A multicriteria satisfaction analysis approach in the assessment of operational programmes

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Abstract

Ex-post evaluation European Operational Programmes could provide useful information and knowledge that can be used as a guide in future planning.

The different concerns of the operational programme stakeholders along with the operating constraints make programme evaluation a difficult and fuzzy task. This paper presents the application of concepts and methodologies of multicriteria data analysis to identify critical success and risk factors in achieving the strategic objectives of a programme. The MUSA (multicriteria satisfaction analysis) method was used for analyzing the satisfaction of project managers with respect to satisfaction criteria associated with four dimensions: the project’s results, the operations of the programme organization, the support of the project organization and the performance of the project team.

The specific case study refers to a sample of projects in the Operational Programme for Education and Initial Training in Greece which was funded by the 3rd Common Support Framework. The results show that the proposed methodology can be a valuable tool for programme organizations, especially in the case of “soft” action projects where the deliverables are intangible and project management at beneficiary organizations is provided at an ad-hoc basis.

Keywords: Managing programmes; Programme appraisal; Multicriteria analysis; Decision making

1. Introduction

A programme is defined by Turner and Muller [8] as a temporary organization in which a group of projects are managed together to deliver higher order strategic objectives not delivered by any of the projects on their own. The main objective of programmes is the delivery of a strategic objective, unlike project portfolios where the main issue is the efficient management of resources and risk ([7,9,10]). Programmes themselves do not deliver individual project objectives. They create benefit through better project organization (i.e. improved coordination, effective knowledge transfer and resource utilization) and better alignment of the projects with the requirements, goals and culture of the master organization ([7,11,12,16]).

The European Union (EU) commitment to economic and social cohesion within Europe is materialized through the co-funding of regional and sectoral programmes at the member states. In the case of Greece, the 3rd Common Support Framework (CSF) funds amount to a total public expenditures (EU plus national funding) of 34.5 billion euros allocated to 25 Operational Programmes:

- 11 Sectoral Operational Programmes which concern development priorities in specific areas such as transportation, communication, education, entrepreneurship, employment etc.
- 13 Regional Operational Programmes, one for each of the 13 geographical regions of the country, and
Technical Assistance Operational Programme, aiming in supporting and strengthening the administrative and control system of the CSF.

Approximately 23,000 projects have been funded so far from the OP of the 3rd CSF with a total budget of almost 25 billion euros.

Each of the 25 operational programmes is managed by a Programme Management Authority (PMA), which is a temporary organization (i.e. public organizations but not being part of the public administration system), established specifically for this purpose, that corresponds to what Pelligrini (1997), Turner (2003), and Thiry (2004) define as programme organizations.

Certain of these programmes include a small number of highly focused large-scale projects, very important in terms of their impact in creating infrastructures (airports, roads, railways, bridges, information and communication networks, public administration structures etc.), in providing employment, and obviously their contribution to GNP growth. The management of such projects is performed by project management organizations staffed with professionally qualified project managers applying PM methodologies and tools with the proper support of information systems. Because of their magnitude, projects of this size and importance are under continuous public scrutiny regarding their performance in terms of meeting time and cost objectives and the quantity, quality and impact of their deliverables. In this case programme and project appraisal can be considered almost identical because of tangible deliverables that serve high level national priorities. This is not however the representative profile of an operational programme. Typically, an operational programme is divided into a number of main lines of action, called axis, which identify its strategic priorities, which are further subdivided into sub-programmes called measures that include a number of similar projects. Thus OPs contain a large number of smaller scale “soft” projects in areas like education and training, business innovation and reorganization, culture etc., that are implemented by permanent or temporary project organizations (PO) operating within the framework of an established formal public or private sector organization or a network of collaborating organizations, which are the project masters or final beneficiaries in the EU jargon.

Finally, each programme aims in creating specific benefits to certain segments of population related to the final beneficiary organization (i.e. employees of the organization, citizens of a city, students of a university, population of a region etc.).

