

# DESIGNING A STRATEGIC PATTERN FOR SOLID WASTE MANAGEMENT WITH THE MINIMIZATION APPROACH THROUGH MAXIMUM CITIZENSHIP PARTICIPATION, STAKEHOLDERS IN DECISION MAKING

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## Abstract

Waste management has become one of the most important challenges, and Lack of waste management as a crisis has plagued cities, plains, forests, seas, and even the oceans. Waste has now become a problem in sustainable development, which on the one hand empties the treasury of municipalities that are helpless to solve it. Environmental protection against the destructive effects of waste, and more importantly their optimal management in order to recycle and reduce the consumption of raw materials is a major challenge for decision makers. So far, the authorities have made efforts to develop criteria, rules, expert regulations and to meet the needs and implementation of these programs. However, in addition to planning, factors such as the allocation of real credits and facilities, education and information play a very important role in this regard. This study was conducted with the aim of designing a strategic model of urban solid waste management with a minimization approach through maximum citizen participation, stakeholders in decision making. Awareness raising, culture building is one of the main factors in waste management. This means that influencing human geography, even by exploiting the optimal role of religion and indigenous beliefs in different parts of the country is one of the operational solutions to reduce primary waste production. For this reason, given the differences between the geographical environment and the type of waste produced, which vary based on the culture and economy of different population points in towns and villages, it cannot be claimed that a single version can solve all the problems but a step towards sustainable development is adopted in this paper.

**Keywords:** Waste Management, Solid urban waste, Strategic model design, Sustainable development, Citizen Participation, Stakeholders in decision making

## Introduction

Increasing the amount of municipal waste, most of which is domestic waste, in other words, biodegradable materials create more and more serious difficulties every year in choosing the optimal urban solid waste management system (Minakova et al, 2018). The state of solid waste management in cities of most developing countries is fast assuming the scale of a major social and environmental challenge (Chukwunonye, 2010). Given that the decision of urban waste minimization methods depends on the maximum participation of citizens and stakeholders in this field, designing a strategic model in the field of waste management is very important. The idea of citizen participation in the administration of city affairs is as old as the establishment of the city; but the development of culture, knowledge and readiness of

citizens in today's world has caused that the social participation of citizens in all urban affairs should be more and more considered as an effective solution in order to maximize the efficiency and effectiveness of organizations such as the municipality and the opinion of urban planners and experts (Aretha Aprilia et al, 2016). This potential has led development professionals to recognize citizenship control as the highest level and type of partnership. As a result, municipalities in many major cities around the world are participating in various projects and venture capital investments, and are financing their investments by investing in citizens; urban waste management is one of the most important of these (Minakova & Timofeeva, 2015). Despite the importance and necessity of the factor of social participation of citizens in the development of cities and one of the main needs of our country for comprehensive development is to pay attention to the concept of social participation in solid urban waste management. This issue has little history in Iran, so that the role of people's participation in this direction is very small and weak (Zahedani and Zohri Bidgoli, 2012; Hassani Ziaberi, 2014). Therefore, this study was conducted with the aim of designing a strategic model of urban solid waste management with a minimization approach through maximum citizen participation, stakeholders in decision making.

