Assessment of Citizen Perception:
A Case Study of Municipal Solid Waste
Management System in Guimaraes, Portugal

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ABSTRACT

This study explores a new method of service delivery in the public sector in Guimaraes, which is the UNESCO Heritage Centre. The primary reason for this effort is the paradigm shift in the public service sector, which has resulted in improved services in terms of quality and performance. The study was to evaluate the level of satisfaction citizens derive from the services provided to them. Innovative project for Solid waste management system was investigated in Guimaraes, Portugal. Data collection was done using a convenience sampling technique. Questionnaires were distributed to collect primary data from citizens of Guimaraes. Quantitative techniques were used to analyze data. The findings of the study indicated that citizens of Guimaraes are more satisfied with the new and innovative method of service delivery as compared to the old conventional method. The study also revealed that there is a significant positive relationship between Public Service Delivery and Citizen Satisfaction. Findings may help improve public service delivery projects success rates.

INTRODUCTION

The biggest challenge faced by almost every country and all the organizations in the world is to provide quality services to its customers with less spending. The biggest organizations are public organizations because they serve a larger pool of customers (Lipskey & Smith, 1990). Different concepts are applied by the researchers (Cronin Jr. & Taylor, 1992; Oliver, 1980; Parasuraman, Zeithaml, & Berry, 1985) to assess the impact of service delivery on citizen satisfaction. Parasuraman, Zeithaml and Berry (1985) stated that Service Quality (SERVQUAL) is model applied to assess how the quality of a service and customer's expectations and perception regarding that service influences their satisfaction. Besides these models, there is an emerging concept called Perceived Service Quality (SERVPERF); this concept is mostly recommended for assessing municipal services (Cronin Jr. & Taylor, 1992). The concept of SERVQUAL and SERVPERF are actually service centred. In most of the countries, service delivery points are between the municipal government and people.

In Portugal, like the other countries of the world, public services are provided by the municipal authorities. In Guimaraes Unesco heritage, the Vitrus Ambiente EM SA started the operationalization of urban cleaning (include the solid waste management in a door-to-door

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system) in January 2016. In April 2016 was implemented the "Pay-as-You-Throw" tariff. Before that, urban cleaning and solid waste management was the municipality's responsibility.

Research questions

Following are the research questions which originated from the background information, which were addressed through this study;
a) What is the quality of the services provided by Guimaraes Municipality, respectively and how this quality affects citizen satisfaction?
b) How citizen perception about service quality influence their level of satisfaction from public services?
c) How much citizens are satisfied with solid waste management?
d) What is the perception of citizens regarding the performance of the municipality?

Service delivery greatly depends upon the performance of the organizations providing services.

Most municipalities provide public services to citizens. Vitrus is providing solid waste management services in Guimaraes, and in this regard, assessing the performance of Vitrus is very important.

REVIEW OF LITERATURE

Service delivery has been a growing phenomenon. It is getting considerable importance with each passing day because of the greater competition among governments all over the world (Landrum, Prybutok, Kappelman & Zhang, 2008). Furthermore, citizens have also become more aware about their rights regarding services due to globalization, localization, and information revolution (Brown & Coulter, 1983; Fitzgerald & Durant, 1980; Ho & Coates, 2004). Delivering services to the public is a challenging job in the present-day world, but Information Communication and Technology (ICT) has made this commotion relatively easy and time-efficient. Governments employ different methods to deliver public services to people efficiently and effectively (Brown, Ryan & Parker, 2000). Solid Waste Management (SWM) refers to the aggregation, collection, packing, transport, storage, as well as final disposal of solid waste (Nasir, Shahzad, Anwar & Rashid, 2017). There is also a need to use a system of Integration of Radio Frequency Identification (RFID) and communication technologies for solid waste bin and truck monitoring system (Hannan, Arebey, Begum & Basri, 2011). Services are measured in multiple ways for example quality, the level of satisfaction the citizens derive from service use, benefits or additional value, demand and customization, i.e., made to requirement (Eiglier & Langeard, 1987; Parasuraman et al., 1985). The performance of the service or the department providing services greatly influences Citizen's perception about service delivery and control level of satisfaction they derive from the services, hence can be used for measuring the delivery of services (Brown & Coulter, 1983; Parks, 1984; Percy, 1986; Ryzin, 2004). However, other than the level of satisfaction citizens derive from service delivery, availability and sustainability of services can also be a greater means to measure the service delivery in a particular setting. It means if the service is available readily as and when required, then the service delivery mechanism is efficient.

