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Evaluation Manual for ICT research in FP7: The Joint Technology Initiatives

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1 European Technology Platforms, Joint Technology Initiatives - The Evaluation Environment

1.1 The relation between European Technology Platforms and Joint Technology Initiatives

The Joint Technology Initiatives (JTIs) originate in the European Technology Platforms (ETPs) that have been set up since the 6th Framework Programme for Research and Development to contribute to Europe's growth, competitiveness and sustainability objectives by better focusing research funding to the needs of industry.¹

The ETPs are means to define R&D priorities, timeframes and action plans on a number of strategically important areas. The ETPs' Strategic Research Agendas (SRA) were set up with a key role of industry. Hence, the development of ETPs is a bottom-up process resulting in differences in origins, approaches and particular ways of working between the single ETPs. Their common characteristic is the definition of the SRA and its implementation, the deployment strategy. Generally, the Technology Platforms are flexible and open to entities joining or leaving the platform, as well as to the integration of new initiatives. The importance of defining and implementing a Multiannual Strategic Plan that includes a Research Agenda (that implements parts or the whole of the corresponding SRA) and the openness to new members are major characteristics of the JTIs as well.

To date 36 Technology Platforms have been established.² A limited number of these Platforms offer opportunities for significant technology advances with the need for setting up a long-term public private partnership in order to implement (parts of) their ambitious SRAs. That is, where the loose co-ordination through the European Technology Platforms and the support through the regular instruments of the European Framework Programme for Research and Development are not sufficient, the European Commission proposed to set up Joint Technology Initiatives. Hence, JTIs arise primarily from the work of the ETPs (SEC (2005) 800, p.9).

¹ For a detailed outline of ETP objectives see <http://cordis.europa.eu/technology-platforms/>

² http://cordis.europa.eu/technology-platforms/individual_en.html

1.2 The relation of Joint Technology Initiatives and Joint Undertakings

1.2.1 Implementation of a Joint Technology Initiative

JTIs have been implemented as so called Joint Undertakings in accordance to Article 171 of the Treaty.³ The Joint Undertakings have the legal status of Community Bodies. Unless stated otherwise, the legal documents of the two Joint Undertakings of DG Information Society and Media, ARTEMIS and ENIAC, are the basis for the information regarding objectives, governance and evaluation of JTIs in the remaining of this Chapter.

1.3 JTIs– Objectives, Tasks, Governance

1.3.1 Joint Technology Initiatives - General Objectives

The **general objectives** common to all JTIs as stated in the programming documents (SEC (2005) 800, p.9) include:

- **Coherent implementation of European research efforts** in the strategic technological fields for the future
- Accelerating the generation of new knowledge, innovation and the **uptake of research into strategic technologies**, leading to enhanced productivity and strengthened industrial competitiveness
- Concentrating efforts on key projects that can help meet **Europe's industrial competitiveness** goals
- **Enhancing the technology verification process** in order to identify and remove obstacles to future market penetration
- **Pooling user requirements to guide investment** in research and development towards operational and marketable solutions

At the same time, the JTIs are not intended to have a restrictive effect on competition. They are intended to enhance downstream competitiveness in key technologies by addressing

³ Article 171: The Union may set up joint undertakings or any other structure necessary for the efficient execution of Union research, technological development and demonstration programmes.

market failures arising from the high costs and risks associated with long-term, pre-competitive, multidisciplinary research.

For the established Joint Technology Initiatives the above objectives are further elaborated in the respective Council Regulations.

1.3.2 ARTEMIS and ENIAC Joint Technology Initiatives - Specific Objectives

The Statutes of the currently running ARTEMIS and ENIAC Joint Technology Initiatives specify the objectives as follows⁴:

The respective Joint Technology Initiative shall contribute to the implementation of the Seventh Framework Programme and the *theme X* (the respective field of research) of the Specific Programme 'Cooperation'. It shall, in particular:

- (a) **Define and implement a Research Agenda** for the development of key competences or technologies for *theme X* across different application areas in order to **strengthen European competitiveness and sustainability** and allow for the emergence of new markets and societal applications. Activities for the implementation of the Research Agenda are hereinafter referred to as 'R & D Activities'.
- (b) **Support the implementation of the R & D Activities notably by awarding funding** to participants in selected projects following competitive calls for proposals.
- (c) **Promote a public-private partnership aimed at mobilising and pooling Community, national and private efforts**, increasing overall R & D investments in the respective field, and fostering collaboration between the public and private sectors.
- (d) **Achieve synergy and coordination** of European R & D efforts in the respective field including, when **added value** can be created, the progressive integration in the respective Joint Technology Initiative of the related activities in this field currently implemented through intergovernmental R&D schemes (Eureka).
- (e) **Promote the involvement of SMEs** in its activities in line with the objectives of the Seventh Framework Programme.

⁴ As given in Article 2 of the Council Regulation setting up the respective Joint Undertaking.

1.3.3 ARTEMIS and ENIAC Joint Technology Initiatives – Tasks

At the operational level the above objectives are translated into more specific tasks. The main tasks and activities of these two JTIs are the following⁵:

- (a) to ensure the establishment and sustainable management of the JTI on the respective field;
- (b) to define and make any necessary adjustment to the multiannual strategic plan including the Research Agenda;
- (c) to define and carry out annual implementation plans for executing the multiannual strategic plan;
- (d) to initiate calls for proposals, to evaluate proposals, and award funding to projects selected through open, transparent and effective procedures, within the limits of available funds;
- (e) to develop close cooperation and ensure coordination with European national and trans-national activities, bodies and stakeholders, in particular the Framework Programme, aiming at fostering a fertile innovation environment in Europe and better synergies and exploitation of R & D results in the respective area of research;
- (f) to monitor progress towards the objectives of the respective JTI;
- (g) to undertake communication and dissemination activities;
- (h) to publish information on the projects, including the name of the participants and the amount of the financial contribution of the respective JTI per participant;
- (i) to carry out any other activity needed to achieve the objectives set out by the Council Regulation.

1.3.4 ARTEMIS and ENIAC: Expected Results from JTI Activity

The ex-ante assessments of the currently running JTIs of DG INFSO outline the expected results stemming from the JTI activities and indicate corresponding result (outcome) indicators.⁶

⁵ Statutes of Joint Undertaking, Annex, Article 2.

⁶ As given in the ex-ante assessments i.e. COM(2007) 234 final and COM(2007) 256 final.

- (a) **Leveraging resources and integrating national efforts.** By providing incentives to industry and Member States, additional national support will be attracted and greater industry funding will be leveraged.
 - Indicators: (i) number of countries that commit funding to the JTI; (ii) commitments and payment appropriations; (iii) national funding committed and spent on projects selected by the JTI; (iv) resources invested by industry in R&D work for projects selected by the JTI.
- (b) **Focusing on common R&D** agendas more effectively than is currently possible.
 - Indicators: (v) number and level of partnerships.
- (c) **Raising programme efficiency** by removing uncertainty as to the availability of national budgets and by removing duplicative evaluation and monitoring procedures.
 - Indicators: (vi) time interval between proposal submission and project selection decision by the JTI; (vii) number of organisations, including SMEs participating in Calls for proposals; (viii) overhead costs for operating the programme; (ix) results transferred to the marketplace.
- (d) **Providing significant economic and social benefits** by making progress towards its technological and economic objectives of the JTI. This progress will be subject to periodic independent evaluation.
 - Indicators: (x) patents filed resulting from projects; (xi) number of publications resulting from projects.

