



TECHNOFI

WISE GUYS

***“Identifying the constituent elements
of the European Added Value (EAV)
of the EU RTD programmes :
conceptual analysis based on practical experience”***

Final Report

Contract No. EVA5CT19990006

20 November 2000

Study performed by :

Yellow Window Management Consultants SA/NV

Technofi SA

Wise Guys Ltd.

Study commissioned by :

European Commission, DG Research

Yellow Window NV/SA – Balansstraat 115 – 2018 Antwerpen
+32/3/241.00.24 - +32/3/241.00.25
mail@yellowwindow.com - www.yellowwindow.com

Contents

Foreword

Executive Summary i-ii

1 Introduction 1

2 Analysis of the EAV Concept 3

3 EAV Revised 18

4 The Implications for FP5 and FP6 32

List of annexes :

1 Methodology

2 List of persons who contributed to this study

3 Relevant literature

Foreword

There is little point in the EU spending public money on research and technological development (RTD) if it doesn't somehow make a difference. Private sector funding for RTD is already supplemented by funding from public authorities at the national and regional level. EU funding has to provide something extra, namely European Added Value (EAV).

Attempts to realise EAV have underpinned EU support for RTD for many years, but fears that EAV was not being realised sufficiently led to renewed attempts in the Fifth Framework Programme (FP5) to highlight the importance of EAV and ensure its capture. In practice, however, these measures proved difficult to implement - largely due to a lack of consensus concerning the definition and measurement of EAV.

In the context of the current discussion of the European Research Area, the attainment of EAV is even more critical. The aim of this report is thus to review the concept of EAV and its implementation in EU RTD Programme life-cycles and to suggest improvements in the way EAV can be captured in the future.

Executive Summary

The attainment of European Added Value (EAV), defined simply as:

“the value resulting from EU support for RTD activities which is additional to the value that would have resulted from RTD funded at regional and national levels by both public authorities and the private sector”;

is enshrined in EU legislation as one of the prime justifications for EU RTD actions. The need to evaluate EAV is also embedded in the EC Treaty. The requirement, therefore, is twofold: to maximise the probability of attaining EAV and to devise pragmatic ways of assessing whether or not it has been attained.

Historically, concepts related to EAV have long been used to help decide the composition of the Framework RTD Programmes. However, following criticisms that the attainment of EAV was not being sufficiently prioritised, renewed efforts were made in the Fifth Framework Programme (FP5) to reassert the primacy of EAV. This involved embedding the attainment of EAV in project selection processes via its incorporation as a key selection criterion. It also involved stressing the importance of the measurement of EAV in subsequent monitoring and evaluation exercises. Nevertheless, even though these changes rightly emphasised the centrality of EAV in shaping the Framework Programmes, it soon became clear that both its use as a selection criterion and its measurement were problematic.

From an evaluation perspective, one obstacle has been finding an operational definition of EAV which facilitates its measurement. Although it is quite straightforward to find a simple way of expressing the concept, it has proved much more difficult to pin it down in such a way that we can say with confidence that EAV has actually been achieved.

Redressing this failure might seem to be the main challenge confronting those concerned with the issue of EAV. It is not. It is a secondary challenge. The primary challenge is to maximise EAV, not to measure it. Measurement of EAV attainment would satisfy the general demand for accountability but it does not in itself improve the chances of successfully capturing EAV. This involves treating monitoring and evaluation systems as programme management tools, designed specifically to enhance programme performance over many programme life-cycles.

In this type of system, the demands of accountability are satisfied via programme life-cycle changes which optimise for EAV, together with a comprehensive monitoring and assessment scheme which first checks whether or not the steps needed for optimisation are in place and then – as a secondary consideration – attempts to estimate the extent of EAV attainment.

Bearing this in mind, we propose a simple solution which prioritises the maximisation of EAV via the introduction of a comprehensive scheme of changes along the whole programme life-cycle.

The underlying premise of the suggested scheme is that the tasks of maximising and measuring EAV are best conceptualised separately.

In the first instance, EAV is maximised by specifying the type of activities and modalities which would guarantee EAV and then ensuring that these are incorporated into work-programmes and project selection criteria in a non-trivial fashion. All activities should then be EAV-compliant, thus optimising for EAV goal attainment.

Secondly, futile attempts to measure EAV are avoided via a scheme designed to assess overall programme effectiveness or goal attainment. This involves clearly specifying programme goals and project selection criteria in terms of a specific set of expected benefits, followed by the use of both well established and novel techniques to estimate the extent of programme goal attainment, itself accomplished via a primary focus on the short-term achievements of participants and a secondary focus on downstream socio-economic and other impacts.

The overall logic of the system is that its successful implementation should ensure that the programme is on track to capture the potential EAV identified by policymakers. The main task of monitoring and evaluation is then to establish whether or not each step in the process has been successful.

The attractive feature of the system from an evaluation perspective is that it concentrates on aspects of programme performance which are measurable and/or capable of assessment. Positive assessments of relevance, efficiency, effectiveness and additionality will also demonstrate that the potential for EAV is being realised.

Implementation of the system can also commence immediately. Its use within the context of FP5 will require modest changes in the procedures now used to select projects and to monitor and evaluate project and programme performance. Its use within the Sixth Framework Programme (FP6), however, will also involve changes in the way in which programme activities and modalities are specified - though in this instance the prospects for maximising the attainment of EAV are highest.

1 Introduction

Each year the European Union (EU) spends a considerable amount of taxpayers' money on Research and Technological Development (RTD), primarily through the RTD Framework Programmes of the European Commission. This is in addition to expenditure on RTD by the governments of each of the Member States of the EU. It is thus legitimate for taxpayers across the EU to ask if this expenditure is justified. They are also entitled to ask whether or not it is being well spent by the responsible authorities.

For many years concepts related to that of 'European Added Value' (EAV) have been used implicitly to justify EU expenditure on RTD. Spending money on RTD is expected to stimulate activities and lead to results which produce EAV. Measurements of this entity are also considered necessary to satisfy the demands of accountability.

The demand for clear and concise definitions of EAV is also intensifying. Increasingly RTD expenditure by the EU attempts not only to support scientific work of a high quality, but also to favour RTD projects in line with 'socially relevant' programme goals, i.e. goals held to be in the visible interests of EU taxpayers. It is not therefore surprising that the issue of public accountability has come increasingly to the fore.

An improved understanding of EAV is also needed by programme administrators if they are to maximise the probability of attaining it. The desire for EAV has to be translated into programme goals and work-plans, and project selection criteria need to reflect the goal of EAV if resultant project portfolios are to have any chance of delivering outcomes in line with this goal. Programme management also needs a firmer grip on the concept and its operational implications if it is to monitor progress towards this goal and optimise project and programme performance. And last, but certainly not least, programme evaluators need an enhanced understanding of EAV if they are to say anything meaningful about overall programme effectiveness or goal attainment, i.e. the extent to which EAV has been achieved.

But doesn't a satisfactory definition of EAV already exist? Isn't it simply the extra value which can be attained as a result of EU support for activities which would not otherwise have been funded by the Member States? And isn't this definition, or one quite like it, already adequately embedded in the processes of policy formulation, programme specification, project selection, monitoring and evaluation? Is there really a need for improved definitions and better implementation of the concept?

The uncomfortable reality is that concepts related to EAV have been used very loosely in the past and have been poorly specified in documents ranging from EU Treaties at one end of the spectrum to the instructions prepared for the evaluators of project proposals at the other. Neither is there an unambiguous, agreed definition of EAV which is shared unequivocally by all interested parties, with stakeholders in various public and private sector organisations all holding different, if overlapping, opinions on the subject. The net result, therefore, is that EAV is not adequately embedded in the policy formulation, programme specification, project selection, monitoring and evaluation processes of the EU institutions.

This situation has to be rectified, and this report suggests some of the steps needed to improve matters. In **Section 2**, immediately after this **Introduction**, we look at the concept of EAV, first attempting a simple definition and then reviewing the way the concept has been reflected

in Commission thinking to date. We focus in particular on why it has proved such an elusive concept to define and operationalise in the past. This part of the report is based on an extensive review of the relevant literature and a large number of workshops and interviews with different members of the EU RTD stakeholder community.

We follow this in **Section 3** with a proposal for a new ‘conceptual scheme’ for EAV. Our hope is that this revised scheme will become the ‘standard reference’ for EAV during the formulation and implementation of future EU RTD policies. After an outline sketch of the scheme, we illustrate in more detail how the scheme manifests itself at various points in programme life-cycles. We cover all stages of the cycle, but concentrate in particular on the monitoring and evaluation stage. This involves examining the strategies which need to be adopted to collect data relevant to the measurement of EAV and, ultimately, make meaningful statements about the attainment of EAV.

Finally, in **Section 4**, we look more closely at how the revised scheme might be implemented in the current Framework Programme (FP5) and the next (FP6).

2 Analysis of the Concept

A Simple Definition of EAV

Expenditure of money on RTD is rightly expected to produce something of ‘value’; i.e. something which is regarded as beneficial, and the concept of eventual ‘value production’ is thus a central plank of the rationale for spending money on research. Similarly, attempts to assess the ‘value’ or ‘benefits’ which result from RTD are central to any evaluation of RTD activity. But the expenditure of **public** money on RTD is expected to produce not only ‘value’, but also to produce ‘**added value**’, i.e. something over and above the ‘value’ which would have been produced in the absence of public expenditure. It is not generally regarded as enough for **public** money to produce something of value if this could also result, for example, from RTD activity funded solely by the **private** sector in the absence of public intervention.

In the case of RTD funded by the EU, there is also a further requirement. The ‘added value’ which results from the expenditure of **EU funds** is typically expected to be additional to anything likely to have resulted from public expenditure by the **Member States** acting individually. This is the ‘**European**’ dimension of ‘European Added Value’.

In a strict sense, therefore, it is relatively easy to arrive at a succinct definition of EAV, namely:

EAV is the value resulting from EU support for RTD activities which is additional to the value that would have resulted from RTD funded at regional and national levels by both public authorities and the private sector.

Difficulties with the Concept

In reality, this simple formulation is neither widely shared nor fully appreciated by the various stakeholders concerned with or touched by the RTD policies of the EU. This is because:

- a clear articulation of the concept and its implementation has been missing to date and the legacy of history is confusion. Although there have been many references to the concept of EAV in the legal decisions and documents which both frame and accompany EU RTD programmes, the way the concept has been specified and applied has changed considerably over time, particularly with the advent of FP5;
- the concept of EAV is actually a composite of a number of many other tricky concepts, few of which are widely understood. These include the ‘EU concepts’ of subsidiarity and proportionality, the related concept of additionality, in all its various forms, and even the generic - but still difficult to define - concept of value itself;
- the relevance and utility of simple definitions of EAV vary tremendously from one context to another. In particular, their utility decreases markedly across the ‘RTD programme life-cycle’ as one moves from the programme formulation stage, involving the

setting of programme objectives and the specification of work programmes, to the selection of projects and, subsequently, the monitoring and evaluation of projects and programmes;

- the idiosyncratic priorities and ‘value systems’ of the stakeholders involved in different programme life-cycle stages make it quite legitimate for them to interpret concepts such as ‘value’ and ‘added value’ in completely different ways.

