Evaluation and analysis of sustainable development in urban transportation

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Introduction

As we all know, sustainable management of transportation takes into consideration the effects of transportation on economic efficiency, environmental issues, resource consumption, land use and social justice. It helps decrease the negative environmental impact, increase the efficiency of the transport system and improve social life. It aims to increase the efficiency of the transportation of goods, services and people with minimum access problems. This is not possible without the reorganization of strategies, policies and programs. The fact of the matter is that transportation of people all around the world is not optimal and a crisis is due in the near future unless corrective and precautionary measures are adopted. Therefore, both developed and developing countries have no choice but to move towards sustainable management of transportation and take the principles sustainable transportation as the focus of their future plans in order to solve the numerous traffic problems in urban areas (www.iiiwe.com). It should be noted that sustainable urban transportation requires the attention of city planners and managers (Hesse, 1995:15).

Sustainable development

Sustainable development means proper and efficient management and utilization of basic, natural, financial and human resources to achieve the desired model. Sustainable development tries to meet the needs of this generation and the next, using appropriate technical facilities, structures and organizations.

The main objectives of sustainable development are listed to be meeting the basic needs of people, improving living standards for everyone, better land management and preservation and a safer and happier future. Yet this goal, providing the necessary growth for improving the living standards of the society and a more preposterous future and at the same time preserving the land, implies a contradiction which is considered to be the nature of the term sustainable development. The problem here is that the changes mankind made to their environment have led them to such a critical stage in the history that living a healthy life on Earth will not be possible anymore unless the assumptions on which the current common models of planning and development are based are revised. Sustainable development is a reputable system which preserves the quality of land while utilizing the resources (Dashti, Monavvari, Sabz Ghobaii, 1387 SH:78).

In the year 1987, the World Commission on Environment and Development published a report which was considered to be an important strategy and that was the concept of sustainable development. This concept soon dominated all the other development-related concepts that had been developed before (Hassanzadeh, Izadi, Jobran, 1388 SH:34).

Maintaining balance, however, among economical, social and environmental goals requires having a long-term perspective, evaluating the effects of current decisions on future generations, making laws and regulations, having the necessary cooperation on local, national and international levels, signing contracts and joining treaties, conventions and protocols and, finally, making institutional and administrative arrangements. And this indicates the next environment and dimension which is the political environment and dimension (Zahedi, Najafi, 1385 SH:63).

Characteristics of a sustainable city

According to Brundtland Commission's report and the reports by United Nations' Commission on

Environment and Development, and based on the definition of sustainable urban development, characteristics of a sustainable city can be listed as follows:

- A moderate and justice-oriented city where justice, food, shelter, education, health and hope are distributed fairly and all the people are involved in the administration of the city.
- A beautiful city where its architecture and landscape is pleasing to the eye.
- A creative city where creativity and freedom of thought are nurtured.
- An ecological city where the ecological adverse effects are kept at a minimum, man-made environments are compatible with natural environments and the natural resources around the city are preserved against urban development.
- A city with convenient access and connection where social activities are acknowledged and encouraged and face to face communication and exchange of information using the latest technologies are increasing by the day.
- A diverse city where a wide range of homogeneous activities which can lead to public and social vitality and motility can be done simultaneously (Parhizgar, Firoozbakht, 1390 SH:59).

Sustainable urban development

Sustainable urban development does not mean either the sustainable development of economical, social and environmental subsystems individually or the increase in the stability of these subsystems. Instead, it tries to maintain a balance among economic growth, ecological restoration, environmental preservation and social progression and the difficulty of the task has made it the focus of research all around the world (Tajik, Sedaghati, 1389 SH:4).

Urban transportation theories until the 1910s

Since the emergence of the first cities in the world until about mid-nineteenth century when automobile and motor vehicles were invented, walking was the main mode of transportation and roads were fitted for the size of a human. This period can be named "the calm period in urban transport" which saw no dramatic and sudden changes in the urban transportation systems. The major modes of transportation in that period were either man-powered or animal-powered and the invention of wheel can be a considered a turning point in the evolution of transportation tools. The first traffic laws were enforced in Roman cities regulating the transportation of cargo by chariots. In the final decades of the nineteenth century, with the emergence of rail transport, railway and trains stations became an important part of the traffic and opened gateways to other cities which led to significant changes in the structure of cities. Moreover, the increasing production of cars, which was specifically sped up in the twentieth century, caused cars, which had been considered a luxury before, to become a basic part of every household. This has led to increasing distance between the workplace and the residence which was followed by the spread of suburbanization. It was at that period that the sudden increase in urban population and the lack of dynamism in the necessary infrastructures led to all sorts of social, environmental, cultural and fundamental problems. Various experts have reviewed and evaluated the problems cities face from different point of views and proposed various methods to solve them. Linear city, garden city movement and grade separation are the most important and influential theories regarding urban transport.