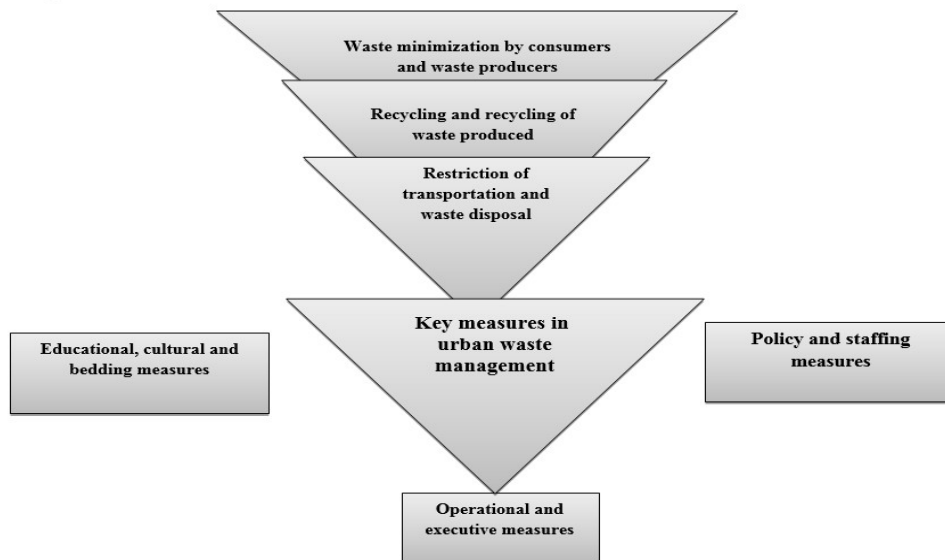
## **Materials and Methods**

The research method used in this study is based on a qualitative-quantitative paradigm with an exploratory approach and in terms of purpose, application, this research is useful for planners, facilitators, and waste management activities and can be used by the relevant authorities, to succeed in strategic cooperation in waste management. The study population of this study includes Key informants, experts and stakeholders in waste management decision making, they have the experience of working in this field. Citizens who work in waste management were also selected as examples. Data from this study were performed in a qualitative section using interviews with stakeholders. The number of people studied was determined by data saturation and theoretical adequacy. The process of data collection and interviews has continued until data saturation and adequacy and the interview questions were selected and asked, openly. Data coding was done using N-Vivo quality software. It was designed below the Strategic model of urban solid waste management with the approach of minimizing urban waste through maximum citizen participation, stakeholders in decision making. In the next step, to evaluate and validate the model, its usability was examined in the action scene and fit the model in the dimensions of measurement, structural and general with the help of smart-pls2 software. Using an open coding system, the researcher reviews the data line by line and codes each sentence after recognizing its processes (Danaeifard, 2005: 61). At the end of the open coding, the groundwork was laid. In central coding, Classes formed, this compares the encoded data and in the form of clusters that fit together. Merged, As a result, similar codes were placed on one floor (Adib Haj Bagheri et al., 2010: 129). In other words, the original codes and categories created in open coding were integrated with similar items, and the connection between the subclasses was identified and a class was formed with new concepts. In selective coding, the relationship between different classes and the central class was determined and then the research story was presented.

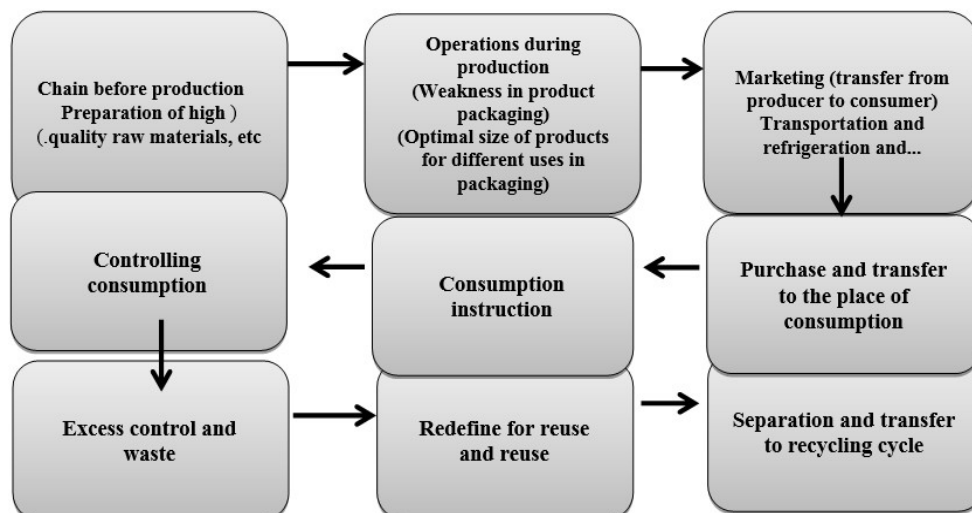
**Results**

The results of the research are shown schematically below.

**Figure 1- The strategic model of stakeholders in decision-making and operations Solid urban solid waste management extracted from interviews**



**Figure 2: Strategic model of urban solid waste management Extracts from interviews Based on decision-making and operational participation, According to an explanation**



• Structural model test

Diagram 1 shows the test of the structural model of the research. Explained structural pattern test Using the path coefficients (path numbers), Significance of path coefficients and R2 values or variance, which tests the relationship between research variables.