Fig. 1 illustrates a typical representation of the different stakeholders and their immediate involvement and objectives in an operational programme and its projects. Four categories of stakeholders can be identified:

i. European and national government authorities which are concerned with the achievement of the high level aggregate programme objectives such as acceleration of growth, and achieving the convergence criteria set by European and national policies at the initiation of the programme.

ii. Programme Management Authorities (PMA) which perform the programme management functions: administrating open public call for proposal submission by final beneficiaries, evaluation and selection of projects to be incorporated in the programme, monitoring and control of project expenditures and the operational objectives of the programme as they are measured by the output indicators [17] that quantify the deliverables of each of the projects within a programme. (e.g. Constructed highway kilometers, number of training sessions, number of persons trained, number of new books in a library and number of computers in a university.)

iii. Project Organizations (PO) act on behalf of the final beneficiaries which as the project masters view the programme as means for supporting their own organizational development and growth and seek to get as many of their planned projects funded by the programme, given the scarceness of public or private funds.
iv. Finally, the Final Beneficiaries have an immediate concern about creating welfare for the programme’s immediate beneficiary population.

Recent research shows that the lifecycle and management of programmes requires largely different practices than do smaller-scale projects ([11–14]). Maylor et al. [15] identified a list of issues that may form a research agenda in the transition form “projectification” to “programmification” showing that Programme evaluation and assessment is quite different than the case of a single project. POs have limited or no flexibility in making any trade-offs between the project scope, budget and quality of deliverables, after the project is incorporated into an operational programme. Even when adjustments are necessary, justified and could work to the benefit of the project, they cannot be decided without the consensus of the FB and the PMA. Thus the impact of the programme results to the final beneficiaries depend a lot on the level and the quality of interaction between all programme stakeholders especially those between the project team, the project organization and the programme organization.

In this paper we present a methodology for evaluating the results of a programme (or sub programme), based on multicriteria analysis methodologies that can assist in identifying strong and weak elements in four dimensions that affect the performance of a programme: the project’s results, the operations of the programme organization, the support and involvement of the project organization (i.e. the final beneficiary) and the effectiveness of the project team.

The rest of the paper is structured as follows: In the next section we give a brief description of the basic principles of the multicriteria preference disaggregation approach as applied in the multicriteria satisfaction analysis (MUSA) methodology, as well as the implemented methodological framework. The application of the multicriteria satisfaction analysis to a sub programme of the Operational Programme for Education and Initial Vocational Training (OPEIVT) in Greece is presented in Section 3. Section 4 includes the interpretation of the analysis results through their mapping to action and improvement plans for all of the programme’s stakeholders. Finally Section 5 presents some concluding remarks, as well as future research in the context of the proposed methodological approach.

2. Applying the MUSA method in programme satisfaction analysis

2.1. Basic principles

The MUSA model was initially developed to measure customer’s satisfaction from a specific product or service, but the same principles can be used to measure global satisfaction of a group of individuals regarding a specific service or operation they interact with. Customer satisfaction measurements can be considered as a reliable feedback system [6], in the sense that it provides in an affective direct, meaningful and objective way the clients preferences and satisfactions. The final beneficiaries of a programme do not exhibit the same exactly attributes and characteristics of typical customer behaviour (i.e. change supplier or service provider when not satisfied); then again, similarities do exist to the case of customer satisfaction in monopoly markets of public utilities (i.e. municipal and public services, urban transportation, etc.). In this sense the objectives of a PMA towards the public interest can only be achieved through the successful implementation of the projects it supports in order to create satisfaction for the final beneficiaries. Therefore, the feedback from the PO’s regarding the evaluation of the four main satisfaction dimensions mentioned in the previous section is a crucial input to strategic planning decisions made by PMAs, since it provides valuable information in identifying strong and weak performance criteria regarding their operation and interaction with FBs and POs.

The main objective of the MUSA model is the aggregation of individual judgements of the surveyed population into a collective value function, assuming that the population’s global satisfaction depends on a set of satisfaction criteria or variables characterising specific dimensions of programme management. Thus surveyed responders are asked to express on an ordinal scale their total satisfaction for each main dimension and the corresponding criteria. The method considers the qualitative form of the responder’s judgements and it estimates a qualitative scale that represents the collective satisfaction value of the surveyed population. Thus it avoids the arbitrary quantification of the collected information, as in the case of descriptive statistics tools, because the coding of the qualitative scale is a result, not an input to the model.

2.2. Overview of the MUSA method

The MUSA method is an ordinal regression-based approach [1–3] used for the assessment of a set of collective satisfaction functions in such a way that the global satisfaction criterion becomes as consistent as possible with responders’ judgements. A detailed presentation of the formal mathematical development of the model is presented in [6]. Here we present a brief description of the principal concepts and methodology employed in MUSA.

