EVALUATING ATTITUDES AND BEHAVIOR TOWARDS SELECTIVE COLLECTION OF WASTE IN CLUJ-NAPOCA CITY, ROMANIA

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ABSTRACT. Involvement of waste generators in selective collection of waste is one of the issues that need to be tackled within a waste management system. The questionnaire survey method is often used in investigating the behaviour, the perception, the knowledge and the attitude of population regarding different environmental issues. In this case, the questionnaire survey method is used in improving waste management process at local level. In Cluj-Napoca, like in other Romanian cities, there is little involvement in waste management process and selective collection of waste at source. This is the issue that the paper is addressing through an online survey questionnaire applied on a sample of 425 persons living in Cluj-Napoca. The questions refer to three main aspects: degree of awareness regarding selective collection of waste at source, the accessibility of the service, and present and future personal behaviour in this sector. The answers reveal that the majority of the respondents are aware of the importance of collective selection of waste, a percent of more than 44% of them state they collect waste selectively and they highlight strengths but also weaknesses of the existing system. The chi square test identified a significant influence of age and education of the respondents and the declared behaviour on selective collection of waste and their opinion on organization of the system by public authorities. Moreover, the identified aspects can be the base of the decision making process related to waste management planning, mainly referring to selective collection of waste.

Key words: *perception, selective collection of waste, survey questionnaire, waste management*

INTRODUCTION

The implication of waste generators within waste management process, mainly through selective collection of waste at source, is one of the main challenges of waste management process. This represents an important factor for the efficiency of waste management processes that plan to reduce waste generation, selection of waste at the source, and therefore to attain the imposed national targets regarding recycling and recovery (Andrew et al., 2003; Omran and Schiopu, 2015; Sujauddin et al., 2008).

As stated by Taboada-González et al., (2011) environmental perception determined the attitude of population regarding the environment; a detailed analysis of the subject is presented by Buenrostro et al., 2014. Therefore, waste generators behaviour and attitude regarding selective collection of waste, recycling and other issues related to waste management is very important within an effective waste management process, helping in the monitoring stage.

The questionnaire survey method is intensely used to identify the perception of population regarding environmental issues (Al-Khatib et al., 2010; Muntean et al., 2012; Sujauddin et al., 2008; etc.) Moreover, this method is also used in identifying the attitude of waste generators regarding waste management and selective collection of waste in particular, and their opinion regarding the actual system (Buenrostro et al., 2014; Desa et al., 2011; Eco-Rom Ambalaje, 2013; Institute of Public Policy, Bucharest, Romania - I.P.P., 2015; Omran and Schiopu, 2015; Otoma et al., 2013, Owamah et al., 2015, Thanh et al., 2012, etc.). A summary of the main characteristics of several questionnaire surveys is performed by De Feo and De Gisi (2010).

When referring to waste management it has been noticed that surveys regarding population opinion performed in this area follow certain issues such as: attitudes and behaviour of population on waste recycling at the moment of the study, estimated changes of behaviour in the future, barriers against waste recycling, but also reasons for a certain adopted behaviour (De Young, 1990).

Generally, this type of surveys are performed in order to evaluate the efficiency of awareness programs regarding waste recycling and waste collecting systems, to identify the reasons that stay at the base of the generation of certain type of waste (e.g. e-waste), etc. (De Young, 1990; Pooman, 2014; Thomas et. al., 2004; Bao, 2011). The final goal of this type of surveys consists in understanding the way the behaviour of the population regarding selective collection of waste can be influenced in order to get a higher percent of waste recycled, thus achieving the imposed targets (Thomas et. al., 2004).

There is focus on selective collection of waste at source because this is the first step of transforming waste into resource (Sujauddin et al., 2008). In this context, it is mandatory to identify the degree of knowledge and awareness of population regarding this subject and also to identify the factors that prevent them to get involved in the recycling process (Omran and Schiopu, 2015). Moreover, the information provided by the questionnaire survey could help improving certain aspects within waste management system, including the increase of the involvement of population.

Besides the fact that Cluj-Napoca is among the first Romanian cities as population number, it is also the second university centre of Romania. Therefore, there are high expectations regarding people's education and behaviour towards waste management. However, there is still little involvement in selective collection of waste at source in Romania, and also in Cluj-Napoca, fact that is translated into a recycling percent of 3,25 % - 5 % of the generated waste (I.P.P., 2015). This should be a reason of concern and an incentive to take action, since the recycling percent by the year 2020 should reach 50% (I.P.P., 2015).

As a consequence of the situation presented above, the paper aims to determine the environmental perception of the current selective collection of waste system and to determine the degree of involvement of population from Cluj-Napoca within the waste management process in order to propose solutions to improve it.

