



LOCATING THE WASTE TRANSFERRING STATIONS BY USING GIS TOWARDS ACHIEVING SUSTAINABLE CITY CASE STUDY: HISTORICAL FABRIC OF YAZD CITY, IRAN

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Abstract

One of the fundamental concepts in urban sustainable development is the influence of green spaces and sustaining environment on cities as it has an exceptional impact on achieving to a sustainable city. Today's living requires recognition of historical textures and cultural wealth's which has adverted urban modernism and its new theoretical ideas. However, improving new service facilities such as electricity, gas and water requires careful planning which must be embedded with old historical texture conditions. This successful process leads to proper places for transforming waste stations throughout the city and improvement of living condition. For instance using geographical information system, "GIS" solves such historical texture issues. These placements of new waste station not only provides a better waste collection but also supplies a multipurpose facility station to access distinction able waste, an educational tool, and healthier environment. As a result, this process has been studied and successfully implemented in the historical city of Yazd to facilitate transforming waste station around historical texture issues.

Keywords: Sustainable city, Sustainable development, waste transferring station, GIS, historical fabric, Yazd, Iran

1. Introduction

By growing the population in all around the world, the movement of ecological system faced many challenges in economical, social and environmental aspects. The balanced biological system that was based on an effective balanced relation in mutual production, consumption and reproduction framework thousands of years has met some evolutions in destructing this balanced biology nowadays. Human as the center of these evolutions felt the disruption of balanced relation and tried to decrease destructive impacts of incident. In twentieth century, some evolutions appeared and created the concept of "sustainability" and then "sustainable development [SD]".

Sustainability was transformed to a new concept in a codified scientific thought in order to think about some solutions to survive the earth and reach to a balanced biology. From this point of view, scientific and theoretical frameworks of this concept was brought up in all dimensions of life in recent decades and caused that some key concepts like "sustainability in city and environment, needs to a more justified society and notice to a sustainable economy" (Betwitt, 2008:23). This time, concept of sustainable city on the contrary unsustainable city was noticed remarkably. In this relation city elements should play their roles as physical and not physical components and one of the most important elements in old cities is historical texture.

Nowadays, value of historical and old cities fabrics as the cultural wealth and identity of countries is evident to all. The fabrics have not been regarded as an inter organism space in cities in any decades and also emerging technology and advancement overlooked a fundamental notice to the fabrics, resulting in forgetting old city. It should be considered that the city is a dynamic organism and we cannot forget its change and evolution, "The important issue is offering plans, sketches and criteria for achieving a clear framework of a city" (Barzegar, 1999:53), and this framework is obtained by a historical recognition that is accompanied by a location process. So, considering physical and not physical aspects and their development in prospect would be a great help to these spaces.



As an alternative, waste transition stations in the old city with a flexible function for promoting historical fabric quality and also paying more attention to sustainability dimensions in these fabrics are being used. Sustainability that is considered as three mottoes “social equity, economic viability, ecological balance” (Akhgar & et al, 2013: 5) can make transitions stations more effective in collecting waste, decreasing transportation costs, air pollution, energy consumption and road depreciation and also increasing environment qualities in old and new fabrics. These stations can deposit urban capital and increase the level of health and hygiene in all.

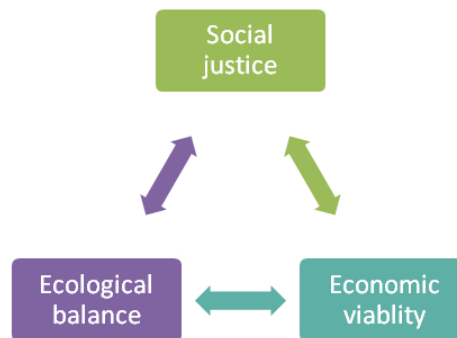


Figure 1: Relationship between sustainable components (Hallsmith, 2003)

Choosing the place of waste transition station is a debatable issue especially for people living nearby. In future, most of the people will perceive the needs to these stations but now it is reasonable to justify the importance of stations for all utilizing educational plans (Curwell & et al, 2006:112). In some cases, there are anxieties about a specific location for waste transition station and its management while noticing to participation in transition station management as a unit having direct relationship with people attaches great importance.

