Customers' Preferences in Municipal Waste Services Procurement

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Introduction

The government sector is, to a large degree, a service sector. In the past decade government services have become more externally sourced than they used to be in the past. In Europe, it is estimated that around 50 % of the total external sourcing in local governments is made up of contracts for services, such as construction work, maintenance work, public transport, municipal waste collection, social services and consultants, network services, etc.

The growth of public service outsourcing implies that public buyers increasingly operate in service triads, whereby the provider directly delivers services to the citizen. Therefore, public buyers are highly dependent on providers for their business performance, since private providers control service delivery, and measures must be taken to ensure appropriate behaviour, through contracts and service-level agreements (van der Valk and van Iwaarden 2011). With respect to equivalent service triads in the private sector, the relationships involved in public sector triads are much more complex (Ancarani 2009). On the one hand, many public services are offered under monopolistic market conditions, leading to lower power of control and "voice" of citizens. On the other, public buyers' decisions are under scrutiny through administrative controls and internal audits (Pettijohn and Qiao 2000), leading buyers in public organisations to focus on the public's perception of procedural appropriateness (Schiele 2005), more often than on value creation (Murray 2001).

Municipal waste services (MWS) provision is one of the services shifting from public in-house management to outsourcing to private firms. Typically, MWS contracting-out involves a single commissioner placing contracts with a single provider and is based on an explicit specification of the service and performance criteria. These criteria are predetermined taking into account environmental and technical constraints, while user requirements and needs are taken into account, if at all, only

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indirectly. However, in recent years due to the processes of rationalisation of public expenses and to increasing customer demand for improvements in service quality (Sweeney and Soutar 2001), the evaluation of the performance of suppliers of public services is gaining more importance (Bovaird 2006). In particular, the rising emphasis on customer orientation and customer value (Brady and Cronin 2001) also in public services (Osborne et al. 2013; Thomas 2013) makes it essential for public organisations to understand how to assess value from the customer's perspective (Woodruff 1997; Leroi-Werelds et al. 2014). This implies that the attributes of the service should be carefully planned considering customer needs and expectations, in order to maximise benefits provided with the service (Lai and Chen 2011).

Further, not only in MSW, but also in other public services, providing customer value is crucial also to avoid a lack of customer collaboration, which may undermine the effectiveness of the service provision itself (Ancarani and Mascali 2012). In MWS the collaboration of users is paramount and a proactive role of the users is asked for, as the capacity of the provider to meet the targets strongly depends on the willingness of the users to differentiate waste before passing it to the collector for waste recycling. In this perspective, effective service provision and value cocreation is grounded in a commitment to collaborative processes among users, public buyers, and providers (Lusch et al. 2007; 2008). According to this approach, the customer's value-creating processes receive input also from the customer's own activities (Vargo and Lusch 2011).

A corollary to the above line of reasoning is that the assessment of users' preferences is crucial for service design in order to motivate and promote collaboration and maximise customer value. Therefore, prior to proceeding to entrusting a provider with service delivery, public procurers should incorporate these preferences in the definition of service-level agreements.

Various qualitative and quantitative approaches have been proposed in the literature to measure users' preferences for service attributes. In this chapter we propose the use of discrete choice experiments (DCE), a quantitative methodology in the tradition of environmental economics and management, in alternative to other qualitative methodologies proposed in the marketing literature (Sánchez-Fernández and Iniesta-Bonillo 2007). The DCE is built on random utility theory, which assumes that the decision-maker, when choosing among available alternatives, prefers the alternative providing the highest utility (McFadden 1980; Louviere et al. 2000).

DCE has already been used to analyse MWS (among others Jin et al. 2006) but the relevance for public procurement has never been underlined. This chapter presents and contrasts the results of two DCE studies conducted in two municipalities in a southern region in Italy, with the aim to illustrate the insights that public buyers can derive from such an analysis, and to show implications for public procurement. The DCE studies investigate the relevance for customers of significant service attributes (waste tariff, frequency of door-to-door waste collection, percentage of recycling).