Diagram 1: Test of structural research model

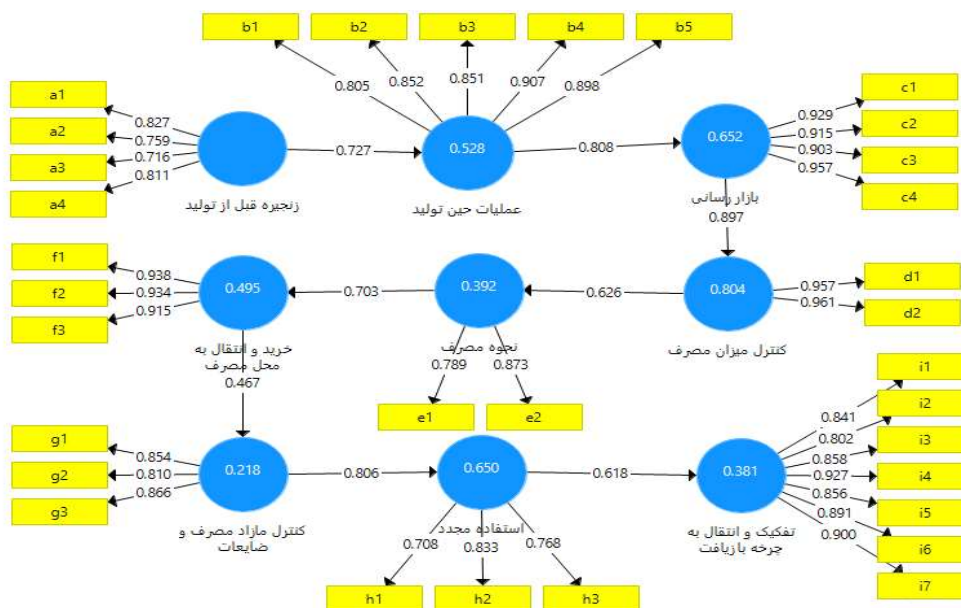
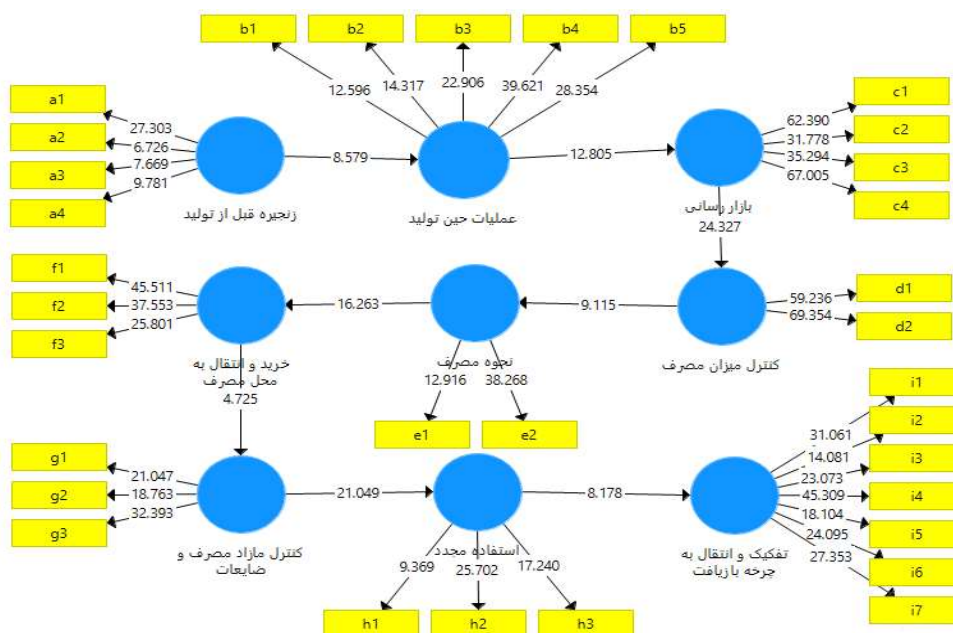


