Danube Transnational Programme

RI2integrate

Macro regional guideline for RI embeddedness

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Content

1. Aim of the project

The main objective of RI2integrate project is to exploit the economic development potential and to better the integration of the operation of the EU's excellent R&D Infrastructure (RI) investment projects through devising and implementing innovative tools for policy learning on macro-regional embeddedness in the Danube Region.

The main result is the improved transfer of scientific results into the economy in the Danube Region, in line with the different needs of the participating countries by the improvement of cross-linkages among the R&D, SMEs, community and government. As the main outputs, 3 tools will be developed and tested for boosting macro-regional embeddedness of RIs (1 public procurement on innovation utilization guide; 1 guideline for aiding the RI related business ecosystem ; 1 roadmap for community dissemination). To ensure policy durability, 7 National and 1 Joint Action Plans will be developed and a transnational RI2integrate Committee will be funded covering all Danube countries.

The main novelty of RI2integrate is two-fold. It's methodology foresees the combination of the Smart Specialization approach (from the expert side) and the Quadruple Helix model (from the stakeholder perspective). Additionally, as a policy driven novelty, the project creates synergies between different EU and territorial funding instruments.

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2. Aim of the guideline

The Macro regional guideline for RI embeddedness deals with the definition of a framework in the sense of a technology transfer model which will focus on the different elements of which the model is typically composed. In doing so, its aim is to provide a deeper understanding of the interactions of a research infrastructure within a technology transfer system. Aside from giving theoretical insight into the subject of technology transfer, stakeholders of a transfer project as well as supporting and inhibiting factors in transfer processes are identified and the specific role of research infrastructures in the role of technology transfer facilitators are discussed.

Furthermore best practice initiatives from the project partner countries and the establishment of NEG (National Expert Groups) as initiatives of research infrastructures are discussed.

The main objective of the Macro regional guideline for RI embeddedness has been fixed with deep knowledge on all territorial challenges. All mentioned challenges have been integrated and the main objective have finalized as: to exploit the economic development potential and to better the integration of the operation of the EU's excellent R&D Infrastructure investment projects through devising and implementing innovative tools for policy learning on macro-regional embeddedness in the Danube Region.

Following the addressed challenges, the Macro regional guideline for RI embeddedness will improve strategic frameworks and cooperation in order to build up excellent research infrastructure in the Danube region. It will be realized through develop a new networking platform and tools along QH with the involvement of R&D institutions, public authorities, SMEs and NGOs and develop new tools addressing the identified challenges.

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3. The Technology Transfer Model for Research Infrastructures (RI)

The technology transfer model, as depicted in figure 1, essentially represents the general connections within the economic development potential and the better integration of the operation of the EU's excellent R&D Infrastructure (RI).
In line with the project RI2Integrate, it is aimed at working as a guideline and thus provides an overview on the integration to the transfer system.