According to the model, each surveyed project manager is asked to express his/her judgements, namely his/her global satisfaction and his/her satisfaction with regard to the set of discrete criteria on a predefined ordinal satisfaction scale (see [4,5] for further details). Let’s assume that an n point ordinal scale is used, where the first point corresponds to “fully dissatisfied” and the last to “fully satisfied”. The method assumes that the collective satisfaction of responders is described by a normalised additive monotonic function (starting at 0% and gaining an additional percentage of total satisfaction at each level of the ordinal
scale, until 100% is reached at the end of the scale), so that each specific choice of the ordinal scale, \( a_i \), is associated with a satisfaction value \( Y(a_i) \). This principle applies not only to the global satisfaction but to each of the satisfaction criteria, where for satisfaction criterion \( k \), any choice \( a_{ij} \) on the ordinal scale, corresponds to a partial satisfaction value \( X^k(a_{ij}) \) as shown in Fig. 2. Furthermore the MUSA method assumes that the global satisfaction value \( Y(a_i) \) is a weighted sum of the partial satisfaction values \( X^k(a_{ij}) \), i.e.

\[
Y(a_i) = \sum_{j=1}^{k} b_i X^j(a_{ij}), \quad \text{for } j = 1, 2, \ldots, n
\]

(1)

\[
\sum_{j=1}^{n} b_i = 1
\]

(2)

Fig. 2 illustrates the case where responder \( r \) judged the overall satisfaction by point \( a_r \) on the ordinal scale, and the partial satisfaction for each of the \( k \) criteria by the choices \( a_{r1}, a_{r2}, \ldots, a_{rk} \). Then, Eq. (1) for the specific responder \( r \) takes the following form:

\[
Y(a_r) = \sum_{j=1}^{k} b_i X^j(a_{rij}) + e_r
\]

(3)

where \( e_r \) is the estimation error for the \( r \)th responder (Fig. 2).

The MUSA method estimates the global and partial satisfaction values \( Y(a_i) \) and \( X^k(a_{ij}) \) respectively, and the relative weights \( b_i \) in such a way that achieves the lowest possible deviations (minimum absolute error) among all responders.

2.3. MUSA results

The MUSA method evaluates the responders’ satisfaction level, both globally and partially, for each of the satisfaction criteria and supplies a complete set of results that explain their satisfaction level and analyze in depth responder’s behaviour and expectations as follows:

1. **Added value curve**: this curve shows the real value in a normalised interval \([0–100\%]\) that responders give for each level of the global ordinal satisfaction scale. As it can be seen in Fig. 2, the satisfaction value for level 1 is 0%. Moving to the second level the added satisfaction value is \( w_2 \), at the next level there is and added value \( w_3 \) and so on. The sequence of the added satisfaction values determines the form of the curve as explained by the demanding index.

2. **Demanding indices**: they are normalised in the interval \([-100\%, 100\%]\) and they correspond to the average deviation of the estimated satisfaction value curve from a “normal” (linear) function. In a linear curve (demanding index = 0%) the added satisfaction value at each level of the ordinal scale (\( w_2, w_3 \), etc.) is constant, showing indifferent responders (i.e. the added satisfaction value at each level of the scale stays the same). In a convex curve (negative demanding index) the added satisfaction value diminishes towards the right end of the scale (case of criterion 1 in Fig. 2), showing that responders receive more of the total satisfaction value, at the lower end of the scale. Exactly the opposite happens with demanding responders where the shape of the
curve is a concave one, showing that the added satisfaction value increases towards the right end of the scale. In general the higher the demanding index the more the satisfaction level should be improved in order to fulfill responder’s expectations.

3. Global satisfaction index: it is the average of the values of the global satisfaction function values weighted by the percentage of responses at the corresponding level and it may be considered as the basic average performance indicator for the business organisation.

4. Criteria satisfaction indices: these indices show in the range 0–100%, the level of partial satisfaction of the responders for the specific criterion, similarly to the global satisfaction index.

5. Weights of criteria: the values of the weights \( b_i \) of each criterion; they show the relative importance of each criterion within a satisfaction dimension.

6. Improvement indices: these show the output of the improvement efforts in any criterion, as they will be explained in Section 4.