1.3.5 ARTEMIS and ENIAC Joint Technology Initiatives – Governance Structure

The major difference of the ARTEMIS and ENIAC JTI's with respect to other JTIs is their membership. In addition to the EC and the industrial partner association (ARTEMISIA and AENEAS for ARTEMIS and ENIAC respectively), Member States and Associated Countries to the Framework Programme can become full members of the JTIs. These members are called "ARTEMIS/ENIAC Member States" (22 in ARTEMIS and 19 in ENIAC). The JTIs have the following relevant governing bodies:

- **The Governing Board:**
 - Includes the members of the JTI and the chairperson of the industry and research committee;

- has the overall responsibility for the operations of the JTI and oversees the implementation of its activities.
- **The Executive Director:**
 - is the chief executive responsible for the day-to-day management of the JTI in accordance to the decisions of the governing board;
 - oversees the daily business and carries out necessary actions for the successful operation of the JTI;
 - is appointed by the governing board.
- **The Public Authorities Board:**
 - consists of the public authorities (EC and ARTEMIS/ENIAC Member States) of the JTI;
 - ensures that the allocation of public funding is fair and transparent; oversees all activities and regulations related to the calls for proposals; .discusses and approves the annual work programme of the JTI.

1.4 Implications for evaluation

JTIs differ in two basic respects from the other funding instruments of the Framework Programme. On the one hand, the JTI is assigned the “funding responsibility”, that is the responsibility to bring forward research and technological development in the respective field by defining and implementing the Research Agendas via calls for proposals. On the other hand, the JTI is assigned the “coordination responsibility”, that is the responsibility to promote a public-private partnership to mobilise and pool the funding efforts of different sources and to achieve synergies of research efforts across Europe. These basic differences set JTIs apart in terms of evaluation needs. Additionally, a fundamental difference between the INFSO JTIs and the other JTIs is that in both ARTEMIS and ENIAC Member States are fully involved in the Governance and in the mobilisation of R&D funding. The leveraging of national funding towards common strategic goals through Calls for proposals and the effectiveness of such system are key features that must be taken into account in the evaluation of these two JTIs.

Moreover, JTIs differ extensively among themselves. Each JTI is more or less unique, comprising of a set of distinct technological areas/systems, with its own objectives, timelines, budgets, and independent management. As a consequence, it must be stressed that:

- Each JTI must be evaluated on its own, as an independent entity;

- Benchmarking between JTIs, in the strict sense of the term, does not make much sense.

The above, of course, does not mean that there is no common ground in terms of evaluation procedures and general evaluative questions that should be asked of each JTI. This is exactly the role of this Manual. It considers the basic evaluative questions for the INFSO JTIs and links these questions to appropriate analytical methodologies, data, and data sources. We draw extensively on an earlier document undersigned by the two principal investigators that dealt with the evaluation rationale and strategy as well as the basic evaluative questions, analytical methodologies, data, and data sources for the for DG INFSO's IST research in general.⁷ The present Manual, however, tries to be sensitive to the idiosyncrasies of JTIs.

A final comment regarding this Manual is in order. While the ex ante evaluation / impact assessment for the two existing JTIs sets out some basic evaluative questions and indicators, those proposed for the social and economic benefits fall far short of what is likely to be expected of subsequent evaluations at the political level. Furthermore, while compliance with the criteria – which are in effect subsidiarity and additionality – is asked for, the criteria themselves could be reassessed in the light of changing circumstances and further evidence at later stages of the evaluation. Accordingly, the Manual expands to cover all likely issues of interest to policy decision-makers and evaluative questions that are sensitive to the evolving socio-technical environments in which the JTIs operate.

Section 2 below provides the evaluation context. Section 3 then goes into some detail regarding the proposed basic evaluative questions, methodologies and data requirements. Section 4 concludes with a reference to the organisation / oversight of the evaluation and important ways of collecting first hand information from RTD project participants.

⁷ Wolfgang Polt and Nicholas S. Vonortas "IST Evaluation and Monitoring", Joanneum Research, Report to DG INFSO, December 2006.

2 JTI Evaluation Scope and Cycle

2.1 General Evaluation Criteria at EU level

The key issues of any interim and ex-post evaluation exercise of funding initiatives at European level are given by the DG Budget's evaluation guide (2004) as follows:

- **Relevance:** The extent to which the objectives of the intervention are in line with the needs of the beneficiaries and/or the social, economic and environmental problems the intervention aimed to address.
- **Effectiveness:** The extent the intervention's activities/ outputs/ outcomes/ long-term impacts correspond with its objectives.
- **Efficiency:** The extent to which the intervention's objectives are achieved at reasonable cost.
- **Utility:** The extent to which the intervention's outcomes and impacts correspond with needs, problems and issues over and beyond those embodied in the strictly stated objectives.
- **Sustainability:** The extent to which the intervention's impacts are likely to continue into the future in the absence of funding assistance.

The importance of these key issues varies with the evaluation cycle i.e. the time an evaluation is conducted (interim or ex-post). The following table depicts these differences:

Table 1: Variation of Key Issues Addressed by Evaluation Exercises

<i>Evaluation Issue</i>	<i>Interim Evaluation</i>	<i>Ex post Evaluation</i>
Relevance	Yes	No
Effectiveness	Yes with respect to implementation and early effects	Yes
Efficiency	Yes with respect to implementation and early effects	Yes
Utility	Sometimes	Yes
Sustainability	No	Yes

Source: DG Budget (2004), Evaluating EU Activities - A Practical Guide, p. 76.

2.2 Evaluation Criteria in Selecting the JTIs

Considerations akin to the key evaluation issues listed above clearly influenced the selection criteria of the Commission for the establishment of JTIs. In order to identify which ETP Strategic Research Agenda justified the setting up of a JTI, the Commission applied the following set of criteria (SEC (2005) 800, p.10 f. selection criteria):

- *Strategic importance of the topic and presence of a clear deliverable*
 - unique contribution to Europe's industrial competitiveness in strategic technologies
 - giving Europe a critical competitive advantage, e.g. by combating the threat of delocalisation and by making Europe more attractive to inward investments in research
 - generating new value-adding economic activity or raising the efficiency of ex-tant activity, and tailoring the activities to multiple technology users
- *Existence of market failure*
 - higher risk and longer investment period
 - technology challenge only be met as part of a co-ordinated approach
 - externalities, both positive and negative, are likely to arise, however the spill-over effects to other areas and to wider society will be positive
- *Concrete evidence of Community value added*
 - for the implementation of the Strategic Research Agenda a critical mass that goes beyond the capacity of individual Member States is needed
 - community funding is made more effective due to an increased leverage on private investment and national public funding
 - Community instruments play an important role in facilitating an effective implementation of the Strategic Research Agenda
 - Community policy objectives in areas of particular interest, such as health, environment, security, will be facilitated by greater co-operation and co-ordination between public and private players
- *Substantial, long-term industry commitment*

-
- Industry commitment is demonstrated by high levels of sustained financial and human resources as well as the willingness of large companies to interact effectively with appropriate networks of SMEs
 - Openness and transparency with clearly defined roadmaps and outputs
 - Up-front identification of technical, legal, financial and managerial frameworks
 - *Inadequacy of existing Community instruments*
 - existing instruments and structures, notably the Framework Programmes, would not achieve the desired outcome because the scale and scope of the Strategic Research Agenda are very ambitious and of a much longer time-scale

These selection criteria underlined the ex-ante analyses for the two extant JTIs in IST, ARTEMIS and ENIAC. Specifically, these analyses⁸ considered:

- Scale of the impact on industrial competitiveness and growth (“Strategic importance of the topic and presence of a clear deliverable” criterion)
- The degree and clarity of definition of the objective and deliverables to be pursued (“Strategic importance of the topic and presence of a clear deliverable” criterion)
- Inability of existing instruments to achieve the objective (“Inadequacy of existing Community instruments” criterion)
- Added Value of European-level intervention (“Concrete evidence of Community value added” criterion)
- Strength of the Financial and Resource Commitment from Industry (“Substantial, long-term industry commitment” criterion)
- Importance of the contribution to broader policy objectives including benefit to society (“Concrete evidence of Community value added” criterion)
- Capacity to attract additional national support and leverage current and future industry funding (“Concrete evidence of Community value added” criterion)

⁸ In the official documents called Identification Criteria and Evaluation Criteria respectively. The detailed outline can be found at SEC (2007) 851, pp.68-70 resp. SEC (2007) 582, pp.62-64.