Therefore the objectives of the paper are: (1) to determine whether the population has sufficient information regarding the selective collection of waste and is aware of its importance, (2) to identify the opinion and attitude of population regarding the current system of selective collection of waste, (3) to evaluate the behaviour of population concerning the selective collection of waste, and (4) to identify solutions to improve selective collection of waste based on the answers of the population such as: suggesting specific educational campaigns, suggesting ways to minimise the perceived barriers against selective collection of waste.

Selective collection of waste in other surveys developed in Romania

Similar results concerning the population behaviour and attitude regarding the selective collection of waste were also obtained by other surveys.

Eco-rom Ambalaje, an organization responsible for taking over packaging waste recycling and recovery obligations (2013) developed a survey on population opinion on recycling and selective collection of waste applied to 1010 persons from 528 Romanian cities. The main conclusions of the study were: over 90% of the respondents heard about recycling, over 60% declared they have children that were informed regarding recycling and separate collection of waste, 64% stated they have access to the infrastructure, but less than 50% are satisfied with the implemented system from their city residence, and 60% of the respondents state they select their waste at the source of generation.

Another survey was developed in 2014 on 103 municipalities from Romania (local authorities and also population) by the Institute of Public Policy from Bucharest, Romania (2015) regarding the actual state of the selective collection of waste and the adopted measures. It indicated that: the coverage of sanitation services in major cities is a real concerning aspect and reaches only 85%, about 47% of the sanitation services are delegated to private companies by the authorities; 43% of the population living in block of flats state they have access to a selective collection of waste system that is near their place of living; 57% of the respondents state they are disposing the recyclable waste to special bins; over 50% agree that the selective collection of waste system implemented for population living in blocks of flats is not efficient; the main reasons of the lack of interest regarding selective collection of waste in residential

areas with blocks of flats are believed to be: (1) lack of education – 51% and (2) insufficient informing programs – 68%, although 60% of the municipalities declared they performed informing and raising awareness campaigns regarding the selective collection of waste.

Furthermore, there are studies also performed in Cluj-Napoca (Popiţa, 2012; Pop et al, 2013). For example, the survey performed by Popiţa (2012) on population from rural and also urban areas indicated that the majority of the 50 respondents from urban area (1) were willing to get involved in waste management by collecting their waste selectively on more categories, other than paper, plastic, metal and glass, including waste of electric and electronic equipment, bulky waste, hazardous waste, and organic waste, (2) would like a system that include penalties, and different payment schemes, but they knew little about the actual waste selective system.

A similar survey was performed in 2013 by Pop et al., on 400 pupils aged between 10 and 18 years old. This study revealed that although they had knowledge regarding selective collection of waste and their importance, they were not aware on their role in waste management process.

The study area

Since there are different systems adopted for selective collection of waste improvements of the systems based on questionnaire surveys, the conclusions can only be interpreted locally, as the population's behaviour will also depend on the adopted system. Therefore, hereafter, the waste management system implemented in Cluj-Napoca will be presented.

In Cluj-Napoca, as in the rest of the country, waste management falls under the responsibility of the local public administration. There have been two private operators that are authorized by the local public administration through a public auction to manage the collection, transport and treatment of household waste generated in Cluj-Napoca for a period of at least 8 years, since September 2010.

Local waste management is based on the following elements: selective collection of waste at the generation source on two fractions – humid and dry fraction, waste transportation at the treating facility (dry fraction) and at the landfill (humid fraction), sorting of the dry fraction of waste and landfilling of the humid fraction of waste. The population living in residential areas with houses was provided with bins for humid fraction and plastic bags for the recyclables (dry fraction), while for the population living in residential areas with block of flats collective places for waste collection still on two fractions have been installed (figure 1 a); economic agents have to organize waste collection location on their expense but with the help of the sanitation company. These two fractions are being collected in different days by the sanitation company. The collecting frequency depends on the generator type: two or more collections per week for the population that lives in single family houses, and daily collection for the population living in blocks of flats. In case of economic agents, the collection rate varies according to the generation rate, so it could be once a week, but also daily.

1a   **1b**

Fig.1. *a. Example of collective waste collection facility on two fractions for residential areas with blocks of flats; **b**. Bins for selective collection of packaging waste located in public areas*

Moreover, besides the two fraction collection system, the population also has the possibility to selectively collect packaging waste on: paper/cardboard, plastic/metal and glass through different coloured bins located in public areas (fig. 1. b).

MATERIAL AND METHOD

In order to meet the above objectives, a questionnaire for 425 people living in Cluj-Napoca was applied. Hence, 95% confidence level and a confidence interval of 5% were estimated, since the total population of the city is 324.576, according to census data from 2011. The questionnaire was performed through Google Drive and delivered through email, socializing networks (www.facebook.com) and other media platforms.