All these points deserve further elaboration. They are best dealt with via an initial review of the way in which EAV has been incorporated to date into the legal texts and the administrative practices of the European Commission. Further clarification is then provided via a discussion of the way EAV is handled at different RTD programme life-cycle stages.

EAV Prior to FP5

Since its earliest days the European Union has been expected to justify its actions in terms of the additional value they might have over the actions of individual Member States. This principle has been formally embodied in successive versions of the EC Treaty and has underpinned programme formulation and the selection of suitable activities. At Maastricht, for example, the general criteria of subsidiarity and proportionality as the principles governing EU activities were introduced. These were later expanded in an annex accompanying the Treaty.

The principle of subsidiarity has two aspects, both of which have to be fulfilled to justify EU activities. In the first instance, the principle says that proposed actions are only justified if they cannot be sufficiently achieved by the actions of Member States in the framework of their individual national constitutional systems. Secondly, actions are only justified if they can be better achieved by action on the part of the EU. The principle of proportionality then states that any action by the EU shall not go beyond what is necessary to achieve the objectives of the Treaty.

These principles are best illustrated by an example. An EU mission to the moon would only be justified if it could not be attempted by an individual Member State AND it could be better undertaken by the EU AND a mission to the moon was a legitimate goal of the EU. A mission to Mars, on the other hand, even if it could not be undertaken by a Member State and was better undertaken by the EU, would not be justified if the goal of the EU was only to reach the moon and not Mars.

The EC Treaty goes further by adding that EU activity is only justified if:

- it has trans-national aspects which cannot be satisfactorily regulated by action by the Member States;
- actions by Member States alone would conflict with the requirements of the Treaty;
- lack of action by the EU would conflict with the requirements of the Treaty;
- action at the level of the EU would produce benefits of a scale or impact which could not be achieved by Member States alone.

These are the broad guidelines which govern all EU actions and the attainment of EAV generally, but there have been many more guidelines which specifically deal with EAV and RTD programmes.

During the 1960s, the presence of a 'technological gap' between the USA and Europe, and an associated 'brain drain' or emigration of skilled people from Europe to America, was perceived. The need for increased co-operation between Member States to meet the challenge was suggested. Several initiatives were proposed and in 1974 the Council adopted a number of resolutions on RTD, including one establishing the necessity for the Community to have its own science and technology policy. Following on from these resolutions, the Commission specified six areas in 1977 as appropriate for its involvement in RTD:

- energy, including research on new sources, conservation measures, and the Joint European Torus (JET);
- raw materials;
- environmental studies;
- living and working conditions, such as the social consequences of technology, emigration, and demographic changes;
- services and infrastructure, including projects such as the establishment of a European network for the exchange of technical information (Euronet);
- industry, a field scarcely touched by Community research previously. Information science, telecommunications and transport were particular areas highlighted.

At the same time, the Commission identified a set of criteria for choosing activities suitable for Community support. **The over-arching requirement was for high quality work in the above areas which contributed to the development or fulfilment of Community policies.** Additionally, however, criteria related to the concept of EAV were also developed. These were:

- efficiency, where community involvement allowed avoidance of duplication and rationalisation of effort (e.g. nuclear fusion);
- trans-national research, involving issues crossing national boundaries, such as telecommunications and some environmental problems;
- the size of the market, where R&D costs were high and potential markets were international;
- common requirements, e.g. international standards.

Subsequently, the Community launched the **First Framework Programme** (FP1) in 1984. The Programme was intended to provide a wider framework within which individual programmes, prepared and approved at the same time, could find a place within the overall whole and interact beneficially with each other. The 'Reisenhuber criteria' were established to guide the choice of suitable programme activities. In addition to the general requirement for high quality work in specific areas to be relevant to Community policies, the Reisenhuber criteria led to a preference for:

- research conducted on so vast a scale that single Member States either could not provide the necessary financial means and personnel, or could only do so with difficulty;
- research which would obviously benefit financially from being carried out jointly, after taking account of the additional costs inherent in all actions involving international co-operation;

- research which complemented work carried out at a national level in a given sector and addressed problems which could only be tackled via the combined efforts of Member States;
- research which contributes to the cohesion of the common market, and which promotes the unification of European science and technology; as well as research that leads, where necessary, to the establishment of uniform laws and standards.

The **Second Framework Programme** (FP2) ran from 1987-1991 and was designed to coincide with the Single European Act, with its stress on research related to the needs of industry and the realisation of the Single Market. Sixty percent of programme funding was for industrial research, and a new theme - 'social cohesion' - was encapsulated into a fifth criterion for Community funding. This additional criterion referred to:

- research which contributes to the strengthening of the Community's economic and social cohesion, as well as to the promotion of its harmonious and widespread development, while maintaining its consistency with the objective of technical and scientific quality.

Little had changed by the time of the **Third Framework Programme** (FP3), which spanned 1990 to 1994. Again there was an over-riding requirement for Community RTD actions to be selected on the basis of scientific and technical objectives, their scientific and technical quality and their contribution to the definition or implementation of Community policies. A particular aim was for Community RTD to strengthen the scientific and technological basis of European industry – including that of small and medium-sized enterprises (SMEs) – especially in strategic areas of high technology, and to encourage it to become more competitive at an international level.

There was also a specific reference in the FP3 Council Decision of 23/4/1990 to the concept of added value, in that Community action was said to be justified “where it presents advantages (added value) in the short, medium or long term from the point of view of efficiency and financing or from the scientific and technical point of view as compared with national and other international activities (public or private)”.

The familiar themes of **cohesion, scale, financial benefits, complementarity** and **unification** were again put forward as selection criteria justifying Community actions, this time expressed as follows:

- research which contributes to the strengthening of the economic and social cohesion of the Community and the promotion of its overall harmonious development, while being consistent with the pursuit of scientific and technical quality (**cohesion**);
- research on a very large scale for which the individual Member States could not, or only with difficulty, provide the necessary finance or personnel (**scale**);
- research, the joint execution of which would offer obvious financial benefits, even after taking account of the extra costs inherent in all international co-operation (**financial benefits**);
- research which, because of the complementary nature of work being done nationally in part of a given field, enables significant results to be obtained in the Community as a whole in the case of problems whose solution requires research on a large scale, particularly geographical (**complementarity**);
- research which contributes to the achievement of the common market and to the unification of the European scientific and technical area, and research leading, where the need is felt, to the establishment of uniform rules and standards (**unification**).

An additional criterion covering the development of scientific and technical potential in Europe via different routes was added for the **Fourth Framework Programme** (FP4: 1994-1998). This justified:

- research actions which contribute to the mobilisation or improvement of European scientific and technical potential and actions which improve co-ordination between national RTD programmes, and between Community programmes and work in other international fora (**S&T potential**).

EAV and FP5

The important point to note about the development and utilisation of the EAV concept prior to FP5 is that its primary use as a selection criterion determining activities considered legitimate for the EU to undertake had unfortunate consequences for its relative status as a high-level EU goal.

In one sense, EAV is equivalent to any other high-level EU goal, e.g. enhanced competitiveness, but in practice it has been treated differently. Whereas consideration of other high-level goals helped to frame the specific objectives of individual programmes and the content of work programmes, the concept of EAV was used instead to frame modalities at a programme level and to suggest activities likely to lead to EAV. High-level goals aimed at preserving the environment, for example, led to the constitution of a specific programme of RTD in this area, whereas application of the concept of EAV led to a focus on modes of collaboration involving international partners (e.g. collaborative projects and networks) and excluded modes which – although likely to lead to goals such as an enhanced environment – would not result in EAV (e.g. projects involving participants from only one country). The concept of EAV was thus used to filter out certain activities once other goals had determined the general thrust of individual programmes, namely those likely to attain the other goals but unlikely to satisfy the demands of subsidiarity.

Over time, however, the use of EAV as a filter became exceedingly mechanical and trivial, with the involvement of partners from different Member States taken as sufficient in itself to demonstrate EAV and justify inclusion within the Framework Programmes. Not surprisingly, this eventually led to a situation where the attainment of EAV was given insufficient priority relative to the attainment of other goals.

The declining priority accorded to EAV came to a halt with the onset of FP5. The first Five-Year Assessment of the RTD Framework Programmes in 1997 considered that EAV had not been given sufficient priority in previous programmes and recommended that it be accorded equal status with the other strategic goals of the EU. Subsequently, the Council Decision covering FP5 set out the goals of EU RTD policy and the way the concept of ‘value added’ was to be applied. This is set out in full in **Exhibit 1**.

The response to the very valid criticism of the Five-Year Assessment Panel was laudable but flawed. The text of the Council Decision certainly elevates the objective of ‘added value’ to the same status as ‘social objectives’ (e.g. improving employment, the quality of life and the environment) and ‘scientific, technological and economic objectives’. At the same time, however, it is less clear about ways in which this formulation can be used to frame legitimate

activities. Instead of clear guidelines concerning the use of EAV as an activity filter, the Council Decision replaced the selection criteria developed previously (i.e. those relating to cohesion; scale; financial benefits; complementarity; unification; S&T potential) with a set of much more limited prescriptions. For EAV specifically, this involved the need to:

- establish a 'critical mass' in human and financial terms, in particular through the combination of the complementary expertise and resources available in the Member States;
- make a significant contribution to the implementation of one or more Community policies;
- address problems arising at Community level, or questions relating to aspects of standardisation, or questions connected with the development of the European area.

The text of the Council Decision is also ambiguous about the interdependence of the three sets of criteria related to EAV, social objectives and scientific, technological and economic prospects respectively. In the past it was quite clear that EAV was a necessary condition for the attainment of other goals, i.e. they could only be attained via routes which also led to the attainment of EAV. In contrast, the Council Decision seems to emphasise their comparative independence, for although it notes that the three criteria must all be met simultaneously, it stresses that the extent to which each criterion is met can vary from case to case.

In a bureaucratic culture dominated by the need to conform to legal strictures, the loose phrasing of Council Decisions can have unfortunate consequences throughout programme life-cycles. Use of the concept of EAV during these stages and some of the consequences of the FP5 Council Decision are explored below.