2. Literature Review

“Waste transition station, is a small industrial unit, a place that waste collector trucks unload waste. Then, it is compacted and finally loaded on bigger trucks for transition to specific place to be buried”(Mosavi,2004 :66). The above definition by its mentioned dimensions introduces station as a small industrial unit and consequently to wants separate it from city and its environment. But, if we change our attitude and look to station as a adaptable building with its interconnected fabric the present definition will be revised and replaced by a unit compatible with its surrounding fabric and is achieved only by a organized management and optimized definition of station in a functional framework. With this approach, waste transition station can be defined as below:

Regarding above definition we can draw some properties for stations as below:

- 1) An enclosed space having poor visibility from outside.
- 2) An enclosed space in specific place that adaptable to its surroundings and transmit waste from small trucks to big ones and have suitable hygienic facilities.
- 3) Waste transition operation from small trucks to big ones is done in station place and it can also be used as a place in which dried waste is separated.
- 4) Waste in the station is loaded on bigger trucks in minimum time.
- 5) Station has facilities for workers.
- 6) Waste transition station has hygiene and installations possibilities in addition to place for washing tanks and trucks.
- 7) Regarding that transition operation is done in specific times and is useless in the others it can be used as an educational base, a place for affording citizens needs and etc in free times.



- 8) Acquisition of land and establishing station by related organizations create a capital furthermore operations like separating dried waste will provide some benefits.
- 9) Waste transition station should be adaptable with its surroundings and by increasing participation in management process defines a compatible functional framework for its citizens.

3. Waste Transition Advantages in Old Fabrics

We can begin this section with question that why are waste transition stations important in old fabrics?

Old fabric in every city has set of characteristics that are built based on considering all cultural, social, environmental and geographical dimensions. Knowing the fabrics is possible by regarding these dimensions. They are cultural heritage of the citizens and should be viewed by careful attention in qualitative and quantitative dimensions such as promotion environment quality or enhancing installations (Zebardast, 2004:14). Notice to old fabric in every place and using new options like mechanized waste collection and erecting suitable waste transition stations can create new landscape resulting in revitalizing old city. The benefits of building stations in old fabric are as below:

- 1) Decreasing transportation costs through putting not standard stations aside.
- 2) Decreasing truck traffic in fabrics.
- 3) Decreasing air and sound pollution (because for trucks), car and road amortization and petrol consumption.
- 4) Possibility to separate dried waste in stations and utilizing for recycling material.
- 5) Creating facilities for people nearby to receive sacks and brochures and buying separated waste inducing them to separate the waste from houses.
- 6) Improving urban landscape in old fabric. Regarding that waste is offloaded near sidewalks and streets and has deteriorated the landscape.

4. Methodology

Regarding criteria for localizing transition stations and also physical and non-physical dimensions in old city of Yazd, survey is carried in hierarchical method and notices to every criteria and utilizes GIS to offer places suitable for stations. Finally, by evaluation each alternative the optimized ones are chosen and showed on the map. In the procedure, limitation factors in the old city are as follows: 1) hospital land use and its functional radius 2) limitation of passages width 3) drainage system in the old city the work as absorption well 4) valuable historical buildings and their limits 5) social capital is low toward the organization that is responsible for collecting waste. 6) Low participation in the old city of Yazd. Some of these factors can be afforded by public training.

5. Case Study: Yazd old city

Yazd old city is situated in the center of the city with 600hectar extent and is developed in thousands of years. The population of the area had been 24000 in 2006 and has 600g waste production per capita. Most of the passages are narrow and domed that make car traffic difficult. Despite widening the passages in present decades, motorized accessibility is still a problem. In other hand there are many ruined and abandoned spaces in the old city.



Figure 2.the narrow passage with domed in the old city of Yazd
Source: authors

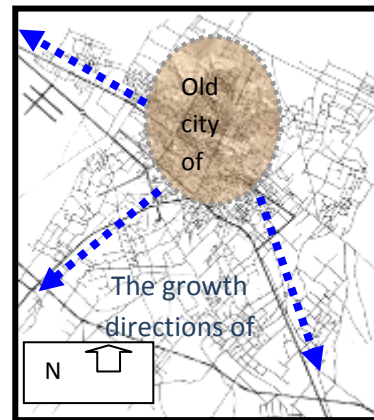


Figure 3.Location the old city of Yazd
Source: authors

Splendid Islamic architecture of the old city attracts many tourists but urban installations are great obstacles; garbage disposal are not hygienic and carts are left after garbage collection and transition to trucks resulting in flowing garbage latex (Akhgar, 2005).

The passage network in the old city can be classified in three categories: new passages, widened passages and old passages (without being widen) that are distinct from each other. Most of the old city area is residential, and industrial centres or big manufacturing factories or large garages are rare. But there are some hospitals, commercial centres (wholesales and retails), administrative, military land uses in it. The quality of buildings is included newly built, renovated, and destructive, in repair and also ruined buildings that are increasing rapidly.