According to Cătoiu, 2003 quoted by Constantinescu, 2011, "a research can't be better than the questionnaire it relies on". Therefore, in the process of questionnaire designing, certain theoretical principles from the study area of development and implementing questionnaires as probing instruments have been taken into account. The main principle that was applied consisted in structuring the questionnaire on three sections: (1) introductive questions that are the questions that refer to the selection criteria of the persons that participate in the study; (2) content questions referring to the study field; (3) descriptive questions that provide information referring to respondent profile.

Although it is recommended that the questionnaire does not start with demographic questions, this is allowed if these represent selection criteria, as it is this case (Constantinescu, 2011).

As a result, the questionnaire begins with a short introduction having as model the questionnaire performed by Bao (2011) and is organized on three sections: (1) introductive questions referring to the city of residence, that is also the selection criteria since the questionnaire is addressed to persons living in Cluj-Napoca, (2) questions referring to: awareness degree regarding selective collection of waste,

aspects regarding the infrastructure for selective collection of waste, and questions on personal behaviour regarding selective collection of waste, and the factors that affect it; and (3) descriptive questions referring to the residence type and area, the number of persons living in a house, age, and the level of education.

The respondents profile is presented in fig. 2: they come from all the neighbourhoods of the city, fact that is important considering that waste management is the responsibility of two private companies that cover all the city, but the greatest number of respondents are from Manastur (29,6%) that is also the most populated neighbourhood; the majority are between 26 and 40 years old (54,4%), younger persons under 25 years old (15,8%) and people between 41 and 50 years (15,5%); 75,5% live in blocks of flats; only less than 17% are high school graduates or less, the majority being university graduates (49,9%) or even having postgraduate studies (34,4%).

Most of the questions used Likert scale responses that are often used in marketing analysis and also in questionnaire survey methods (Bao, 2011; Jacoby, 1971). In order to avoid errors resulted from neutral answers the alternative: „I don't know" was used (Bao, 2011).

As recommended by Constantinescu (2011), the order of the questions follows certain rules: beginning from general to particular, from easy to more difficult, from closed questions to open answered questions. Moreover, the funnel approach described by Oppenheim (1992) was applied.
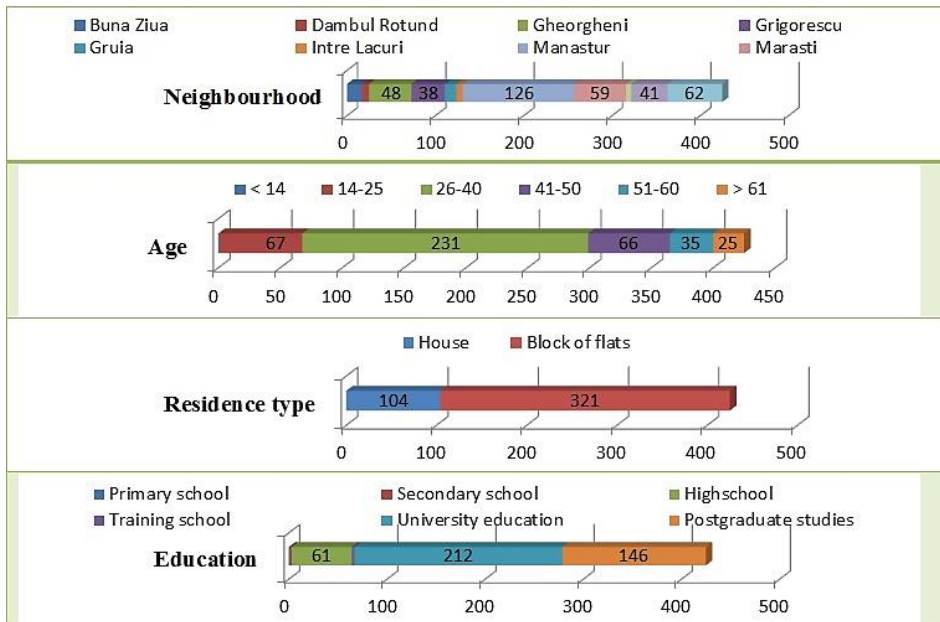

Fig. 1. *The profile of the respondents in term of area residence, age residence type and education*

Data analysis was performed using Excel Microsoft Office at a significance level α of 0,05. Moreover, *chi square test* was used to determine whether the personal behaviour, the attitude of the respondents, and their knowledge regarding selective collection of waste were significantly related to any of the variables: age, education, residence area (neighbourhood) and residence type.

RESULTS AND DISCUSSIONS

Data gathered from the survey was assessed to investigate the following: population's awareness degree regarding selective collection of waste, aspects regarding the infrastructure for selective collection of waste, and personal behaviour regarding selective collection of waste and the factors that affect it.