Exhibit 1 Annex 1 of the Council Decision Concerning FP5

CRITERIA FOR SELECTING THE THEMES AND OBJECTIVES OF COMMUNITY ACTIVITIES

1. The European Community's RTD policy is directed towards strengthening the scientific and technological bases of Community industry and encouraging it to become more competitive at international level, while promoting all the research activities deemed necessary by virtue of other Chapters of the Treaty. It shall also contribute to promoting the quality of life of the Community's citizens and to the sustainable development of the Community as a whole, including the ecological aspects. Its implementation is based on the twin principles of scientific and technological excellence and relevance to the above mentioned objectives. Moreover, in pursuit of a cost-benefit approach dictated by concern for optimum allocation of European public funding and in accordance with the subsidiary principle, themes for the fifth framework programme and the related objectives are selected on the basis that the Community shall take action only if and in so far as the objectives cannot sufficiently be achieved by the Member States.
2. In application of the foregoing principles, the framework programme shall be defined on the basis of a set of common criteria, divided into three categories :
 - Criteria related to the Community 'value added' and the subsidiarity principle*
 - need to establish a 'critical mass' in human and financial terms, in particular through the combination of the complementary expertise and resources available in the various Member States,
 - significant contribution to the implementation of one or more Community policies,
 - addressing of problems arising at Community level, or questions relating to aspects of standardisation, or questions connected with the development of the European area,so as to select only objectives which are more efficiently pursued at the Community level by means of research activities conducted at that level.
 - Criteria related to social objectives*
 - improving the employment situation,
 - promoting the quality of life and health,
 - preserving the environment,in order to further major social objectives of the Community reflecting the expectations and concerns of its citizens.
 - Criteria related to economic development and scientific and technological prospects*
 - areas which are expanding and create good growth prospects,
 - areas in which Community businesses can and must become more competitive,
 - areas in which prospects of significant scientific and technological progress are opening up, offering possibilities for dissemination and exploitation of results in the medium or long term,in order to contribute to the harmonious and sustainable development of the Community as a whole.
3. The criteria referred to in paragraph 2 will be used, and where necessary supplemented for the purposes of the implementation of the fifth framework programme, in order to define the specific programmes and select research and technological development activities, including demonstration activities. The three categories of criteria will apply simultaneously and must all be met, although to a different extent from case to case.

EAV and Programme Formulation

During the programme formulation stage, high-level EU goals have to be translated into specific programmes, each with their own objectives, work programmes and modalities. In essence this is a highly political process of consensus formation involving suggestions from all the Member States and the institutions of the EU. Naturally, too, these suggestions vary from one Member State to another given different perceptions of the importance of particular goals and political priorities within individual Member States. Assessments of the amounts of 'value' and 'added value' likely to be generated by particular activities are also prone to vary considerably.

It is at this stage that a clear formulation of the concept of EAV and the way it should be implemented is of particular importance as a way of arriving quickly at an acceptable consensus. This involves finding an optimum balance between too simple a definition on the one hand and too complex and detailed a scheme on the other. Consensus formation is an organic, political process and not an overtly mechanistic process involving detailed comparisons and complex ranking procedures. It is not therefore necessary for all the stakeholders to have a particularly sophisticated understanding of the difficult concepts associated with EAV. Only a very general definition of EAV is needed initially, together with a set of clear instructions as to the way it can be used to frame programme objectives, work programmes and modalities.

This was the case prior to FP5. A simple definition of EAV similar in nature to the one presented at the start of this **Section** was used to specify the type of activities which could lead to EAV. Specific programmes aimed at achieving other high-level EU goals were then framed in terms of EAV-compliant activities and modalities.

In comparison, the revised formulation of EAV which accompanies FP5 is less satisfactory. Although the intention was to ensure that the attainment of EAV was prioritised, the confused way in which it is currently formulated is not conducive to this end.

EAV and Project Selection

This situation is echoed as one moves away from programme formulation and towards the more prosaic business of selecting projects. This requires the clear articulation of project selection criteria and their effective communication to project proposers and proposal evaluators alike. It is not enough in such instances to ask proposal evaluators, for example, to select projects which provide EAV without first defining what this is. Neither is it sufficient only to define it in very broad terms. Effective project selection cannot depend on a multitude of arbitrary interpretations of loosely specified selection criteria. There have to be common reference points and a shared understanding of concepts such as EAV if they are to be used as

project selection criteria. Proposal evaluators also have to be able to score or rank projects in terms of their potential to achieve EAV.

In theory, proposal evaluators could arrive at a shared understanding of EAV via a consensus formation process similar to the one which implicitly operates at the level of programme formulation. In practice, however, this is not feasible. Instead, pragmatism dictates that programme administrators should provide both project proposers and proposal evaluators with a common reference point, e.g. an easily understood definition of EAV which can be used to guide the process of writing proposals and later used by evaluators to select projects in a standard and uniform manner.

But this is where the difficulty lies. In the first instance, this articulation of the concept of EAV has to be far more detailed than the generic one presented at the beginning of this **Section**. In particular, it has to specify the type of activities which are expected to lead to EAV and/or the nature of the expected benefits. This is because there are two different selection process models which can be used, either separately or together. One is compliance-oriented; the other is attainment-oriented. In the compliance-oriented model, project proposals are judged in terms of their fit with EAV-oriented modalities (e.g. do they involve research on large-scale projects necessitating international collaboration? Do they involve work on the development of international standards?). In contrast, the attainment-oriented model involves asking questions about the amount or extent of EAV which is likely to be generated.

The compliance model was appropriate prior to FP5, when the concept of EAV was used to suggest legitimate programme modalities and activities. The attainment model is more appropriate when the goal of EAV is prioritised, as it is in FP5.

Implementing the attainment model, however, is much more difficult than implementing the compliance model. Initially it means specifying the full range of benefits which are expected to result from a programme, e.g. 'improved competitiveness', 'greater mobility of scientific personnel' and 'enhanced environmental protection'. But it also means specifying each of these in considerable detail if proposers and evaluators alike are to judge whether projects are likely to lead to these benefits, and this task is certainly not trivial. For example, RTD projects can lead to 'improved competitiveness' via numerous direct and indirect routes, all of which should be considered when assessing the likelihood of a project resulting in improvements in this sphere.

There are even greater hurdles to overcome, however. Estimating the likelihood of particular benefits is one thing, but assessing whether or not these expected benefits are likely to provide 'added value' on a European scale is quite another. To make such assessments, proposal evaluators would need access to detailed knowledge concerning the extent of RTD funding across Europe for similar types of project. They would also need techniques to estimate the 'value' likely to be produced via these efforts and ways of comparing this 'background' value with the 'value' produced by the project under consideration. These are clearly unrealistic aspirations.

In reality, proposal evaluators are not expected to assess 'added value' as such. Typically they are asked instead to assess whether or not projects are expected to produce benefits in line with programme goals. **Exhibit 2** shows the project selection criteria used in FP5. In addition to basic questions about the scientific and technological quality of proposals and the

adequacy of teams and approaches, evaluators are asked if projects are likely to contribute to eventual benefits in terms of social, economic and scientific and technological objectives.

They are not asked to estimate whether or not these benefits are likely to produce EAV. Instead they are asked a separate series of questions concerning the European dimension of the problem tackled, the added value of constituting the consortium and the potential for the project to contribute to one or more EU policies. Answering these, however, is still very difficult for many proposal evaluators, since all require extensive background knowledge concerning the nature of the problem addressed, the strength of existing EU capability in the area and the coverage of EU policies.

Exhibit 2 Project Selection Criteria FP5

EVALUATION CRITERIA FOR SELECTING PROJECTS IN FP5

1. Scientific /Technological Quality and Innovation
 - The quality of the research proposed and its contribution to addressing the key scientific and technological issues for achieving the objectives of the programme and/or key action;
 - The originality, degree of innovation and progress beyond the state of the art, taking into account the level of risk associated with the project;
 - The adequacy of the chosen approach, methodology and work plan for achieving the scientific and technological objectives.
2. Community Added Value and Contribution to EU Policies
 - The European dimension of the problem. The extent to which the project would contribute to solving problems at the European level and that the expected impact of carrying out the work at European level would be greater than the sum of the impacts of national projects;
 - the European added value of the consortium – the need to establish a critical mass in human and financial terms and the combination of complementary expertise and resources available Europe-wide in different organisations;
 - The project’s contribution to the implementation or the evolution of one or more EU policies (including “horizontal” policies, such as towards SMEs, etc.) or addressing problems connected with standardisation and regulation.
3. Contribution to Community Social Objectives
 - The contribution of the project to improving the quality of life of health and safety (including working conditions);
 - The contribution of the project to improving employment prospects and the use and development of skills in Europe;
 - The contribution of the project to preserving and/or enhancing the environment and the minimum use/conservation of natural resources.
4. Economic Development and S&T Prospects
 - The possible contribution to growth, in particular the usefulness and range of applications and quality of the exploitation activities for the RTD results arising from the proposed project and/or the wider economic impact of the project;
 - The strategic impact of the proposed project and its potential to improve competitiveness and the development of applications markets for the partner and the users of RTD results;
 - The contribution to European technological progress and in particular the dissemination strategies for the expected results, choice of target groups, etc.
5. Resources, Partnerships and Management
 - The quality of the management and project approach proposed, in particular the appropriateness, clarity, consistency, efficiency and completeness of the proposed tasks, the scheduling arrangements (with milestones) and the management structure. In addition, the tools to be used for monitoring project progress, including the quality of specified indicators of impact and performance, and ensuring good communication within the project consortium;
 - The quality of the partnership and involvement of users and/or other actors in the

field when appropriate; in particular, the scientific/technical competence and expertise and the roles and functions within the consortium and the complementarity of the partners;

- The appropriateness of the resources – the manpower effort for each partner and task, the quality and/or level and/or type of manpower allocated, durables, consumables, travel and any other resources to be used. In addition, the resources not reflected in the budget (e.g. facilities to carry out the research and the expertise of key personnel).

EAV, Project Selection and Additionality

The difficulties associated with assessing the likely attainment of EAV at the project selection stage lead one to look for alternatives. One possibility would be for proposal evaluators to assess potential achievements in terms of a number of concepts related to ‘added value’, all of which derive from the related concept of ‘additionality’.

Classically the concept of additionality itself has a number of variants, normally described as input, process and output additionality. These can be distinguished as follows:

- input additionality occurs when public sector funding **induces an activity** which would not have been carried out by the private sector in the absence of public support;
- process (or behavioural) additionality occurs when public sector funding affects **the way an activity is performed** compared to the way it would have been performed by the private sector in the absence of public support;
- output additionality occurs when public sector funding **leads to results** which would not have been achieved by the private sector in the absence of public support.

