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CASE STUDY

Environmental management solutions for bus terminals utilizing SWOT analysis

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ABSTRACT

As a communication link between suburban and urban roads, terminals prevent buses from entering the cities, thus, they play an important role in improving traffic flow, reducing urban environmental pollution. Clearly, proximity of te rminals to cities will bring about environmental pollution in different forms (soil, water, air and wastewater). The current study tries to investigate the environmental management solutions for Tehran West Terminal. For this purpose, all the environmental aspects of bus terminals, including air, water, soil and traffic were investigated. Then, with respect to the primary assessments, a questionnaire was prepared and distributed among drivers and terminal staff. According to the obtained results, a SWOT matrix was designed and implemented after completing the Analytic Hierarchy Process. The results of soil sampling showed that pollutants like heavy metals and volatile organic matters (Benzene and Toluene) were above the standards set by the Iran Department of the Environment. In terms of air pollutants, all the gases and particles were above the standards set forth by Iran Department of the Environment. According to SWOT analysis, the aggressive scenario strategies obtained the highest scores. They included periodic trainings for the managers, drivers and other terminal staff (5.31), constant monitoring by Iran Department of the Environment (4.72), establishing internal environmental regulations (4.44), forbidding unauthorized car repairs especially oil Chang outside the repair shops (3.93), and supervision of cooperative managers on controlling vehicles and their drivers (3.73), were selected as superior strategies, respectively.

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INTRODUCTION

Environment is a common shared asset and capital by all human. This asset, belongs to not only the present generation, but also all the future generations. Thus, preserving and protecting it is a social responsibility. Despite all these facts, human behavior towards the environment has not been reasonable and friendly. Therefore, air, water and soil pollutions, acid rain, destruction of Earth's ozone layer, and the climate change are evident across the globe, regardless of geographical boundaries of the countries (Moqhbel, 2017). Amongst the most important environmental events focused on this issue were the Stockholm Conference (UN Documents, 1972), the Rio Conference (UNCED; 1992), the United Nations Development Programme (UNDP) conferences, and other international conferences in Toronto, Vienna, and

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Tokyo. Despite strict promises and approvals, and introducing currently existing environmental concerns, unfortunately, the unfair human treatment of environment still continues. However, setting specific rules and regulations and signing international agreements have improved the situation to a great extent (Rezayan *et al*., 2017). Urban environmental protection is one of the most important issues in many countries of the world which has gradually been considered as a major urbanization issue. As the population centers, cities deal with numerous and different environmental issues which lead to an increased pressure on environment, incidence of various types of environmental pollution, and degradation and loss of natural spaces, resulting in increasing needs of citizens to a healthier environment (Mohammadzadeh and Abdoli, 2017). The Twenty-year Vision Document (IRI. Ministry of Economic Affairs and Finance, 2003) and the Article 50 of the Constitution of the Islamic Republic of Iran (IRI. Government Information Base, 2015) emphasize on the significance of preserving environment, and development of urban environmental issues, in the form of unit urban management, focuses on urban environmental management. Waste management and recycling, improving green spaces, and organizing jobs and polluting industries are the most important concerns of urban environmental management which requires special attention of protectors and planners. With growing significance of environmental protection in today's world and the need to pay more attention to different aspects of this issue from the perspective of urban management, as the most influential institutions in realizing the goals of urban environmental protection, municipalities seem to have a major role. Thus, they will face new challenges, as local governments, in terms of planning and management (Moqhbel, 2017). The environment, which embraced humans and allowed them to live, is now threatened by them. Currently, the experts are paying more and more attention to environmental pollution due to rapid growth of population and industry as well as limitation of natural resources. It has also been considered by the public as a tangible issue. In today's societies, the importance of environmental protection seems essential and obvious (Mohammadzadeh and Abdoli, 2017). Undoubtedly, taking any measure or implementing any plan requires adequate knowledge and understanding of environment and its pollutants (Pearce *et al*., 2013). Environmental crises caused by pollution now threatens many countries in a dangerous way. Therefore, with serious and logical protection of environment and scientific planning, countries would be able to control environmental crisis (Odum, (2014). Accordingly, learning about environmental pollution and factors affecting its incidence will pave the way for coping with the pollution and reduce its costs (Bodaqhpour and Charkhestani, 2011). Terminals in the cities are the main need and demand of people. As a communication link between suburban and urban roads, terminals prevent buses from moving in the city area, thus, they play a valuable and important role in improving traffic situation, reducing urban environmental pollution and providing security, welfare, direction, and travel management. Of course, travelers will not wander around the city looking for different bus lines (Ahmed *et al*., 2008). Clearly, proximity of terminals to cities will bring about environmental pollution in different forms (soil, water, and air and wastewater pollution). Learning about these pollutants, their extent, and the ways to control them can help a great deal solving urban environmental problem (Faraji Mulaei, 2012). With respect to the impact of environment on human life, it is essential to protect the environment. Obviously, achieving this goal entails understanding the issues that contribute to environmental pollution. Given that Tehran metropolis has a large population and it is considered as the first polluted city in the country, identifying and knowing the factors affecting its environmental pollution is of utmost significance; thereby, taking serious measures to eliminate these factors, aimed at protecting the environment, helps reducing the pollution (Esfandiari *et al*., 2013). Because of high population density, establishment of industries and factories in urban and suburban areas of the city, and above all, heavy traffic, geographical situation, topography, and specific climate condition of the area, which increase extensive gaseous and particulate emissions, Tehran is considered as one of the polluted cities in the world (Soltani *et al*., 2016). The most pertinent way to solve urban transportation problems - such as congestion, overcrowding, air pollution, and high consumption of oil products – is to develop public transport system (Alavi *et al*., 2016). Thus, the most significant goals and services of a sustainable urban transport system may include reducing emissions aimed at mitigating climate change and protecting the

