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Session ST1. Road service quality levels and innovations to meet users' expectations.

SERVICE QUALITY ON THE ROADS OF MADRID THROUGH A PIONEERING SURVEY

CONSENSUS DECISIONS

Last autumn, the General Directorate for Roads under the Council for Public Works, Town Planning and Transport of the Community of Madrid decided to take the pulse of user satisfaction levels with respect to highway infrastructures usage.

The aim of this research was to get opinions from the people of Madrid as a source of information when taking technical and political decisions regarding actions on the network.

The General Directorate for Roads in the Community of Madrid obtained greater and more versatile information on which to plan its initiatives to improve the highway layout. This information has been obtained by preparing a study that differs significantly from those normally conducted for this purpose.

The results of this research, relatively innovative from a methodological point of view, were obtained through an opinion poll carried out in 2,400 Madrid homes, and an en-route survey of 520 drivers. Quantitative results were completed with a series of meetings held among different groups with a special awareness and knowledge of the road (bus, taxi and truck drivers, Civil Guard for traffic, cyclists, etc.), plus the opinions posted on the web page of the General Directorate for Roads.

To obtain an opinion regarding service quality on regional roads, four defining components have been considered: alignment, surface, sign-posting and equipment; and six aspects offered by the infrastructures: mobility, safety, comfort, environment, services and information. The results of the opinion poll, supported and corrected with the information provided by the en-route survey and group meetings, allowed certain indicators to be established, whose weighted aggregation gave rise to a quality index for the roads most used by the people of Madrid.

Summarizing considerably, it transpired from the interviews that the aspect valued most highly by Madrid people, in terms of services, was safety; otherwise, they mention the difficulty of mobility commonly suffered at certain times and on certain days, together with how road works influence traffic fluidity. The evaluation given to regional roads by interviewees was positive: 6.3 on a scale where 0 was the most negative evaluation, and 10 the most positive. As regards the opinion of the groups interviewed (collective meetings), they pointed out the need to review and improve specific aspects such as rest areas, hard shoulders, accesses to towns and industrial estates, the lack of a separate area for cyclists to circulate, etc.

To conclude, we should highlight that the results of this work are quite satisfactory. They have established some indicators whose evaluation may be continuously updated through the web-site, and more systematically, by conducting periodic opinion polls. Some aspects could be improved, but we have started down a productive research path and with immediate consequences: help in taking technical and political decisions to improve the quality of out roads.

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THE REGION OF MADRID

The Region of Madrid covers an area of 8,065 kms^2, approximately 1.6% of the whole Spanish territory, with a population of five million inhabitants distributed around the capital and the metropolitan area, with a radius of about 25 kms., where 90% of this population is located, giving rise to considerable mobility.

Growth seen over the last decade has created the need to make significant investments in developing infrastructures, in general, all over Spain, and particularly in the Community of Madrid.

In fact, this growth process in the Community of Madrid has taken place more spectacularly. Firstly, the mentioned metropolitan area's population has expanded to a considerable extent, with at least eight of its districts having over 200,000 inhabitants, giving rise to a mobility increase of about 2%, mainly due to growth in the number of vehicles on the road, increasing by 5.6% with respect to the previous year, above the rest of the country, which stands at about 5%.

During the year 2002, the Community of Madrid Road Network, which runs to a total length of 2,590 kms., carried an average daily intensity of 7,577 vehicles and a vehicle/km volume of almost 7,500 million. Of this Network, the one termed the main network, comprising 628 kms., carried an average daily intensity of 22,019 vehicles, with some sections reaching an intensity of 100,000 vehicles/day.

This population growth, number of vehicles on the road, traffic volume justifies a major increase in investment in infrastructures, while ordinary procedure cannot assume such financing. In the Community of Madrid, extraordinary private financing procedures have been implemented: SHADOW TOLL.

The General Directorate of Roads in the Community of Madrid, concerned and responsible for the management of the highway network assets entrusted to it, is

modifying its concept of management, and modernizing it. This new line is based on knowledge of the ultimate aim of any organization, in this case the administration itself, which is none other than to provide satisfaction to the CLIENT or users of the road network, considering such client not just as a driver or vehicles user, but also those persons and organizations whose activity and residence is closely associated with the road.

We must find out objectively what it is that USERS want, and from knowing their needs, manage the highway network in such a way as to the needs they express.

SERVICE QUALITY

Introduction

Road quality service levels and innovations to meet user expectations

We define SERVICE QUALITY as the roads' capacity to meet the demands and needs of the USERS they serve.

Let's consider road USERS as all those who benefit from them or suffer the inconveniences that they may give rise to.

As a result, within this broad spectrum, we have drivers, with the advantages and drawbacks that transport highways may cause them, and can therefore evaluate the service quality given to them by roads. We would also have to take into account neighbours in the vicinity of roads, with their advantages of accessibility, and drawbacks such as noise, pollution. etc. Other users to be considered are the transport operators with their idiosyncrasies, vehicle manufacturers, works contractors, those responsible for conservation and exploitation, the administration itself, both from the point of view of the road and its consequences, considering these to include the environment, town planning, and in a broader sense, territorial regulation and traffic regulation

We see that by taking into account the broad spectrum of USERS, defining SERVICE QUALITY as a general concept is a difficult task, although this broad consideration is necessary in order not to fall into subjective analysis, and to achieve a road network definition, taking into account its Service Quality objectively.

