



PARTH-WORTH UTILITY OF THE USE OF BIO-FUELS IN PUBLIC TRANSPORTATION

A. Pirani, A. Gaviglio, L. Rigamonti, M. Licitra Pedol

DEPARTMENT OF AGRICULTURAL AND ENVIRONMENTAL ECONOMICS AND POLICY
UNIVERSITY OF MILAN (ITALY)

INTRODUCTION

The present proposal for the conference is the initial result of a research work called Ingenio. The study is focused on the evolutionary dynamics of the “urban system” and on the life quality improvement demands expressed by its citizens. In particular, the urban system faces an increasingly urgent issue: how to harmonize the strategic development with environmental and economic sustainability. The aim of the study is to evaluate the part-worth utility, attributed by the citizens, to the bio-fuel use in the public transportation sector. To do that, a case study was defined (the Milan metropolitan area), and the pollution reduction proposal’s effect upon the citizens’ behaviour was evaluated.

The research project was realized thanks to the funding of the Ingenio Global Subsidy, financed by the European Social Fund, the Italian “Ministero del Lavoro e della Previdenza Sociale” and the Lombardia Region. The study has been joined, in a collaborative research method, by Milan’s public transportation firm: ATM Spa (Azienda Trasporti Milanesi).

PROBLEM STATEMENT

Today, cities and metropolitan areas are subjected to constant and fast changes. The static structure of buildings, roads and infrastructures is becoming a "support" for a vast series of dynamic activities. According to the urban system description that emerges from a recent study (Mobile Landscapes) made by the Massachusetts Institute of Technology (MIT), great flows of mobility are increasingly apparent (particularly in the Milan metropolitan area).

At the same time, its citizens express an increasing demand of a better quality of life. This also seems to be proved by the Citylab investigation, conducted in 2004, in which the were asked citizens to highlight the most important "areas of improvement" in their city. The study showed that pollution control and prevention (preceded only by sanitary service improvement) is now one of the most important issues.

Therefore the public administrations have to face a new and urgent matter that mainly concerns the difficulty of harmonizing the "long term development" demands with those of the middle term ones, which often influence political choices. The preservation of landscapes and the environment, when seen as an improvement to the of quality of life, has a non-monetary influence on the value of a territory. Besides that, it constitutes an opportunity for sustainable economic development.

This presents a good opportunity to investigate how much of an affect the citizen's demand of pollution reduction has on their behaviour in their "transportation choices". In fact it is not possible to individualize an "economic utility" of such demands if the same citizens do not value them in the process of a service choice (For example: public transport versus own car).

Every citizen and consumer analyzes the stimuli coming from the outside and makes a decision based on these stimuli. For this reason one of the main objectives of marketing studies is the interpretative models definition that allows us to identify consumer "segmentation". The "segmentation" is, in fact, one of the most important research methodologies that marketing can use for simplifying or better understanding the great complexity of the consumer's motivation and behaviour.

Nevertheless, the consumer's behaviour is not explained only by the relationships between consumption (both preferences and intensity) and socioeconomic variables such as age, sex, income, degree of education. On the contrary, such vision of the consumer's choice dynamics appears incomplete because the consumer's behaviour is not connected solely to the socioeconomic variables.

During the purchase, the consumer associates a beneficial expectation with the choice that can be both tangible and intangible (utility, sense of social realization, etc.). From this it understood that the *homo oeconomicus* is only a convenient abstraction for the purpose of consumption process modelling. Therefore it has recently been recognized that some interpretative models that allow us to understand the real motivations that lead to consumption and purchase choices are needed. Such a process is highly complex, and the purchase decisions come from a multiplicity of factors (not always being rational). For this reason the methodological approach to the consumer's behaviour study needs multiple points of view, based on complex analysis tools and interpretative models that can explain the consumer's mental process.

RESEARCH QUESTION

With the goal of analysing the citizens' and consumers' motivations and attitudes in the public transportation sector, the traditional methods of investigation introduce some substantial limits: first of all, the purchase behaviour is conditioned in a conclusive way by the presence of a monopolistic market; secondly, the citizens and consumers are not inclined to express their true attitudes.

Among the most recent analysis methodologies used to study the consumer's behaviour, the Conjoint analysis aroused the greatest attention. This statistic technique allows us to understand and to explain the product's attributes that are remarkable in the consumer's choice process. The term "Conjoint" comes from the methodology's conceptual base, that is, at the base of the consumer's perception there is a unitary and global consideration that comes from a perceiving of all elements at the same time. In fact, the consumer does not appraise every characteristic of the product (or service) in a separate way, but rather these are perceived through their combination. In particular, he associates a value to every product's or service's attribute (part-worth utility): the association of the value attributed to every characteristic subsequently determines the global utility.