Awareness degree regarding selective collection of waste

The answers of the respondents indicate that 99% of them know the meaning of selective collection of waste (figure 3.a).
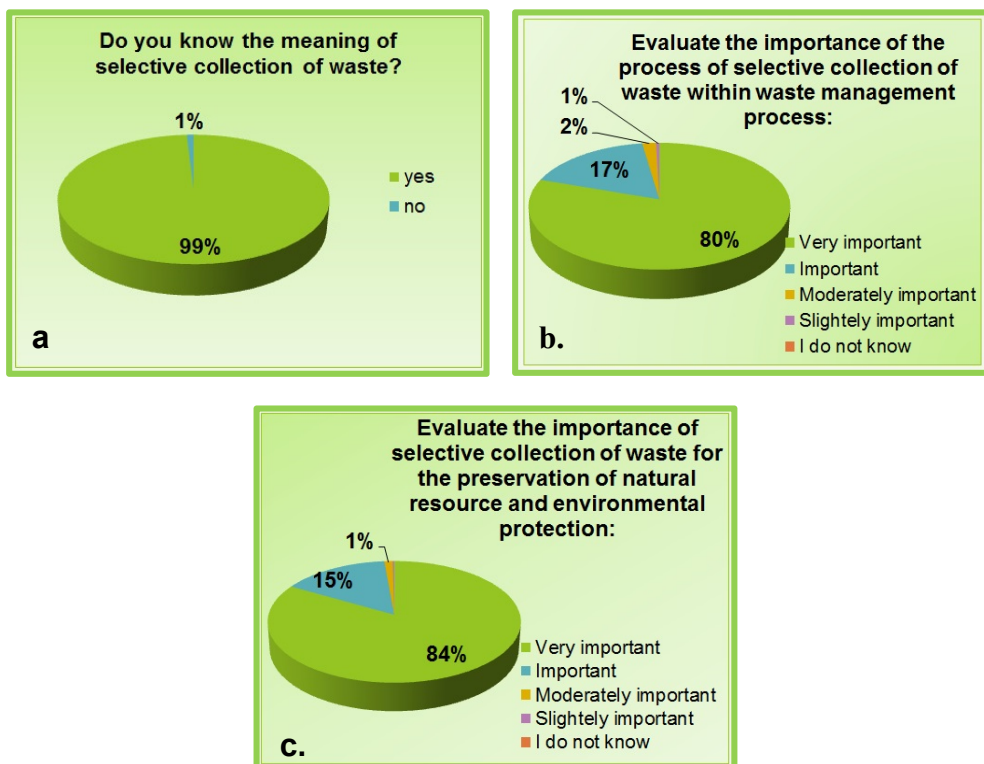
**Fig. 2.** *Awareness degree regarding selective collection of waste*

Moreover, they are aware of the importance of the selective collection of waste for the waste management process, and also for the preservation of natural resources and environmental protection, as shown in fig. 3.b and fig. 3.c.

Although the profile of the respondents (fig. 2.) show that most of them are educated persons with university diplomas, the chi test results indicate that this aspect didn't significantly influenced the answers regarding the awareness degree on selective collection of waste (table 3). These answers could indeed reflect the reality, since awareness and informing campaigns are developed in Cluj-Napoca by public authorities and sanitation companies, fact that is also highlighted by assignments of the public authorities gathered in the study developed by IPP (2015).

However, as noticed also in other studies (e.g. De Feo and De Gisi, 2010), the knowledge of rules, or the awareness degree does not really mean translation into action by the citizens.

Aspects regarding the infrastructure for selective collection of waste

Respondents were asked to give their opinion on the implemented system of selective collection of waste in Cluj-Napoca. Only less than 50% of the respondents answered that, in their opinion, the interest of public authorities for waste management had increased over the last years, and evaluated the actions of the public authorities in this domain as being low (fig. 4.a. and fig. 4.b.).
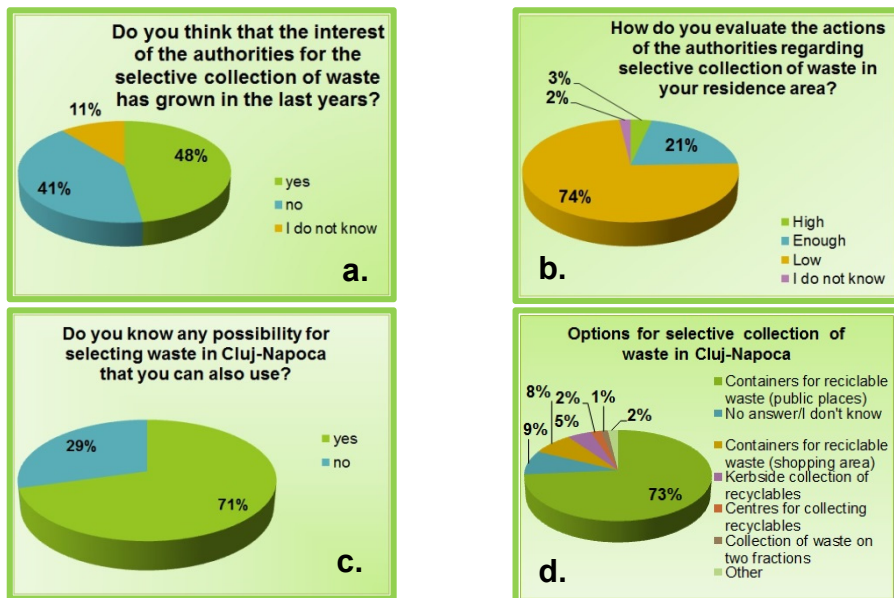
Fig. 4. *Opinion on the system of selective collection of waste*