environment, increasing the quality of local air and preserving it against all kinds of pollution, and preparing the ground for using renewable and clean fuels instead of fossil fuels (Bodaqhpour *et al*., 2011). So far, many researches have been carried out in this field. (Ngo, 2015) analyzed "the relationship between bus pollution policies and morbidity using a quasi-experiment". In this study, bus emissions were investigated using spatial and temporal variations. Thus, a dataset including daily information of buses and transition routes of New York City Bus Fleet, between 2006 and 2009, was employed. The results indicated that the number of patients with respiratory diseases is directly related to the distance from the bus station. These findings suggest that the prevention of bus pollution can make a great progress in promoting public health. In a research by (De Fátima Teles, and De Sousa, 2014), "environmental management and business strategy: structuring the decision-making support in a public transport company", the ability to manage environmental efficiency is introduced as a strategic emerging issue for companies. Making a decision about issues related to environment requires an explicit methodology along with involvement of associated enterprises. The main objective of this research was to give the results of the early stages of developing the methodology to endorse making a decision about environmental strategies of the Transportation Terminal Company. In "SWOT analysis for an environmental friendly urban transport system", Öncel, (2009) studied transportation system of Istanbul from environment point of view. In this research, basic information regarding transportation system and its policy in Istanbul was presented. For analyzing transportation system of Istanbul from environment point of view, SWOT matrix was used. The current research is conducted to investigate environmental management solutions for Tehran West Bus Terminal through examining soil and air pollution caused by the transportation vehicles of this terminal. Also, management strategies for reducing and controlling environmental pollutants. This study was carried out at Tehran West Bus Terminal in 2017.

MATERIALS AND METHODS

With growing population of the country, population density in urban areas, and emergence of a problem called urban traffic, along with increasing city to city travels and evolution in providing passenger service to these travelers, a proposal of establishing an Organization for Transportation and Terminals was introduced in 1949. However, it was not seriously considered until 1974 when construction of the first terminal of Tehran (South Terminal) was started by Municipality of Tehran (Hagigatian *et al*., 2015). Finally, following the glorious victory of Islamic Revolution, Terminal Law was approved by the Revolutionary Council which promoted Tehran Municipality to establish the Organization for Transportation and Terminals, and since then, the organization obtained a legal personality and financial independence (Savadkoohi, 2006). Now, Terminals and Transportation Organization of Tehran Municipality mainly manages the function of four large terminals (South, West, East, and Beihaghi) and construction of several new non-central terminals including new Poonak Terminal, Ayatollah Saeedi, Sheikh Fazlolah, and new Tehran East Central Terminal (Babazadeh *et al*.,2015). The experience of South Bus Terminal was enough for travel agents to recognize the problem of bus traffic from south Tehran to western and northern cities and think about the idea of constructing West Bus Terminal. In 1991, construction of the largest bus terminal of the country was started out at this place (Ramezani and shabankho, 2013). In second half of 1996, Tehran West Bus Terminal, with an area of 50 hectares, was inaugurated with presence of the president of the time, Ayatollah Hashemi Rafsanjani. So far the largest terminal of the country, Tehran West Terminal is built on two floors; on the ground floor, sales agents' offices are and business-service booths are based, and the upper floor is assigned to Terminal management office and administrative offices of the travel agents (Babazadeh *et al*., 2015).