The “Existence of market failure” criterion was addressed separately at the beginning of the ex-ante assessments by outlining the challenge in the respective research and technology field in more detail.

Moreover, the ex-ante assessments indicated the expected impacts of the two JTIs in question. These impacts were classified into three categories: (1) economic, (2) social and (3) environmental impacts, each comprising several sub-categories.⁹ It is important to note that the expected impacts differ between the two JTIs in accordance to the different research fields and Research Agendas.

2.3 Evaluation Cycle

The Council Regulation establishing the JTIs in question (Article 12) determined the need for two interim evaluations, the first to be produced no later than 31 Dec 2010 (3rd financial year) and the second no later than 31 Dec 2013 (6th financial year). Both interim evaluations should be carried out with the assistance of independent experts¹⁰ and should cover the quality and efficiency of the JTIs and the progress towards the objectives set. The Council Regulation also determined the conduct of a final ex-post evaluation by the Commission no later than 6 months after the winding-up of the JTIs (after the 10th financial year).

Figure 1: JTI Evaluation Cycle

Prev.Y	FY 1	FY 2	FY 3	FY 4	FY 5	FY 6	FY 7	FY 8	FY 9	FY 10	Foll.Y

-  **Ex-ante Evaluation**, e.g. impact assessment, analysis of effects.
- submitted with the proposal on the establishment of a new JTI
-  **Interim Evaluation**
- no later than Dec. of the respective Financial Year (FY)
-  **Ex-post Evaluation**
- no later than 6 months after the last FY, i.e. the 10th Year

Source: Figure based on data given in the JTI Programming Documents

⁹ For a detailed list of the specific impacts that are expected to result from ENIAC and ARTEMIS see SEC(2007) 851 pp.39-58, resp. SEC(2007) 582 pp.52-57.

¹⁰ According to DG INFOS's evaluation plan the first interim evaluation of ARTEMIS, and ENIAC respectively, will be conducted simultaneously between June 2009 and December 2010 by external evaluators. The evaluation's focus is to be prospective and retrospective. The financial resources available for the mid term evaluation is €75.000 each. (Data taken from:

http://ec.europa.eu/dgs/information_society/evaluation/data/pdf/evaluation_plan_2008.pdf).

3 Evaluation System of the JTIs

The chapter defines a common evaluation framework suitable for all JTIs and defines the key evaluative questions for the two interim evaluations and the ex post evaluation. The suggested evaluative questions strongly build upon the results of “The Blueprint of the Evaluation and Monitoring of the IST R&D in the 6th and 7th FPs” and relate to the evaluation issues relevance, effectiveness, efficiency, utility and sustainability. Wherever possible, the same evaluative questions are used in order to allow for the greatest extent of coherence between the two strategic documents. For each evaluation we start with a description of key evaluative questions, followed by the type of analytical method to be applied, data requirements, and data sources.

3.1 Content of the Interim Evaluations of the JTIs

The overall context of the two interim evaluations is set in the JTI’s statutes: “The interim evaluations shall cover the quality and efficiency of the respective JTI and the progress towards the objectives set”. This directly follows the direction of the Commission’s proposal for the whole Seventh Framework Programme.

Given the extended time length of the JTIs, the interim evaluations become of critical importance, not least for calibrating purposes with respect to efficiency in implementation and effectiveness in orientation towards the programme objectives.

The Interim Evaluations should concentrate on the following aspects of the JTI:

- **Relevance:** Continuing validity of the assumptions set at the start/planning phase of the JTIs.
- **Effectiveness:** The progress towards meeting the objectives set.
- **Efficiency:** The extent to which the JTI has been managed and operated efficiently, whether there has been good communication of objectives and progress, and the ability to address problems as they arose.
- **Research Quality:** The extent to which the JTI sponsors world-class research that helps propel Europe to a leadership position globally

Clearly, *programme implementation* by the Commission is at the core of these evaluation exercises.

3.2 First Interim Evaluation

The first Interim Evaluation is to be completed by the end of the third fiscal year of the JTI. At the time of this evaluation none of the research projects funded by the JTI in question will have been completed. A few projects may have produced some outputs. That is to say, at this stage one can only start addressing the initial effects on the direct recipients of the financial assistance. Hence, we can only initiate the discussion regarding the efficiency of the Programme in delivering outputs and its effectiveness in making the correspondence between “results” and Programme “objectives”.

The first interim evaluation should also cover external information regarding the evolution of the general socio/economic context affecting the focal area of the JTI in question to allow an examination of the continuing relevance of the initial objectives for the remaining part of the JTI. Moreover, the first interim evaluation should provide important feedback from stakeholders to inform the management regarding improvements in the thematic foci and the implementation process of the JTI under examination.

3.2.1 Evaluative Questions

Evaluative questions and their relationship to the specific JTI objectives (outlined in section 1.3.2) and expected results (outlined in section 1.3.4) are listed in the table below.

Table 2: Evaluative Questions for the first Interim Evaluation

	Objectives (as in section 1.3.2)	Evaluative Questions	Results (as in section 1.3.4)
Relevance	A	Has the SRA defined and implemented efforts which aim at the development of key competencies across different areas to strengthen European competitiveness and sustainability?	B
		Are the original aims of the SRA still in line with the changing market and funding environment?	
		What changes in the socio-economic environmental contexts have occurred since the initiation of the programme and which are their likely effects?	
Efficiency	B	Has the implementation of the Programme been satisfactory?	C
	D	Were the overall legal framework and the modalities for implementation of the JTI clear, appropriate and effective?	
		E	
		Did the activities of the JTI constitute effective methods of achieving the targets set?	
		Were the level of funding and other available resources adequate?	

		Were the JTI's communication activities appropriate as to position the JTI as a major contributor in the respective field?	
		Were the targeted industrial and research communities, including SMEs, able to respond appropriately?	
Effectiveness	D	Has there been progress towards achieving the targets set in its SRA?	D A
		To what extent has the JTI succeeded in setting up network(s) in accordance to its mandate?	
	C	What progress has been made in setting up a long term, tripartite public-private partnership?	
		Has the JTI made a difference, did it induce participants to activities that would not have been carried out without the programme?	
Quality	A	Is the quality of research under way satisfactory?	D

3.2.2 Evaluation Methods and Data Requirements

For answering the evaluative questions above a series of studies must be launched. Various analytical methodologies can be utilized but the overall approach will probably lean quite heavily on the side of qualitative work and descriptive data.

The main evaluative questions should be answered by a synthesis report of a panel of experts which is fed with information stemming from the various analytical studies dealing with the relevance, efficiency, and effectiveness of the initiative and the quality of research performed.