2.4. Methodological framework

The implementation of the MUSA method for evaluating the satisfaction of final beneficiaries of the projects of an operational programme is based on the results of a survey among Project Managers (PM) and consists of the following steps:

I. A preliminary analysis including face to face interviews with a target group of PMs in order to define the four basic satisfaction dimensions and the specific satisfaction criteria.

II. Questionnaire design and Administration of the Survey: using results from previous step to develop the questionnaire, determination of survey parameters (sample size, questionnaire form, etc.), mailing and collection of questionnaires.

III. Analysis of collected data using the MUSA model.

IV. Interpretation of the results derived form the data analysis and a reliability testing process regarding the validity of the model.

3. Application of satisfaction analysis to an operational programme

The Operational Programme of Education and Initial Vocational Training (OPEIVT) is one of the 11 Sectoral Operating Programmes, of the 3rd Common Support Framework (CSF) in Greece. Its overall budget of 2.8 billion euros, for the 2002–2006 period is used to fund approximately 2000 projects classified in five axes of action, and 14 measures (sub-programmes).

A considerable part of the programme concerns projects in Higher Education aiming in creating and upgrading infrastructure but also supporting expansion, reforms and quality improvements. Thus Universities and Technological Education Institutes being the final beneficiaries of certain measures are Project Organizations competing for having their proposed projects funded. The high volume of the project being funded by OPEIVT led to the development of Project Offices within each institution for the management of the projects. Hence each project is managed by an assigned project team consisting of members of academic staff, external experts and administrative and technical personnel.

Measuring the satisfaction of the final beneficiaries will provides interesting qualitative results in the programme – project environment that extend beyond the nominal measurements of budget and output indices.

3.1. Satisfaction analysis dimensions and criteria

The satisfaction analysis entails four dimensions, each of which is defined by a set of analytical quality characteristics (criteria):

1. Total Satisfaction from the Project’s Results
   1.1 Clarity of overall programme objectives
   1.2 Contribution of project to overall strategic goals/ objectives
   1.3 Realization of starting objectives/Vision
   1.4 Exploitation of project results by the academic community
   1.5 Meeting Budget targets

2. Total Satisfaction from PMA Operations
   2.1 Submission of proposal
   2.2 Selection and Approval process
   2.3 Implementation support
   2.4 MIS support
   2.5 Timely Payments
   2.6 Level of Funding to the Scope of the project
   2.7 Level of Funding to initial Budget

3. Total Satisfaction from PO support (support and involvement of the academic institution)
   3.1 Management support and involvement
   3.2 Administrative and Technical personnel support
   3.3 Accounting department support
   3.4 MIS support

4. Total Satisfaction from Project Team (PT)
   4.1 Technical-Administrative competence
   4.2 Subproject leaders
   4.3 Academic Staff contribution
   4.4 Outsourcing-Consulting
   4.5 Diffusion of results

For each of those four dimensions the project managers expressed their global satisfaction on a five-point qualitative scale (Totally unsatisfied, Little satisfied, Somehow satisfied, Satisfied, Very Satisfied). The survey was conducted in October 2005 by mailing the questionnaire to 270 project managers at Universities and Technological
Education Institutes who had managed development project (expansion of higher education, library development, reforming and upgrading of undergraduate courses etc), of budgets over 100 thousand euros, with at least three years duration and being close to completion. Forty four (44) answers were received (16% response rate), representing projects accounting to a total of 30 million euros.

3.2. Satisfaction analysis

3.2.1. Project results

The results of the analysis are quite satisfactory regarding the satisfaction of the institutions from the project’s results with an overall satisfaction index of 95.1%. It is important to notice that all criteria show very high satisfaction levels with the exception of the criterion regarding the exploitation of the results (Table 1). However, as important this criterion could be it does not affect the overall satisfaction level significantly because it is assigned much less weight than the rest of the criteria. It is important to notice that the criterion concerning the clarity of programme’s objectives is the one with the highest satisfaction level, and is also assigned considerably larger weight than the rest of the criteria.

Additionally, the form of the global satisfaction curve indicates that the project managers are non-demanding (Fig. 3) as they declare that a large part of their expectations (80%) is fulfilled, even if the perceived satisfaction level is “little satisfied”. A high overall satisfaction index of 95.1% is combined with a low demanding index of −69.7%.

3.2.2. Programme and project organizations

The satisfaction analysis shows considerable differences regarding the level of satisfaction that project managers receive from the support provided to their projects by the PMA in contrast with that of the final beneficiary institution (PO).