Clearly the latter variant - output additionality - is closest to the concept of ‘added value’, with both dependent on assessments of the **outcomes** of RTD projects. But output additionality is also the hardest for proposal evaluators to estimate. It depends critically on extensive background knowledge concerning the nature, extent and likely results of all private sector RTD efforts in relevant fields, and this is clearly beyond the scope of individual proposal evaluators.

In comparison, input and process additionality are easier to tackle because of their more limited focus on specific **activities** as opposed to **outcomes**. This is especially so if the activities proposed by participants are compared with the activities the participants themselves would have conducted in the absence of public support, rather than with similar activities conducted by other RTD actors.

Using this constrained variant of ‘activity additionality’, proposal evaluators can be asked to use their judgement to decide whether a project would help participants achieve results faster or more efficiently than would be the case in the absence of public support (a form of process additionality). Similarly, they can ask whether or not an activity (e.g. international co-operation) would be carried out or not by the participants in the absence of EU support (a form of input additionality).

These constrained or partial estimates of ‘activity additionality’ may seem far removed from more desirable estimates of ‘outcome additionality’ or ‘added value’, but unlike estimates of

the latter they do possess the virtue of being achievable. They are also potentially useful pointers to the likelihood of EAV being achieved if one assumes a positive correlation with the ultimate attainment of EAV. In theory this need not always be the case, but in reality it constitutes a sound ‘common sense’ approximation.

EAV, Monitoring and Evaluation

The difficulties encountered with the concept of EAV at the early programme formulation and project selection stages of programme life-cycles pale into relative insignificance when compared with those which confront programme evaluators charged with assessing the EAV of whole programmes *ex post*.

The problems can be divided simply into two broad categories:

- ‘Mission Impossible’ problems relate to the measurement of what we have termed ‘background value’, i.e. the value which would have resulted from RTD activity across the EU if there had been no EU RTD programmes;
- ‘Mission Improbable’ problems relate to measuring the actual ‘programme value’ associated with project and programme achievements.

Mission Impossible: Estimating Background Value

‘Background value’, as defined above, is a hypothetical entity. As such it is naturally impossible to measure. But it is not impossible to track historical trends and make extrapolations based on ‘reasonable’ assumptions and models. This would involve agreeing the areas in which EAV is anticipated, specifying adequate indicators of ‘improvements’ in these spheres, accessing comprehensive historical data on these indicators across the EU, evolving acceptable models capable of extrapolating these trends, and defining ways of translating these ‘indicator shifts’ into estimates of ‘value shifts’.

None of these are simple steps, however. All, in fact, are extremely difficult, and some are very costly. Activities of this nature are thus rarely, if ever, attempted. Unfortunately this means that ‘true’ estimates of EAV (which depend on calculating the difference between ‘background value’ and ‘programme value’) are unattainable.

Mission Improbable: Estimating Programme Value

Even in the absence of sound estimates of changes in ‘background value’, attempts to estimate ‘programme value’ or related concepts are still laudable. If nothing else, these estimates can be compared with initial expectations in each of the areas in which EAV is anticipated. Since these expectations are embodied in high-level programme goals, this amounts to an assessment of goal attainment. In essence, evaluators use the concept of **effectiveness**, defined as the degree of goal attainment, as a useful surrogate for ‘added value’ or, in the case of the EU, EAV.

Measuring effectiveness, however, is also complicated. In the first instance it requires goals to be very well specified in order for them to be verifiable. Ideally, they should also be defined in quantifiable terms expressing ‘**expected value**’. Hypothetically these could then be compared with estimates of ‘**value attained**’. This is feasible in some instances but not in others. Some aspects of the goal of improved competitiveness, for example, could be expressed in terms of financial targets - the most usual way we have of expressing ‘value’ in a quantitative way. For many other goals, especially ‘socially relevant’ goals such as improved quality of life and a safer environment, there are much less satisfactory ways of expressing ‘expected value’ in a quantitative fashion. In reality, therefore, goals are hardly ever formulated in this way. Instead they are usually expressed in terms of ‘**expected benefits**’, i.e. improvements in particular areas which, more often than not, are expressed in qualitative rather than quantitative terms.

From Value to Benefits and Programme Effectiveness

One direct consequence of this is that there is rarely any call to provide quantitative estimates of ‘value attained’ when assessing programme effectiveness. Usually it is enough to devise indicators of change in ‘**benefits attained**’ and to compare these with ‘**expected benefits**’. When the latter are expressed in quantifiable terms (i.e. when programme goals are expressed in terms of quantitatively verifiable objectives), every effort should be made to collect quantitative data on ‘benefits attained’. This enables the degree of goal attainment or programme effectiveness to be quantified. When goals and ‘expected’ benefits are not expressed in quantitative terms, however, the potential to express programme effectiveness quantitatively is also inevitably reduced.

Even when ‘expected benefits’ are well-defined, there still remains the problem of assessing or measuring ‘benefits attained’. Normal procedure is to focus on the participant level and investigate the benefits accruing to individual participants. This is an effective way of collecting data on short-term impacts on the RTD teams involved in the projects. It is less well suited to the collection of data on medium-term impacts on the parent organisations of the RTD teams, or on the longer-term impacts on society as a whole.

Data (or at least opinions) certainly can be collected on these medium- and long-term impacts, but problems of causality and attribution then lead to the ‘raindrops on water’ dilemma - after the event, how do you assess which drops reinforced each other to cause a wave and which ones cancelled each other out? The further away one is in time and space from initial events or perturbations, the harder it is to assess their individual contributions to resultant phenomena at an aggregate level. Assessments of expected benefits or impacts are thus relatively easy when the ‘distance’ between an ‘RTD event’ and a related ‘consequence’ in space or time is small, but assessing the downstream impact of an RTD project on the broad socio-economic environment is much more difficult.

Evaluators are thus driven to focus primarily on the more direct, short-term impacts on RTD teams. This may seem analogous to searching for a lost key under a lamp-post, even though one knows the key was probably lost somewhere else, but the situation is not so ludicrous. In the first instance, many of the high-level goals connected with RTD programmes are directly concerned with so-called ‘knowledge’, ‘networking’ and ‘strategic management’ goals, i.e. goals related to the expansion and consolidation of know-how and knowledge bases (knowledge goals); those relating to network formation and the establishment of new links

and partnerships (networking goals); and those relating to attempts to reduce costs, lower risks and manage RTD projects efficiently (strategic management goals). Short-term benefits and impacts on RTD teams can be expected in all these areas. There is every possibility, therefore, of finding the lost key by looking under the lamp-post.

For 'exploitation' impacts, however, i.e. those associated with goals with a strategic or commercial orientation and concerned primarily with the eventual exploitation of knowledge and skill bases to improve competitiveness, enhance policy-making, increase the safety of the environment etc., the key is much more likely to be located far away from the glow of the lamp. Evaluators currently possess a few methodological torches capable of shedding light in these nooks and crannies, particularly when commercial and economic impacts are involved, but new tools are desperately needed to explore other downstream impacts on the social, political and environmental fabric of the EU.

Programme Evaluation and Additionality

Just as the concept of effectiveness is used by programme evaluators as a more pragmatic tool than that of EAV assessment, the concept of additionality is similarly deployed to good effect. As discussed earlier, its use is typically confined to estimates of additionality at the participant level. Estimates can be made of the extent of 'new' activity induced as a result of participation (input additionality) or the way in which participation affects the performance of RTD by a research team - faster, better etc. - (process additionality). Assessments can also be made of output additionality at this stage of the programme life-cycle, i.e. of the quality and utility of the results compared to likely achievements in the absence of the programme.

All these estimates of additionality at the level of individual participants help provide partial answers to the question of whether or not programmes succeed in creating EAV. In themselves, however, they cannot answer the question fully. The aspect of additionality which is of most relevance to public sector authorities concerns the extent to which the overall benefits resulting from public expenditure on RTD are additional to the benefits which would have been produced by the private sector in the absence of public expenditure. A true assessment of additionality thus requires an assessment not only of the benefits accruing directly to participants, but also of those accruing indirectly to society at large. Unfortunately, this requires overcoming the same causality and attribution problems which generally constrain the assessment of long-term, socio-economic impacts, and again we lack many of the tools needed to resolve this dilemma.

3 EAV Revised

The stage is now set for an overhaul of EAV in the specific context of the EU RTD Framework Programmes. In particular we shall focus on two different ways or modes of utilising the concept of EAV: one which can be used to maximise the amount of EAV produced by EU RTD programmes; and another for use in the assessment of EAV. After first outlining a scheme which involves the use of both these modes across the whole RTD programme life-cycle, we home in on the issues to be tackled and tactics to be employed at the programme formulation, project selection and monitoring and evaluation stages of the programme life-cycle.

In so doing, we elaborate on:

- the selection rules which can be used to ensure that actions and activities are consistent with the attainment of EAV;
- areas in which benefits resulting in EAV can be expected;
- the formulation of project selection criteria and the construction of project portfolios consistent with overall programme goals;
- the most effective ways of collecting and analysing data on project progress and performance;
- the elements which need to be in place to guarantee that adequate programme evaluation can occur.

EAV Modes

The attainment of EAV is enshrined in EU legislation as the prime justification for EU RTD actions. The need to evaluate EAV is also embedded in the EC Treaty. The requirement, therefore, is twofold: to maximise the probability of attaining EAV and to devise pragmatic ways of assessing whether or not it has been attained, ensuring that attempts to assess achievements are governed by the possible rather than the impossible.

From an evaluation perspective, one obstacle has been finding an operational definition of EAV which facilitates its measurement. Although it is quite straightforward to find a simple way of expressing the concept, it has proved much more difficult to pin it down in such a way that we can say with confidence that EAV has actually been achieved. We can assess many related aspects, e.g. the goal attainment of participants and the advantages or added value for them of participation in EU RTD programmes, but it has proved impossible to arrive at an adequate, composite assessment of the EAV associated with the EU RTD Framework Programmes as a whole.