The current research is a descriptive-survey study conducted to investigate the consequences of environmental damage of Tehran West Terminal (Fig. 1). To do so, all environmental aspects of the terminal, including air, soil, and traffic, were first examined. Then, a questionnaire was developed based upon preliminary evaluation and it was distributed among terminal drivers and staff. Finally, SWOT analysis was performed according to the obtained results. The research process started with library studies (to obtain information on transition terminals and environmental pollutants). Thereafter, a questionnaire was developed with regard to the researcher observations. The questionnaire was

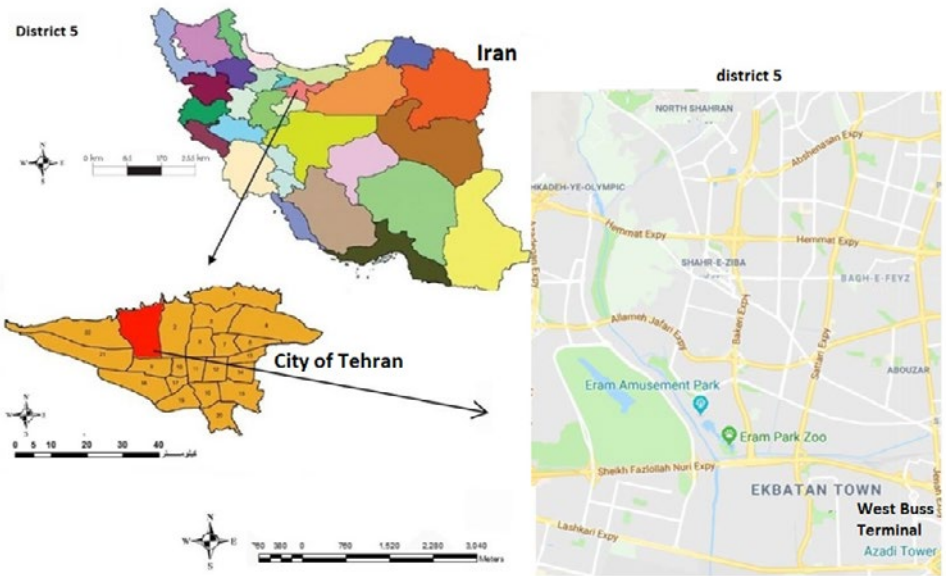

Fig. 1: Map of the study area

designed using 5-point Likert Scale. Statistical data obtained by analyzing the results with SPSS software. Following these analyses, internal and external factors, including strengths, weaknesses, opportunities and threats were identified and weighted in SWOT matrix so as to determine effective strategies.

The Variables

In the current research, number of buses at terminal, the time the buses started before moving, and equipment and facilities available at terminal were considered as independent variables. Also, dependent variable of this study were soil- air pollution parameters; soil pollutants included volatile organic compounds and air pollutants included outstanding pollutants.

Filed method for monitoring pollutant

Soil

After choosing one of the locations for bus oil exchange, which are mainly parks and resting areas, a surface soil sample was collected from a 0-25 cm depth (IDOE, 2016. A). Then, another soil sample was collected from the area outside the terminal. All samples were labeled and stored in polyethylene bags to be transferred to a lab. It is worth noting that, all the sampling locations were recorded by GPS. After transferring to the lab, the soil samples were placed in open air for 72 hours so that excess humidity would be evaporated. After grinding the soil samples in a porcelain mortar to give them uniform particle size, they were first passed through a 2-mm, and then, through a 63-micron sieves. In the next step, using a gas chromatograph, volatile organic matters (chemicals benzene, toluene, ethyl benzene and xylene) BTEX) and, if necessary, other parameters were analyzed.

