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Assessment of Municipal Waste Management Policies by the Citizens of Orestiada, Greece

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Introduction

Effective waste management - a pivotal environmental problem that modern Municipalities are to face, why? Because we need:

- ▶ Effectiveness throughout an integrated procedure
- ▶ Strategies
- ▶ Measures
- ▶ Motivations
- ▶ Citizens to adopt environmentally friendly attitudes
- ▶ Waste production reduction
- ▶ Tailor – made plans for each case
- ▶ Climate change impacts' alleviation

Policies to be able to implement!

Introduction



Situation in Greece

- ▶ Conventional and out of date solutions in most cases
- ▶ Social, financial, political problems not resolved
- ▶ Disposal as the main waste management method
- ▶ Low percentages of recycling or other advanced methods
- ▶ Citizens awareness on recycling issues is inadequate, although considered as positive regarding environmental – financial aspects
- ▶ Limited access on relevant information (recycling, cleanness regulation)


Introduction

Policy planning in an international basis is moving towards advanced methods and technologies

- ▶ Overpopulated countries (China)→ Land demand→ Incineration
- ▶ Full use of the biodegradable fraction (if sorted effectively from metals, stones etc)→ Composting→ soil fertilizer
- ▶ Source separation systems→ clearer useful materials (plastic, paper, glass etc) collected from the recycle bins
- ▶ Landfilling→ remains a necessity at least for the disposal of the remaining fraction of waste after treatment
- ▶ Incineration for hazardous waste (healthcare waste contaminated with blood/radioactive waste)→ disposal of the ashes in special facilities
- ▶ Recovery of the biogas released by anaerobic digestion→ utilization for the production of power, heat, combined