Redressing this failure might seem to be the main challenge confronting those concerned with the issue of EAV. It is not. It is a secondary challenge. **The primary challenge is to maximise EAV, not to measure it.** Measurement of EAV attainment would satisfy the general demand for accountability – one of the reasons for having an evaluation system in place – but it does not in itself improve the chances of successfully capturing EAV. This

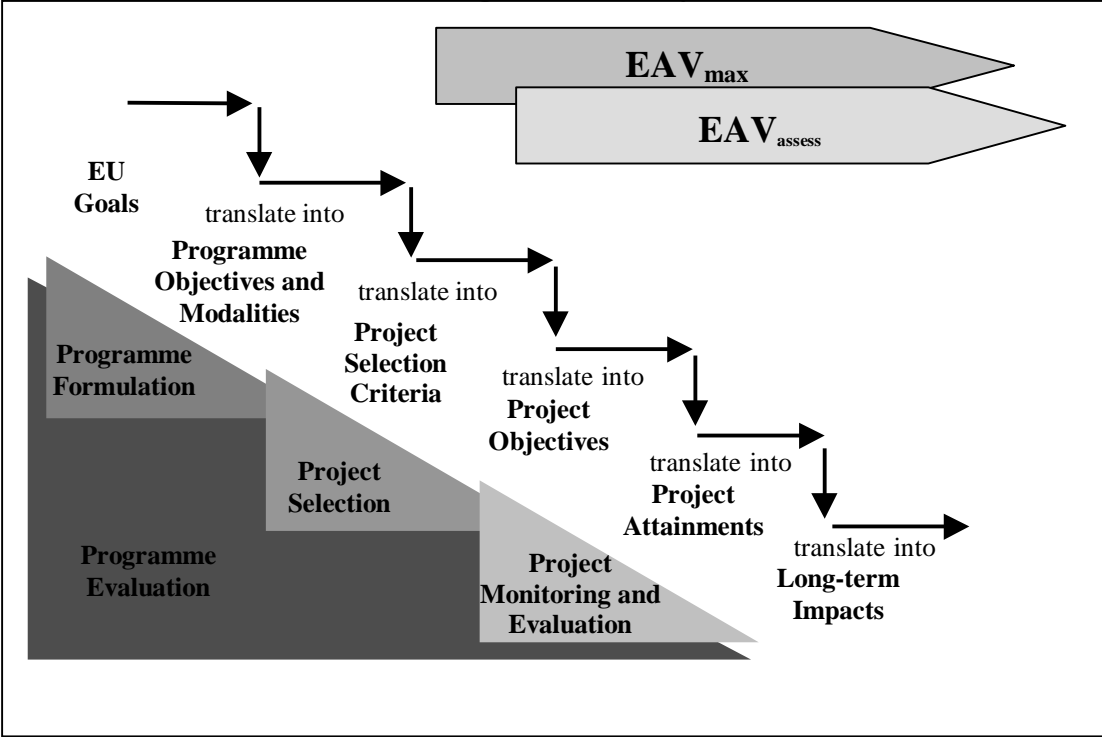
involves treating monitoring and evaluation systems as programme management tools, designed specifically to enhance programme performance over many programme life-cycles.

In this type of system, the demands of accountability are satisfied not solely via an evaluation system which asks how much EAV has been attained, but via programme life-cycle changes which optimise for EAV, together with a comprehensive monitoring and assessment scheme which first checks whether or not the steps needed for optimisation are in place and then – as a secondary consideration – attempts to estimate the extent of EAV attainment.

Bearing this in mind, we propose a simple solution which prioritises the maximisation of EAV via the introduction of a comprehensive scheme of changes along the whole programme life-cycle.

The essence of this system is depicted in **Exhibit 3**. It shows the three main programme **life-cycle stages** and the simple series of **translation steps** which need to be implemented over the cycle. It also depicts two **EAV modes**: one termed **EAV_{max}** and the other **EAV_{assess}**. The first represents a scheme which attempts to **maximise** EAV; the second a scheme which tries to **assess** programme performance aspects related to the attainment of EAV.

Exhibit 3 EAV Modes and the Programme Life-cycle



The underlying premise of the system is that the tasks of maximising and measuring EAV are best conceptualised separately.

The overall logic of the system is that the successful implementation of each step should ensure that the programme is on track to capture the potential EAV identified by policymakers. The main task of monitoring and evaluation then becomes one of establishing whether or not each translation step has been successful.

EAV_{max}

The system we propose attempts to maximise EAV via one scheme - **EAV_{max}** - which only sanctions modalities and activities likely to result in EAV. This treats EAV in much the same way that it was treated prior to the onset of FP5. In essence it involves first specifying the type of activities which would guarantee EAV and then ensuring that these modalities are incorporated into work-programmes and project selection criteria. All projects and other activities should then be **EAV-compliant**, thus optimising for EAV goal attainment. The main task of monitoring and evaluation related to this mode - **EAV_{max}** - is then to review the adequacy of the selection processes in place via sanity checks on the EAV-compliance of resultant work-programmes, projects and other activities.

EAV_{assess}

The focus on assessing EAV came strongly to the fore with the prioritisation of EAV as an EU goal in FP5 and the inclusion of a provision in the protocol annexed to the Treaty which states that: “the reasons for concluding that a Community objective can be better achieved by the Community must be substantiated by qualitative or, wherever possible, quantitative indicators”.

Prioritising EAV had a number of unfortunate consequences, however. In the first instance, giving it the same status as other high-level EU goals detracted from its historical use as an activity filter, i.e. from its use in an **EAV_{max}** mode. Secondly, attempts to treat it like any other goal led to an unfortunate formulation of project selection criteria which demands too much of project evaluators. Thirdly, it put the onus on programme evaluators to carry out what was earlier termed ‘Mission Impossible’, i.e. a full-blooded assessment of the EAV associated with the RTD Framework Programmes.

All of these difficulties can be avoided and priority still given to the attainment of EAV if it is recognised that the goal of EAV is achieved via the process of attaining the other EU policy goals and is not, in itself, attained independently. Attaining all these other goals is meant to produce something of ‘value’, though not all of this is likely to constitute EAV, as defined in the early part of the last **Section**, unless all the activities supported are ‘EAV-compliant’. The trick, therefore, is to ensure that the **EAV_{max}** mode guarantees compliance, and then to concentrate on the assessment of the ‘value’ generated via the search for other EU goals.

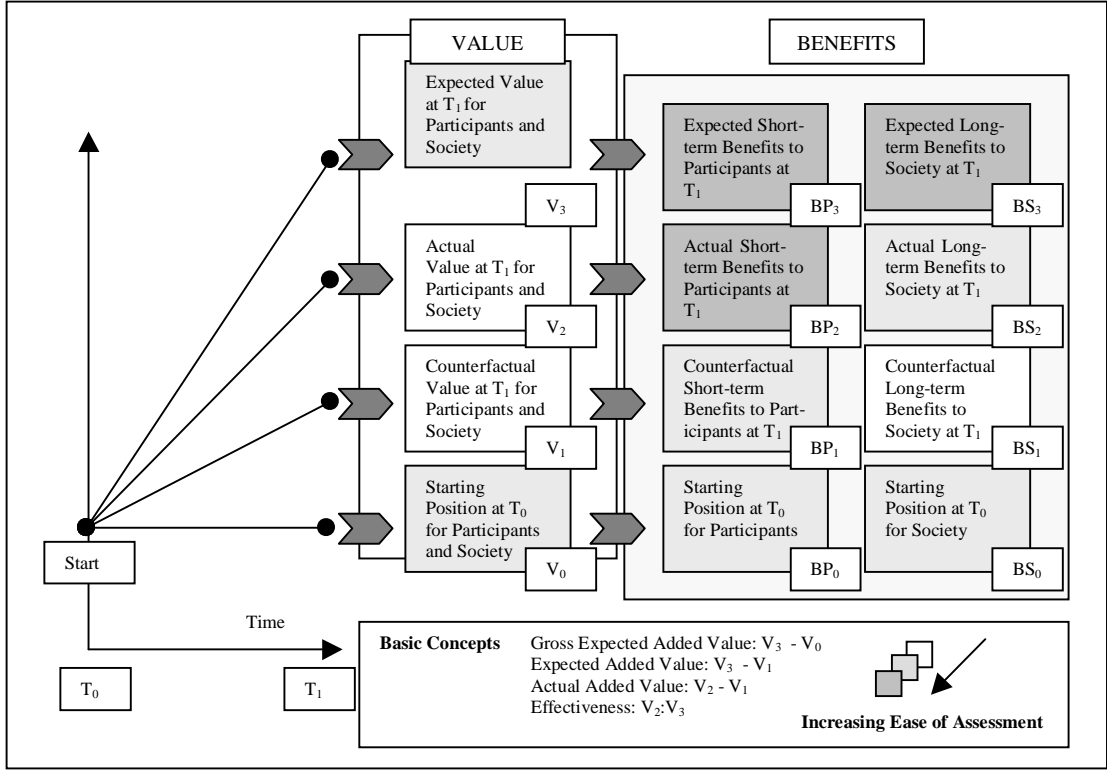
We can use the concept of an **EAV_{assess}** mode to describe the search for indicators of programme performance related to the attainment of EAV. In a perfect world we could formulate a simple definition of EAV and ‘measure’ the ‘value’ resulting from all EAV-compliant activities. Alas, however, the world we inhabit is far from perfect. In the previous **Section** we demonstrated how a simple definition of EAV can be easily derived, but we also saw how the utility of this definition - and indeed of the concept of EAV itself - wanes as we move from the initial programme formulation phase of RTD programme life-cycles to the eventual programme evaluation stage.

We also saw, however, that other concepts can be substituted - namely effectiveness and certain forms of additionality - which not only provide partial perspectives on EAV and the attainment of EAV, but which themselves address important issues relevant to programme formulation, project selection and monitoring and evaluation.

Exhibit 4 demonstrates some of the elements which would have to be incorporated into the **EAV_{assess}** mode. Ideally one would want to measure ‘Actual Added Value’ – the difference between the actual value resulting from a programme and the value which would have resulted in the absence of the programme (the counterfactual value). For all the reasons explored in the last **Section**, however, this is not possible. The focus of evaluation effort thus shifts away from the concept of ‘value’ and towards the concept of ‘benefits’ - divided here into the short-term benefits to participants and the long-term benefits accruing to society at large. It also moves away from the concept of ‘Actual Added Value’ and towards the concepts of ‘Effectiveness’ – a comparison of actual benefits (achievements) with expected benefits (goals) – and to a subsidiary focus on limited forms of ‘Additionality’.

Furthermore, given the relative ease of assessment, the focus also shifts to measurements of effectiveness expressed in terms of comparisons between the actual and expected short-term benefits to participants.

Exhibit 4 Basic EAV_{assess} Concepts and Relationships



The steps required in the **EAV_{assess}** mode are then as follows:

- specify goals in terms of expected benefits for different audiences, e.g. short-term for participants and long-term for ‘society at large’;
- ensure that these are reflected in project selection criteria and that participants are informed of these criteria;
- assess benefits accruing to participants and, if possible, to society at large;
- assess additionality from the perspective of participants;
- compare actual benefits with expected benefits in order to make statements about goal attainment and effectiveness.

It should also be noted that the evaluation effort concentrates primarily on issues and areas conducive to measurement and assessment – notably the attainments of participants and impacts on their organisations. As noted in the last **Section**, however, this is equivalent to finding lost keys under a lamp-post, since all of these attainments and impacts should contribute to EAV if application of the **EAV_{max}** mode has ensured EAV-compliance.