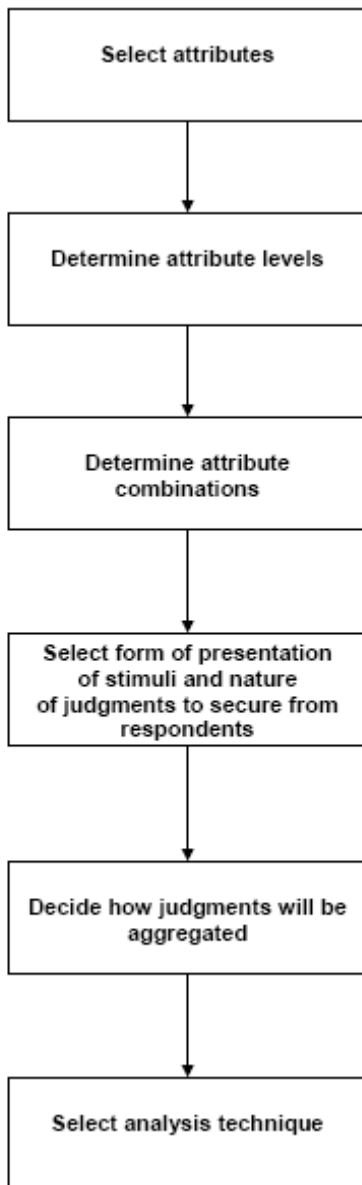
Through the Conjoint analysis, in analogy with the reality, a series of product (or service) alternatives are submitted to the consumer, so that it reproduces real purchase situations and evaluations. In this way it is possible to realize a simulation that submits a series of buying alternatives to the consumer. The use of the conjoint analysis also allows one to understand which attributes are remarkable in the purchase process, and therefore, to evaluate their part-worth utility. Finally, it is also possible to estimate the relative weight of every attribute considered in the simulated choice process.

The proposed project concerns the application of the marketing tool described above to Milan's transportation case study. By using a conjoint analysis we can gain a better understanding of the real value that consumers (citizens) attach to bio-fuels' use in public transportation. The key question then is to determine how the citizens (buyers) value this specific attribute (use of bio-fuels) of the public transportation service. The study tries to answer, for example, the question, "Is low price valued more highly, or are the consumers willing to pay a higher price to secure pollution reduction?"

METHODOLOGY & EXPECTED RESULTS

The Conjoint analysis is similar to traditional experimentation, and it is distinguished from other analysis methodologies by the experiment's design formulation, in which the factors (the product's characteristics) can be manipulated by the researcher. As shown in Figure 1, the consumption behaviour's study is founded on an experimental plan.

The proposed contribution, starting from a review of the models in literature, will define the "experimental design" to apply to the bio-fuels' case study. In particular, it will be defined through a series of steps:



1. Product's (service's) attributes. They are related to the study's aim, but the choice should be guided by the principle that the attributes are both important to consumers and capable of being acted on. With the purpose of building good experimental design, this phase is very important and the contribution of the transport firm is conclusive.

2. Attribute levels. The number of levels for each attribute is directly connected to the number of stimuli the respondent will be asked to judge. The range of various attributes should be somewhat larger than the normal range but not so large as to disorient the person being interviewed.

3. Attribute combinations. It determines what the full stimuli set will look like and takes into consideration the total number of stimuli (S). $S = A^l$ (Where A is the attribute number and l is the level for each attribute).

4. Stimuli presentation and Nature of judgments. These two variables are connected to each other and their choice influences the understanding of the questions.

5. Judgments' aggregation. In this step it must be decided if the consumers' responses will be aggregated and, if so, how it will be done.

6. Analysis technique. Depending on the method that was used to collect data it must be decided which type of analysis model will be used.

After the experimental design is defined, a test is needed to get some first results which will be useful for the debugging of the definitive analysis scheme. From the results of the preliminary test it will be possible to get feedback to improve the methodology scheme.

Figure 1: the CA experimental design (*Adapted from Churchill & Iacobucci*)

CONCLUSIONS

The results that we expect to get will allow us to understand if the consumers and citizens are really oriented and prepared, in their purchase choices behaviour, to pay a “quid more” to get some environmental benefits and to make the transportation system “sustainable”.

The proposal introduces an innovative content in the way that it foresees the application of a consumer segmentation analysis “borrowed” by the marketing. This also represents an innovative approach to the definition of interpretative models that are useful for describing future scenarios, which today are in greater demand as a basis for defining policy.

The knowledge acquired in the project will widen the basis for the decision makers who must manage the future choices regarding sustainable development and agriculture. In fact, before studying how to support the bio-fuels production, we should answer the question, “Do the citizens want us to do that and are they prepared to pay for that?”