Air

At this step, a few points (at least 8 points) were first selected, and then, suspended particles smaller than 2.5-micron as well as CO, SO_2, NO_2 gases were measured to compare the concentration of pollutants in the selected locations with standard areas. It should be noted that monitoring at all stages of the experiment was carried out when the vehicles were started. In order to measure suspended particles and range of gases TSI-Dust Track and Aeroquip S300 were used, respectively. The sampling was performed during the rush hour, i.e. between 7-9 a.m.

Statistical Population

Based upon field studies, random sampling was performed and the sample size was determined according to the number of terminal drivers and staff using Cochran formula. The specialists' questionnaire

was distributed among 12 subjects and the managers' questionnaire was distributed among 10 co-operative managers.

Sample size determination in a population with unknown size

When a population size is unknown, the Eq. 1 can be used:

$$n = \frac{Z_{\frac{\alpha}{2}}^{2} \times S^{2}}{d^{2}} \quad (1)$$

In Eq. 1, the most important parameters to be estimated is S^2 which is the variance of the initial sample. To calculate S^2, a number of questionnaires were distributed to obtain the variance of the initial sample. Z^2 is a fixed value which depends on the confidence interval and error level (α). Usually, the considered error level is between 1% and 5%. For example, if the considered error or significant level is 5%, the confidence interval is 95%. So, according to the tables of statistical data, Z^2 equals 1.96. These tables are available at the end of the books of statistics. Based upon the same error level, d equals 0.05%. In order to determine the sample size of a preliminary study, the questionnaires were distributed among 10 environmental specialists in the field of air monitoring. By estimating the variance of the initial sample at 95% confidence level, the sample size was calculated using the Eq. 2:

$$n= (1.96(0.411)\ 0.05=16.11 \quad (2)$$

According to the calculations, 16 subject were selected as the statistical sample.

RESULTS AND DISSCUSION

As stated, one of the locations for bus oil exchange was selected and a surface soil samples were collected from a 0-25 cm depth. Then, another soil sample was collected from the area outside of the terminal (Fig. 2).

The samples were transferred to the lab, and after certain preliminary measures, analyses of heavy metals and volatile organic compounds were performed. The reason for analyzing these pollutants were presence of oil matters and volatile organic compounds in engine oil and gasoline, presence of heavy metals in engine oil, and unknown type of soil pollution.

Results of soil sampling from the selection locations were indicative of soil pollution in the bus parking area. The samples were collected on April 17 at 10 a.m. Soil sampling was carried out due to observing soil pollution and it is based on standards (IDOE, 2016, B) (Table, 1). The control soil sample was taken because it was not contaminated with oil

Fig. 2: Locations selected for soil sampling

Table 1: Amount of soil pollutants in the selected sampling locations

Parameter and unit	Sample point 1	Sample point 2	(Industrial area)	(Residential area)	(Groundwater protection)
Cr^{+6} (µg/kg)	54.148	91.56	10000	390	19.0
As(µg/kg)	63.18	86.4	8.3	43.0	15
Hg(µg/kg)	21.312	19.59	610	23	3
C_6H_6(µg/kg)	7.188	5.29	200	22	5.0
C_8H_{10} (µg/kg)	9.62	3.7	10000	100	10
C_7H_8 (µg/kg)	4.244	7.14	41000	16000	5
C_8H_{10} (µg/kg)	4.189	16.21	12000	100	10

Soil remediation standard (IDOE, 2016, B)

Table 2: Geographical coordinates of the locations selected for air pollutants sampling

Sampling locations	Longitude	Latitude
North (car parking)	51°20'3.49"E	35°42'22.04"N
Northwest (ready to move buses)	51°19'57.72"E	35°42'20.63"N
West	51°19'57.03"E	35°42'16.24"N
Southwest (exit)	51°19'57.28"E	35°42'11.80"N
South (exit and bus traffic)	51°20'3.20"E	35°42'11.16"N
Southeast (daily vehicles inspection)	51°20'9.05"E	35°42'12.31"N
East (enter and bus traffic)	51°20'10.09"E	35°42'16.60"N
Northeast (ready to move buses)	51°20'9.34"E	35°42'20.83"N

Fig. 3: Locations selected for air pollutants sampling

matters no there was no oil leakage on the selected location.