EAV Modes and Programme Formulation

The two EAV modes call for different actions at each stage of the programme life-cycle. At the programme formulation stage, the priority is to ensure that high-level EU goals guide the setting of programme goals and modalities, with the **EAV_{max}** concept primarily used to specify modalities and activities likely to lead to EAV during the pursuit of other EU goals; and the **EAV_{assess}** concept used to articulate expected benefits in the form of verifiable objectives.

EAV_{max} and Programme Formulation

Based on a review of relevant literature and interviews with stakeholders involved in the programme formulation stage, the following **EAV_{max}** selection principles are suggested as a way of ensuring that modalities are EAV-compliant.

The prime consideration is that all actions and activities should be aimed at the realisation of one or more high-level EU goals. In addition, they should then comply with one or more specific conditions. Allowable actions and activities are those which:

- are necessitated by the requirements of the Treaty;
- cannot be supported by individual Member States alone;
- help avoid duplication of effort in the Member States;
- complement work conducted within the Member States on issues and problems which have a European dimension;
- are trans-national in character because they require the involvement of participants from different Member States;
- have potential net benefits which are trans-national in character.

Four points should be noted about the above set of conditions and their application. First, the set of provisos makes no mention of some of the selection criteria used for Framework Programmes to date, e.g. those relating to strengthening the EU science and technology base, improving competitiveness and contributing to social and market cohesion. Instead these are all treated as legitimate high-level goals of the EU, with actions geared towards them subject to all the specific conditions noted above.

Second, the list does not specifically mention activities such as those relevant to the formulation and setting of EU standards and regulations. This is because activities such as these are covered by other items in the list, e.g. those referring to complementary work on issues with an EU dimension, or to the trans-national character of the resources and impacts involved.

Third, the formulation given above asks only for one or more of the above conditions to be satisfied in the pursuit of one or more high-level goals. Many other formulations are possible, however. An extreme formulation, for example, could call for actions to aim at all or multiple EU goals and to satisfy all the EAV criteria. Such a formulation would be extremely limiting. In contrast, the formulation proposed above allows a great deal of flexibility in the selection of relevant activities. It would allow, for example, participants from a single Member State to undertake work considered to have potential net benefits which are trans-national in character. This flexibility could be very important in the development of the European Research Area, as is the inclusion of the criterion relating to the legitimacy of co-ordination actions to avoid duplication of effort in the Member States.

Conversely, the formulation above could be used to sanction any work of a high scientific quality which was undertaken jointly by participants from different Member States, irrespective of its relevance to other EU goals. This is exactly the type of situation which the Davignon report sought to counter by advocating a higher profile for the issue of EAV and a greater focus on the relevance of work to other Community goals. Every effort will be needed, therefore, to ensure that the flexibility inherent in the above formulation is not abused.

Finally, mention should be made of the appropriate level at which actions should be framed. The selection criteria noted above could theoretically be used to define programme level modalities or to sanction activities at the level of individual projects. As far as possible, we recommend that the \mathbf{EAV}_{\max} criteria are used to frame programme level modalities (e.g. thematic networks looking at the relevance of work in particular scientific fields to the Community goals related to improved employment prospects). This will guarantee EAV-compliance for all activities conducted within these modalities and lessen the pressure on individual proposers to demonstrate the contribution of their proposed activities to EAV.

EAV_{assess} and Programme Formulation

Turning now to the $\mathbf{EAV}_{\text{assess}}$ mode, this calls for the articulation of programme goals in terms of verifiable objectives and expected benefits which can later be compared with actual, realised benefits. In theory this first requires clear statements of all high-level EU goals. In practice, it is sufficient to work with a list of the following nature – itself based on a review of relevant documentation, past practices and interviews with key stakeholders.

The main areas in which benefits and impacts are expected to result from EU RTD programmes are listed below and elaborated in **Exhibit 5**:

- improved scientific and technological capability;
- improvements in the way participants conduct their affairs;
- improved position and status of participating organisations;
- improved ability to tackle problems of a trans-national nature;
- improved policy and regulatory environment;
- improved economic situation and prospects;
- improved social, physical and cultural environment.

Exhibit 5 Areas of Expected Benefit

AREAS of EXPECTED BENEFIT

1. Improved scientific and technological capability

- expanded and consolidated know-how and knowledge bases;
- enhanced skills of RTD personnel;
- greater mobility of RTD personnel;
- enhanced scientific and technological infrastructure.

2. Improvements in the way participating organisations conduct their affairs

- better use of S&T resources;
- improved ability to network;
- improved risk management;
- enhanced ability to innovate.

3. Improved position and status of participating organisations

- improved product and service range;
- enhanced processes;
- improvements in productivity, competitive position, market position etc;
- improved reputation.

4. Improved economic situation and prospects

- greater availability of exploitable know-how;
- consolidation of the internal market;
- the establishment and growth of new markets;
- improved competitive and trade position of the EU versus other blocs.

5. Improved social, physical and cultural environment

- improved quality of life, working conditions, health and safety;
- improved employment prospects and labour utilisation;
- improved ability to preserve or enhance the natural environment;
- improved social cohesion across the EU;
- greater appreciation of the benefits of cultural diversity.

6. Improved policy and regulatory environment

- the development of new technical standards and regulations;
- inputs into the policy formulation process.

7. Improved ability to tackle problems of a trans-national nature

- better identification and specification of problems with an EU or global dimension;
- better ability to monitor EU or global problems;
- better ability to remedy or mitigate EU or global problems.

The role of the list is first to guide the selection of individual programme objectives; second to act as a template for specifying project selection criteria in the next life-cycle stage; and

third to help structure the search for actual benefits. In its first role, the guiding principle should be that programmes aim to attain multiple goals – with improvement of scientific capability a necessary goal and other goals context dependent. The role of the list in other life-cycle stages is considered in due course.

EAV Modes and Project Selection

The priority here is to ensure that the EAV_{assess} benefits expected for each programme are adequately reflected in project selection criteria and processes. In turn, areas in which benefits are expected should be highlighted in the documentation provided to potential participants, and proposers should be asked to furnish information about their project objectives in order to allow proposal evaluators to assess if these are in line with programme objectives and expected benefits.

As noted earlier, we recommend that the EAV_{max} principles are used to frame activities and modalities at the programme level rather than the project level. The next step is to base a new set of project selection criteria on the EAV_{assess} expected benefit areas, as shown in **Exhibit 6**.

In practice this involves amending the selection criteria used for FP5 (see **Exhibit 2**) by adding four new selection criteria, i.e. those relating to:

- improvements in the way participating organisations conduct their affairs;
- the improved position and status of participating organisations;
- the improved ability to tackle problems of a trans-national nature;
- an improved policy and regulatory environment;

and deleting the criterion relating specifically to EAV, primarily because all the issues itemised under this heading in the current project selection criteria are adequately covered by the new criteria. The European dimension of the problem, for example, is covered by the new selection criterion dealing with improvements in the ability to tackle problems of a

Exhibit 6 Revised Selection Criteria

PROPOSED NEW SELECTION CRITERIA

Project Composition

- Adequacy of resources, partnerships and management

S&T Improvements

- Potential to improve scientific and technological capability

Process Improvements

- Potential to improve the way participating organisations conduct their affairs

Positional Improvements

- Potential to improve the position and status of participating organisations

Economic Impacts

- Potential to improve the broader economic situation and prospects

Social Impacts

- Potential to improve the social, physical and cultural environment

Policy Impacts

- Potential to improve the policy and regulatory environment

Trans-national Impacts

- Potential to improve the ability to tackle problems of a trans-national nature

trans-national nature. Similarly, the European added value of the consortium could be covered by a new formulation of the criterion relating to improved scientific and technological capability; and the project's contribution to EU policies is specifically covered in the new criterion relating improvements in the policy and regulatory environment.

Although not covered by the **EAV_{assess}** benefit areas, the selection criterion currently used in the context of FP5 which refers to resources, partnership and management should also be retained. This is obviously needed to ensure that projects are capable of achieving the benefits covered by the other selection criteria.

One of the advantages of using the **EAV_{assess}** benefit areas as selection criteria is that participants can identify with them, particularly the first four criteria, and express their project plans and goals in similar terms. They are also able to appreciate that projects have to be in line with the broad policy and socio-economic goals of the EU, i.e. those covered by the next four benefit areas. In contrast, many participants (and proposal evaluators) have found it difficult to get to grips with the rather nebulous concept of Community added value.

Current practice, as reflected in the Manual of Proposal Evaluation Procedures for FP5, is for evaluators to award marks on a scale of 1-5 for the sub-components of each criterion. A score is then agreed for each separate criterion, and a composite project score produced after each criterion has been weighted, with these weightings varying from one programme to another, depending on orientation. The 'Competitiveness and Growth' programme, for instance, accords more weight to the 'Economic' criterion than it does to the 'Social' criterion, whereas the opposite is true for the 'Quality of Life' programme. Weightings also vary from one type of action to another, e.g. the weighting systems are different for collaborative RTD projects, thematic networks and accompanying measures. Further points to note are that threshold levels are usually set for certain criteria, thus ensuring that projects not in line with certain goals are excluded even if composite marks are acceptable, and that the Commission reserves

the right, in the final analysis, to produce a final ranking which ensures coverage of programme objectives.

This is a sound system which should be retained. It could be complemented, however, by the use of simple 'portfolio analysis' techniques which utilise the scores given for each criterion to produce different 'selection scenarios', thus allowing both proposal evaluators and Commission officials to see the portfolio implications of subtle changes in weighting systems and threshold levels. In turn, this would allow the portfolio to be fine-tuned to programme goals and the prospects for resultant benefits (and hence EAV) maximised.

EAV Modes and Project Monitoring and Evaluation

Once projects are underway, the emphasis switches to the collection of data on project progress and - eventually - project attainments and longer-term impacts. This provides a check on whether or not achievements are in line with expectations.

In line with the **EAV_{assess}** scheme, the main task is to check if the expected benefits in each of the **EAV_{assess}** areas have been realised. The logic of the whole scheme suggests that the first line of attack is to check whether or not participants have themselves attained their own project goals, since these were chosen to be in line with programme goals. The beauty of the scheme results firstly from the fact that it is relatively easy to assess goal attainment in this area, and secondly from the fact that all resultant benefits should contribute to EAV if **EAV_{max}** is implemented at the programme level.

Checking on the participant goal attainment can be done via questionnaires and surveys, conducted either as part of regular monitoring schemes or as a component of *ad hoc* studies. The key element, whichever route is adopted, is to make sure that the data collected on goal attainment are commensurate with the structure of the **EAV_{assess}** benefit areas.