The questions regarding the efficiency and effectiveness are closely related. The programme structure, its administrative procedures and project selection criteria might have an impact on participation and the quality of research to be conducted within the JTIs. Therefore, the evaluation should review the organizational set-up of the JTIs and their management system. The main methodologies will include focus group reports and interviews which cover the impressions of participants, stakeholders, Commission officials and Member State representatives as to shed light upon the strengths and weaknesses of the JTIs procedures.

The effectiveness of JTI operations may mostly be assessed qualitatively at the time of the first Interim evaluation: Case studies at programme and consortium levels (selectively), focus group reports, and interviews will prove the most feasible and useful. Most important will be a programme participant survey which should outline the importance of the JTI RTD programme for the strategies of participants. The survey could serve to create indicators on progress towards technology application and deployment.

Another line of evaluation should concentrate on social Network analysis (SNA): SNA allows describing the features of the interorganizational networks formed by the JTI funding and their relative positioning in the global networks in their respective fields. It also allows looking at the attractiveness of the programmes to key public and private organizations across member states, and at the role of these networks in creating and disseminating new IST knowledge. SNA also identifies “hubs”, i.e., organizations with many linkages and the ability to connect disparate parts of the network. SNA is a good tool to use in order to gauge behavioural additionality, meaning the lasting effects of the initiative in terms of changing behaviours of the participating organizations. Main objectives of SNA are to demonstrate over the time span of JTIs operation whether its activities enlarge and foster a) European Integration of research efforts and b) increase co-operation between academia and industry.

Yet another important aspect as regards effectiveness of research is whether the JTIs manage to set up long-term public-private partnerships according to their mandate. At the stage of the first interim evaluation one should therefore have a first look at which Member Countries could be attracted by JTIs and whether Member Countries started to align their public R&D funding activities in the respective field with JTI activities.

Regarding research quality, at the time of the first interim evaluation only few projects will have final outputs in terms of scientific/technological advances, patents and publications.

It is important to stress that the data gathering process at the project level should start at the very beginning of the operations of the JTIs.

Table 3: Relevance - Methods, Indicators and Data Sources

<i>Has the SRA defined and implemented efforts which aim at the development of key competencies across different areas to strengthen European competitiveness and sustainability?</i>		
<i>Are the original aims of the SRA still in line with the changing market and funding environment?</i>		
<i>What changes in the socio-economic environmental contexts have occurred since the initiation of the programme and which are their likely effects?</i>		
<i>Methodologies</i>	<i>Principle Indicators</i>	<i>Data Sources</i>
<ul style="list-style-type: none"> Interviews and focus groups with the JTI, Industry Partners and Member States representatives JTI document reviews (i.e. strategic plans, project documentation, call 	<ul style="list-style-type: none"> Context analysis will reflect the appropriateness of the goals of the JTIs and help explain certain programme and applicant characteristics, such as the application behaviour of SMEs and results to be expected from the JTI's activities. 	<ul style="list-style-type: none"> Ex ante evaluation of JTI Policy studies from countries, EU, OECD European Competitiveness Report ERAWATCH

description) • Data Analysis of secondary databases	• Importance of the JTI for the strategies of participants	• Trendchart
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Table 4: Efficiency - Methods, Indicators and Data Sources

<p><i>Has the implementation of the Programme been satisfactory?</i></p> <p><i>Were the overall legal framework and the modalities for implementation of the JTI clear, appropriate and effective?</i></p> <p><i>Were the activities of the JTI carried out efficiently and were they cost effective?</i></p> <p><i>Did the activities of the JTI constitute effective methods of achieving the targets set?</i></p> <p><i>Were the level of funding and other available resources adequate?</i></p> <p><i>Were the JTI's communication activities appropriate as to position the JTI as a major contributor in the respective field?</i></p> <p><i>Were the targeted industrial and research communities, including SMEs, able to respond appropriately?</i></p>		
<i>Analytical Methodologies</i>	<i>Principle Indicators</i>	<i>Data Sources</i>
<ul style="list-style-type: none"> • Study focusing on the implementation dimensions of the JTI, including managerial aspects of the programme • Study on appropriateness and effectiveness of funding schemes • Expert Panel deliberations and report 	<ul style="list-style-type: none"> • Administrative data on overhead expenditure at programme and project levels, speed of processing applications and contracts, other bureaucratic hurdles, etc • Qualitative indicators of efficiency, trust, management improvement, contractual effectiveness • Clarity of JTI documents addressing prospective applicants and of extent of absorption by applicants • Focus groups on issues of JTI's organisational set-up and management system and man. processes 	<ul style="list-style-type: none"> • Mechanism for structured reflection on the different dimensions of implementation – process for continuous process improvement • Survey of client satisfaction (participants and of non-participants, including non-applicants, rejected applicants, 'near misses') regarding managerial aspects of consortia (EU funded and not) • Focus groups of participants, stakeholders, Member States • Public consultation • Interviews with Commission and Member State officials

Table 5: Effectiveness - Methods, Indicators and Data Sources

<p><i>Has there been progress towards achieving the targets set in its SRA?</i></p> <p><i>To what extent has the JTI succeeded in setting up network(s) in accordance to its mandate?</i></p> <p><i>What progress has been made in setting up a long term, tripartite public-private partnership?</i></p> <p><i>Has the JTI made a difference, did it induce participants to activities that would not have been carried out without the programme?</i></p>		
<i>Analytical Methodologies</i>	<i>Principle Indicators</i>	<i>Data Sources</i>
<ul style="list-style-type: none"> • Study on input / behavioural additionality • Case studies of representative consortia, organizations • Network analysis • Focus group reports • Study on market effects of IST/ JTI RTD 	<ul style="list-style-type: none"> • Indicators of innovative performance by participants and their innovation capacity: <ul style="list-style-type: none"> ○ patents ○ products at planning stage ○ prototypes ○ newly introduced products, ○ turnover from these products, (expected / realized), etc. • Indicators of other benefits to participants: <ul style="list-style-type: none"> ○ Networking ○ Research awareness ○ Market awareness ○ Goodwill • Importance of the JTI RTD programme for the strategies of participants • Progress towards technology application, deployment • Creation, expansion, maintenance of important networks • European knowledge hubs at global level • Competitiveness indicators for private sector 	<ul style="list-style-type: none"> • RTD project and participant data from Commission • CIS • Participant surveys • International statistics on relevant markets and technology areas • Focus groups of industry, stakeholders (participation of non European experts highly desirable) • Interviews with Commission officials and member state officials • Interviews with R&D managers not involved in the R&D programme • European Competitiveness Report

Table 6: Quality - Methods, Indicators and Data Sources

<i>Is the quality of research under way satisfactory?</i>		
<i>Analytical Methodologies</i>	<i>Principle Indicators</i>	<i>Data Sources</i>
<ul style="list-style-type: none"> • Science benchmarking at sector level • Case studies of representative consortia, organizations • (Social) Network analysis for individual scientists 	<ul style="list-style-type: none"> • Research activities: Intensification and diversification of research activities • Conference appearances, conference proceedings • Scientific papers, working and published • Patent applications • Knowledge advancements: New facts, news processes, new products • Market impact: revenues of new products and services due to JTI activities (as % of firm total and market share), profits from products and services due to JTI activities (as % of firm total and market share), sustainable international competitiveness • HR dimension (attracting PhDs, leading scientists in the programmes, etc) • European knowledge hubs at global level 	<ul style="list-style-type: none"> • New product announcements a) Dialog's NPA/plus database b) RDS Business & Industry databank (owned by the Gale Group) • RTD project and participant data from Commission • Entry Survey of programme participants • Annual Reports of RTD projects • Exit Survey of programme participants • EPO patent databases • USPTO patent databases • ISI bibliometric databases • SCOPUS data

3.3 Second Interim Evaluation

The second Interim Evaluation is to be completed at the end of the sixth fiscal year of the JTI. At the time of this evaluation some research projects funded by the JTI in question will have been completed. Other on-going projects may have produced some outputs. For a good set of projects, then, this evaluation can address the initial effects of the JTI funding on the capabilities and performance of participating organizations.