The rest of the chapter is organised as follows: First, an overview of the concept of customer value is provided. Next, the main features of the choice experiment methodology adopted, and the case study descriptions and analysis are presented. The chapter concludes with a discussion and implications of results.

Value for Customer

The concept of value for customer has become predominant in the marketing literature recently. It has been applied also to public service provision assuming that it implies a customer focus replacing the product focus and a service dominant logic replacing a process focus (Osborne et al. 2013).

A review of the literature on customer value provides some key insights into the nature of the concept. First, a well-accepted definition is that proposed by Zeithaml (1988, p. 14), in which customer value is "the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given". Second, customer value is perceived by the customer, i.e. it is the customer who defines the value of a product/service and not the supplier (Vargo and Lusch 2008; Woodruff 1997). Third, customer value is personal. Each customer perceives value based upon personal characteristics such as his/her own needs and desires, knowledge, previous experience, and financial resources (Grönroos 2011; Holbrook 1999; Woodall 2003). Fourth, the value perceived by the customer depends on circumstances, time frame, and location (Woodruff 1997; Woodruff and Gardial 1996). Fifth, customer value implies an interaction between the customer and the product/service and is experiential, which means that it resides in the consumption experiences derived there from. According to the notion of value-in use, which implies that real value only emerges during use, "value is not created and delivered by the supplier but emerges during usage in the customer's process of value creation" (Grönroos and Ravald 2011, p. 8). When the supplier produces and delivers resources that the customer perceives as potential value, this contributes to the value creation process.

Research in service markets suggests that measuring value requires the consideration of personal interactions, in line with the notion of value cocreation mentioned by Grönroos (2011). Customers' self-generated activities (e.g. using personal knowledge and skill sets) may integrate resources provided by the supplier and other sources contributing to the cocreation (Vargo and Lusch 2011). These activities are relevant for customers who may derive pleasure and reward from self-tailoring and gaining control of the service (Bateson 1985; Dabholkar 1996). However, customers' likelihood to be involved into these co-production activities depends not only on the evaluation of the efforts involved, but also on the willingness to engage in this evaluation (Etgar 2008). In the MWS setting, value cocreated by the actors involved in MWS may include simple and complex activities ranging from compliance with the service provider operating rules for collection, to co-learning, to actively searching for information about waste separation and recycling, to providing feedback to providers.

All these activities take place within social systems in which individuals can learn, adapt, and make choices based on their perceptions of the reality through their "sense-making" activities (Edvardsson et al. 2011). Individuals may prefer to engage in certain activities rather than in others, and may (or may not) like a role as resource integrator according to the given context (Schau et al. 2009).

The view that value cocreation is essentially personal and experiential is in line with Woodall's classification (2003), which identifies five main concepts of value

Table 1 Time and experience phases along the public service provision

Time phases	Experience phases
1) *Ex ante* (prepurchase)	Collecting information
2) *Transaction* (at the point of contract and during experience)	Purchase
3) *Routine* operations (normal operations)	Learning
3 bis) *Failure/Recovery* from failures (during use/experience)	Emergency
4) *Re-agreement* or disposition	Purchase/disposition

for the customer, namely net VC (in terms of balance of benefits and sacrifices), derived VC (in terms of use/experience outcomes), marketing VC (in terms of perceived product attributes), sale VC (in terms of reduction in sacrifice or cost), and rational VC (in terms of assessment of fairness in the benefit–sacrifice relative comparison). In the context of MWS, we can apply this theoretical conceptualisation considering the customer value provided by the service as an aggregate including all the customer perceptions across the different time phases of interaction, experience cycle with the service, and experience cycle with the supplier. The relevant time phases for a generic public service are reported in Table 1.

Combining the concepts of value and the phases along the service experience, the model of value can be sketched as a Rubik cube in which each small face represents one of the components of the value perceived (Fig. 1).