The Commission currently intends to collect data on project attainments via a series of questionnaires distributed to participants at project start, at project end, and approximately three years later. The logic of this scheme is that participants are asked in the first questionnaire to indicate their goals and the expected scale of achievements at different points in the future, whereas in subsequent questionnaires participants are asked to indicate actual achievements in these spheres. The expectation and achievement profiles for all participants can then be compared and judgements made about overall goal attainment and effectiveness. The questionnaires also contain additional questions relevant to assessments of additionality from the perspective of participants.

The nature of the data to be collected by the questionnaires is similar to that required by the **EAV_{assess}** scheme. For example, it asks for data on the impact of involvement on:

- the RTD team itself (corresponding to the first **EAV_{assess}** area, i.e. improved scientific and technological capability);
- the parent organisation (corresponding to the second and third **EAV_{assess}** area, i.e. improvements in the way participating organisations conduct their affairs, and improved position and status of participating organisations);
- EU policy goals (corresponding to the remaining **EAV_{assess}** areas).

The use of questionnaires of this nature is vital if sufficient data are to be collected to satisfy the demands of accountability and the wishes of the European Parliament for adequate programme evaluation. In their current form, the questionnaires are probably too long and too detailed to be circulated to participants. It would not be too onerous or costly a task, however, to shorten them and bring them fully into line with the requirements of the **EAV_{assess}** scheme.

Both the **EAV_{assess}** scheme and the questionnaires proposed by the Commission emphasise the importance of exploring the range of benefits resulting from involvement, assessing additionality from the point of view of the participants and checking on the degree of goal attainment. Both also consider that the use of simple scaling techniques is sufficient to accomplish these tasks. There are some attempts in the questionnaires to collect quantitative data on certain tangible outputs (e.g. number of publications, patents, licences etc.) and on commercial returns, but these efforts are not prioritised, primarily because of the difficulties related to causality and attribution discussed in the previous **Section** of this report.

There is scope, however, for new approaches to the problem of determining the ‘value’ resulting from RTD activities. Efforts in the past have focused on calculations of return on investment (ROI). Typically ROI has been explored in the context of interviews in order to overcome some of the problems related to attribution and causality, though with limited success. Some studies of this nature have produced authoritative-sounding estimates of ROI, but most professionals in the field remain sceptical about their robustness and reliability.

Efforts to estimate ROI depend on estimates of the actual commercial return or ‘value’ associated with particular RTD inputs. In this context, calculating the actual sales of products which owe something to RTD inputs has never been a problem, but specifying the exact relationship between specific outputs (sales) and various input factors, of which RTD is only one, has been problematic.

This problem can be avoided if a different approach is taken to the topic of ‘value’. Actual ‘market value’, as represented by commercial returns, cannot be directly attributed to RTD inputs. We need, therefore, a way of ascribing a ‘market value’ more directly to specific RTD activities. One possibility is to think in terms of the ‘market value’ of the results of specific RTD outputs. Could this be determined, for example, by asking potential bidders at an auction (rivals) what they would pay for these outputs? This ‘virtual auction value’ is difficult to determine, however. To ascribe a value, potential bidders would need considerable information about the nature of the RTD outputs, and making this available would necessarily entail making a free gift of the product, thus reducing its auction value to zero. Realistically, therefore, one cannot ask potential bidders to value RTD outputs produced by rival organisations.

The only people who can really appreciate the value of particular RTD results are those in possession of them. If asked to value results, however, these people are likely to quote input values, i.e. the cost of producing, or even of replicating, the results. This undervalues results by failing to take timeliness and future potential into account in the valuation process. Alternatively, however, RTD actors could be asked to provide a ‘virtual ransom value’, i.e. the price they would pay to keep the knowledge they currently hold if threatened with complete erasure of their ‘knowledge memory banks’. This value is likely to be much more (or less) than replacement value, since it would take into account timeliness and the importance of the results to the future production of value.

Just as new approaches are needed to assess the value which results from RTD outputs, fresh approaches are also needed to explore the downstream impacts of RTD projects and programmes. Even though the EAV Mode approach provides a strong rationale for focusing on the benefits accruing to participants and the contribution of their projects to broader policy targets, there is still room for alternative coverage of socio-economic impacts. This could include longitudinal studies of the impact of participation on the long-term technology and business strategies of participating firms; studies of the development of policies (e.g. environmental policies) and the contribution of (environment-related) RTD within the Framework Programmes; or the development of models linking shifts in RTD funding in particular areas with subsequent shifts in innovation and economic indicators at an EU level. Fresh angles on additionality could also result from scrutiny of the motivations and technological trajectories of non-participants in carefully constructed cohort studies.

None of these in themselves will be able to overcome some of the intrinsic problems, such as those related to causality and attribution, which have hindered the development of adequate indicators of the EAV associated with the EU RTD Framework Programmes. But they all provide partial indicators which are capable of complementing our understanding of the actual worth of these initiatives.

EAV Modes and Programme Evaluation

Programme evaluation is more than the monitoring and evaluation of project attainments and impacts. It has to consider performance over the whole programme life-cycle. In the scheme we suggest, the evaluation issues of **relevance** and **additionality** are prioritised when scrutinising the programme formulation stage at the beginning of the programme life-cycle. This involves asking whether programme goals, verifiable objectives, work-programmes and modalities are truly in line with the concept of EAV and the perceived needs of the EU population.

Later during the programme life-cycle, the focus shifts to the evaluation issue of **efficiency**, concentrating in particular on whether or not selection processes actually produce a project portfolio in line with programme objectives and the needs of participants. Finally, at the end of the life-cycle, the main evaluation issue becomes **effectiveness**, with a particular focus on establishing whether or not the goals of projects and participants are achieved.

The attractive feature of this system from an evaluation perspective is that it concentrates on aspects of programme performance which are measurable and/or capable of assessment. Use of the **EAV_{max}** and **EAV_{assess}** modes and positive assessments of relevance, efficiency, effectiveness and additionality will also demonstrate that the potential for EAV is being realised.

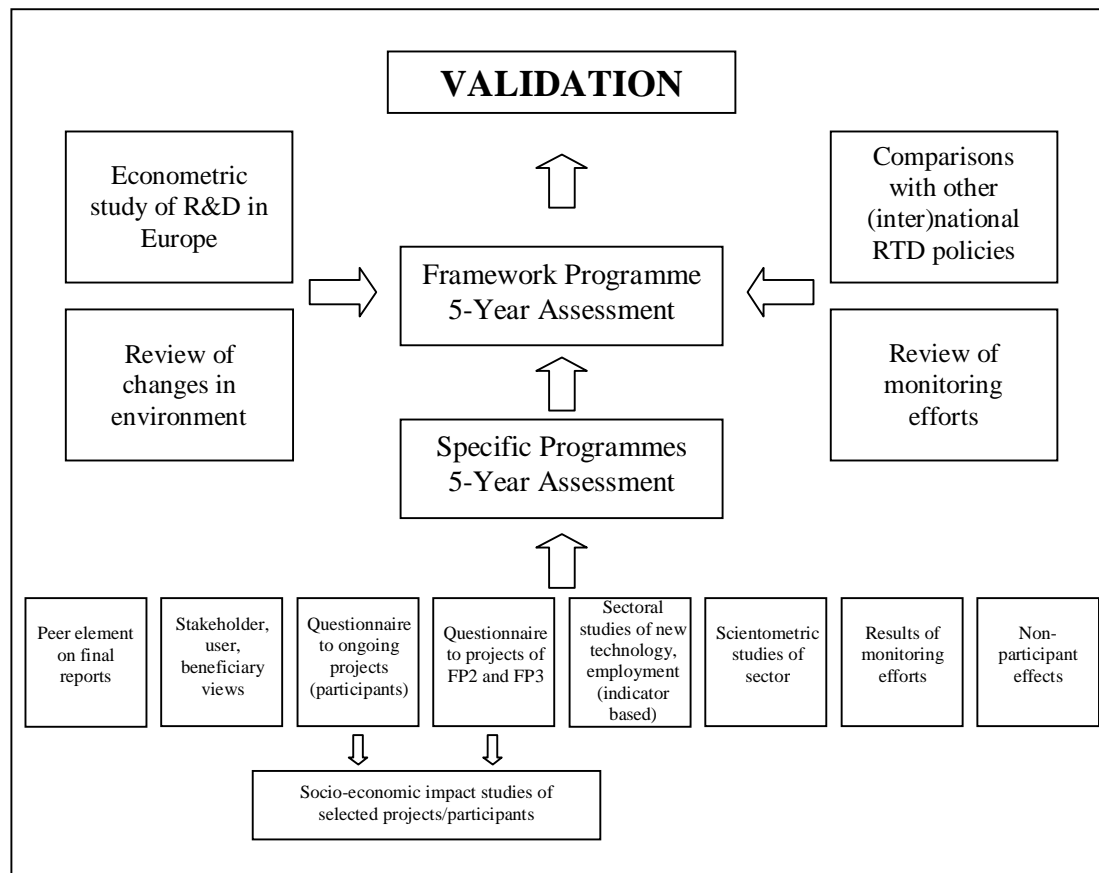
The Commission currently has an elaborate system in place to monitor and evaluate the RTD Framework Programmes of the EU. This involves the production of Annual Monitoring reports and Five-year Assessments, all prepared by independent Panels charged with reviewing the available evidence on performance. **Exhibit 7** shows the scheme suggested for

FP5 by an independent Working Group comprised of evaluation experts, including the inputs needed by the Panels to assess performance.

From an EAV perspective, it is important to note that:

- the Five-year Assessment Panels should be charged with assessing the overall alignment of programme goals and modalities with the potential to realise EAV;
- the Annual Monitoring Panels should assess the efficacy of project selection procedures to ensure that project portfolios are capable of realising expected benefits;
- the most critical inputs to the Panels are those focusing on the achievements of participants, i.e. the modules concerned with:
 - questionnaires to project participants;
 - studies focusing on stakeholder, user and beneficiary views;
 - reviews of project monitoring reports;
 - peer reviews of final reports;
 - socio-economic impact studies of selected projects;

Exhibit 7 Evaluation Scheme for FP5



- The modules covering sectoral, scientometric and non-participant studies are less critical but still likely to illuminate the issue of EAV;
- The results of all these modules – critical and less so – will need to be packaged and summarised succinctly if they are to be digested easily by the Panels;
- The proposed background studies:
 - reviewing changes in the broad environment (scientific, technological, social, physical, economic etc.);

- comparing EU RTD policies with policies elsewhere; and
 - presenting econometric studies of RTD in the EU;
- are vital inputs to the Five-year Assessment Panels. Not only do they provide the backdrop to assessments of achievements over the previous five years, they also help frame recommendations concerning the pursuit of EAV in the future.

4 Implications for FP5 and FP6

The last **Section** stressed that changes are needed in three key life-cycle stages if the revised scheme for EAV is to be implemented. The steps needed to realise the scheme, however, and the priorities associated with these steps, depend critically on the focus and timing of these changes.