When studying the concept of Service quality, the same thing happens as with USER, since there exist several points of view to define quality. On one hand, we could consider what the users expect, and on the other, the quality that the Administration itself has planned, concluding with the most important, and the one we must act upon, which is the Service Quality perceived by all users.

To reach a definition of road Service Quality, it is firstly necessary to plan the

problem that leads us to carry out a user survey campaign, where they will be asked about road safety, accessibility, comfort, reliability, etc.. Once the surveys' basic matrix has been obtained, they will be evaluated through a broad study of the behaviour and perception of the service provided, according to the answers.

Users, since they are of varying types, will understand QUALITY differently, though it is certain that in every case they will be able to find this concept easy to define. Generally speaking, they will not know if the road metal is good or bad, and the same will be true of the alignment or other technical concepts, but service quality is a much broader term and acceptable in all cases. As a general rule, users will ask for their journeys to take place without uncertainties and as uniformly as possible.

The basis for all quality management consists of understanding the clients' requirements and analyzing the way to providing them with solutions that respond to their needs.

The aim of the different Road Administrations is to provide a high-quality service, both for road users and those persons who are affected by it. To achieve this aim, we must know what it is our clients, the infrastructure users, want from us, and how far we are meeting their expectations. The study carried out by the General Directorate for Roads of the Council for Public Works, Town Planning and Transport in the Community of Madrid, is a fundamental tool providing us with close contact with road users.

There is a standard phrase which states that roads must enable circulation, be safe and clean so as to attract users. The first of the three points is the one that has historically received the most attention. Nevertheless, the other two aspects, together with all other points relating to infrastructure (such as comfort, congestion, etc.), have not been given the importance they deserve, so far.

At present, the term "service quality" is only used rather subjectively to define the different Service Levels (SL) that a road may operate in. These SL only measure traffic density. Although this indicator is very useful for planners and road agents, its usefulness from the users' point of view is rather low.

The aim of the study we are undertaking is to determine service quality perceived by users, and to develop a model to allow the results from the surveys to be used in road planning and management. Obviously, it is not possible to carry out this task with the same degree of foresight, as material is evaluated in a laboratory, mainly due to the subjective nature of the study. However, its conclusions allow us to know the service quality perceived by users, and use this information in making investments in roads, with an objective of the working group having been to eliminate subjectivity as far as possible, and for the survey to comprise the maximum number of users, including drivers, affected by the highways, roadside services, police, etc. etc.

The study was structured in several stages, the first of which was a poll of users

of roads dependent upon this Office, that is, a series of surveys and group meetings which led into the following stage, which consisted of developing and evaluating the model for incorporating the results of the first stage into the planning process.

The third stage consists of developing a web page, frequently up-dated, providing information, together with the survey and the results arising from it.

Web Page

The first of the tasks carried out was the creation of the "Roads" web page, within the Community of Madrid web portal, http://www.madrid.org. This page, aimed at users of the Community of Madrid Road Network, and at the public in general, included the presentation by the General Director for Roads, Mr. Francisco J. de Águeda Martín, an up-dated map of Community highways (where users can make open consultations), and a map with the latest traffic data and accident rate on the network, plus a suggestions box.

Visitors to the page can make whatever suggestions, and even complaints, they wish.

The page is being perfected and new information will be added in the future, all aiming to improve the relationship between user and administration.

Opinion poll

To carry out the opinion poll, the following methodology has been proposed and developed:

Firstly, a home interview survey was carried out on the population of Madrid 18 years old or above, to fully comprehend their assessment of the Community of Madrid's Road Network service quality.

Secondly, an "en route survey" was conducted on drivers travelling along these roads.

Finally, several "Group Meetings" were held between groups with significant knowledge and frequent use of the roads targeted by this survey.

Home interview survey:

The scope of the home interview survey is the population resident in the

Community of Madrid of 18 years old or more. The survey aims to reflect the opinion of Madrid locals on a series of points regarding the regional road network, regardless of whether they are drivers or not and their level of usage on this road network.

The essential idea is that all the people of Madrid have an opinion on the subject, which is more or less solid according to frequency of network usage – every day for work or study reasons, just weekends to get to a second home, or if they ever go to a hospital consultation, for example, regardless of whether they are drivers, passengers or public transport users.

It should be remembered that over 60% of the population over 18 years old in the Community of Madrid has a driving licence, a proportion which is included in the sample due to its random character.

The survey starts with some general questions, and then specifies which are the two regional roads the subject most uses, w2ith the following questions focusing on their characteristics. The survey ends with some identification variables: age, sex and level of education.

The survey's central part makes reference to aspects of the road such as: alignment, surface, sign-posting, facilities or services offered to users. This is all presented in a "non-technical" way so that the subject does not need to have a specific profile in order to understand what they are being asked to evaluate.