In particular, the model takes into account both the longitudinal perspective (temporal dimension of value for the customer) and the transversal perspective (value perceptions change during the transition from an experience phase to another). The model of value for customer can be applied by considering aggregated value cube projections on planes corresponding to the time phases.

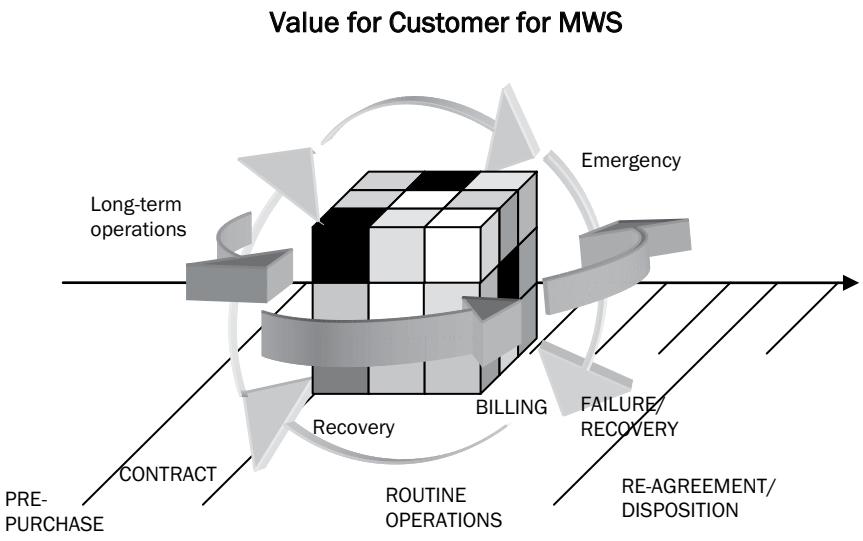

Fig. 1 Model of aggregated value for customer for MWS

Value for Customer in Public Procurement

The concept of customer value can be applied to the public sector, where the object of public procurement is to provide the users of public services with increased value (Jackson 2001). The concept of public value can be defined as the means to deliver the goals of public policy (Kelly and Muers 2002), and several authors have argued that this concept involves finding out what the public thinks, and requires techniques effective at investigating public preferences. Further, Erridge (2007) reinforces the link between public value and procurement, stressing that consultation is crucial to guarantee the match between service delivered to citizens and public preferences. In the same vein, other authors have argued that the operative definition of public value calls for a deliberation involving the key stakeholders. As a consequence, public procurement for services must incorporate consultative and participative processes in order to mediate between the particular values pursued by potentially competing publics (Stoker 2006).

According to the stakeholder theory (Parent and Deephouse 2007), the need for participative procedures and consultations have increased in the past few years, as the direct customers of public services have acquired salience by exhibiting attributes (power and urgency) they did not own before. This has turned end users into key stakeholders whose preferences need to be measured in order to assure their participation in value creation.

Direct consultation procedures may become an essential element of public service codesign, especially for local public services. This participative approach differs in important ways both from the traditional focus on formal consultations with interested parties, and with the method of eliciting users' satisfaction ex post through customer satisfaction, which is then fed into the future service programming efforts.

The direct codesign avoids the risk that users perceive the service are designed in a top–down fashion, and emphasises procedural fairness, thus fostering acceptance, even among those who disagree with the final decision, and increasing participation in service production (Bryson et al. 2013). Moreover, the codesign of the public services may produce better outcomes, above all in delivering services that require knowledge sharing and training in executing complex activities, as in the case of MWS. In this case, the effort required may be better balanced in the customers' perception by the reduction of uncertainty and clear goal setting.