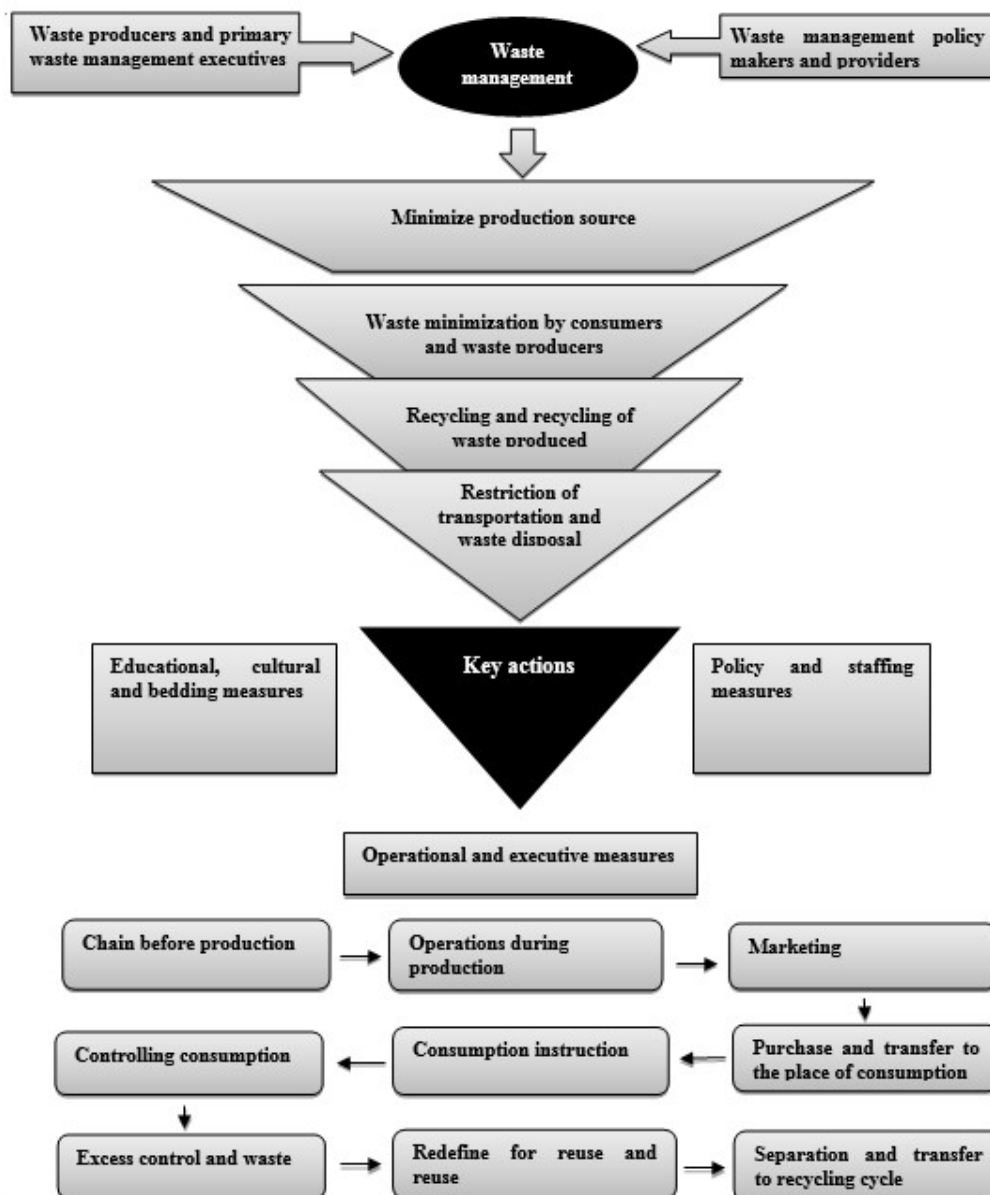
Diagram 2: Measuring the overall model in a meaningful way



According to Diagram2; with a significant coefficient of variables that is greater than 1.96. Therefore, the relationship between the proposed contexts was confirmed.