Measurement of air pollution

8 points were first selected, and then, suspended particles smaller than 2.5- and 10-micron as well as CO, SO_2, NO_2 gases were measured to compare the concentration of pollutants in the selected locations with the standard areas. It should be noted that monitoring at all stages of the experiment was carried out when the vehicles were started. The samples were collected on March 11 and April 25 2017 at 7 a.m. (Fig. 3). Then, data of the same dates were obtained from Tehran Air Quality Control Company to make a comparison.

Table 3: Results of measuring air pollutants over Tehran West Bus Terminal on March 17, 2017 between 7-10 a.m.

Sampling locations	CO (ppm)	NO2 (ppm)	SO2 (ppm)	PM_{10} (ppm)	$PM_{2.5}$ (ppm)
North	43.2	0.25	0.04	252	63
Northwest	46.0	0.37	0.07	222	66
West	57.7	0.25	0.06	255	54
Southwest	53.1	0.28	0.09	273	59
South	55.8	0.39	0.11	309	76
Southeast	60	0.57	0.12	284	69
East	62.7	0.52	0.09	260	73
Northeast	45.7	0.46	0.10	271	66
IDOE Standard (2016.C)	1-hour 35 ppm	1-hour 0.1	1-hour 0.075	150	35

Table 4: Results of measuring air pollutants over Tehran West Terminal on April 17, 2017 between 7-10 a.m.

Sampling locations	CO (ppm)	NO2 (ppm)	SO2 (ppm)	PM_{10} (ppm)	$PM_{2.5}$ (ppm)
North	43.2	0.25	0.04	252	63
Northwest	46.0	0.37	0.07	222	66
West	57.7	0.25	0.06	255	54
Southwest	53.1	0.28	0.09	273	59
South	55.8	0.39	0.11	309	76
Southeast	60	0.57	0.12	284	69
East	62.7	0.52	0.09	260	73
Northeast	45.7	0.46	0.10	271	66
IDOE Standard (2016.C)	1-hour 35 ppm	1-hour 0.1	1-hour 0.075	150	35

After selecting locations for sampling, measurements were carried out according to monitoring standards (Table, 3 and 4).

According to the results obtained from Tehran West Terminal's air pollutants samples, most pollutants were above the standards set by the IDOE.

Table 5: Reliability of the questionnaires

Ratio	Target group
0.896	Staff
0.925	Managers
0.984	Specialists

Questionnaire

The questionnaire was distributed among three groups of managers, specialists, and staff (including drivers and terminal staff). The reliability of the questionnaire was calculated as shown in Table 5. Content Validity Ratio (CVR) of the questionnaire was confirmed by the specialists. The group of specialists included experts in the field of environment - air pollution, urban environmental management, traffic control management, and senior management of the terminal.

SWOT matrix analysis

SWOT analysis is an effective tool for identifying the environmental conditions and internal capabilities of an organization. The foundation of this efficient tool is based on strategic management as well as marketing and learning about organizations environment. SWOT, also known as TOWS, is the comobination of initial letters of Strength, Weakness, Opportunity, and Threat. Strength and weakness are inherently associated endogenous factors while threat and opportunity are exogenous factors associated with the environment. Here, a mere introduction of the SWOT analysis is presented and its implementation is not described.

The steps of SWOT analysis can be summarized as follows:

- A brief description of the steps
- Prioritizing internal and external factors

- Creating a SWOT matrix and entering the selected factors according to priorities
- Comparing internal and external factors with each other and determining SO, WO, ST, and WT strategies
- Determining the required steps to carry out the specified strategies
- Performing the measures and reviewing their results

In order to develop strategies related to bio-management in the studied area, strategic planning framework was used. In this framework, development of strategies is realistic and based on the characteristics of the studied community. With this approach, the main research tool in SWOT analysis model which is widely common globally, especially in the field of sustainable development is used (Sedighi and Vahdatzad, 2013) (Table, 6).