Perception about service quality is based on attitudes and experiences already formed in the minds of customers, and this perception can be measured through SERVPERF model which

measures the service quality concerning performance component of services as the performance of service is the most critical aspect (Bolton & Drew, 1991; Cronin & Taylor, 1992). There is a gap between the actual performance in the public sector and the perception of the public about performance, and due to this gap, the satisfaction levels may differ widely. Numerous reason contribute to this gap for example Citizen's expectations and knowledge about the services and structure or delivery mechanism (Goodsell, 1985; Heintzman & Marson, 2005; Kelly & Swindell, 2002; Ryzin, 2004; Rothstein & Uslaner, 2005; Van de Walle & Bouckaert, 2003). Hence it can be concluded that due to the rapid expansion in the use of ICT that has taken place throughout the past couple of decades, the role of information in general, and transparency in particular in shaping citizens' general perceptions of government performance and attitudes toward government has increasingly attracted attention from scholars of public management and this has also heightened the role of Citizen's perception because perception can be easily deceived through mass media (Cook, Jacobs & Kim, 2010; Hood 2007; Welch, Hinnant & Moon, 2005). Therefore, there is a need to assess how citizens develop perception and how this perception influences their satisfaction or dissatisfaction from infinite services of different qualities being provided to them.

RESEARCH DESIGN

Theoretical Framework

The literature review identified various gaps in the available literature regarding public service delivery, citizen satisfaction and perceived service quality. Perception of citizens regarding the quality of services like solid waste management will be studied because this is the most important services provided by the municipality. This study will explore services concerning their performance, quality and delivery.

Quality of services will be assessed in terms of tangibility, reliability, responsiveness, assurance and empathy using SERVPERF scale to assess it in relation to the performance of services.
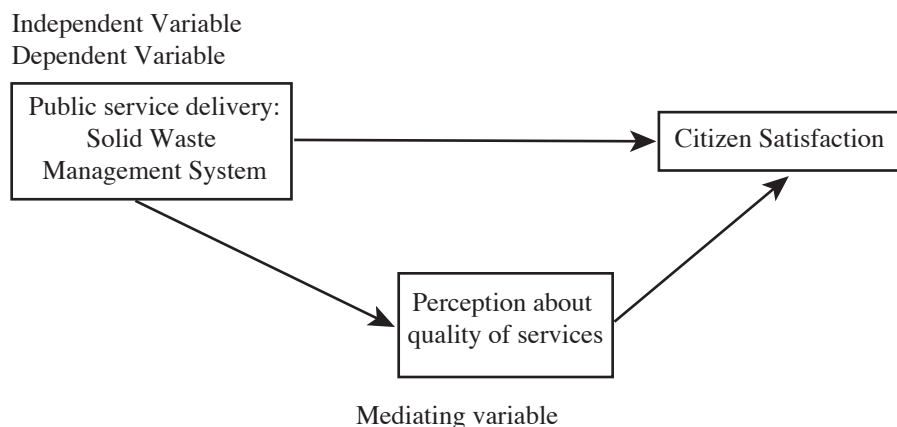

Figure 1: *Theoretical Framework (Path Diagram)*

Figure 2: *Research Model*

Hypotheses

H1: Citizens of Guimaraes are satisfied with solid waste management services.
H2: There is a direct relationship between Public service delivery and Citizen Satisfaction
H3: Perceived Service Quality mediates between the delivery of public services and Citizen Satisfaction.

The next section will discuss the whole research methodology. It will identify the research population, sample size, research instrument and the entire procedure carried out to collect data from respondents.

Research Methodology

This section gives a brief overview of the whole methodology adopted to collect data from the respondents. It also provides the profile of the Guimaraes and its municipal authority. This was empirical research in which the population consisted of citizens above 24 years of age having primary education. The target population constituted residents and multi-store building of Guimaraes, Unesco heritage site (Figure 3). The sample was taken in a way to ensure diversity in terms of responses, and this regarding data was collected from the historical centre. The sample consisted of more than 60% of the population. The study used a convenience sampling method. It was ensured that the data is rich in terms of age, education, income and residence or locality. Every house/person and merchants responded to one questionnaire. A questionnaire-based survey was used to collect primary data. The questionnaire was designed by adapting already developed scales for various constructs. It also helps in assessing the extent to which citizens are satisfied with the delivery of public services and even the degree to which Citizen's perception about service quality and performance of municipality mediates this relationship.
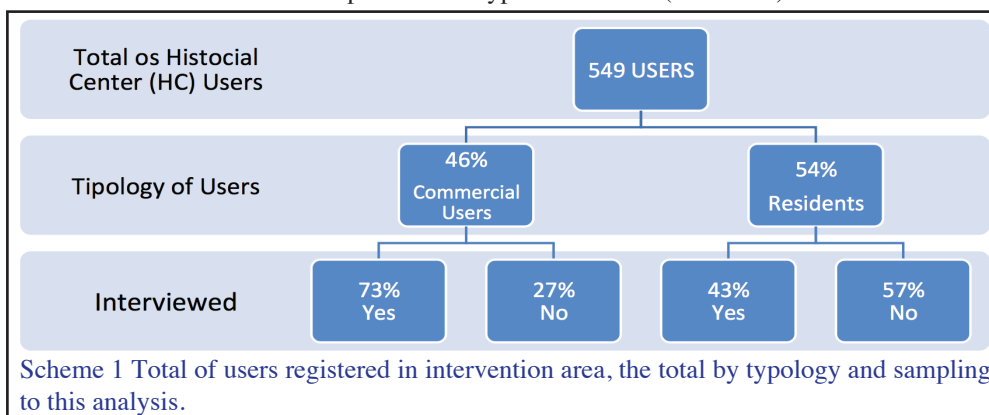