The overall satisfaction indices from PMA and PO are 85.7% and 65% respectively. Furthermore the shape of the corresponding global satisfaction value functions (Figs. 4 and 5) show that while project managers are not particularly demanding in the case of the PMA, this is not the case for the PO. For example in the case of the PMA, the estimated satisfaction value curve shows that 76.3% of the project managers total satisfaction is achieved at

![Global Satisfaction Function for Project's Results](image1)

Fig. 3. Global satisfaction value curve for project’s results.

![Global Satisfaction Function for PMA](image2)

Fig. 4. Global satisfaction value curve for PMA.

![Global Satisfaction Function for PO](image3)

Fig. 5. Global satisfaction value curve for PO.

Table 1

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight (%)</th>
<th>Average satisfaction index (%)</th>
<th>Average demanding index (%)</th>
<th>Average improvement index (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarity</td>
<td>29.3</td>
<td>95.7</td>
<td>−72.7</td>
<td>1.26</td>
</tr>
<tr>
<td>Contribution</td>
<td>20.0</td>
<td>94.0</td>
<td>−60.0</td>
<td>1.20</td>
</tr>
<tr>
<td>Realization</td>
<td>20.0</td>
<td>91.0</td>
<td>−60.0</td>
<td>1.80</td>
</tr>
<tr>
<td>Exploitation</td>
<td>10.7</td>
<td>77.8</td>
<td>−25.1</td>
<td>2.38</td>
</tr>
<tr>
<td>Budget</td>
<td>20.0</td>
<td>92.5</td>
<td>−60.0</td>
<td>1.50</td>
</tr>
<tr>
<td>Global index</td>
<td>95.1</td>
<td></td>
<td>−69.7</td>
<td></td>
</tr>
</tbody>
</table>
the second point of the ordinal scale (i.e. even though project managers state that they are little satisfied), while in the case of the PO, at the same point of the ordinal scale, the estimated satisfaction value is only 13.5% of the total. As it can be seen in Fig. 5, the added satisfaction value (in relative terms) is 32.5% moving from the “little satisfied” to “somehow satisfied” level, 28.5% between the next two levels and a significant 25.5% of the total value is achieved only when responders choose the highest level on the ordinal scale.

Examining the satisfaction criteria in both cases (Table 2) it is important to note that the high level of global satisfaction from the PMA is due to its excellent performance during the implementation of the project, where the associated criterion receives almost 1/3 of the total weight and has an average satisfaction index of 93%. It is also worth noticing the attitude of project managers towards the funding of their projects. Although they are not quite happy with the amount of funding they received as compared with what they asked for (the lowest satisfaction level among all criteria), they appear very satisfied with the level of funding they received when it is judged up to the scope of their project, with an estimated satisfaction level of 86.4%, the second highest of all PMA criteria. This could be explained by the fact that project managers’ usual practice is to inflate the proposed project budgets knowing that the PMA always makes cuts to proposed budgets.

Regarding the satisfaction of project managers from the involvement and support they receive from their institution, it seems that the support provided to the project from the PO accounting systems and MIS is quite satisfactory, although the satisfaction level for the later is lower when compared to the same criterion for the PMA. The support provided by the PO administrative/technical support is considered by project managers a significantly important component of their overall satisfaction since its estimated weight is the highest among the four criteria for the PO support. An improvement to the corresponding satisfaction index for this criterion, which is lower than the average, could improve the overall satisfaction level for the PO. The most significant finding of the criteria analysis for PO satisfaction is that management involvement and support receives an extremely low satisfaction level of only 33.7%, associated with a high demanding index which shows that project managers expect and demand the management of the institutions to be actively involved in the projects. This result taken in conjunction with the low satisfaction regarding the exploitation of results (Table 1) identifies a significant problem in EC funded projects in academic institutions.