At this stage a thorough appraisal of the efficiency of the Programme in delivering outputs and of its effectiveness in making the correspondence between “results” and Programme “objectives” can be initiated. Six years into the initiatives, the evaluation should also review whether targets set at the beginning of the JTIs are still relevant and whether the market failure previously identified has been overcome at least to some extent.

3.3.1 Evaluative Questions

Evaluative questions and their relationship to the specific JTI objectives (outlined in section 1.3.2) and expected results (outlined in section 1.3.4) are listed in the table below.

Table 7: Evaluative Questions for the Second Interim Evaluation

	Objectives (as in section 1.3.2)	Evaluative Questions	Results (as in section 1.3.4)
Relevance	A	Are the original aims of the SRA still in line with the changing market and funding environment?	B A
		What changes in the socio-economic environmental contexts have occurred since the initiation of the programme and which are their likely effects?	
Efficiency	B	Has the implementation of the Programme been satisfactory?	C A
	D	Were the overall legal framework and the modalities for implementation of the JTI clear, appropriate and effective?	
	E	Were the activities of the JTI carried out efficiently and were they cost effective?	
		Did the activities of the JTI constitute effective methods of achieving the targets set?	

		Were the level of funding and other available resources adequate?	
		Were the JTI's communication activities appropriate as to position the JTI as a major contributor in the respective field?	
		Were the targeted industrial and research communities, including SMEs, able to respond appropriately?	
Effectiveness	D C A	Has there been progress towards achieving the targets set in its SRA?	D A
		What are the most important outputs, early outcomes and early impacts of the JTI?	
		Did the interactions of the network members grow since the implementation of the JTIs?	
		What is the achieved economic impact at the firm/participant level, what is the technological impact at the sector level, which socio-economic impact might arise due to the achieved results?	
		What progress has been made in setting up a long term, tripartite public-private partnership? <ul style="list-style-type: none"> ◆ To what extent did the JTI succeed in leveraging resources from the member states and integrate national efforts? ◆ To what extent has industry lived up to their commitments and matched the level of effort made from the public side? 	
		Has the JTI made a difference? Did it induce participants to activities that would not have been carried out without the programme?	
Quality	A	Is the quality of research under way satisfactory?	D

3.3.2 Evaluation Methods and Data requirements

For pursuing the second interim evaluation, again, a series of focused studies must be launched. In order to evaluate issues regarding the relevance of the JTI activities again a review on the initially foreseen tasks of the JTIs needs to be performed. Emphasis should be placed on the potential changes in the economic and social environment of the different actors involved in the JTI, namely the economic situation in the participating Member States, changes in the national and international funding environment, and the R&D investment behaviour of firms. This context analysis will allow to reflect the appropriateness of the goals of the JTIs and will help justify certain programme and applicant characteristics, such as the application behaviour of Small and Medium Sized Enterprises.

The second interim evaluation should also put a stronger focus on issues regarding effectiveness as a series of projects will have been completed. Evidence on first outputs, outcomes and impact may be collected and in particular, issues of behavioural additionality may be covered at this stage of the evaluation. Various analytical methodologies can be utilized in the supporting studies. While the overall approach might still remain relatively more qualitative and descriptive, on balance there can be significant empirical investigations to support several arguments as well – for instance, relate firm performance to the specific research.

Also research quality may be addressed quantitatively. Publications and patents constitute major outputs of research programmes. Large databases of patents, scientific publications, and citations can capture various aspects of research output including quantity, quality, significance, dissemination, and intellectual linkages of the funded research. They can be used creatively in combination to other existing sources of information (e.g., data on financial performance) or in combination to newly created information from targeted surveys to assess the effects of the initiatives on participating organizations.

Table 8: Relevance - Methods, Indicators and Data Sources

<i>Are the original aims of the SRA still in line with the changing market and funding environment?</i>		
<i>What changes in the socio-economic environmental contexts have occurred since the initiation of the programme and which are their likely effects?</i>		
<i>Methodologies</i>	<i>Principle Indicators</i>	<i>Data Sources</i>
<ul style="list-style-type: none"> • Interviews and focus groups with the JTI, Industry Partners and Member States representatives • JTI document reviews (i.e. strategic plans, project documentation, call description) • Data Analysis of secondary databases 	<ul style="list-style-type: none"> • Context analysis will reflect the appropriateness of the goals of the JTIs and help explain certain programme and applicant characteristics, such as the application behaviour of SMEs and results to be expected from the JTI's activities. • Importance of the JTI for the strategies of participants 	<ul style="list-style-type: none"> • Ex ante evaluation of JTI • Policy studies from countries, EU, OECD • European Competitiveness Report • ERAWATCH • Trendchart

Table 9: Efficiency - Methods, Indicators and Data Sources

<p><i>Has the implementation of the Programme been satisfactory?</i></p> <p><i>Were the overall legal framework and the modalities for implementation of the JTI clear, appropriate and effective?</i></p> <p><i>Were the activities of the JTI carried out efficiently and were they cost effective?</i></p> <p><i>Did the activities of the JTI constitute effective methods of achieving the targets set?</i></p> <p><i>Were the level of funding and other available resources adequate?</i></p> <p><i>Were the JTI's communication activities appropriate as to position the JTI as a major contributor in the respective field?</i></p> <p><i>Were the targeted industrial and research communities, including SMEs, able to respond appropriately?</i></p>		
<i>Methodologies</i>	<i>Principle Indicators</i>	<i>Data Sources</i>
<ul style="list-style-type: none"> • Synthesis of information from established mechanism for structured reflection on implementation dimensions • Benchmarking study comparing managerial aspects of JTI-funded consortia and other collaborative RTD projects • Study on appropriateness and effectiveness of funding schemes • Expert Panel deliberations and report 	<ul style="list-style-type: none"> • Administrative data on overhead expenditure at programme and project levels, speed of processing applications and contracts, other bureaucratic hurdles, etc • Qualitative indicators of efficiency, trust, management improvement, contractual effectiveness • Indicators of clarity of JTI documents addressing prospective applicants and of extent of absorption by applicants 	<ul style="list-style-type: none"> • Mechanism for structured reflection on the different dimensions of implementation – process for continuous process improvement • Survey of client satisfaction (participants and of non-participants, including non-applicants, rejected applicants, 'near misses') regarding managerial aspects of consortia (EU funded and not) • Focus groups of participants, stakeholders • Public consultation • Interviews with Commission officials and member state officials