Figure 3: *Guimaraes UNESCO Heritage Site*

ANALYSIS

One year after the urban clean and waste collection service was awarded to the public company VITRUS Ambiente, currently responsible for the operation of PAYT Project and street cleaning; researchers made a population inquiry about Urban Cleaning in Historical Centre (HC) to know if they were satisfied or not with the urban cleaning service. Scheme 1, with the data summary analysis, shows the sampling of users that accepted was involved in this analysis. The intervention area is classified as UNESCO World Heritage and characterized by a high density of construction with the predominance of single-family housing and local commerce. In this area, 585 users were identified and divided into two user's typology (residents and commercial), and further 36 uninhabited or unoccupied houses or multi-store building were also identified.

In this approach the entire Unesco site was covered and was interview 312 users, corresponding to approximately 60% of HC total users. With more detailed, was registered the opinion of 73% of commercial users and 43% of residents. These were expected because commercial users are more receptive to this type of initiative (Scheme 1).

Scheme 1 Total of users registered in intervention area, the total by typology and sampling to this analysis.

By the other hand, the extraordinary results achieved on recycling rates and household waste reduction in the first year of PAYT Project implementation can prove the Citizen's satisfaction. In the first year of PAYT Project implementation was collated 814 ton of municipal waste and recycling. More precisely 538 ton of household waste and 304,22 ton of recyclable material was collected separately. Thus, in 2016, 34% of municipal waste collected in HC was collated separately and sent to recycling. Comparatively, with the year of 2015, the PAYT project achieved an increase of 124% of recycling rate and decrease by 34% of household waste.

Table 1:
Two years comparison

Waste Collected (ton)	The year 2015	The year 2016
Household Waste	**821**	**538**
Recyclable	128	276
Paper and cardboard	33	74
Plastic (packaging)	67	148
Glass	28	54
TOTAL	**949**	**814**

RESÍDUOS RECOLHIDOS E SUA COMPOSIÇÃO FÍSICA

ANO 2015 **949t**	821t 87%	33t 4%	67t 7%	22t 2%	13%
ANO 2016 **814t**	538t 66%	74t 9%	148t 18%	54t 7%	34%

These results plus population feedback received through direct contact with workers are also a positive sample of citizen satisfaction because this shows the positive local community adhesion to the PAYT Project and their efforts to adopt the best environmental and sustainable practices. It is possible to conclude this project are a good solution to local community significantly increased the rates of recycling and waste reduction. In addition, it also makes a significant contribution to the application of the hierarchy principle of waste management.

This system taught the population the importance of waste prevention, reuse and recycling and waste valorization perception. Thus, the local community of HC is now part of the solution to the waste production and urban cleaning problem in Guimarães and encourages others in this effort.
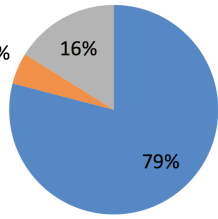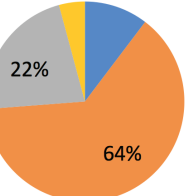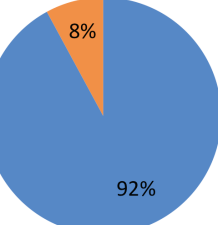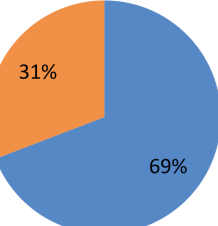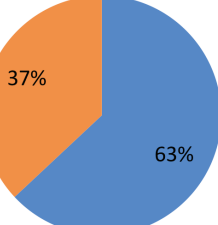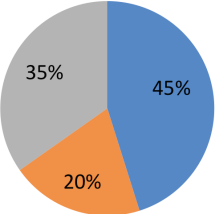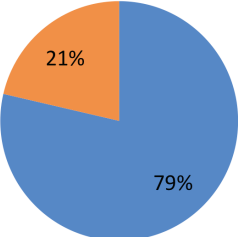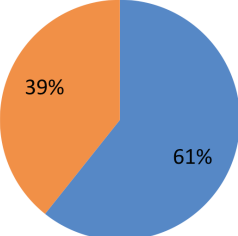
FINDINGS

