of the most interested subject for our cities. Achieving sustainable development is possible with the dynamics that make up the cities. Urban resilience is essential for effective assessment of these dynamics in the long term.

"Resilient transportation" has also emerged at this point as a necessity and an element of urban resilience. This concept is summarized as the evaluation and implementation of resilient city principals in the perspective of urban transportation. Interpretation and regulation of urban transportation policies on the basis of resilience and the fact involving both part of the city and whole city in different scale, including participatory planning approach, and interaction with the dynamics of the city are important characteristics of this concept.

In the past, earthquakes, floods and natural disasters have been exposed to the present and future threats to our country should take important steps to adopt the concept of a resilient city.

In the process from the 1999 earthquake to the day-to-day process, various searches and tests such as the determination of meeting points and area of containers in the structure and area scale within the scope of disaster management were started in city of Istanbul. These searches will have become a whole, not only in the space but also in the transportation, infrastructure, social and administrative areas, with the control and implementation mechanism. For example, it should be ensured that the identified assembly points are integrated with the elements, such as the major and minor discharging axis that are described in the study. In addition to this, informing the citizens about these arrangements will also enable the regulations to function as a whole.

The aim of this article is to present the study that can be done as a proposal in the subject of ensuring coordination among different disciplines which are mentioned above. The most important result to be

drawn when the subject is assessed in the city of Istanbul is the city's significant potential for the establishment of the defence mechanism. However, disaster risks, population surplus, restrictions on possible interventions to be made and great usage of private vehicles make it difficult to use the potentials efficiently and effectively.

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ID 1546 | DROUGHT RISK, FARMER COMMUNITIES' PERCEPTIONS AND PLANNING FOR RESILIENCE IN RURAL CRETE, GREECE

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ABSTRACT: Drought incidents may originate from both, manmade and natural factors and are characterized by uncertainty. The present paper attempts to shed light on the interrelations between exposure, drought perceptions and the adaptive responses opted by agents attempting to cope with drought risk and to provide insights into the planning processes implemented at the levels of the individual agents and the water management authorities. The choice of personal versus collective resilience strategies is largely a function of risk perception and the availability of resilience assets, but it is also a matter of power relations and alliance forging. The farming communities and the local self-government authorities of Messara plain in rural Crete provide the testbed on which the authors have attempted to scrutinize their initial assumptions by using appropriate questionnaires and interviews with key-staff of planning authorities.

1 INTRODUCTION: "DROUGHT", "DROUGHT RISK PERCEPTION" AND "PLANNING FOR RESILIENCE": THEORETICAL ASSUMPTIONS AND SCOPE OF THE WORK

Drought is often considered by the general public as the result of changes (more or less permanent) in the local prevailing climatic / meteorological conditions (basically in precipitation). According to the experts however, it is a phenomenon generated and influenced by both natural and manmade factors; even the natural factors may originate from the manmade component of Climate Change (CC). Drought is usually classified into five types or versions interconnected with each other: (a) Meteorological or Climatic; (b) Hydrological; (c) Agricultural; (d) Socio-economic and (e) Ecological. The present work focuses principally on hydrological, agricultural and socioeconomic drought in a rural territory since it is these versions