FP6 Implementation Focus

There are two options for implementing the revised scheme. One is to commence immediate implementation within FP5. The other is to introduce it in time for FP6. If it is implemented in FP6, changes can be made in all three life-cycle stages. If implemented immediately, changes are only required in two of them.

The priorities associated with implementing the revised scheme in FP5 and FP6 respectively are depicted in **Exhibit 8**. If FP6 is taken as the focus for change, and preparations commence immediately to implement the revised scheme in FP6, there is still time for changes in all programme life-cycle stages. In this instance, the immediate priority in the build up to FP6 is to amend the programme formulation process to ensure that the concept of **EAV_{max}** informs the choice of suitable actions and activities within FP6. In parallel, the concept of **EAV_{assess}** should dictate the specification of goals and goal statements in terms of expected benefits in clearly articulated impact arenas.

Exhibit 8 Life-Cycle Stages and Priorities for Change

Life-Cycle Stages	Priorities for Change	
	FP5 Implementation Focus	FP6 Implementation Focus
Programme Formulation	<i>Not Applicable</i>	<i>Priority 1</i>
Project Selection	<i>Priority 1</i>	<i>Priority 2</i>
Project Monitoring and Evaluation	<i>Priority 2</i>	<i>Priority 3</i>

The next step is to perform a modest overhaul of project selection processes and criteria along the lines suggested in **Section 3**, specifically excluding mention of the attainment of EAV as a separate selection criterion, but implicitly taking it into account via its subliminal presence in the other selection criteria. **Exhibit 9** illustrates the correspondence between the current FP5 selection criteria and the proposed new criteria. Although there is no specific reference to the concept of EAV in the new criteria, it is embedded as a component of all of them.

Exhibit 9 Current and Proposed Selection Criteria

Proposed Selection Criteria	Current FP5 Selection Criteria				
	Scientific and Technological Quality and Innovation	Community Added Value and Contribution to EU Policies	Contribution to Community Social Objectives	Economic Development and S&T Prospects	Resources, Partnerships and Management
Project Composition Adequacy of Resources, Partnerships and Management		✓			✓
S&T Improvements Potential to Improve Scientific and Technological Capability	✓	✓		✓	
Process Improvements Potential to Improve the Way Participating Organisations Conduct their Affairs		✓	✓	✓	
Positional Improvements Potential to Improve the Position and Status of Participating Organisations		✓	✓	✓	
Economic Impacts Potential to Improve the Broader Economic Situation and Prospects		✓		✓	
Social Impacts Potential to Improve the Social, Physical and Cultural Environment		✓	✓		
Policy Impacts Potential to Improve the Policy and Regulatory Environment		✓			
Trans-national Impacts Potential to Improve Ability to Tackle Problems of a Trans-national Nature		✓			

Finally, the last step in the sequence is to ensure that the monitoring and evaluation procedures in place for FP6 are adequate enough to allow the eventual assessment of benefits and impacts and programme efficiency and effectiveness.

FP5 Implementation Focus

The sequence of priorities for immediate implementation of the scheme within FP5 is also depicted in **Exhibit 8**. Here the situation is radically different. Given that FP5 is already underway, changes to the programme formulation stage are only relevant to the current policy discussion concerning the shape and form of FP6. Attention switches, therefore, to the other two life-cycle stages. In theory, the most effective way of implementing the new EAV scheme is firstly to amend extant selection procedures and criteria; and secondly to alter monitoring and evaluation procedures in line with these changes. In practice, however, the first of these steps might not be possible, since it would involve rewriting the Manual of Proposal Evaluation Procedures and retraining proposal evaluators. The upheaval involved might nevertheless be preferable to the dissatisfaction currently experienced by Commission staff and external evaluators struggling to cope with the present inclusion of a specific EAV selection criterion in the existing manual of procedures.

If a decision is taken to amend selection procedures for use during the remainder of FP5, the transformation matrix depicted in **Exhibit 9** could be used as starting point to recast and elaborate each of the new selection criteria. **Exhibit 10** draws upon the expanded criteria contained within the existing manual of evaluation procedures and recasts them into a set of generic factors which need to be taken into account when applying the new criteria.

Given a template of this nature, the next steps involve each individual programme first amending the suggested set of generic criteria via the addition of programme specific items; and second evolving a weighting system which reflects the prioritisation of overall goals and hence selection criteria in individual programme areas.

Exhibit 10 Suggestions for an Expanded Set of Selection Criteria

Proposed New Selection Criteria	Factors to Be Taken into Account
Project Composition	<ul style="list-style-type: none">• The adequacy of the resources devoted to the project• The competence and track record of the participants and the involvement of partners from different parts of the EU• The quality of the managerial administrative arrangements in place to conduct the project
S&T Improvements	<ul style="list-style-type: none">• The quality of the research proposed and the adequacy of the chosen approach• The potential to consolidate or expand existing know-how• The scientific and technological risk associated with the project• The potential to enhance S&T capability in the EU via enhanced skills, shared know-how, mobility of research personnel and/or improved S&T infrastructure

Process Improvements	<ul style="list-style-type: none"> • The project's potential to improve participants' ability to organise and conduct S&T activities in the EU • The project's potential to improve networking behaviour within the EU • The project's ability to improve the management of risk • The project's potential to improve innovation capacity and performance
Positional Improvements	<ul style="list-style-type: none"> • The potential to enhance the reputation of participants • The existence, adequacy and credibility of exploitation plans • The potential to produce new products, processes and services • The potential to enhance productivity and improve competitive and market position within and beyond the EU
Economic Impacts	<ul style="list-style-type: none"> • The project's potential to increase the general availability of exploitable know-how in the EU • The project's relevance to consolidating the internal market • The relevance of the project to the establishment of new markets inside and outside the EU • The likelihood of the project helping to improve the competitive and trade position of the EU relative to other areas
Social Impacts	<ul style="list-style-type: none"> • The contribution of the project to improved quality of life, working conditions and health and safety in the EU • The contribution of the project to improved employment prospects, labour utilisation and the deployment of skills in the EU • The contribution of the project to preserving or enhancing the environment and contributing to sustainable development in the EU • The contribution of the project to improved social cohesion across the EU
Policy Impacts	<ul style="list-style-type: none"> • The project's potential to contribute to the implementation or evolution of one or more EU policies • The project's potential to address problems concerned with standardisation or regulation
Trans-national Impacts	<ul style="list-style-type: none"> • The extent to which projects can contribute to the identification, monitoring, assessment, resolution or mitigation of problems with an EU or Global dimension or impact

Once formally specified, the revised set of selection criteria can be used to suggest procedures and protocols for the collection and assessment of monitoring and evaluation data during and after FP5. As indicated in **Section 3**, the critical step is to ensure that data are collected from participants on goal attainment in areas corresponding to each of the selection criteria. **Exhibit 11** gives an example of just some of the questions which could be asked by Scientific Officers and included in mid-term, end-of-term and *ex post* questionnaires and interviews.

Exhibit 11 Monitoring and Evaluation Issues

Expected Benefits/Impacts	Relevant Monitoring and Evaluation Questions
<p>S&T Improvements Improved Scientific and Technological Capability</p>	<p>What have been the scale of expected achievements and impacts in terms of:</p> <ul style="list-style-type: none"> • Enhancements to organisational knowledge bases • Maintenance of expertise in specific areas of research • Production of new knowledge • Exploration of new, alternative scientific and technological paths • Acceleration of RTD activities • Deeper understanding in core S&T areas • Monitoring of S&T developments in the field • The development and evaluation of improved tools, methods, techniques, tests • The production of publications, PhDs etc. • Enhanced skill levels of RTD personnel • Access to complementary sources of expertise, know-how or technology
<p>Process Improvements Improvements in the Way Participating Organisations Conduct their Affairs</p>	<p>What have been the scale of expected achievements and impacts in terms of:</p> <ul style="list-style-type: none"> • The formation of new research partnerships and networks • The formation of longer term strategic or business alliances • Improved ability to co-operate with sources of complementary expertise • The monitoring of competitors' activities • Improved ability to access public funding for RTD activities • Improved ability to manage technological and commercial risk
<p>Positional Improvements Improved Position and Status of Participating Organisations</p>	<p>What have been the scale of expected achievements and impacts in terms of:</p> <ul style="list-style-type: none"> • The enhanced reputation and image of the organisation • The production of demonstrators, prototypes, pilots etc. • The production of patents, licences, software, codes, databases etc. • The development of new or improved products, processes and services • Commercial returns to the organisation • Improved competitiveness of the organisation • Improvements in the turnover, market share or productivity of the organisation
<p>Economic Impacts Potential to Improve the Broader Economic Situation and Prospects</p>	<p>What have been the scale of expected achievements and impacts in terms of:</p> <ul style="list-style-type: none"> • The dissemination of project results • The establishment of new product and service markets • Improved economic development in local, regional, national, EU and global markets

<p>Social Impacts Potential to Improve the Social, Physical and Cultural Environment</p>	<p>What have been the scale of expected achievements and impacts in terms of:</p> <ul style="list-style-type: none"> • Improved employment prospects in the EU • Improved quality of life in the EU in terms of health care, consumer nutrition, safety etc. • Improved preservation of the environment in terms of reduced pollution, cleaner production and use of energy, preservation of natural resources etc. • Improved cohesion across the EU
<p>Policy Impacts Potential to Improve the Policy and Regulatory Environment</p>	<p>What have been the scale of expected achievements and impacts in terms of:</p> <ul style="list-style-type: none"> • The development of standards • Improved inputs to policy formulation • Improved inputs to regulation and legislation • Improved implementation of EU goals in general
<p>Trans-national Impacts Potential to Improve Ability to Tackle Problems of a Trans-national Nature</p>	<p>What have been the scale of expected achievements and impacts in terms of:</p> <ul style="list-style-type: none"> • The establishment of critical masses of RTD in the EU • Increased levels of investment in RTD in the EU • Improved scientific and technological infrastructure • The contribution to the identification, monitoring, assessment, resolution or mitigation of problems with a trans-national dimension

Data collected on achievements and impacts can then be compared with expectations in each of the impact areas corresponding to individual selection criteria. This will allow assessments to be made of participant, project and programme effectiveness, all capable of being expressed in terms of the ratio between achievements and expectations. Although these estimates will not provide a formal assessment of the amount of EAV associated with the Framework Programmes, they will allow statements to be made about the successful attainment or otherwise of EAV if activities within the programmes are themselves EAV compliant. Within FP5, the application of both the current and revised selection criteria favour the inclusion of activities likely to lead to EAV, and use of the fully revised scheme and the application of **EAV_{max}** for FP6 will ensure that all activities in future Framework Programmes are EAV compliant.