The final strategic model of urban solid waste management extracts from interviews based on decision-making and operational participation according to a waste management cycle

**Figure 3: Strategic model of urban solid waste management in the context of the executive contexts extracted from the interviews Based on decision-making and operational participation According to a waste management cycle**



## Discussion

One of the most important environmental issues in developing countries is urban waste management. One of the essential components for the successful implementation of waste reduction, recycling and composting programs is public participation. Urban management, through various cultural and educational programs, and the implementation of incentive schemes try to attract the participation of citizens in the field of urban waste management. Studies show that informing and creating a culture to protect the environment for different segments of society and sensitizing public opinion against environmental degradation is one of the most effective ways to prevent it. The development of culture, knowledge and readiness of citizens in today's world has caused the social participation of citizens in all urban affairs more and more as an effective solution to maximize the efficiency and effectiveness of organizations such as the municipality and urban planners and experts. To be placed. The concept of social participation in the management of urban solid waste in Iran has little history, so that the role of people's participation in this direction is very small and weak (Zahedani and Zohri Bidgoli, 2012; Hassani Ziaberi, 2014). Therefore, this study was conducted with the aim of designing a strategic model of urban solid waste management with a minimization approach through maximum citizen participation, stakeholders in decision making.

In line with the main goal of the study, the following goals were considered in the study process:

- Identify target groups (stakeholders in decision-making) to design a strategic model for urban solid waste management with a minimization approach by increasing citizen participation.
- Identify the objectives of solid urban waste management with a minimization approach by increasing citizen participation in the eyes of stakeholders in decision making.
- Identify urban solid waste management methods with a minimization approach by increasing citizen participation from stakeholders in decision making.
- Develop the necessary arrangements and organization for solid urban waste management with a minimization approach by increasing citizen participation in the eyes of stakeholders in decision making.
- Design a strategic model for urban solid waste management with a minimization approach by increasing citizen participation.
- Evaluate and validate the designed model of solid urban waste management with a minimization approach by increasing citizen participation from stakeholders in decision making.

Achieving the objectives of this study was considered based on qualitative-quantitative paradigm with exploratory approach.

In response to the first question of the study, "What are the target groups (stakeholders in decision-making) of solid urban waste management with a minimization approach to increase



citizen participation?" And based on the analysis of stakeholder responses in waste management decision making in two the group of policymakers and service providers of waste management and waste producers and primary implementers of waste management were classified. Within this framework, the organizations and institutions responsible at the level of policy-making headquarters and the development of relevant laws and guidelines in the field of waste management, including managers and experts related to waste management in municipalities, the Environment Organization, Ministries of Mining Industry and Trade and Agricultural Jihad , The National Standards Organization, the private sector active in the field of waste management, non-governmental organizations active in the field of waste management and environmental activists active in the field of waste management. Also, the waste producers and primary executives of waste management are manufacturing companies, households, organizations, departments and public and private institutions that produce waste, high-grade and low-waste industries.

In response to the second question of the research, "What are the goals of urban solid waste management with a minimization approach to increase citizen participation?" Waste was produced by consumers and producers of waste, recycling and recycling, and restrictions on transportation and waste disposal were limited.

In response to the third and fourth questions of the research, "What are the methods of urban solid waste management with minimization approach to increase citizen participation?" And "What are the arrangements and organization required for urban solid waste management with minimization approach to increase citizen participation?"

Staff interventions, service implementation measures, and educational and cultural measures and grounding were the main measures taken by the interviewees to advance the objectives of waste management. In line with each of the proposed measures, arrangements and arrangements were also made, for example: for the actions of the headquarters that the waste management organization as the main trustee of this issue, can focus on the implementation of related laws and regulations and its executive guarantees.

In the field of executive measures, services such as concluding memoranda of understanding with guilds, offices, companies, hospitals, etc. Development of recycling stations in neighborhoods, development of recycling industries, etc., appropriate pricing of waste management services. These tools can be used to effectively change citizens' consumer behavior, avoid waste production, reduce waste production, and increase waste recycling rates.

In the field of educational and cultural activities and bed construction, we can also include measures such as publishing educational books: production of educational videos and program implementation by seminars and non-governmental organizations, cultural context of waste management through students, naming some days in. He mentioned the year and the implementation of projects such as Day without Nylex and....

According to the participation of stakeholders in the field of waste management, the executive platforms in the waste management cycle extracted from the interviews were

described, which include 9 parts of the pre-production chain, operations during production, marketing, consumption control, consumption, purchase. And transfer to the place of consumption, control of excess consumption and waste, redefining for reuse and use and separation and transfer to recycling cycle.

