A DECISION SUPPORT SYSTEM FOR MOBILITY DECISION MAKERS
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BIOGRAPHY
Suana Casari was born in 1975 in Mezzolombardo-Trento- Italy. She has a degree in economics. She knew “value methodologies” last year, when attended module I workshop and FAST seminar, during SAVE Annual Conference, on behalf of FIAT Research Centre - branch of Trento - where she works in Business Methodology Dept. as project leader. At the moment she is working on a project based on Value methodology for the Local Public Administration.

BIOGRAPHY
Head of Business Engineering Group at Business Information Technologies Dept. in CRF. He graduated in Industrial Engineering at Polytechnic of Turin (Italy) in 1997, when he joined CRF. He started his experience in the field of Cost Management methodologies, applied within the Product Development Process, developing and transferring to FIAT Auto a methodology for Value Engineering application, strongly integrated with Voice Of the Customer analysis.
In the field of Cost Management, he has been involved in other different application, both for product/processes cost driven optimization and for the application of these methods from products to services development; he also has participated to public funded projects (national and european, as COMPETE).
Actually he has extended his experiences on business processes and the methodologies/tools to manage them, as Business Process Reengineering, Project Management, Knowledge Management.

ABSTRACT
This paper describes our effort to spread “function/value approach” in a prototype of Italian Public Administration, where VA/VE are unknown, and where we are going to structure decision processes. Actually, our Decision Support System (DSS) based on “value approach” is going to guide Public Administrations in decisions about mobility problems. It is not only a cost reduction tool, but a value improvement instrument, that suits perfectly to public administration goal: improve Value for citizen according available budget, considering that Value for citizens means Value for Public Administration.

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INTRODUCTION

Leaving out slight terminological differences between value analysis, function analysis, value engineering, value management, etc., we focus our attention on the core of “value methodologies”, that is the viewpoint of the problem-solver: thinking by function instead of components and improving value instead of just reducing costs.\(^1\)

After having applied “value concepts” to “product deployment process” of automotive products, Fiat Research Centre is carrying out a project where “value methodologies” are applied to a system, mobility system in particular.

For mobility system we mean every infrastructure or service supplied by public administration to citizen to allow and facilitate movements on the territory.

This project is called: CITIMAN (Citizen Mobility Modelling and Management) and is based on Value Analysis axiom, that is “thinking by functions” instead of thinking by components as usually engineers do. Our approach starts from this axiom and enhances citizens needs. Mobility management is conscious that citizen satisfaction is a strategic objective to pursue, but in fact it is considered only a checking instrument instead of a structured planning driver. We suggest, instead, to consider costs and citizen’s needs in equal relationship in public mobility decisions, in order to evolve beyond the vision of being a customer-driven organization to the reality of continuous value improvement.

Our aim is not to support design of infrastructures that sustain mobility, but it is to support political decisions among different mobility solutions and investments. Public services are particularly complex because the citizen/customer are extremely divided up and cause public services supply is sometimes obligatory and bind by laws, by budget, by territorial features and by the interpretation of social and political requests. Moreover, mobility represents one of the most important parameter for the development of the economy and the wellness on territory, ever since it is joint with several aspects of social and economic life.

In this context, we are suggesting a structured methodology, to support mobility planning giving objectivity to strategic decisions, with particular attention to citizen’s opinions and expectations (that we define as VOC “Voice of the Citizen”).

OUR ACTIVITY

We are developing an integrated methodology based on interaction between Public Administration’s (Transport Department) and citizen-user’s interests. It is based on Function/Value Analysis approach and “Voice of the citizen” activities.

With Function/Value Analysis you find and list all the functions supplied by a product (or a service) and you obtain the cost of each function.

“Voice of the Citizen” techniques (questionnaire, focus group, interview, experimental\(^2\) economics...) allows you to map perceived functions and to obtain a perceived value for

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\(^1\) For “function/value philosophy” see: Value Engineering-A systematic approach, A.E.Mudge, CVS.

each of them. Of course, for an accurate representation of citizens’ needs, a scientific and structured process is necessary. Integrating this two aspects, that is comparing costs and perceived value, you can define for your product (or service) which functions are critical and you can compare your performances with other services ones. For Public Administration is even more important and necessary to know “perceived value” of its citizens, to make prudent decisions and investments, according to its budget. Therefore for public administration is even more important deciding according to VALUE, where value for us is represented by this logical relationship:

\[
\text{Value} = \frac{\text{Function worth for citizens}}{\text{Function cost}}
\]

Considering also technical parameters.

Where:
- Function worth for citizens is defined in terms of “importance” and “satisfaction” by means of focus group and questionnaires.
- Function cost is defined by means of correlation matrix.
- Technical parameters (or performance index) are defined by mobility boards as quality indicators.
- Value is defined comparing in different ways these three previous aspects by means of graphs, that we call “value profiles”, and appropriate considerations.