Table 10: Effectiveness - Methods, Indicators and Data Sources

<p><i>Has there been progress towards achieving the targets set in its SRA?</i></p> <p><i>What are the most important outputs, early outcomes and early impacts of the JTI?</i></p> <p><i>Did the interactions of the network members grow since the implementation of the JTIs?</i></p> <p><i>What is the achieved economic impact at the firm/participant level, what is the technological impact at the sector level, which socio-economic impact might arise due to the achieved results?</i></p> <p><i>What progress has been made in setting up a long term, tripartite public-private partnership?</i></p> <p><i>Has the JTI made a difference? Did it induce participants to activities that would not have been carried out without the programme?</i></p>		
<i>Methodologies</i>	<i>Principle Indicators</i>	<i>Data Sources</i>
<ul style="list-style-type: none"> • Study on input / behavioural additionality • Case Studies at programme and consortium levels (selectively) • Network analysis • Focus group reports • Study on relative (and changing) competitiveness of private sector participants • Study on market effects of relevant IST RTD 	<ul style="list-style-type: none"> • Importance of the JTI RTD programme for the strategies of participants • Progress towards technology application, deployment • Creation, expansion, maintenance of important networks • European knowledge hubs at global level • Competitiveness indicators for private sector • Indicators of JTI RTD applications usage by the public and private sectors and by households 	<ul style="list-style-type: none"> • Monitoring by the Commission and Member States • Focus groups of industry, stakeholders (participation of non European experts highly desirable) • Interviews with Commission officials and member state officials • European Competitiveness Report • Participant surveys

* Extant data collection instrument: needs standardization, restructuring to produce simple, quantifiable, standardized information

** New data collection instrument: standardized

Table 11: Quality - Methods, Indicators and Data Sources

<i>Is the quality of research under way satisfactory?</i>		
<i>Analytical Methodologies</i>	<i>Principle Indicators</i>	<i>Data Sources</i>
<ul style="list-style-type: none"> • Case Studies at consortium level • Econometric study on company performance • Study on relative (and changing) competitiveness of private sector participants • Study on market effects of relevant IST RTD 	<ul style="list-style-type: none"> • Knowledge advancements: New facts, news processes, new products • Patent applications • Research activities: Intensification and diversification of research activities • Conference appearances, conference proceedings • Scientific papers, working and published • Market impact: revenues of new products and services due to JTI activities (as % of firm total and market share), profits from products and services due to JTI activities (as % of firm total and market share), sustainable international competitiveness • HR dimension (attracting PhDs, leading scientists in the programmes, etc) • European knowledge hubs at global level • Indicators of JTI RTD applications usage by the public and private sectors and by households 	<ul style="list-style-type: none"> • New product announcements a) Dialog's NPA/plus database b) RDS Business & Industry databank (owned by the Gale Group) • RTD project and participant data from Commission • Entry Survey of programme participants (**) • Annual Reports of RTD projects (*) • Exit Survey of programme participants (**) • EPO patent databases • USPTO patent databases • ISI bibliometric databases • SCOPUS data

3.4 Ex-post Evaluation

The ex-post evaluation is to be completed within six months after the JTI's (final) 10th fiscal year. There are no explicit specifications in the JTI Statutes over the ex-post evaluation. However, the proposal of the Commission for the Seventh Framework Programme calls for an external evaluation concentrating on the Programme's rationale, implementation and achievements. These will be the general guidelines for the INFSO JTIs.

The general keywords for the evaluation are given by the long term objectives of Community research, including leadership, effectiveness, innovation capabilities of industry, competitiveness, critical mass, key social (environment, cohesion) and economic (growth, employment) challenges, efficiency in programme implementation, better integration of public and private RTD effort, and strengthening the ERA.

The ex-post evaluation of a JTI is envisioned as an extensive case study which, in addition to extensive description of the organizational structure, time evolution, and objectives, will be based on both quantitative and qualitative investigation

3.4.1 Evaluative Questions

Evaluative questions and their relationship to the specific JTI objectives (outlined in section 1.3.2) and expected results (outlined in section 1.3.4) are listed in the table below.¹¹

Table 12: Evaluative Questions for the Ex Post Evaluation

	Objectives (as in section 1.3.2)	Evaluative Questions	Results (as in section 1.3.4)
Relevance	A	In retrospect, were the rationale and intervention logic for the JTI appropriate?	B
		Was the research portfolio (following the implementation of the Research Agenda) appropriate overall?	D

¹¹ The evaluation issues of Utility and Sustainability that apply in ex post evaluation (Table 1) have not been singled out in Table 12 for simplicity. Their essence is largely covered by the questions relating to the issues Relevance and Effectiveness.

		Has the JTI strengthened European competitiveness and sustainability and allowed for the emergence of new markets and societal applications?	
Efficiency	B D E	Has the implementation of the Programme been satisfactory?	
		Were the overall legal framework and the modalities for implementation of the JTI clear, appropriate and effective?	
		Were the activities of the JTI carried out efficiently and were they cost effective?	C A
		Did the activities of the JTI constitute effective methods of achieving the targets set?	
		Were the level of funding and other available resources adequate?	
		Were the targeted industrial and research communities, including SMEs, able to respond appropriately?	
Effectiveness	D C A	What have been, the outputs, outcomes and impacts of the JTI?	D A
		Has the JTI affected the industrial organization and the behaviour of individual players in the affected sectors? These could be reflected in:	
		<ul style="list-style-type: none"> ◆ Achieving critical mass ◆ Inducing participants to activities that would not have been carried out without the JTI (input and behavioural additionality) ◆ Disseminating knowledge more efficiently ◆ Integrating core organizations with more peripheral ones and integrating European organizations with global “knowledge hubs” ◆ Advancing regional innovativeness and entrepreneurship ◆ Advancing ERA 	
		Has the JTI made a difference? Did it induce participants to activities that would not have been carried out without the programme?	

3.4.2 Evaluation Methods and Data requirements

In order to assess the JTI achievements, i.e. the outputs outcomes and early impacts of JTI activities, on industrial structure, and on the behaviour of individual players in the affected sectors a series of qualitative and quantitative assessments must be undertaken. The principal instruments for information collection should include participant surveys in order to evalu-

ate direct and indirect effects of JTI funding. Case studies and Cost Benefit analyses could also provide further insight into private returns (the returns to project participants), and social returns (including the returns to others beyond the project participants and broad societal benefits).

At this stage, the balance of analytical methods tilts towards more quantitative approaches. Econometric and advanced statistical analyses will prove most useful in associating JTI RTD outputs to participant performance and societal benefits. These analyses should be based on combinations of publicly available data (patents, citations, publications, alliances, financial performance) and customized survey data. The econometric and statistical analyses should widely use control group approaches (e.g. matched pairs) to compare successful participants with non-successful applicants and non-participants. Social network analysis can inform policy makers of the changing industrial landscape and the effect of the JTI in that transformation. It can point to “hub” organizations and their critical roles in maintaining the connectivity of the network and the progress towards the ERA. Furthermore, benchmarking procedures can be used to obtain snapshots of the relative performance of the JTIs.