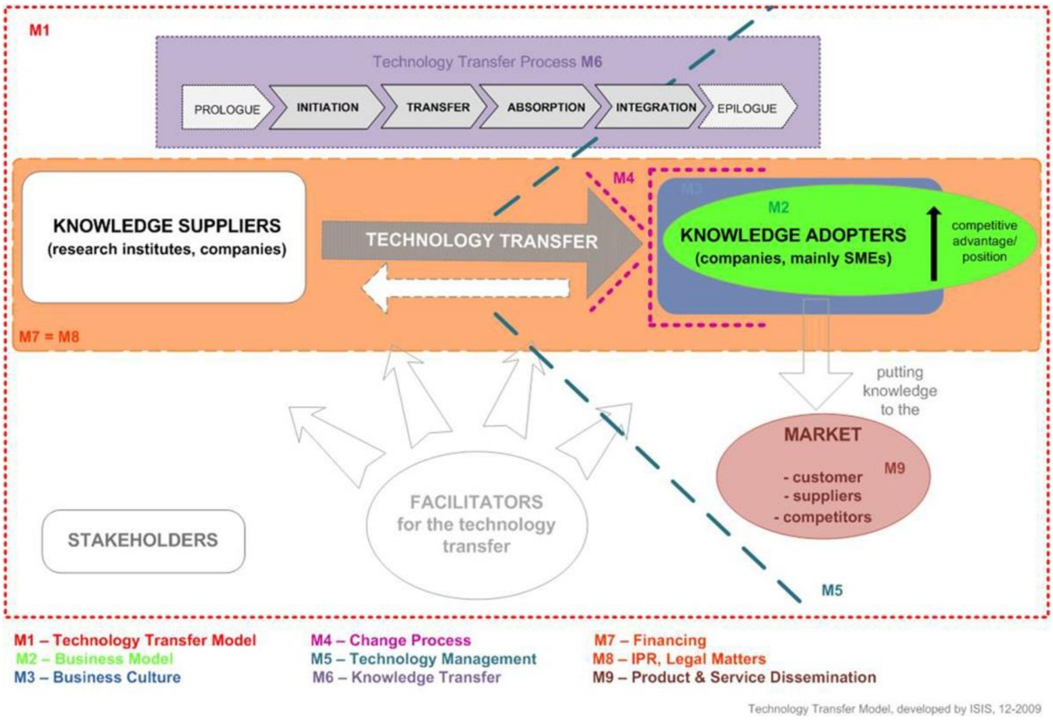

Figure 1: Technology Transfer Model [Source: ISIS, 2009]

It can be obtained from figure 1 that the technology transfer model is composed of several elements, all of which will be discussed in detail within the following sections. In short, the model comprises the (knowledge and) technology transfer process itself which is typically a two-way-process between knowledge suppliers (e.g. research institutions, companies) and knowledge adopters (e.g. companies) and which consists of six transfer phases to run through. During a transfer process, however, several barriers, obstacles and resistances but also supporting factors may arise and have an impact on the transfer outcome. In such a situation, it is an essential task of a research infrastructure to identify those transfer-inhibiting factors and to set appropriate measures, but also to interconnect knowledge and technology suppliers

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with adopters beforehand and to support them in transfer processes in order to improve and intensify transfer activities. Similarly, the stakeholders of the transfer project are an integrated part of the model as they can significantly influence the transfer's progress and outcome.

3.1. Description of the RI2Integrate model

Before this chapter begins to deal with the subject of technology transfer, it seems to be useful to first of all systematize the different transfer forms and to define a technology transfer. As can be seen in figure 2, research transfer from one organization or individual to another may comprise transfer of data, information and knowledge as well as technology.

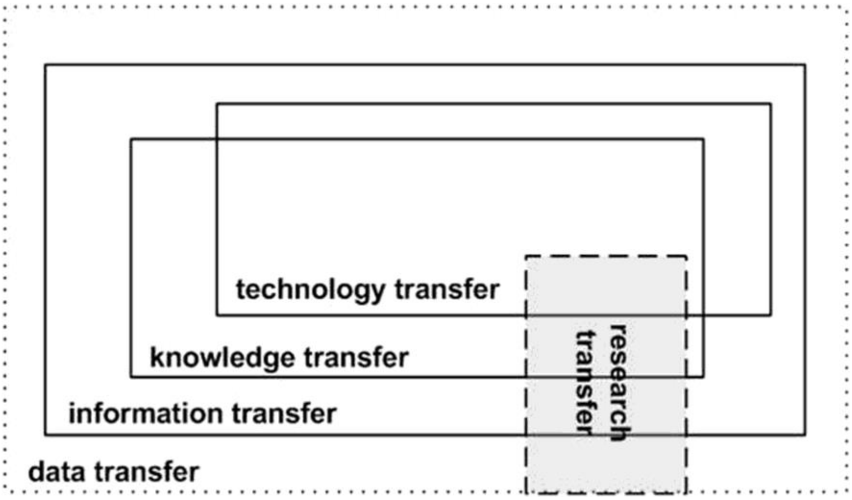

Figure 2: Systematization of transfer forms [Source: ISIS, 2009]

In general, a *DATA* is an incoherent fact but contains potential to be interpreted. *INFORMATION*, however, consists of data which was categorized or classified by someone and already possesses context and structure. This structure generally allows for filing and locating the data. *KNOWLEDGE*, in turn, is composed of data and information and is always linked to an individual. It can only be developed through learning effects where previous experiences of the respective individual are integrated. Thus, machines are able store data and information, but knowledge can only be accumulated and stored by human beings.