Fig.1 Value concept

We are providing a DSS (Decision Support System) based on VALUE, to our Local Public Administration and our goals are:

- facilitate analysis of necessary improvement for conventional mobility paradigms, or eventual disinvestments (improving bus comfort, reducing waiting time, improving bus access for disabled persons, eliminating any convenience, …)
- allow to compare different mobility paradigms, in particular innovative solutions (car sharing, car pooling, bus on demand, etc.)
- grant the conformity of new solutions with customer requirements, budget and legislative constraints
- develop an approach that can be used for the development of other services, apart from mobility, that Public Administration supplies to citizens

Our activities:
- Benchmarking on methodologies to model, simulate and estimate transport system and benchmarking on methodologies to point out and structure Voice of the Customer
- Methodology deployment and support instruments customization: define a general model of demand (with focus group, questionnaire, experimental session, …) and supply (with function analysis), define a methodology to compare supply and demand, to deal with costs and to evaluate different solutions
- Implementation of case studies
- Implementation of our methodology in a demonstrative tool software (electronic handbook, set of components, functions and matrix, templates to fill in, etc.)

A DECISION SUPPORT SYSTEM

In fig. 2 is schematised the integration between VE and “Voice of the Customer/Citizen”, in order to construct an instrument that models demand and supply for supporting public administration’s decisions. We have summarized methodology steps in a flowchart that describes the logical path. Above the most general path:

![Flowchart](image)

*Fig. 2 Main methodological steps in our electronic handbook.*
Every single step is detailed in activities that need input to be realized and that supply output that are necessary for following steps. Every activity is codified in a rule (or instruction), that specifies technically what you have to do to complete each activity and supplies you relative templates.

This “electronic handbook” is the first part of our electronic tool. We are going to give not only instructions, but also a real help with a semifinished set of tools, that final user can use as starter kit to build up its analysis. We have subdivided “mobility systems” in elements: public vehicles, bus stops, bus and rail stations, streets, traffic control system, parking, etc. And for each element we have listed the relative functions and components.

**ELEMENT: i.e. BUS STOP**

<table>
<thead>
<tr>
<th>FUNCTIONS</th>
<th>COMPONENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow access to public transport service</td>
<td>Pole</td>
</tr>
<tr>
<td>Allow bus stop</td>
<td>Roofing</td>
</tr>
<tr>
<td>Indicate exact point of bus stop</td>
<td>Seat</td>
</tr>
<tr>
<td>Indicate exact point of waiting</td>
<td>Informative panel</td>
</tr>
<tr>
<td>Sell tickets</td>
<td>Area (lifted and indented sidewalk)</td>
</tr>
<tr>
<td>Inform citizen/users</td>
<td>Ticket vending machines</td>
</tr>
<tr>
<td>Supply comfort</td>
<td>Extra services (newspaper, music, ...)</td>
</tr>
<tr>
<td>Protect citizen/users (security)</td>
<td>Display for real time information (next bus...)</td>
</tr>
<tr>
<td>Protect citizen/users (safety)</td>
<td>Security systems (telecamera, security guard)</td>
</tr>
<tr>
<td>Supply illumination</td>
<td>Lighting system</td>
</tr>
</tbody>
</table>

For each element we have structured functions according to FAST logic and we have defined a correlation matrix (function/components). In this way we have a set of “modular elements” that final user can mix and integrate for a Value Analysis Study on more complex personalized problems. For example, bus service supplier who wants to analyze “urban bus system” in order to decide how and where make its investments (bus comfort, or bus stop security? Disabled people devices? Or air conditioning devices?) can select that elements related to its problem (buses and bus stops) and will have a standard starter kit to develop its study, that can be modified according to specific needs. For starter kit we mean: esteem of cost, standard function deployment, FAST diagram and correlation matrix for each element of “mobility system”. Moreover, our system will suggest “technical parameters” and will supply some examples of questionnaires, focus group and data elaboration, in order to support VOC survey and analysis. For technical parameters we mean index that explain quality of a particular aspect of the service. I.e., about security, “number of accidents” could be one of the technical aspects we consider.

See above the main logic path of our demonstrative software:
For each element we supply a starter kit made of: standard component definition and relative costs, standard function deployment, FAST diagram, technical parameters, matrix.

If user want to analyze just one element has only to personalize that element selected (modifying or validate functions and costs)

If user have to deal with more complex/general problems have to select that elements he want to consider and the system integrate automatically every information in the matrix (possibility to modify, add or remove functions or costs is always granted).
SUMMARY

Decision about mobility problems (potential improvements, budget allocations, …) are usually made according to experience of decision-makers or according to political will and in any case without any structured process. We believe that “value/function approach” and “VOC survey” (correctly integrated), could be a good guide line for structure decision processes in public administration. On these assumptions, we are going to enable public transport authorities and operators to define better their obligations in respect of the needs and expectations of passengers/users, considering that value for citizens means value for public administrations.

REFERENCES

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