Table 13: Relevance - Methods, Indicators and Data Sources

<i>In retrospect, were the rationale and intervention logic for the JTI appropriate?</i>		
<i>Was the research portfolio (following the implementation of the Research Agenda) appropriate overall?</i>		
<i>Has the JTI strengthened European competitiveness and sustainability and allowed for the emergence of new markets and societal applications?</i>		
<i>Methodologies</i>	<i>Principle Indicators</i>	<i>Data Sources</i>
<ul style="list-style-type: none"> • Identification of market / systemic failure as a rationale for the intervention • Logic analysis of the relations between objectives and instruments • Analysis of subsidiarity vis a vis national programmes • Policy studies from member countries • Qualitative analysis of policy goals attached to the JTI • Analysis of the sectoral innovation system that includes the JTI activities 	<ul style="list-style-type: none"> • Policy objectives benchmarks: intended v. achieved • Linkages between items on logic chart (objectives, interventions, outputs, outcomes) • Subsidiarity indicators • Technical added value • Economic added value 	<ul style="list-style-type: none"> • Policy studies from countries, EU, OECD • European Competitiveness Report • Ex ante evaluation of JTI • Trendchart, IST policies of Member States • Interviews with Commission and Member State officials • Trendchart, IST policies of Member States • Expert reviews • Focus groups

Table 14: Efficiency - Methods, Indicators and Data Sources

<i>Has the implementation of the Programme been satisfactory?</i>		
<i>Were the overall legal framework and the modalities for implementation of the JTI clear, appropriate and effective?</i>		
<i>Were the activities of the JTI carried out efficiently and were they cost effective?</i>		
<i>Did the activities of the JTI constitute effective methods of achieving the targets set?</i>		
<i>Were the level of funding and other available resources adequate?</i>		
<i>Were the targeted industrial and research communities, including SMEs, able to respond appropriately?</i>		
<i>Methodologies</i>	<i>Principle Indicators</i>	<i>Data Sources</i>
<ul style="list-style-type: none"> • Synthesis of information from established mechanism for structured reflection on implementation dimensions • Benchmarking study comparing managerial aspects of JTI-funded consortia and other collaborative RTD projects • Study on appropriateness and effectiveness of funding schemes • Expert Panel deliberations and report 	<ul style="list-style-type: none"> • Importance of the JTI for the strategies of participants • Progress towards technology application, deployment • Creation, expansion, maintenance of important networks • European knowledge hubs at global level • Competitiveness indicators for private sector • Indicators of product market penetration – extent of usage • Administrative data on overhead expenditure at programme and project levels, speed of processing applications and contracts, other bureaucratic hurdles, etc • Qualitative indicators of efficiency, trust, management improvement, contractual effectiveness • Indicators of clarity of JTI documents addressing prospective applicants and absorption extent by applicants 	<ul style="list-style-type: none"> • Focus groups of industry, stakeholders • Policy studies from countries, EU, OECD • European Competitiveness Report • Ex ante evaluation of JTI • Mechanism for structured reflection on the different dimensions of implementation – process for continuous process improvement (**) • Survey of client satisfaction (participants and non-participants, including non-applicants, rejected applicants, ‘near misses’) regarding managerial aspects of consortia (EU funded and not) (**) • Focus groups of participants, stakeholders • Public consultation • Interviews with Commission officials and member state officials

Table 15: Effectiveness - Methods, Indicators and Data Sources

<i>What have been, the outputs, outcomes and impacts of the JTI?</i>		
<i>Has the JTI affected the industrial organization and the behaviour of individual players in the affected sectors?</i>		
<i>Has the JTI made a difference? Did it induce participants to activities that would not have been carried out without the programme?</i>		
<i>Methodologies</i>	<i>Principle Indicators</i>	<i>Data Sources</i>
<ul style="list-style-type: none"> • Case studies of representative consortia, organizations • Econometric analyses and advanced statistical analyses to address questions of participant innovative and financial performance, spillovers, benefits to society. • CBA and social CBA for larger projects such as selected IPs • Market studies on industry level and by technology area • (Social) Network analysis of organizations in JTI and rest of FP7 • Study on the evolving organization of industries related to IST RTD • Comparative study on regional innovativeness and entrepreneurship • Progress report on advancing ERA 	<ul style="list-style-type: none"> • Indicators of scientific achievements by participants: <ul style="list-style-type: none"> - Conference appearances, conference proceedings - Scientific papers, working and published - HR dimension (attracting PhDs, leading scientists in the programmes, etc • Indicators of innovative performance by participants and their and innovation capacity: <ul style="list-style-type: none"> - patents - products at planning stage - prototypes - newly introduced products, - turnover from these products, (expected / realized), etc. • Indicators of other benefits to participants: <ul style="list-style-type: none"> - Networking - Research awareness - Market awareness - Goodwill • Indicators of broader impacts: <ul style="list-style-type: none"> - consumer and producer rents - spillover effects - positive and negative externalities - hedonic prices 	<ul style="list-style-type: none"> • RTD project and participant data from Commission • Annual Reports of RTD projects (*) • Entry and Exit Survey of programme participants (**) • EPO patent databases • USPTO patent databases • ISI bibliometric databases • New product announcements a) Dialog's NPA/plus database b) RDS Business & Industry databank (owned by the Gale Group) • Community Innovation Survey • International statistics on relevant markets and technology areas • Publicly available statistical information on industry structure, conduct and performance • Commission administrative data on projects and participants (Cordis) • Case study narratives • Regional activity data

	<ul style="list-style-type: none"> • Critical mass indicators (economies of scale, economies of scope, other) • Leverage effects (input additionality), measures of full / partial / negative additionality, network relations (centrality etc) • Indicators of network evolution such as the creation / strengthening of 'hubs', network positioning, status, competitiveness • Overlapping structures of FP-funded and other regional / national networks, especially for deployment of ICTs • Indicators of industrial organization such as entry, exit, concentration, competition, market penetration, technology diffusion and utilization, etc 	<p>sources (local/national governments, think tanks, regional development associations)</p> <ul style="list-style-type: none"> • Interviews with regional government and industry leaders
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Note: It should be stressed that we view the evaluative questions defined in this Chapter as a stable 'common ground' but the suggested analytical methodologies and indicators as indicative. The reason, of course, is that a question may be addressed in different ways depending on the technical and socio-economic environment of a specific activity. The final determination of the exact methodology(ies) to answer a specific question can be made only after specifying the particular analytical domain in terms of technologies, sectors, and organizations.

4 Organization

4.1 Major JTI Evaluation Challenges

It is worth summarizing again here several issues to be considered when setting up the various evaluation exercises for JTIs (interim, ex-post):

- JTI objectives and tasks that are manifold and, to a large extent, specific to the technological field and the market environment in which the JTI sets up its operations.
- Very particular set-up of the public-private partnership with the Commission joining forces with both national governments and the private sector, universities and research institutes.
- Twofold mission: funding and coordination.
- Socioeconomic and environmental expected impacts that differ according to the research field and activities of the respective JTI.

Furthermore, the evaluation of JTIs is subject to a couple of generic evaluation difficulties, as originally noted in the Blueprint of the Evaluation and Monitoring of the IST R&D:¹²

- Attribution: Possibly the single most difficult challenge in the evaluation of JTIs is the difficulty of deciphering the additional value that the Commission's funding and coordination provides given the multiple funding sources involved (Community, Member States, participants).
- Portfolio effects: The need for appraising portfolio effects, based on knowledge and network spillovers among participants and synergies among technology fields and markets, becomes very strong for JTIs. The delineation of the various kinds of synergies and spillovers becomes a core part of the evaluation.

¹² Wolfgang Polt and Nicholas S. Vonortas "IST Evaluation and Monitoring", Joanneum Research, Report to DG INFSO, December 2006.

4.2 Institutional setting of the JTI Evaluations

In view of the above difficulties, the evaluation of JTIs must be overseen and coordinated by strong Expert Panels of exceptional knowledge breadth and dedication. Panels of independent experts should be constituted to oversee the evaluation effort in both cases of interim and ex-post evaluations. The panel will deliberate early on to determine the core evaluation questions –founded on the questions exposed in the previous chapter – and to determine the background reports and evaluative studies to be commissioned. They will deliberate later to consider the variegated results of the evaluative studies and, on the basis of the broad experience of their members with IST research, markets and policy, to report the result of the evaluations overall.

Due to the need for balancing the challenges mentioned above, the membership of the Expert Panel must be composed of technical experts, evaluation experts, and experts in the areas of S&T policy and business strategy. A mixture of representatives from the ICT industries and academia is advised. The deliberations of the Panel should be largely based on the evidence from the supporting studies outlined for the various funding instruments in the previous subsections. The Panel should also have available some resources to commission a limited number of studies according to the opinion of the Panel members.