Though the difficulties of going beyond formal participation cannot be denied, several authors have identified ways of dealing with the issue of substantive participation and of measuring perceived customer value. Studies have focused, among others, on motivations for participating (Lowndes et al. 2001), on ways of building participation chains (Simmonds and Birchall 2005), and on newer ways of assessing customer value that keep public preferences into account (Leroi-Werelds et al. 2014). These approaches offer grounds for basing public procurement not only on value-for-money concepts but also on the wider concept of value for customer.

Analysis of Users' Preferences

In this chapter customers' preferences for the appropriate design of MWS provision have been investigated through two case studies in which the current attributes of the service were considered unsatisfactory by the buyer (municipal government), and in which the buyers were in the process of entrusting a private supplier with the service provision through a public tender, and of defining the new attributes of the service itself.

In both cases, buyers implemented a consultation with the residents in order to measure user preferences for various attributes of MWS by means of the DCEs methodology. In what follows, the results of such studies are reported, with the aim to show the kind of information that can be retrieved from choice-based methods, as opposed to more traditional methods based on intention to participate or on the rating of the desirability of single attributes of the MWS. From a managerial point of view, the two cases show how even a small municipality can implement public preference measurement as an effective tool to evaluate the most appropriate attributes of the service and to foster customer participation.

Method: Discrete Choice Experiments

The DCE method relies on the identification of the relative weights of a set of attributes among which the decision-maker trades off when asked to choose among a set of possible alternatives. The method is grounded in the theory of random utility and has been widely adopted in environmental management, marketing, and the social sciences to analyse user preferences and to evaluate nonmarket goods and services (Adamowicz et al. 1994, 1998). Hence, the DCE method is suitable when the service to be evaluated is multidimensional, and importance is attributed to trade-offs between them. DCE allows modelling complex trade-offs between attributes by treating the price of the service as just one component attribute of the valued good. Typically, a DCE builds and contrasts a set of hypothetical multi-attribute scenarios with respect to the status quo scenario.

DCE has been previously used to measure the various economic values of the urban waste disposal system (Birol et al. 2008; Ezebilo 2013; Karousakis and Birol 2008; Ku et al. 2009 among others). In the case of waste disposal, relevant attributes of the service are tariff, frequency, mode of collection, percentage of recycling, etc. After the identification of the appropriate attributes and of their values, the set of scenarios are generated through experimental design techniques. In our experiment, we follow the design used by Verma and Pullman (1998) based on fractional factorial design.

Organisation of Service

In the first municipality (population 10,859 as of 2012), the service had been run by a private entity since 2010 and had been implemented through door-to-door collection of the organic fraction of waste for about 25 % of the population residing

in the town centre. For the rest of the town population, the service collected waste and/or recyclables and/or organics on a scheduled basis from waste bins distributed across town, and dedicated to plastic, paper, glass, and to nonrecyclable matter. About 20% of waste was recycled at the time of the analysis.

In the second municipality (population 10,391) service was run in-house at the time of the study. The mode of waste collection included waste being dumped in street dustbins, emptied by collectors, to be then taken to a landfill. Recycling of paper, plastic, glass, clothing, and tin was further undertaken with the same method. Only 5% of waste was recycled. At the time of the study, the municipality was contemplating the possibility of introducing door-to-door collection to improve the service and increase the percentage of recycling.

Study Deployment

In both municipalities data collection was carried out in the period May–July 2013. Scenarios based on the DCE methodology were built and administered to a randomly extracted sample of the population. A second section of the study (not reported in this chapter) collected information about the degree of satisfaction with the current service in terms of tariff, percentage of recycling, customer care of the service provider, kindness, and competence of personnel. In this second section, each attribute of the service was evaluated individually, without consideration of the trade-offs with respect to other attributes.

In the first municipality, only residents that received the door-to-door service were included in the study. Three attributes of service provision were considered (waste tariff, schedule of collection, and percentage of recycling). Three levels were considered for each attribute. The resulting factor structure (Table 2) was used to build eight scenarios (plus the status quo configuration), which were then combined into four choice sets, each made up of two scenarios and the status quo.