As seen in fig. 4.c., the majority of the respondents know at least one possibility to collect waste selectively. Moreover, although in Cluj-Napoca the kerbside collection system on two fractions is implemented, and it is the most at hand, 73% of the respondents indicated the containers for recyclable waste located on public places as the facility they are using (fig. 4.d.).

As a consequence, the majority of the respondents indicated that the best measure to improve selective collection of waste would be to increase the number of containers for recyclable waste located on public places, and to increase the information, the education, and the raising awareness campaigns on selective collection of waste. All suggestions of actions that should be undertaken by public authorities for the improvement of selective collection of waste at local level are presented in table 1.

There are more answers than the number of respondents because the question was an open one, meant not to limit their answers, so respondents had the possibility to give more suggestions.

Table 1. *Opinion on actions that should be undertaken by authorities in order to improve selective collection of waste*

Actions that should be undertaken by public authorities in order to improve selective collection of waste at local level	No. of answers
Increasing the number of containers for recyclable waste	205
Information, education and raising awareness on selective collection of waste	118
Improvement of the collection system	48
Penalties for not complying with selective collection of waste	46
Material rewards for compliance with selective collection of waste	31
Ecological landfill & waste treatment facilities	27
Increasing the collection frequency	26
Waste sorting facility	15
Campaigns for selective collection of waste	13
I don't know/ I am not interested	12
Coercion measures for selective collection of waste	8
Exclusion of informal recycling system	7
Transparency of waste management system	7
Buy back system for recyclable packaging waste	4
Buried containers for selective collection of waste	3
Facility for organic waste treatment	3
Selective collection of biodegradable waste	2
Others	21

Personal behaviour regarding the selective collection of waste and the factors that affect it

According to their answers, more that 78% state they select their waste, even if partially, and only 22,6% do not collect their waste selectively (figure 5.a), although it is clear that is not entirely true. This large discrepancy between claiming

recycling attitudes and actual behaviour was also identified by other studies (*e.g.* Omran and Schiopu, 2015). Moreover, 67% of the respondents declare they intend to increase their efforts regarding the selective collection of waste (figure 5 d.).

Moreover, the study indicated certain pro-environment behaviour factors that promote a proper behaviour in terms of selective collection of waste, that are mainly environmental protection and money saving (figure 5.b.). However, the major perceived barrier against selective collection of waste was also highlighted in figure 5.c., and it mainly consists in insufficient infrastructure for this specific purpose.

Education is considered the main factor that influences behaviour on selective collection of waste, followed by legal issues (figure 5.e.), but there is not only one educational method that stands out in their preferences (figure 5.f.).

Furthermore, Table 2 lists possible reasons that would make generators decrease their efforts of selecting waste.