In the following section, first, the importance of stakeholders identified in the field of waste management from the perspective of respondents was evaluated. According to the presented results, the average of both groups of stakeholders has been evaluated more than 3 and also the significant level shows the effectiveness and importance of both groups. However, the group of policymakers and waste management service providers has a higher average.

Then, the average scores provided by the respondents in terms of the importance of the goals and approaches proposed in the field of waste management were evaluated. Significant levels indicate the importance and, in other words, validation of all four approaches in the field of waste management.

Then, the average scores provided by the respondents in the field of key measures in the field of waste management were evaluated. Significant levels indicate the importance of key measures in the field of waste management.

Then, the average scores provided by the respondents in the field of executive platforms in the field of waste management were evaluated. The findings show that the proposed platforms have an average score above 3. Also, the significant level indicates significant and in other words confirms the importance of executive platforms in the field of waste management.

At the end, based on the steps taken in the study of the final strategic model of urban solid waste management, the interviews were compiled based on decision-making and operational participation according to a waste management cycle.

## **Conclusion**

Waste management has become one of the most important challenges in the world, and many countries around the world are facing a waste crisis. Lack of waste management as a crisis has plagued cities, plains, forests, seas, and even the oceans. Waste has now become a problem in cities, which on the one hand empties the treasury of municipalities that are helpless to solve it, and on the other hand poses a major threat to the environment. Environmental protection against the destructive effects of waste, and more importantly their optimal management in order to recycle and reduce the consumption of raw materials is a major challenge for decision makers. So far, the authorities have made efforts to develop criteria, rules, expert regulations and to meet the needs and implementation of these programs. However, in addition to planning, factors such as the allocation of real credits and facilities, and education and information, play a very important role in this regard. A more important point than this is the lack of public participation and responsibility in waste management.



Awareness raising, culture building is one of the main factors in waste management. This means that influencing human geography even by exploiting the optimal role of religion and indigenous beliefs in different parts of the country, is one of the operational solutions to reduce primary waste production.

For this reason, given the differences between the geographical environment and the type of waste produced, which vary based on the culture and economy of different population points in towns and villages, it cannot be claimed that a single version can solve all the problems.

### **Suggestions**

- Waste management strategies have been considered in various societies for many years and many activities are carried out to achieve a social habit. These efforts will succeed in any form, regardless of the key role of waste producers. Arrangements must be made for all elements of the system to produce and recycle waste to participate in decision-making and implementation.
- The process of waste reduction at the production site depends on the performance of various institutions such as municipalities, industries, manufacturing and services, education, public media, and so on. Tehran Municipality's commercial units can be directly involved in separation programs from the source and reduce some of the waste flow. In addition, because the fruit and vegetable markets and its distribution are at the disposal of the organizations affiliated with the municipality, the municipality of Tehran can also plan to reduce waste in this area.
- Arrangements should be made for manufacturers to consider how much of the company's output is consumed and how much is consumed as waste during production.
- Put a label on the product packaging that shows the percentage of product waste to the customer that the decision to use the product has less waste with the consumer.
- Also explain how to recycle each product packaging component and its contents on the packaging.
- The best, least expensive, and safest way to avoid waste problems is to try to avoid producing them. These new processes not only protect the environment, but also save money due to lower energy consumption and raw materials.
- Reducing the amount of consumables used in packaging and shipping products to the consumer market is another example of this type of action.
- Given that the amount of waste production in urban communities, including in Tehran, is related to lifestyle, people living and the type of activity in different urban areas, analyzing the lifestyle of families living in municipal areas can cause fluctuations in the amount of waste produced to justify.
- Also, the amount of waste produced depends on the pattern of consumption of packaged food and beverages. Considering that the consumption of these materials in the northern regions of Tehran is much higher than in the southern regions, it is obvious that the

production of waste resulting from this type of consumption pattern is higher in the north of Tehran. A clear example of this can be mentioned in the amount of water consumed in the northern regions of Tehran.