According to the drivers, as travelers prefer cleaner and better quality buses, drivers are forced to keep up the quality, and thus change their buses every few years[1]. Due to severe road police surveillance on driver's documents in city to city travels, drivers pay special attention to periodic inspection of vehicles[2]. At West Terminal, there is enough space which can optimally be used for establishing a department called "Terminal Environment"[3]. According to drivers' response to the questionnaire - they did not explicitly responded to "the use of repair shop" - and field observations, it seems that repairs are likely to be performed at unauthorized locations[4]. As it was clear from the questionnaire, most of the drivers are not interested in environmental education which can be due to lack of awareness[5]. Analytic Hierarchy Process (AHP) was used for weighing the measured items to prioritize their levels of significance. AHP helped to determine the weights of every indices of internal and external factors. After collecting the responded questionnaires, significance of each factor was determined, and then, the weights of every indices of internal and external factors were obtained (Tables 7 and 9). Next, Internal Factor Estimator (IFE) and External Factors Evaluation (EFE) matrices were created. In the first column, relative weight of each factor, weight coefficients, between 0 (insignificant) and 1 (very significant), were assigned with regard

Table 6: Internal strategic factors of SWOT model in West Bus Terminal environmental management

Weaknesses (W)	Strengths (S)
- Other than repair shops, vehicles are also repaired at the terminal area which poses the risk of oil leakage in the soil[4]. - It is a problem that drivers are reluctant to environmental education due to lack of awareness5. - Managers have no supervision on drivers' activity when working with the vehicles. - Environmental pollutants are above the standard. - Terminal has no intra-organizational environmental rules.	- High-quality buses are always available at the terminal[1]. - Before moving to destination, drivers get their vehicles serviced on a daily and regular basis[2]. - Terminal managers are willing to solve environmental issues and cooperate with municipality due to justification made by the municipality. - There is easy access from terminal to nearby streets as well as highways. - There is enough space at the terminal to launch environmental projects[3].

Table 7: Internal factors 'weights

	Row	Weight	Rank	Weighted point
Strengths	1	0.08	1	0.08
	2	0.09	2	0.18
	3	0.1	2	0.2
	4	0.11	3	0.33
	5	0.12	4	0.48
Weaknesses	1	0.1	3	0.3
	2	0.12	4	0.48
	3	0.1	3	0.3
	4	0.07	1	0.07
	5	0.11	3	0.33
total		1		2.75

Table 8: External strategic factors of SWOT model in West Bus Terminal environmental management

Threats (T)	Opportunities (O)
Increased migration to Tehran which will be followed by further movements	Established Organization for Transportation and Terminals and regular monitoring of the municipality
Lack of coordination and consistency in organizations and bodies responsible for urban environmental management	Thinking of environmental protection in the country, city and region
lack of regular IDO monitoring	Public institutions and organizations multi-year approach for delivering relevant services
lack of cooperatives' attention to environmental laws	High impact of media on changing the attitudes of officials and managers
Establishing terminal in strategic locations od Tehran	Promotional programs for improving the situation of environment

Table 9: External factors 'weights

	Row	Weight	Rank	Weighted point
Opportunities	1	0.11	3	0.33
	2	0.12	4	0.48
	3	0.08	1	0.08
	4	0.11	3	0.33
	5	0.08	1	0.08
Threats	1	0.12	4	0.48
	2	0.1	2	0.2
	3	0.08	1	0.08
	4	0.08	1	0.08
	5	0.12	4	0.48
total		1		2.62

to effect of the factor's content on current strategic success. In fact, relative weight column shows the rotation of effectiveness of each factor in the current situation as suggested by the experts. For this purpose, after determining prioritizing the factors by experts, the column was normalized to obtain weights between 0-1 for each factor, the total of which was 1. This column is created by AHP method.

Table 8 shows the list of external strategic factors, including opportunities and threats affecting environmental management in the Terminal location. As can be seen, the impact of institutions and organizations is an opportunity while increased migration to Tehran and lack of regular environmental monitoring are effective factors considered as threats.

The proper strategic decision to decrease the threats could be: Reduce taxes and providing grants and governmental financial aids for the promotion of environmental situation in the site. New advertisements policy in order to raise public awareness in national media and billboards in the city regarding the environmental protection. Significance of this issue would draw more attention of the authorities. This awareness encourages cooperatives' managers to become more aware of environmental issues. Lack of cooperation between IDOE organizations and terminals for establishing environmental rules within the terminals area must be taken in to consideration.