In the second municipality, the mode of collection was further added to the attributes, distinguishing among the standard collection system through dustbins, door-to-door collection, and a municipal collection centre (MCC) (Table 3).

Respondents in the second municipality were further split into two groups (Groups A and B) in order to allow for the evaluation of different schedules of door-to-door collection. This practice is common among researchers undertaking DCE studies (Verma and Pullman 1998).

Table 4 summarises the characteristics of the two samples in terms of gender, age, and level of education.

Table 2 Attributes and levels of attributes—first municipality

Attribute	Level 1	Level 2	Status quo
Schedule of collection	Twice a week for organics and nonrecyclables, once a week recyclables	Once a week irrespective of type of solid waste	Three times a week for organics and nonrecyclables, once a week recyclables
Tariff reduction	10%	40%	None
% recycling	30%	60%	20%

Table 3 Attributes and levels of attributes—second municipality

Attribute	Level 1	Level 2	Status quo
Mode of collection	MCC	Group A—door-to-door (three times a week for organics, once a week for other types of waste) Group B—door-to-door (twice a week for organics, once a week for other types of waste)	Waste bins
Tariff reduction	10%	40%	None
% recycling	30%	60%	5%

Table 4 Sample characteristics

		Municipality 2 ($n=211$)		Municipality 1 ($n=86$)	
		Group A ($n=104$) (%)	Group B ($n=107$) (%)	Standard (%)	Door-to-door (%)
Gender	Male	58	57	44	42
	Female	42	43	56	58
Age	<40	40	43	50	47
	40–60	39	39	40	38
	>60	21	18	10	15
Education	Primary	17	13	12	19
	Secondary-low	44	37	36	27
	Secondary-high	34	42	45	39
	University degree	5	8	7	15

Results

First Municipality

Data obtained from the scenarios were analysed through logit and alternative specific conditional logit (ASCL) models. Data analysis shows some distinct patterns of choice: first, respondents prefer scenarios offering a high frequency of waste collection, and/or a marked reduction in the waste service tariff. Marginal attention is paid to the fraction of recycled waste. In particular, the condition leading users to opt for a service configuration alternative to the status quo is the joint presence of a marked reduction in the tariff (−40%) vis-a-vis only a moderate decrease in the frequency of waste collection.

This pattern suggests that the frequency of collection is a key attribute for the citizen, who is on average willing to trade off a reduction in frequency only in exchange for a significant reduction in the payment. This conclusion is further strengthened by the finding that the majority of respondents opted for the maintenance of the status quo configuration (in which the frequency of service collection

Table 5 Logit model on service attributes—first municipality

	Coefficient	St. error	*p*-value
Tariff reduction	1.688	0.543	0.002
Frequency of collection	0.270	0.097	0.005
% recycling	−4.238	0.473	0.000
Constant	−0.313	0.263	0.232

was highest). Table 5 shows the estimated coefficients for the three attributes as obtained from a logit regression.

The size of the coefficients shows that the tariff reduction is the most important attribute in determining the choice of a waste collection scenario, followed by the frequency of collection. Conversely, the percentage of recycling attribute is negatively related to the probability of choosing a scenario. This can be attributed to the fact that many households perceived a higher percentage of recycling as involving extra effort in separating waste for collection on different days, disposing it in separate street bins, etc. Interestingly enough, in the questionnaire that accompanied the DCE and aimed at investigating the most relevant and valuable aspects of a waste collection service, recycling emerged as one of the most valued attributes. The fact that this statement is at odds with the results of the DCE is a testament to the fact that when faced with trade-off choices, single attributes may not turn out to be as important as they may appear to be at first.