Results of the chi square test analysis are presented in Table 3. The only aspects identified as being influenced on respondents profile were behaviour regarding selective collection of waste, and their opinion on the efforts of public authorities regarding implementation of waste management system in their residence area.
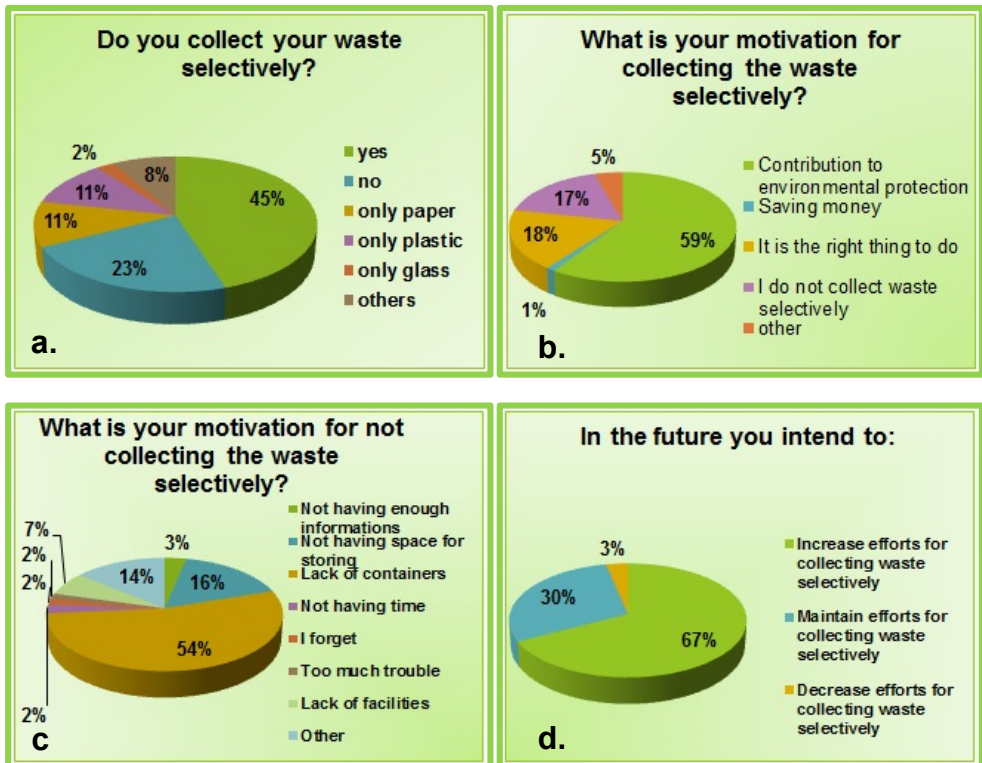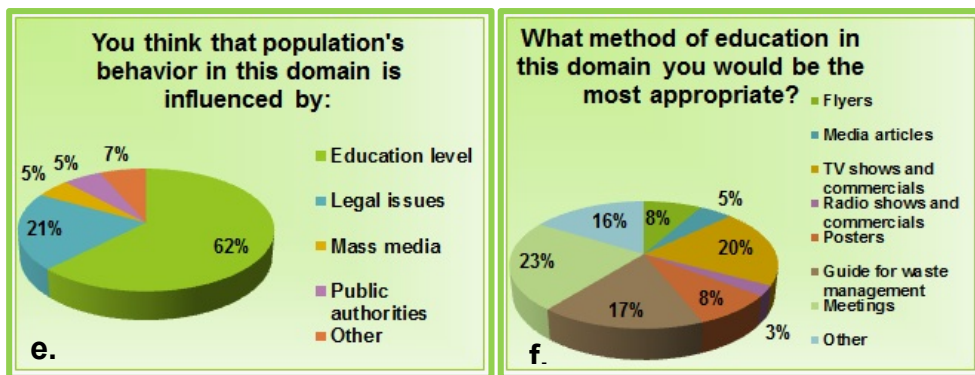
Fig. 5. *Present and future behaviour of waste generators regarding selective collection of waste*

The statistical analysis indicates that education and age are criteria that significantly determine the answers of the respondents regarding behaviour on selective collection of waste and their opinion regarding the efforts of public authorities in implementing selective collection of waste.

Table 2. *Reasons to reduce efforts regarding selective collection of waste as perceived by waste generators*

Reasons that would determine you to reduce your efforts regarding selective collection of waste	No. of answers
Mixing selected waste and not recycling it by the sanitation companies	37
Lack of bins for recyclable waste	22
Long distance to the bins for recyclable waste	6
Lack of interest from behalf of public authorities and sanitation companies	6
Not collecting recyclable waste by sanitation companies	4
Other reasons	7
It is not the case/ I have no reasons to do that	51

Since there are two private companies delegated by public authorities to perform waste management in Cluj-Napoca, a third criterion was chosen for this analysis in order to determine whether the implementation of the system is different in the two areas, due to this aspect. Nevertheless, the results indicate that the residence neighbourhood does not significantly interfere with knowledge, attitudes and behaviour of the respondents regarding selective collection of waste as seen in Table 3.

Considering there are different facilities available for collecting waste selectively if living in a block of flats and if living in in residential areas with houses criteria of residence type was also analysed through *chi square test*. However, the results indicated that the answers of the respondents were not significantly determined by this aspect (Table 3).