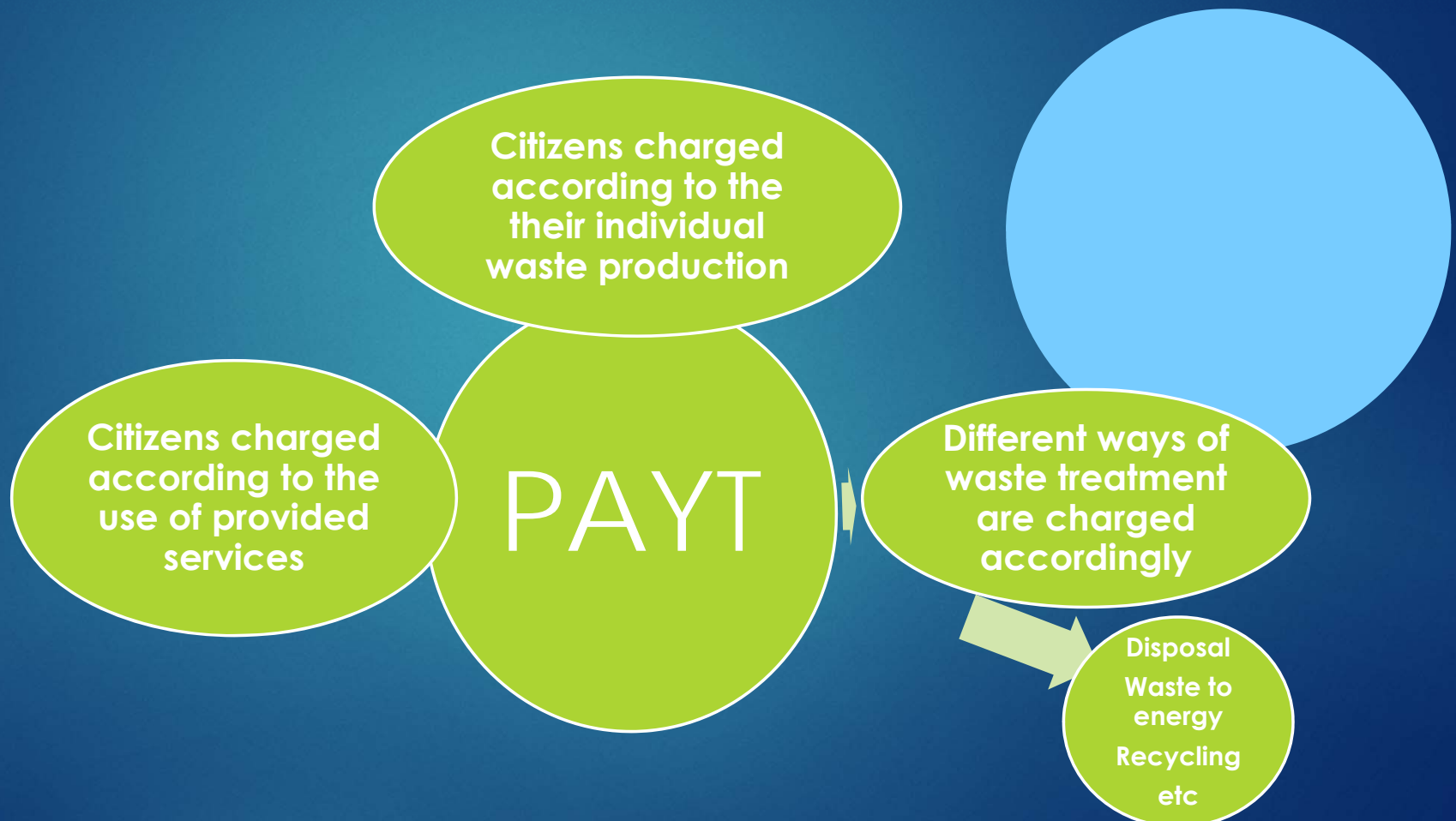
Introduction

Administrative authorities

- ▶ For administrative authorities charging waste management is not an easy process
- ▶ Sustainable waste management is an integrated process incorporating complex and sophisticated methods  increase management costs
- ▶ Citizens' willingness to pay is affected by demographic characteristics such as age or annual income, education and other factors
- ▶ Flat charging models (tax-based) and Pay As You Throw (PAYT) strategies usually used
- ▶ Great in interest in moving towards PAYT strategies

Introduction

Administrative authorities



Introduction

Stakeholders' attitudes

- ▶ Waste management frame is followed by policies that are designed and aspire to be implemented into an era of barriers and conflicts within the different stakeholders
- ▶ Local people react with “Not in my backyard” behaviors when local authorities present a new plan for the construction of a waste management plant of a sanitary landfill near their area can be explained
 - ▶ ineffective functioning of similar waste management plants with negative impacts on human health (unpleasant odors, fires, noise pollution, and traffic)
 - ▶ fall of land value for the broader area
 - ▶ not to mention that the land value of this areas after their rehabilitation is also calculated in costs of construction and management of a sanitary landfill

Aim of this study: examine the views of the citizens of Orestiada on waste management policies - strategies and recycling on a local and national level and also the way that the non-existence of a sanitary landfill in their area influences their attitudes towards waste management policies – strategies

Methodology



- ▶ The Municipality of Orestiada formed the research area
- ▶ Simple random sampling was applied, due to its simplicity and the fact that it requires less possible knowledge about the population, compared to any other method
- ▶ “Population” under investigation is the total of the citizens in the Municipality of Orestiada
- ▶ In order to estimate the sample size we carried out a pre-sampling for 50 people
- ▶ The sampling size was estimated according to the types of simple random sampling to 400 citizens
- ▶ The collection data was carried out in 2015
- ▶ the Statistical Package SPSS was used for the data analysis

Methodology



- ▶ For the multi-variable “trends in waste management” reliability and factor analysis were applied
- ▶ In order to find the internal reliability of a questionnaire we use the alpha co-efficient (α -Cronbach)→ to find if the data have the tendency to measure the same thing
- ▶ When the alpha coefficient is 0.70 or higher it is regarded as satisfactory and when it is higher than 0.80 it is regarded as very satisfactory
- ▶ In practice, lower alpha co-efficients with values not lower than 0.60 may also be accepted