The application of the ASCL model allows disaggregating results based on selected control variables. In the first municipality, this model was applied to the valuation of different percentages of waste recycling. In Table 6, choice was disaggregated according to the binary variable gender (males = 0, women = 1). The interest in the gender variable rests with the fact that women are often, especially in the south of Italy where data were gathered, the "waste managers" of the household. Therefore, their preferences are important because they may be more sensitive to noneconomic attributes of the service which require active participation or which have effects on the life of the family. Quite interestingly, women seem to be the least interested in the attribute "percentage of recycling", and the ones most in favour of the current configuration of the service.

Table 6 Condition-specific logit model (by gender)—first municipality

	Coefficient	St. error	*p*-value
Tariff reduction	6.413	0.9113	0.000
Frequency of collection	0.1260	0.0996	0.206
30% recycling gender constant	−0.7835 −3.0501	0.3286 0.4120	0.017 0.000
60% recycling gender constant	−0.6036 −2.5821	0.2870 0.3710	0.035 0.000

Second Municipality

Results from the second study basically confirm the same choice patterns found in the first municipality. In particular, frequency of collection for the door-to-door mode and tariff reduction are viewed as the two most important attributes of the service, while recycling is only marginally related to the probability that a scenario is chosen. Again, this is at odds with the results obtained from the questionnaires measuring the perceived importance of each attribute and the willingness to engage in recycling.

For the A group, the most frequently selected scenarios involve the high-frequency door-to-door collection (three times a week) with MCC selected only by 8 % of respondents. For group B, in which the frequency of the door-to-door collection is lower, MCC is selected by 19 % of respondents. Further, while the variable "frequency of door to door collection" is statistically significant for Group A it is not for Group B. This suggests that door-to-door collection is considered a valuable attribute of the service only if it is matched by a high frequency. Tables 7 and 8 summarise the estimates from a logit model for the two groups.

Conclusions

Public service procurement needs to be grounded in a greater participation of the stakeholders involved in service attribute design. Direct users are clearly crucial among these stakeholders and this entails that consumer preferences must be explicitly held into account through various forms of consultations. MWS has a special role among services provided by the public sector, since the match between consumer needs and service specification is crucial to guarantee the collaboration of users and thus service effectiveness.

Table 7 Logit with covariates (Group A)—second municipality

LR $chi^2(8) = 180.01$, prob > $chi^2 = 0.0000$
Log likelihood = −698.70452
Pseudo $R^2 = 0.1141$

	Coefficients	St. error	*p*-value
Tariff	4.85	0.51	0.000
Door-to-door (2)	−0.31	0.30	0.301
MCC	−0.19	0.30	0.532
% recycling	0.56	0.50	0.260
Age	0.04	0.11	0.704
Gender	−0.04	0.14	0.746
# Household members	0.02	0.08	0.757
Education	0.02	0.09	0.856
Constant	−1.73	0.49	0.000

Table 8 Logit with covariates (Group B)—second municipality

LR $chi^2(9) = 497.83$, prob > $chi^2 = 0.0000$
Pseudo $R^2 = 0.3046$
Log likelihood = −568.36705

	Coefficients	St. error	*p*-value
Tariff	7.30	0.55	0.000
Door-to-door (3)	0.85	0.34	0.013
MCC	−0.30	0.36	0.412
% recycling	1.06	0.53	0.047
Age	$1.70e^{-16}$	0.13	1.000
Gender	$7.23e^{-17}$	0.16	1.000
# household members	$7.27e^{-17}$	0.08	1.000
Education	$1.12e^{-16}$	0.12	1.000
Constant	−2.75	0.57	0.000

Although customer participation to MWS design cannot be given for granted, various qualitative forms of customer participation (focus groups or general consultations to elicit customer motivations and expectations) have been experienced. In this chapter we suggest that these qualitative approaches may be inferior to choice-based methods, which are no more difficult to administer than standard questionnaires but offer the advantage of presenting customers with trade-offs between alternative specifications of the same service. Our two cases clearly show that while waste recycling emerged as an important feature of the MWS in questionnaires measuring desirability of each individual attribute, they rate quite poorly in the choice-based study, where waste tariff and frequency of collection appear to be far more important.

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