Table 3. *Results of the chi square test*

Answers regarding:	Chi square	Degrees of freedom	Criterial value: χ2 (α;ν)
Education vs.			
Meaning of separate collection of waste	0,924	5	11,07
Importance of separate collection of waste for environmental protection	10,265	15	24,996
Importance of separate collection of waste within waste management process	10,346	15	24,996
Factors that influence population behaviour on selective collection of waste	23,649	30	43,773
Suitable method of education and awareness	43,431	50	65,025
Interest of public authorities regarding selective collection of waste	9,965	10	18,307
Option for selective collection of waste in Cluj-Napoca	3,687	5	11,07
Statement weather they collect waste selectively or they don't	**19,709**	**10**	**18,307**
Efforts of public authorities regarding selective collection of waste in their residence neighbourhood	**28,214**	**5**	**24,996**
Reasons for collecting waste selectively	14,322	20	31,41
Reasons for not collecting waste selectively	26,437	24	36,415
Neighbourhood vs.			
Interest of public authorities regarding selective collection of waste	18,712	20	31,41
Efforts of public authorities regarding selective collection of waste in their residence neighbourhood	33,859	30	43,773
Option for selective collection of waste in Cluj-Napoca	13,365	10	18,307
Statement weather they collect waste selectively or they don't	27,267	20	31,41
Age vs.			
Statement weather they collect waste selectively or they don't	**30,921**	**10**	**18,307**
Reasons for collecting waste selectively	14,00	25	37,652
Reasons for not collecting waste selectively	36,072	28	41,337
Future behaviour regarding selective collection of waste	9,91447	10	18,307
Factors that influence population behaviour on selective collection of waste	25,439	30	43,773
Suitable method of education and awareness	49,989	50	65,025
Importance of separate collection of waste for environmental protection	21,461	15	24,996
Importance of separate collection of waste within waste management process	9,053	15	24,996
Interest of public authorities regarding selective collection of waste	14,444	10	18,307
Option for selective collection of waste in Cluj-Napoca	2,719	5	11,07

Answers regarding:	Chi square	Degrees of freedom	Criterial value: χ2 (α;v)
Efforts of public authorities regarding selective collection of waste in their residence neighbourhood	**29,82917**	**15**	**24,996**
Residence type vs.			
Interest of public authorities regarding selective collection of waste	5,46659	2	5,991
Efforts of public authorities regarding selective collection of waste in their residence neighbourhood	2,157	3	7,815
Option of facility for selective collection of waste in Cluj-Napoca	3,531	1	3,841

Nevertheless, it is clear that in order to increase the number of persons that collect waste selectively, awareness on this matter must be increased and a transparency of the local public system must be promoted so that population understands the cycle of the waste after is being disposed of and until is being recycled. It is indicated that awareness and informing campaigns do rely not so much on the importance of selective collection of waste but on specific information regarding materials that can be recycled and transparency of waste treatment after is being collected. Since public satisfaction with the implemented system of selective collection of waste is rather low, actions should be taken in order to improve the system, mainly regarding facilities consisting in containers for recyclable waste, so that effort of population is being reduced.

CONCLUSIONS

The results of the survey indicate that population: (1) has knowledge regarding selective collection of waste, (2) is aware of its importance for the environment and also for waste management process, (3) considers that local authorities need to get involved more in the process, although improvement is seen by 48% of the respondents;

However, discrepancies are noticed regarding the respondents belief about their knowledge and involvement, and the reality and the existing data on waste selective collection at source;

Certain directions that can be followed by stakeholders involved in waste management can be deducted. Hereby, the study identified that the efficiency of the selective collection of waste depends mostly on factors such as: infrastructure accessibility, confidence in the public waste management system, and education and awareness level. Therefore, these aspects can be the base for decision making in order to improve involvement of population in selective collection of waste at source.

The performed statistical analysis indicated that there are no significant differences regarding waste collection in different neighbourhoods of the city, age and education being the only criteria that significantly determined the answers.

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REFERENCES

Al-Khatib I. A., Monou, M., Abu Zahra A. S. F., Shaheen H. Q., Kassinos D., 2010, Solid waste characterization, quantification and management practices in developing countries. A case study: Nablus district – Palestine, *Journal of Environmental Management*, **91**, pp. 1131–1138.

Andrew D., Anthony J., Keith P., 2003, An in-depth study of the effects of socio-economic conditions on household waste recycling practices. *Waste Management & Research,* **21**, pp. 180–90.

Bao R., 2011, *Waste and Recycling Attitudes and Behavior of Students in Turku*, Master's Thesis, Universitatea din Turku University, Biology Department de Biologie, 45 p., Turku, Finland.

Buenrostro O., Márquez L., Ojeda S., 2014, Environmental Perception of Solid Waste Management in the Municipalities of Pátzcuaro Region, Mexico, *Environmental Engineering and Management Journal, December 2014,* **13** (12), pp. *3097-3103, http://omicron.ch.tuiasi.ro/EEMJ/.*

Cătoiu, I. (coord.), 2003, Marketing research (Cercetări de marketing) Ed. a II-a, Editura Uranus, Bucureşti.

Constantinescu M., 2011, Principii teoretice în dezvoltarea și implementarea chestionarelor ca instrumente de sondare a pieței (Theoretical Principles of Development and Implementation of Questionaires as Market Survey Tools), *Revista de Marketing Online*, **5** (2).