The quality of the panel's judgement or analysis will depend on the experts' knowledge, experience, independence and willingness to fully participate in the evaluation exercise. As with any subjective assessment, there is the potential problem of credibility. It may also be difficult to select a wide enough range or large enough group of experts, and different stakeholders may claim different (groups of) experts. Since experts are unlikely to be equally knowledgeable about a particular area, some sort of weighting system should be applied. Still, there is the possibility of the "chatty bias" i.e. the views or more outspoken experts stand out although their view may not be representative. It is of utmost importance that the expert panels opinions should never be the only source of data or analysis; rather, the experts' synthetic view should depend on a variety of independent, objective sources of information.

Ideally, one Expert Panel would be constituted at the early stages of a JTI to follow the whole cycle of evaluation. The long lifespan period of a JTI (10 years), however, would make it impractical to maintain continuation of such a panel. We thus consider it more feasible to suggest the formation of two Experts Panels:

- One Panel should be set-up to oversee the two interim evaluations of the JTI.
- A second Panel should be set-up to oversee the ex-post evaluation of the JTI.
- Each of these Panels should comprise about seven to nine members of highly skilled people from industry and academia that will have the support of all stakeholders of this complex public-private partnership.

- To achieve continuation, it may be that a number of panel members will serve on both Expert Panels.

Given the time needed to compile the extant evaluative and background studies and to commission new, and in view of past experience with time constraints, it is advisable to install the first Expert Panel as close as possible to the initiation of the JTI. So constituted, the Panel members can meet once at the very beginning of their term to decide on the major axes of their work regarding the core evaluative questions and the evaluation strategy. They can then meet once per year at maximum to oversee progress with the continuing evaluation of the initiative. The Panel should assume its regular meetings 6-8 months before the deadline for the completion of the evaluation report (two interims and ex-post).

4.3 Background Studies

The evaluative questions for the JTIs cannot be addressed in a one-shot appraisal. On the contrary, data collection and the appropriate evaluation studies must be an on-going operation during the JTI's life-cycle. Moreover, a series of background studies must be launched to allow a concerted view on the contextual environment of the JTI – and the evolution of that environment – and support the two interim evaluations and the ex post evaluations. The background studies will serve as important benchmarks and should be repeated at the four important stages of the evaluation lifecycle of the JTI, including initiation, first interim, second interim, and ex-post evaluation. We recommend to perform the following background studies:

- A study delineating the borders of the thematic areas of the JTI, linking these areas to industry sectors, and reporting the distribution of competencies and technologies around the globe.
- A study of the sectoral innovation system that includes the activities of the JTI. Among others, this study should extend to regional innovativeness and entrepreneurship in Europe as well as market structure and company performance in the thematic areas of the JTI.
- A study of the policy rationales and objectives regarding the JTI from the point of view of Member states, linking these to their national/regional policies.

4.4 Information Acquisition through Project Participant Surveys

The Blueprint on IST Monitoring and Evaluation for IST suggested that an Entry Survey and an Exit Survey be instituted to provide snapshots of the project participants at the beginning

and at the end of projects and a summary of project results. A similar procedure should be implemented in the case of the JTIs.

In order to retrieve an overview about projects managed by the JTIs and its respective programme participants, an Entry Survey should be filled by all programme participants at the initiation of their RTD projects. The survey instrument should be simple and focus on participant characteristics and their own expectations for the specific RTD project they are about to engage in. The themes of the entry survey could include:

- Basic business data for the participating unit such as industry classification, size (turnover, employees), RTD investment
 - Objectives for participating in the specific RTD project supported by the JTI
 - RTD objectives
- Business objectives
- Initial considerations/expectations regarding the specific RTD collaboration.

An Exit Survey, to be required by all programme participants at the completion of their RTD projects, should follow a simple format and should focus on the following aspects:

- Obtained or expected outputs
- Effects of the project on the responding participant
- Issues of consortium management
- Impressions of the functioning of the specific JTI programme.

In addition to the Entry and Exit Surveys, the ex-post evaluation of the JTI will require more detailed data about the characteristics of the participants, their strategic behaviour regarding the specific RTD project and beyond, and their views regarding the added value (additionality) of this project. The only instrument available to obtain such information in a semi-quantitative form useful for evaluative analysis remains the participant survey.¹³ The Expert Panel should be aware of this need and make sure to allocate the appropriate resources. At a minimum, the Participant Survey will gather information on:

Basic business data for the participating unit should ensure that the industrial sectors affected and the participating firms may be characterised. The data should include:

¹³ Such surveys have been repeatedly implemented before in relation to the evaluation of the Framework Programme.

- The NACE code(s) at the 4 digit level for the participating business unit
- Turnover data of the enterprise unit for the last three years
- Export data of the enterprise for the last three years
- RTD investment data for the last three years
- Human capital devoted to project implementation
 - Number of scientists, functional backgrounds, levels of seniority and technical work experience should be included. Possibly also man-months allocated to the project should be gathered.

Innovation and research history data should provide a first picture on the innovation capacity of the participating firms. The following categories should be included:

- Patenting data of the participating business unit for the last three years
- Publication data of the participating business unit for the last three years
- Product innovation in the past three years (new-to-the market; new-to-the-firm)
- Process innovation in the past three years
- Percentage of turnover from new/improved products in the past three years

Qualitative information characterising the market and the strategic orientation of the RTD project participant.

Co-operation data should provide a picture of the absorptive capacity and additionality of the participating firms. The survey should ask for the number, types, and “character” of collaborative R&D projects the partners have engaged in the past: Data should include:

- number of projects
- EU vs. own-funded projects
- scientific and commercial risks of these projects
- distance from partners’ core technological expertise

Additionality data are of utmost importance in evaluation activities as publicly funded collaborative R&D is inherently linked to specific strategic and operational objectives of the respective policy measure. In its simplest meaning, additionality can be understood as the difference between the states of the world that would have occurred with and without a public

programme. More specific, additionality addresses the issue of whether public support is resulting in new activity rather than in substituting private support for the specific activity that would have occurred in the absence of the intervention. For the entry survey, we suggest to put focus on issues of behavioural additionality, which can be defined as the difference in firm behaviour resulting from a government intervention, and on input additionality, which considers whether the funding the government provides to a firm supplements the firm's own expenditures or substitutes for them. We suggest that the Entry Survey questions should gather input additionality indicators of the following type:

- Substitution of private capital by public capital (an enlargement of the project implies that the aid has not substituted private capital)
- Existence of alternative financial sources (implies that one source of funding could be substituted by another source, which might not necessarily be own sources)
- Impossibility to carry out the project without public aid:
 - Without public aid the project would have been carried out in the same way (implies substitution)
 - Without public aid the project would not have been possible (implies no substitution / full additionality)
 - Due to public aid it was possible to carry out the project in the form and extensity (implies partial additionality)

Information on aspects of behavioural additionality should be gathered by comparing the type of RTD projects that are to be carried out with JTI support to other RTD activities in the portfolio of programme participants and by the positioning of the publicly funded RTD project within the participants' overall RTD portfolio (Polt and Streicher 2005). Furthermore questions regarding the motives of participation should be put forward.

In conclusion, it is important to stress that the obtained information from all three surveys should be of a form that makes it amenable to analysis in conjunction to other publicly available information. That is to say, the answers should not be in qualitative, free format form. They should rather be confined to specific categories and quantified as is frequently the case with Likert scales.