- Eugene Henard was one of the first experts to pay attention to traffic issues in the early twentieth century when motor transport in cities was increasing and subway was on its first days. He also proposed some strategies to solve these problems, especially in his hometown, Paris (Kashani Joo, Mofidi Shemrani, 1388 SH:10).

Urban transport theories from 1920 to 1970

From the first half of the twentieth century until the early 1960s, the emphasis on facilitating the movement of motor vehicles in any possible way was an inseparable part of every transport and traffic planning in cities. During this period, separating the pedestrians' and the vehicles paths received a lot of attention in order to maximize the

efficiency of the modern transportation system and pedestrians and their needs were not top priority. Le Corbusier's Ville Radieuse and Tange's spatial structure of large cities can be reviewd from this point of view. Some experts believe that, in the 1960s, "Le Corbusier's recommendations were carried out and streets turned into traffic-making machines." The first signs of paying attention to public transportation in the United States can be seen in this period. Private investors started developing residential districts around suburban tramway tracks in order to create maximum economic return which led to the public-transport-oriented development theory. Urban historian, Sam Bass Warner, has described, in his book, how public transportation and suburban real estate development had led to urban decentralization and called American cities as "consisted of two parts: a business town and a residential one." Since the early 1970s, however, there has been a change of attitude among experts regarding the issue of transport in cities. In this period, prioritizing private vehicles was devalued and emphasis was put on public and non-motor transportation. The principles of smart urban planning was one of the major theories proposed in this period, which took into consideration the issues of public transportation as well as evolution in all urban aspects.

Urban transport theories from 1980 until present

With the start of the 1980s, the earlier approach to vehicle transport faced many challenges and moderating the traffic of motor vehicles in cities, especially in residential areas, has become a fundamental principle. Thus, the views that are based on the balance between the movements of pedestrians and vehicles were developed in that period.

One of the major theories that were proposed during this period was the woonerf pattern or the"traffic calming" theory, which was not implemented until the early 1980s although it was proposed in the 60s. Woonerfs are in fact neighboring streets that restrict the speed of vehicles and prioritizes the traffic of pedestrians and people's daily routines and they can especially be seen in Germany and the Netherlands. Woonerfs, in Germany and Finland, are streets or series of streets in a town or city in which pedestrians and bicycles have a higher priority than motor vehicles according to traffic laws. By 1999, the Netherlands had the highest number of woonerf in the world with 6000. Finally, on the eve of the third millennium, a combination of urban design principles and public transport, especially railway systems, were emphasized more than ever in order to establish more compact communities, capable of mixed use and with the possibility to walk around the transport terminals. Of the major theories proposed in this regard are traffic villages which create a more vibrant and sustainable neighborhoods, focusing on public transportation (Kashani Joo, Mofidi Shemirani, 1388 SH:10).

Sustainable transport, a prerequisite for sustainable development

Investment in transportation can be justified by stating that transporting goods, services and working force is a vital part of the economy. It is usually believed that the amount of cargo being transported has a strong correlation with economic growth on the supply side and utilization of vehicles by the economic growth is on the demand side. However, there is evidence that suggests that high levels of GDP can be associated with those transportation systems which are not dependent on private vehicles. Cities and districts can play an important role in decreasing the use of private vehicles and the subsequent environmental pressures caused by the economic growth. In a green economy, the need for transportation is reduced by efficient urban planning and design and the adverse effects of economic growth can be reduced by providing high-quality low-carbon transportation, especially by public transportation, non-motor transport infrastructures and cleaner and more efficient vehicles. For low-income people, access to public transportation services will ease traffic jams and reduce the time of the travel which will leave them with more time to spend on productive economic activities (Yazdan Panahi, Maleki, 1391 SH:7).

Recommended policies in order to develop sustainable transportation

1 Increasing the public transportation;

2 Replacing fossil fuels;

3 Establishing committees for urban transportation and car inspections;

4 Providing special facilities for the private sector;

5 Reasonable fuel pricing;

6 Banning the travel of private cars

7 Changing the working hours or demand managements.

(Rasafi, Zarabadpour, 1388 SH)

Conclusion

Transportation has always been one of the most important factors affecting the urban structure. However, especially in the last century, development of motor vehicles and increasing demographic changes have become the major problems of urbanization. Theoretical approaches to urban transport also have had different processes in different periods of time. What is certain is that in order to solve the problems of the city, managers and planners in the field must be one step ahead because in this instable and uncertain area, the only strategy and policy that is bound to succeed is the effort to understand the future and its influential factors. Although this effort is associated with risks, taking these risks sounds far more logical than just watching the future developments and looking for alternative solutions. Insufficiency of the existing system or parallel administration in urban transport will lead to a gap between supply and demand in transport facilities. Traffic jams, a significant increase in the duration of travel, increased accidents, air pollution and noise pollution are the side effects of unsustainable transport in cities. With the dramatic increase of urbanization and the urgent need to provide quality living spaces, only some of transport will be in line with sustainable development in the future.

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