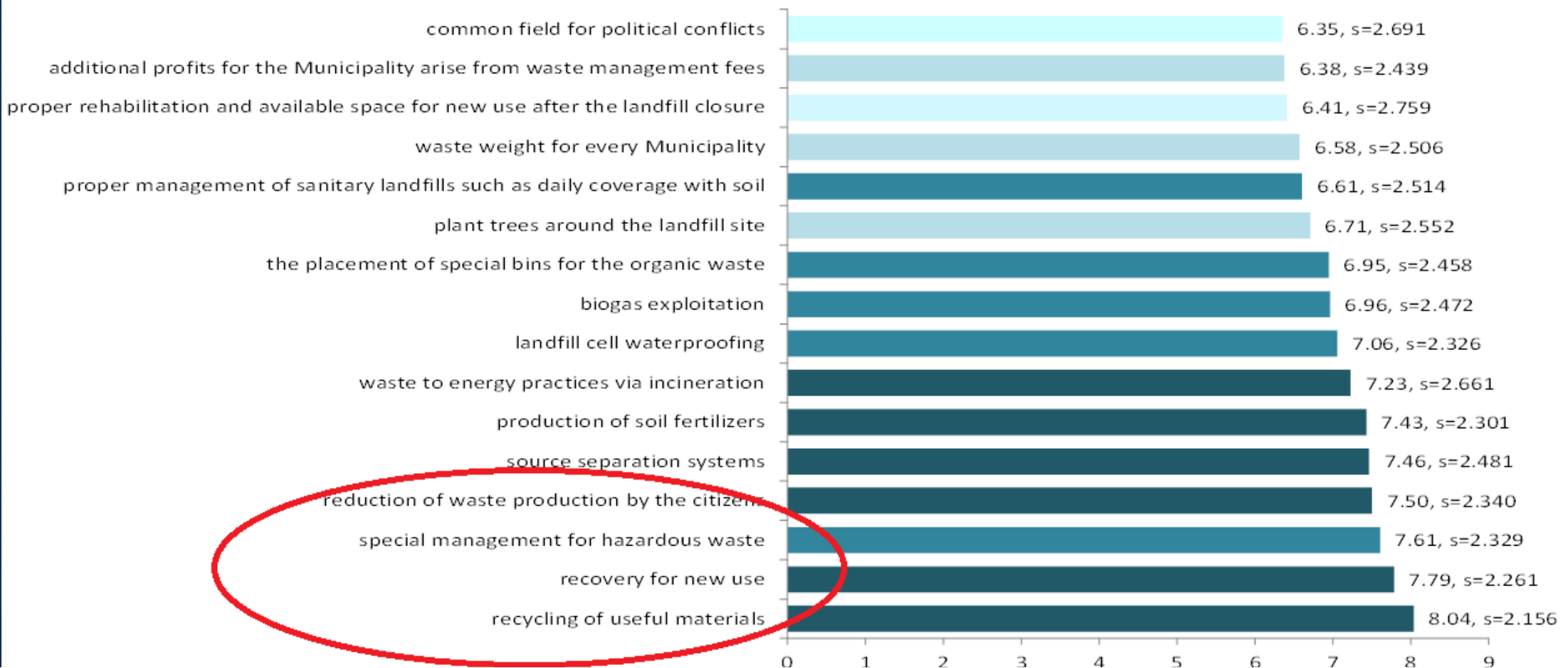
Methodology



- ▶ Factor analysis is a statistical method that aims to find the common factors within a group of variables
- ▶ The principal components method was used
- ▶ The selection of the number of factors is a dynamic process presupposes repeatedly the estimation and evaluation of the model and in particular we applied the criterion of smooth slope on scree plot
- ▶ We also resorted to the rotation of the principal components matrix by using the maximum variance rotation method by Kaiser
- ▶ Finally, we examined if there are any factors which can explain the correlations between the variables of our data and attempt to provide an interpretation (if possible)
- ▶ The variables that “belong” to each factor are those whose loadings, on the table indicating the loadings of the factors after rotation, are over 0.5 for that factor

Results

Figure 1. Citizens' assessment concerning policies – strategies for waste management within a scale from 1 (lowest acceptance) to 10 (highest acceptance)