De Feo G., De Gisi S., 2010, Public opinion and awareness towards MSW and separate collection programmes: A sociological procedure for selecting areas and citizens with a low level of knowledge, *Waste Management,* **30**, pp. 958–976.

De Young R., 1990, Recycling as appropriate behavior: a review of survey data from selected recycling education programs in Michigan, *Resources, Conservation and Recycling,* **3**, pp. 253-266 Elsevier Science Publishers B.V./Pergamon Press.

Desa A., Abd Kadir N. B., Yusooff F., 2011, A Study on the Knowledge, Attitudes, Awareness Status and Behaviour Concerning Solid Waste Management, *Procedia Social and Behavioral Sciences* **18**, pp. 643–648.

Eco-Rom Ambalaje, 2013, Ce cred românii despre separarea și reciclarea deșeurilor de ambalaje? Percepții, atitudini și participarea la colectarea separată și reciclarea deșeurilor de ambalaje generate în gospodării.

Institute of Public Policy, Bucharest, Romania, (Institutul pentru Politici Publice București), 2015, National Analysis of the State of Separate Collection and recovery of Waste in Large Urban Areas, (Analiză naţională a stadiului colectării separate şi a valorificării deşeurilor în marile aglomerări urbane. Soluţii eficient de politici publice pentru evitarea sancţionării României) Bucharest, 31 August 2015.

Jacoby J., Matell M.S, 1971, Three-Point Likert scales are good enough. *Journal of Marketing Research,* **8**, pp. 495–501. Elsevier Science Ltd.

Muntean O.L., Mărincaș A., Dobrean A., 2012, Percepţia cetăţenilor privind problemele de mediu globale, naționale și locale (Studiu de caz: Municipiul Cluj-Napoca), *Ecoterra*, **30**.

Omran A., Schiopu A.M., 2015, Reasons for Non-Participation in Recycling of Solid Waste in Northern Malaysia: a Case Study, *Environmental Engineering and Management Journal, January 2015,* **14** (1), *pp.* 233-243.

Oppenheim A.N., 1992, Questionnaire Design, Interviewing and Attitude Measurement: new edition. Continuum: London and New York, pp. 100–117.

Otoma S., Miyazaki I., Hoang H., Diaz R., Hong H., 2013, A survey on municipal solid waste and residents' awareness in Da Nang city, Vietnam, *Journal of Material Cycles and Waste Management*, **15**, pp. 187–194, DOI 10.1007/s10163-012-0109-2.

Owamah I. H., Izinyon O.C., Igbinewekan P., 2015, Characterization and Quantification of Solid Waste Generation in The Niger Delta Region of Nigeria: a Case Study of Ogbe-Ijoh Community in Delta State, *Journal of Material Cycles and Waste Management*, DOI 10.1007/s10163-015-0426-3.

Pooman U, 2014, A Survey of Consumer Behaviour Towards E-Waste Management in the City of Mumbay, *International Journal of Research in Applied, Natural and Social Sciences*, **2** (8), aug 2014, pp. 2347-4580.

Pop I.N., Cojocaru S., Bican-Brișan N., 2013, Waste Management – Theory and Practice. Study Case: Raising Awareness Campaign in Cluj-Napoca Schools, *Studia UBB Ambientum*, **LVIII** (1-2), pp. 93-104.

Popiţa G.E., 2012, Contribuţii la eficientizarea sistemelor de gestionare a deșeurilor menajere (Studiu de caz: Judeţul Cluj), Teză de doctorat.

Sujauddin M., Huda S.M.S., Rafiqul Hoque A.T.M., 2008, Household solid waste characteristics and management in Chittagong, Bangladesh, *Waste Management* , **28**, pp. 1688–1695.

Taboada-González P., Aguilar-Virgen Q., Ojeda-Benítez S., Armijo C., 2011, Waste characterization and waste management. Perception in rural communities in Mexico: a case study, *Environmental Engineering and Management Journal*, **10**, pp. 1751-1759.

Thanh N.P., Matsui Y., Fujiwara T., 2012, An Assessment on Household Attitudes and Behavior Towards Household Solid Waste Discard and Recycling in the Mekong Delta Region – Southern Vietnam, *Environmental Engineering and Management Journal, August 2012,* **11** (8), pp. *1445-1454 http://omicron.ch.tuiasi.ro/EEMJ/.*

Thomas C., Yoxon M., Slater R., Leaman J., 2004, Changing recycling behaviour: an evaluation of attitudes and behaviour to recycling in the Western Riverside area of London. In: Waste 2004 Integrated Waste Management and Pollution Control Conference, 28-30 Sep 2004, Stratford-upon-Avon, UK.