3.2.3. Project team

Project managers seem very satisfied with the project team as shown by the non demanding curve (Fig. 6). The results shows a large discrepancy between project managers’ satisfaction from their project team and the parent organization with the PT index at 92.2% to be almost 50% higher than the corresponding PO index.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Satisfaction results from PMA and PO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria</td>
<td>Weight (%)</td>
</tr>
<tr>
<td><strong>PMA Criteria</strong></td>
<td></td>
</tr>
<tr>
<td>Submission</td>
<td>9.5</td>
</tr>
<tr>
<td>Selection</td>
<td>10.9</td>
</tr>
<tr>
<td>Implementation</td>
<td>27.8</td>
</tr>
<tr>
<td>MIS</td>
<td>14.3</td>
</tr>
<tr>
<td>Payments</td>
<td>14.3</td>
</tr>
<tr>
<td>Funding/scope</td>
<td>14.3</td>
</tr>
<tr>
<td>Funding/budget</td>
<td>9.0</td>
</tr>
<tr>
<td>Global index</td>
<td>85.7</td>
</tr>
<tr>
<td><strong>PO criteria</strong></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>25.5</td>
</tr>
<tr>
<td>Admin/techn</td>
<td>34.0</td>
</tr>
<tr>
<td>Accounting</td>
<td>29.5</td>
</tr>
<tr>
<td>MIS</td>
<td>11.0</td>
</tr>
<tr>
<td>Global index</td>
<td>65.0</td>
</tr>
</tbody>
</table>
The satisfaction analysis shows no significant differentiation between the different criteria for the performance of the project team. All criteria are weighted the same and receive high level of satisfaction (Table 3).

Even if a certain bias of project managers toward their team exists, a comparison of the satisfaction levels between the project team dimensions and those of project organization, shows that projects run successfully by the project team with little involvement of the rest of the project organization especially in the involvement of the management which is crucial in the organization-wide exploitation of the projects results. An assertion of this observation is the discrepancy between the satisfaction level concerning the diffusion of results within the PO (88%), and that of the exploitation of results (77%).

### 4. Interpretation of results

#### 4.1. Action diagrams

Combining relative weights and average satisfaction indices, a series of action diagrams can be developed (Fig. 7). The cut-off level for the axes is the centroid of all points in the diagram.

The action diagrams, similar to SWOT analysis, indicate the strong and the weak points of responder satisfaction, and define the required improvement efforts. Each of these maps is divided into quadrants, according to relative importance (high/low) as it is expressed by the satisfaction index, and performance (high/low) as it is measured by the relative weight of each criterion.

### Table 3

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight (%)</th>
<th>Average satisfaction index (%)</th>
<th>Average demanding index (%)</th>
<th>Average improvement index (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical-administrative compet</td>
<td>20.0</td>
<td>93.0</td>
<td>-60.0</td>
<td>1.40</td>
</tr>
<tr>
<td>Subproject leaders</td>
<td>20.0</td>
<td>89.8</td>
<td>-60.0</td>
<td>2.05</td>
</tr>
<tr>
<td>Academic staff contribution</td>
<td>20.0</td>
<td>88.3</td>
<td>-60.0</td>
<td>2.55</td>
</tr>
<tr>
<td>Outsourcing</td>
<td>20.0</td>
<td>90.3</td>
<td>-60.0</td>
<td>1.95</td>
</tr>
<tr>
<td>Diffusion of results</td>
<td>20.0</td>
<td>88.0</td>
<td>-60.0</td>
<td>2.40</td>
</tr>
<tr>
<td>Global satisfaction</td>
<td>92.2</td>
<td></td>
<td>-70.1</td>
<td></td>
</tr>
</tbody>
</table>

![Fig. 7. Action diagrams for project's results, PMA, PO and Project Team.](image)
This grid can be used in order to identify priorities for improvement by classifying actions. The bottom right quadrant is obviously the first priority, for the attributes are important to responders but performance of the associated criterion is rated moderately low. The second priority may be given to the satisfaction criteria in the top right quadrant, especially if there is margin for improvement. The third priority issues are indicated in the bottom left quadrant where performance is low; even though these issues are not terribly pertinent at the time of the analysis, they may become more important in the future. Finally, last priority for improvement can be given to the criteria in the top left quadrant because this category is the least important since performance of the satisfaction criteria is relatively good.

4.2. Improvement diagrams

The action diagrams indicate which satisfaction dimensions should be improved, but they cannot determine the output or the extent of the improvement efforts. A solution to this problem is given by the improvement diagrams which combine the average improvement and demanding indices for the criteria of each dimension.

The demanding indices, as stated before, indicate the extent of improvement efforts: the higher the value of the demanding index, the more the satisfaction level should be improved in order to fulfil responders' expectations.