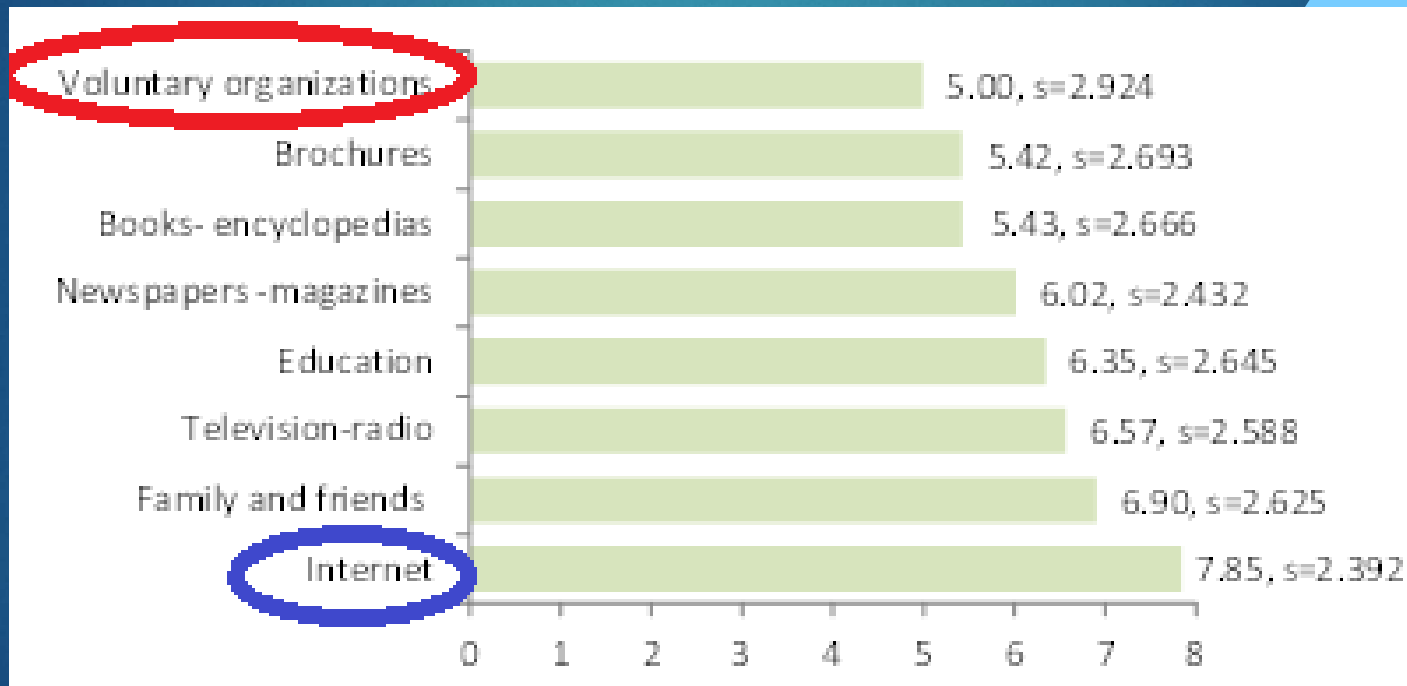
Results

Table 1. Table with factor burdens, after rotation

Variable	Factor burdens			
	1	2	3	4
Special management for hazardous waste	0.713	0.373	0.011	0.014
Landfill cell waterproofing	0.700	0.193	0.260	0.100
Daily coverage of the waste with soil	0.636	0.025	0.272	0.313
Biogas exploitation	0.617	0.231	0.093	0.316
Placement of special bins for the organic waste	0.524	0.196	0.447	0.055
Recovery for new use	0.112	0.839	0.146	0.189
Recycling of useful materials	0.465	0.707	-0.017	0.050
Reduction of waste production by the citizens	0.040	0.645	0.320	0.146
Waste to energy practices via incineration	0.326	0.618	0.176	0.061
Production of soil fertilizers	0.546	0.576	0.016	0.136
Source separation systems	0.467	0.490	0.231	-0.109
Additional profits for the Municipality arise from waste management fees	0.167	0.026	0.847	0.003
Waste weight for every Municipality	0.085	0.364	0.706	0.142
Plant trees around the landfill site	0.305	0.205	0.483	0.357
Common field for political conflicts	-0.014	0.194	0.139	0.776
Proper rehabilitation and available space for new use after	0.369	0.011	0.012	0.700

Results

Figure 2. Citizens' assessment concerning means of information for waste management issues



Conclusions & Proposals



- ▶ The citizens of Orestiada seem to be oriented towards environmentally conscious views in waste management issues on an integrated basis
- ▶ Recycling and reuse issues are of outmost importance for them
- ▶ Moreover, certain policies and strategies such as waste prevention, source separation systems, production of soil fertilizers and waste to energy through incineration are also issues stand out for their significance
- ▶ In fact, the aforementioned variables are classified in the same factor titled general waste management policies – strategies
- ▶ This grouping reveals that citizens acknowledge the importance of incorporating these policies into the local waste management plan for the city of Orestiada
- ▶ Not to mention that the nearest landfill site is situated in a distance of more than 120 km

Conclusions & Proposals

- ▶ Next in the sequence come waste management policies – strategies concerning the landfill site and the Municipality
- ▶ Not to mention that the last factor titled waste management policies – strategies concerning the Municipality includes the variables that are regarded as less important as there are not any plans for the construction of a landfill site in the geographical area of Orestiada
- ▶ Nevertheless, when aiming to successful waste management results, taking into consideration only the technical parts of the problem is not a solution
- ▶ There are specific strategies and measures the Municipality has to apply and certain cleanness regulations to control the whole procedure, from waste production and minimization to collection, treatment and final disposal
- ▶ Some of the important parts of this procedure are the waste weight and the management of the additional costs the Municipality receives from the existence of a waste management plant across its territory
- ▶ Last but not least, as the most important source of information for the residents is the internet, if the public authorities want to promote this way of information in waste management education



Thank you for your attention!