- Before addressing the proposed program and executive mechanisms to improve the structure of waste management services, it is necessary to pay attention to some of the issues considered by citizens in the survey conducted in this study. Because regardless of these issues, the implementation of any program regarding waste management services can be faced with the problems and lack of cooperation of citizens, managers of departments and organizations and owners of classes. Therefore, in this section, first the issues emphasized by the citizens are mentioned and then the desired executive mechanism in that field is proposed. A wide range of comments and suggestions have been made by the citizens of Tehran. If they become executive mechanisms and some structures, laws and regulations are amended, the necessary grounds can be provided for the success of waste management projects. It also helped people pay for waste management services. These executive mechanisms can be considered as follows:

- Separation of waste from the source was one of the issues that citizens, managers of organizations and business owners criticized from various dimensions. Therefore, reviewing the waste separation plan is an issue that should be seriously on the agenda of Tehran Municipality and responsible organizations. In this regard, several mechanisms must be considered. First, waste management agencies and organizations believe that their waste is mostly dry (paper and cardboard) and can be recycled, so if the municipality has a proper plan for collection and recycling.

- On the other hand, the method adopted by the Tehran Municipality to separate waste from the source is not a good model to cover this issue in the city of Tehran. Studies of this study and interviews with Tehran citizens showed that the existing and practiced methods of the Waste Management Organization, such as creating recycling booths, or weekly delivery to melodic vehicles and even placing waste. Segregated in mechanized blue tanks, none of them are among the top priorities for waste producers to deliver the separated waste. Rather, most of those who dispose of waste place the separated waste next to the trash in front of the doors of the houses, and this is the dominant pattern of behavior among Tehran citizens in the field of waste segregation. Therefore, the most viable way to successfully implement a waste segregation plan from the source is to collect the segregated waste from the doors of homes, organizations and industries. To implement this method, the municipality must instruct the builders of residential, office and commercial units during construction to install two separate trash cans for wet and dry waste in front of the doors of houses and buildings so that waste producers can use the method. They prefer to use it to deliver separate waste. This method is not only the least expensive way to deliver waste and is tailored to the tastes of waste producers, but it is also a method that can expose people to waste separation on a daily basis, and in the shortest possible time, change the behavioral pattern of waste producers in the field of waste segregation and help to maintain and stabilize it. To do this, some changes must be made to the rules and regulations of construction and the completion of work, and oblige

them to install two trash bins, one for wet waste and the other for waste. Use dry ones. For existing buildings, a program should be put on the agenda for owners to install another garbage basket for dry waste.

If managed properly, all waste can be returned to the production cycle for achieving sustainable development. This management starts with planning and legislation before the consumption of citizens and even before the production of goods. Various countries, along with the manufacturing sector, have enacted laws to recycle waste, especially electrical and electronic waste. For example, in a country like Japan, when you buy this type of equipment, the cost of its destruction is also received from the customer.

### Acknowledgements

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### Reference

- Aprilia, A.; Tezuka, T.; Spaargaren, G.(2016) Household Solid Waste Management in Jakarta, Indonesia: A Socio-Economic Evaluation. Zero-Carbon Energy Kyoto (.56-62).
- Afangideh, Asuguo. I., Joseph, Kinuabeye. U., Atu, Joy. E. (2012) Attitude of urban dwellers to waste disposal and management in Calabar, Nigeria, European Journal of Sustainable Development, Volume 1, No. 1.
- Bo Gattis (2018). The Why's and how's of Citizen Satisfaction Surveys: An Examination of Cities Alliance, "The impact of city strategies, Washington D.C, USA.
- Minakova, Irina. Tatyana, Bukreeva. Bukreeva, Olga .Timofeeva (2018). IMPROVEMENT OF SOLID WASTE MANAGEMENT: ORGANIZATIONAL AND TECHNOLOGICAL ASPECTS. : 16(9)1, 505, 99 – 103.
- Minakova I.V., Timofeeva O.G. (2015). Institutional innovations in a control system of the address of municipal solid waste in the region // in the world of discoveries. No10 (70). P. 118-125 (in Russian).
- Timofeeva O.G., Minakova I.V. (2013). To a question of adaptation of institutional bases of utilization of a plastic container and packing in the developed countries to conditions of the Russian economy // YuZGU News. – Kursk. No1. P.215-219.
- Sara/Bergqvist, S & Lisa/Wieslander (2006) L. Waste management and health. A case study in Mbale, Uganda. Degree project in Public Health 10 poäng. Malmö University: Health and Society, Public Health department, vol.20506.