Internal - External (IE) matrices

Internal matrix is a tool used for evaluating internal factors of the organization. It actually measures strengths and weaknesses of organizational units. External matrix is a tool that allows strategists to evaluate the environmental, economic, social, political, cultural, legal, and technological aspects of the project in a considered timeframe which applies to both public and private organizations (Sedighi and Vahdatzad, 2013). According to the results of IFE evaluation (Table, 7), its total point was 2. 75 and total weight point of EFE matrix (Table, 9) was 2.62. According to the current research findings, Tehran West Terminal's environmental management is in the most defensive position (Weakness/Threat (WT)). Therefore, existing capabilities and potentials as well

Table 10: Prioritizing the strategies

Rank	Strategies	Total point
1	Regular trainings for managers, drivers and other terminal staff (WT1)	5.31
4	Forbidding the repairs work, especially changing oil in places other than repair workshops (WT2)	3.93
2	Regular monitoring by IDOEO and municipality (WT3)	4.72
3	Establishing environmental rules within the organization (WT4)	4.44
5	Cooperatives' managers supervision on controlling vehicles and drivers (WT5)	3.73

as upcoming opportunities should be used in the best way possible in order to succeed in improving the quality of environment in in Tehran West Terminal.

Quantitative Strategic Planning Matrix (QSPM)

At this stage, using the Quantitative Strategic Planning Matrix (QSPM), the various strategies developed at the stage of the formation of a comparative strategy matrix, are evaluated and judged and their relative attractiveness (AS) determined and ultimately prioritized. It should be noted that the greater the attractiveness of a strategy, the higher the priority. At this stage, the data gathered in the framework of strategic planning is analyzed using the SWOT model. To achieve the highest priorities in environmental management of Tehran West Terminal based on research results, the matrix of the comparison of the two internal factors (strength, weakness) and external factors (opportunities and threats) was considered and fundamental strategies were identified. According to IFE and EFE matrices, WT strategies (improving weaknesses and turning threats into opportunities) require special attention. After forming a QSPM, WT strategies of SWOT matrix were prioritized (Table, 10).

CONCLUSION

In urban planning, determining an appropriate location for establishment of urban utilities is of great significance. This means that each urban activity requires its own location and it cannot be located in any urban area. It can be made possible by considering the service features and their association with others. One of the main urban services are urban and suburban passenger terminals. Due to increased traffic load and population, and thus urban development, traditional conditions governing the deployment of this service have been accompanied by many problems. Social, economic, traffic, and water requirements have to be considered, as well. Setting proper schedule for bus transfers, meeting the bus service and repair needs, making easy access from urban to suburban bus transfers available for passengers, facilitating load transmission and discharge, communicating and observing of the hierarchy of travel, creating an environment with a quiet landscape away from polluted areas of workshops and bass washes, providing easy access for passengers at the entry of terminals to halls and urban transport services, separating the incoming and outgoing passengers, creating separate parking lots, creating appropriate stations on the passengers' departure platforms, creating proper waiting rooms for the passengers, and providing diverse welfare services for passengers of long trips. Results obtained from soil sampling indicated that pollutants like heavy metals and volatile organic matters such as benzene and toluene were above the standards set by IDOE. So, forbidding repairs, especially changing oil in public places of Terminals is very necessary. In terms of air pollutants, concentrations of all gases and particles, especially in eastern and southeastern parts were above the standards set by the IDOE, which seem natural because of the dominant wind direction. According to SWOT analysis, defensive strategies with the highest score are prioritized as follows: Regular trainings for managers, drivers and other terminal staff (5.31), regular monitoring by IDOE and Municipality of Tehran (4.72), establishing environmental rules within the organization (4.44), Forbidding repairs, especially changing oil in places other than repair workshops (3.93), and cooperatives' managers supervision on controlling vehicles and drivers (3.73), respectively selected as the next strategies. Based on the results, it is recommended that:

-It is necessary to conduct a 24-hour research on the traffic of busses and passing cars at the terminal in a few consecutive days.

- It is necessary to measure the exhaust of the

terminal buses with portable devices in order to control the quality of the buses.

- It is proposed to conduct a pilot waste management plan at the terminal by the municipality.
- It is advisable to identify the parts of the area which its soil is polluted and take the proper masseurs to be properly refined.

- It is suggested that measurements be made at 21-24 at night, in which the urban traffic volumes are reduced and the volume of interurban passenger traffic is increased.

- An integrated environmental education program must be conducted on the regular and consecutive bases for the managers, staff and the drivers working in the Terminal.

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CONFLICT OF INTREST

The authors declare that there are no conflicts of interest regarding the publication of this manuscript. In addition, the ethical issues; including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy have been completely observed by the authors.

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