During the fieldwork was covered all the streets, houses and commercial buildings of HC. The local community feedback was positive, as show the data analysis in table 2. This work also reveals an excellent opportunity to share some environmental concerns and municipal waste management system dynamics and regulation issues. In the end, the population felt that their opinions are important to the urban cleaning services achieve better performance.

This public satisfaction was important to evaluate the public service, namely the urban cleaning and had two main goals: i) analyzed the local community satisfaction about urban cleaning and public hygiene activities (as street cleaning and waste collection), ii) developed induvial and collective environmental awareness.

Based on the answers received, it is possible to conclude that the public is satisfied with the street cleaning and with the municipal waste collection system. In general, the local community is very satisfied with the urban cleaning service.

Table 2:
Public satisfaction with public services

Question		Answers
1. Do you think that your street is cleaner?	Comparatively to the previous years, 79% of the respondents said yes, the street is cleaner; 5% not notice differences between now and previous and 16% of respondents said that the street is not cleaner because doesn't agree with the door-to-door municipal waste collection system.	5% 16% 79% ■ Yes ■ Equal ■ No
2. Do you think that door-to-door municipal waste collection system is:	73% of respondents said that door-to-door municipal waste collection system is excellent or good, to 23% is acceptable and is bad for 4%.	4% 10% 22% 64% ■ Excellent ■ Good ■ Decent ■ Bad
3. Do you agree with "polluter pays" principle?	92% of the respondents agree with this principle and 8% do not agree.	8% 92% ■ Yes ■ No
4. Do you know the "Pay-as-You-Throw" benefits?	-69% of the respondents know the benefits of the system and 31% do not know.	31% 69% ■ Yes ■ No
5. Do you have the perception that recycling rate increased because of the PAYT waste tariff implementation?	-63% of respondents has that perception and 37% no.	37% 63% ■ Yes ■ No

6. Do you think that PAYT decreased your waste management tariff?	Comparatively to the previews system: 45% of respondents said yes; for 20% the tariff is the same or almost the same; -35% said no.	35% 45% 20% ■Yes ■Equal ■No
7. Do you agree with supervision and application of fines for the defaulters?	-79% of respondents said yes and 21% said no.	21% 79% ■Yes ■No
8. Do you think that realization of workshops about municipal waste reduce and recycling are important to educate the local population?	-61% of respondents said yes and 39% said no.	39% 61% ■Yes ■No

The study reveals a wide range of results which give an insight into the specific public services, its delivery, performance and quality of services.

Discussion

The satisfaction of citizens with specific public services was measured using self-reported direct questions. Citizen satisfaction with a particular service was calculated by taking the frequency of all the responses. This method had been used by Şandor and Raboca (2004) previously for determining the level of satisfaction of citizens in Romania. The same method was used to calculate the level of satisfaction of citizens in case of urban cleaning and solid waste management in Guimaraes. Citizen was satisfied with solid waste management services, and thus, the H1 hypothesis was readily accepted. It can be assessed that Vitrus is providing better services and are performing well in the service domain. They are using RFID for monitoring solid waste truck.

The results of the study have shown that public service delivery directly influences or alters the level of satisfaction. Results indicate a strong relationship between the dependent and independent variables. Hence, H2 is also accepted. These results are supported by the results of the study conducted by (Akinboade, Kinfack & Mokwena, 2012). However, there exists a direct relationship between the two variables too. Public services can increase or decrease citizen satisfaction directly. Public authorities providing services must target the perception of citizens to improve their satisfaction.

CONCLUSION

The study also indicated that the perception of citizens greatly mediates between the delivery of public services and citizens satisfaction. Proper service delivery leads to positive perception about service delivery which increases the satisfaction level of Citizen. The study recommends various ways to overcome challenges in this regard. In future, Vitrus can use the sensors in the bins to gauge and improve its services. Also, they can provide SMS and online complaint handling system to enhance public trust in their services further.

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