A sample size of 2,400 surveys, distributed by means of a single criterion relating the following areas: Madrid district, metropolitan area and the rest of the Community.

The second area mentioned has been disaggregated, in turn, into the following four zones: north, west, south and east.

These zones correspond to the divisions used normally in studies by the Community of Madrid, and are based on different, well-contrasted, social class structure.

Establishing the sample size extracted from infinite populations, over 100,000 people, as is the case in each of the areas mentioned above, is carried out in such a way that the assumed sampling error is lower than 5% (using the normal parameters for a confidence coefficient of 96.6% and "p" and "q" of 50%).

To avoid possible smaller problems, and ensure correct functioning of the survey methodology, an initial pre-test was undertaken with 50 surveys to test the questionnaire's worthiness. Analysis of the responses to these allowed us to detect problems, including non-understanding of certain questions, incorrect formulation, etc.

The questionnaires were also supervised to ensure that they were correctly

filled out, with telephone check-ups in a proportion of about 15% of homes surveyed.

En route surveys:

On the basis of the Home Interview Survey, we identified the most significant roads that Madrid locals have the clearest opinions about (and which is extremely negative or positive).

These roads were targeted for the En Route Surveys, which were carried out by asking drivers of cars and other vehicles stopped to re-fuel, shop or use the café in any of the petrol stations on these roads, whether or not they were resident in the Community of Madrid.

The aim for this survey is: to find out the opinion of the driver surveyed, of the road they have been travelling on, and a certain demonstrative character, since opinions can be valid for other roads when they have similar characteristics to those on chosen roads.

500 surveys were carried out, distributed around some of the petrol stations located along the roads, separated far enough from each other to cover the whole length; half the surveys were carried out during the week and the other half on Sundays; so as to survey all kinds of different users: those using the road for work, study or other reasons, and those who, at weekends, used it basically for leisure purposes.

No kind of representation is intended with this survey, since the universe is unknown. The information obtained in the survey is complementary to what was established by the Home Interview Survey, though they are two different processes.

Group meetings:

Several group meetings were planned with the following professional organizations whose activity takes place in the Community of Madrid: carriers, taxi drivers, inter-urban bus drivers, industrial workers, hotel keepers, petrol station managers and representatives of the Guardia Civil for Traffic. A meeting was also held with a group of cyclists, sporting road users with very specific problems and requirements.

The aim is to have the collaboration of the Professional Associations in driving sectors, the Madrid Chamber of Commerce and Industry and the Cycling Federation.

These directed meetings, held in Community of Madrid premises, were based on a script with the casuistics of each sector, which is discussed and commented. These meetings are limited to small groups of people (between eight and ten). The meetings are recorded on audiovisual media, their content is analyzed and a report is

drawn up on the subjects associated with the regional road network that concern each group most.

Model

The results obtained from the surveys and the different group meetings allow us to identify each of the characteristics liable to influence service quality provided to users, and a weighting process should be systematized for every variable in the study, so that the adjusted weighting for each variable is obtained by applying Delphi methodology developed by the members of the methodological team.

The basic criterion for assigning weights to each of the variables is to identify those aspects most liable to reduce service quality, considering the main aspect which under no circumstances should drop in service quality is driving safety for users. Therefore, the rest of the aspects are subject to this general criterion.

Similarly, the study also included an introduction to highway safety, obtaining data on users' perceptions as regards traffic safety on the Community highways.

Including the data into an expert system allowed the global weights for each section to be re-calculated according to results obtained from the service quality index perceived by users. This consideration not only means that we take into account road users opinions on each of the elements analyzed (including safety), but that it also means that these dynamic weights can be calculated every time we wish to obtain a service quality index, so all weights will be systematically adapted to the opinion that road users offer every time.

2nd stage of the opinion poll

The conclusion obtained from the first stage of the study of Service Quality on the Community of Madrid Road Network makes it necessary to complement this initial approach with a new opinion poll, and on the basis of the data obtained from the first and data from the second, draw up a road quality index, perceived by users, which genuinely reflects the requirements of the network.

The new opinion poll consists of two differential parts, though complementary with each other. The first of them consists of carrying out a series of home interview surveys which will follow a methodology parallel to that of the first study, but the subjects, apart from being over 18 years old, will be asked to possess a driving licence and be habitual users of the Community of Madrid Road Network. This situation modifies the scope of the sample but specifying the responses for the Community of Madrid Network.

From the results obtained, a service quality index will be defined as a weighted sum of concepts such as mobility, safety, environment, comfort, user information, etc. UIT these variables, it is possible to check different sub-indexes such as alignment, surface, containment system, sign-posting, fluidity, accidents, environment, etc.

Although in the first stage, certain service quality indexes were created for the Community Road Network, this second stage has set the objective of achieving an acceptable correlation between the quality indexes perceived by users and the technical parameters that define each variable (surface, alignment, sign-posting, etc.), via measurable, quantifiable technical components, in such a way that infrastructure managers, in this case the General Directorate for Roads in the Community of Madrid, is able to adjust its actions to this new management and highway infrastructure operating procedure, that is, considering users as one more element in the decision process for managing the network.