On the other hand, the output of improvement efforts depends on the importance of the satisfaction dimensions and their contribution to dissatisfaction as well. The average improvement indices show the improvement margins on a specific criterion, and they are assessed on a 0 to 1 scale by multiplying the weight of the criterion by the respective dissatisfaction index (100% minus the satisfaction index). Thus a zero value occurs when the weight of the criterion is zero or the satisfaction level is 100%, while a maximum value of 100% means that the corresponding criterion has a weight of 100% and at the same time a null satisfaction level.

As shown in Fig. 8, each of these maps is divided into quadrants according to demanding level (high/low) and effectiveness (high/low) that may be used to rank improvement priorities:

(i) First priority is given to the bottom right quadrant: this area indicates direct improvement actions since these dimensions are highly effective and responders are not demanding therefore small effort is expected to create relatively large improvement in overall satisfaction.

![Fig. 8. Improvement diagrams for project’s results, PMA, PO and Project Team.](image-url)
(ii) Second priority is given to the criteria in the top right and bottom left quadrants: it includes satisfaction dimensions that have either a low demanding index or a high improvement index.

(iii) Third priority to the top left quadrant: it refers to satisfaction dimensions that have a small improvement margin and need substantial effort.

4.3. Main action and improvement points

The analysis of the action and improvement diagrams identifies the following main point of improvement actions:

1. Clarity of programme’s objectives, support of the PMA during project implementation, and support from the PO accounting systems and administrative/technical personnel are acknowledged as the leverage points since they show high performance combined with high importance (Fig. 7 – action diagrams).

2. The satisfaction derived from the project’s results to the extend they contribute to the objectives of the PO is also a high performer, while the realization of the POs vision at the beginning of the projects achieves a high satisfaction value.

3. More active involvement of the management of the POs will help the projects especially with respect to better exploitation of results. This is not an easy task, since project managers are very demanding, but improvement in this criterion will improve the global satisfaction dramatically since it has a high improvement index (Fig. 8 – improvement diagrams).

4. Elements of project’s results that can with little effort contribute significantly in raising global satisfaction because of high effectiveness index (Fig. 8) include the exploitation of results and the alignment of results to the initial objectives/visions of the project organization, and should receive high attention. Although the first issue is rather easy to deal with, the later one is linked to the weak involvement of the management of the institutions to the projects.

5. Also, the diffusion of results in the academic community and the increased participation/involvement of academic staff in similar projects can be considered first priority issues with respect to the effectiveness of the improvement efforts in these areas.

6. The PMA should consider improvements on making timely payments, and providing more support during the submission of project proposals that will lead easily to increases in project manager’s satisfaction. Obviously improving the ratio of actual funding to the proposed budgets will also have a positive effect, but given that a high level of satisfaction is already expressed for the amount of funding relative to the project scope, it seems that project organizations are quite satisfied with the level of funding they receive.

5. Conclusions

Programme evaluation, especially in EU funded programmes should extend beyond the financial management aspects of the projects and include assessment of results as they are perceived by final beneficiaries. This paper contributes to programme management literature by demonstrating how multicriteria analysis techniques can be a valuable tool for a programme organization not only for project selection and assessment of project risk, but also for evaluating programme results, especially when interaction between different stakeholders is critical to the success of the programme.

The employment of the MUSA method in measuring satisfaction levels regarding the project results, the support and operations of the programme organization, the involvement of the project organization and the performance of the project team can provide input to:

- identify relevant weight and importance of various internal and external factors that affect the perceived satisfaction of beneficiaries;
- provide action plans and prioritize improvements for both the programme and the project organizations.

In addition by applying the MUSA approach to different sub-programmes within the same programme organization or across different programme organizations, it is possible to make comparisons between programme management authorities, types of programmes/sub-programmes, categories of beneficiaries and other characteristics in order to identify risk factors associated with those dimensions.

The MUSA model for assessing the satisfaction criteria for each of the four dimensions separately, as it was applied here can be extended to study the impact of the programme and project organization and the project team to the achievement of the programme results through the deliverables of the incorporated projects.

Further research can be carried out to investigate whether it is possible to cluster projects based on satisfaction measurement results.

On the technical side the issue of weighting the input from different projects could also be investigated. Research in this direction could lead to different views: Should the weight of the project be based on their size (and therefore impact on the programme), or on some other criteria given that large projects are usually run by large and more organized and mature project organizations with less risk and need for support from programme organizations than smaller projects?

Overall, within the complex framework of EU programme management, multicriteria analysis could help in providing a systematic analysis framework for decision making.
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References