5.1 Network connection

Passages and network connections are the most important elements in cities. Gutenberg search for urban structure in accessibility concept and believes that “communities try to overcome distance” (Marshall, 1969: 23).

An efficient network connection is achieved when there are passages with suitable width to facilitate the traffic. So, passages width, first and last points, and passage structure (in order to guide trucks movement to station and utilizing high efficiency) and traffic volume has great importance. Consequently passages with minimum of 8 meters were used in this work because of car width and possibility to park in both sides of the passages. To widen the passages in the old city is not justifiable because of its historical value, so we should use the present possibilities.



Figure 4. Passages with minimum of 8 meters
Source: authors



Figure 5. Passages structure in old city of Yazd
Source: authors



5.2 Land use

Parcel proximity, density and parcel partitioning with mixed land uses have great importance. Regarding extent of uncultivated lands in old city area, it was tried to utilize these lands as the first priority, so functional radius of some land uses such as hospitals and hygienic and commercial centers have great importance.

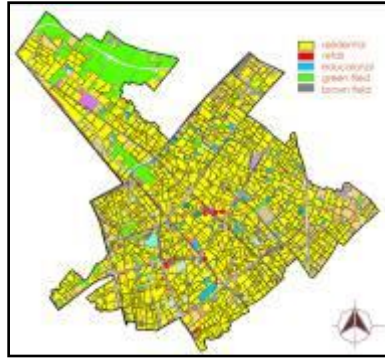


Figure 6. Yazd old city land use
Source: authors

5.3. Land area

Considering station definition its activities, the location should have suitable area (land area has great effect for station place). So, the parcel should have suitable length and width.

5.4. Limits of valuable historical positions

Yazd old city not only has historical urban texture but also has valuable monuments. Jame Mosque, Amirchakhmagh Square, Zargarha Bazaar, Khan Square, Khan Bathroom, Mortaz House, Alexander Prison are some of Yazd monuments that has various limits in landscape, function and traffic.

5.5 Landscape and visual axis

Old city of Yazd (except of places that are redeveloped) is exceptional for its visual axis and landscape. It is tried to consider visual axis, high volume passages and historical buildings in urban scale for locating the station. Utilizing places with indirect sight (like passages with low volume traffic and high speed) and use other factors locating the station.

5.6 Quality of buildings

As there are many abandoned and devastated buildings in old city of Yazd and they have high meters area, these buildings have the most priority in locating the station.

Land redevelopment and renewal devastated building opportunities, including new services, in Yazd are set to be transformed, thanks to a new freely available online tool, launched today by the Yazd Municipality (YM) and the Homes and Communities Agency (HCA).



Figure 7. Devastated buildings in old city of Yazd
Source: authors



Figure 8. Devastated buildings in old city of Yazd
Source: authors

5.7 Population density and other components

Dispersion of population in the old city of Yazd and information about all cultural and social components in each district are two important factors locating the station. Immigrants from neighbour countries and other parts of Iran can have effective role for locating the station and its management.



Figure 9. blocking area of old city with population density
Source: authors

5.8. Urban infrastructure

Considering limitations of old city and drainage system that works as absorption well that will become a modern network in future, station should be located wherever urban drainage system and other infrastructural lanes are available and be supported by watering, electricity, gas and telecommunication systems. Regarding mentioned factors and notice to environment hygiene and physical aesthetics The station can be located suitably.



Figure 10.transferring waste in the old city of Yazd
Source: authors



Figure 11.transferring waste station in old city of Yazd
Source: authors

6. Conclusion

Decreasing population of the old city in current decades is resulted in migration of residents to the other districts of the city. This process mirrors the old city problems and lack of a systematic view of authorities. So, increasing quality level in the old city can entice people to remain and live there. This article tries to increase environmental qualities of the old city by considering the mentioned factors. So, erecting multi-functional transition stations are offered as a rapid and successful alternative. Achieving above goals is tangible when localizing the stations follows suitable criteria. Some results were achieved surveying the old city of Yazd:

- 1) Transition waste places are not suitably localized in the old city of Yazd that cause disorder in traffic and create environmental pollution.
- 2) Accompanied by developing multifunctional stations, the bad remainder of waste can be removed from public memory and sustainable development can be used.
- 3) Separating waste can be an economical help to organization.
- 4) Mixed offered model can be useful for other districts of the city if physical and nonphysical information be regarded and be implemented in various systems.
- 5) Localized stations can afford the old city needs in the following years.

Finally, we should consider that cultural advertisement and notice to citizens' participation and increasing public awareness can help solving the old city problems.



Figure 12.selection place with GIS,
Source: authors



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