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In theory and practice, the terms *KNOWLEDGE TRANSFER* and *TECHNOLOGY TRANSFER* are often used synonymical, but in line with this training they are clearly interpreted as self-contained terms: While *TECHNOLOGY TRANSFER* comprises the exchange of technological and technology-related knowledge between individuals and organizations, *KNOWLEDGE TRANSFER* refers to the exchange of any kind of knowledge which is aimed at enlarging the receivers' knowledge base. Thus, transfer objects can differ, but not necessarily. However, *KNOWLEDGE TRANSFER* can be used as a generic term as this transfer form inevitably covers all areas of *TECHNOLOGY TRANSFER*.

A technology transfer typically has specific characteristics which may also have an influence on the transfer process. In the following figure, characteristics in regard to planning, the interaction of all involved, convertibility as well as uncertainty are presented briefly.

Interaction of all the involved	Planning
• Individuals have a central role in the transfer process • They contribute to the transfer process's success • A continuous interaction of all people involved is necessary for the transfer process and promotes the quality and extent of the transfer	• Knowledge is not only transferred in one knowledge flow • Transfer of knowledge can be planned or unplanned • If knowledge is consciously transferred, the transfer has to be planned • There are a lot of unplanned transfers of knowledge within a company • The external technology transfer is a planned transfer

Modification	Uncertainty
• The demand for the knowledge transferred may change during the transfer process • A new demand for knowledge may develop during the transfer process • The technology provider, transfer facilitator and technology recipient need to remain flexible because of changes in technology	• Three groups of technology uncertainty exist: technology novelty, technology complexity and technology tacitness • Technology novelty refers to the degree of prior experience implemented in technology • Technology complexity includes the level of interdependence between components in the respective technology, level of interdependence between the technology and elements external to it • Technology tacitness refers to the tacitness of the knowledge embodied in the technology and includes the degree to which the technology is physically embodied, codified, and complete

Figure 3: Characteristics of Technology Transfer [According to: Singer, 2009]

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It should be noted that a technology transfer holds characteristics similar to those of a service innovation. In short, a service innovation can be understood as a novel ends-means combination which may occur on the potential level, process level or outcome level. The methods and concepts of the service provider can be considered as the means which fulfill the end of innovation. Since the customer is integrated in the service production process, he/she also recognizes the potential and process level of the provider and is therefore able to register and to appreciate the value of innovation.

Figure 4 presents the typical characteristics of service innovations and points out the congruent characteristics with technology transfers.

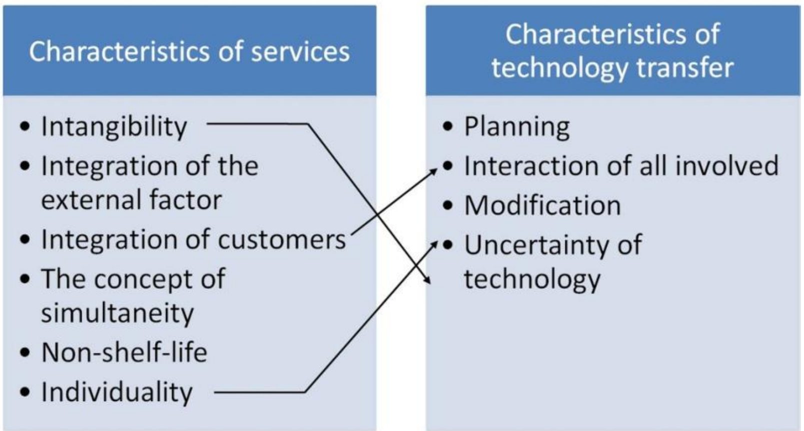

Figure 4: Congruent characteristics of service innovations and technology transfers [Source: Singer, 2009]

3.2. The Technology Transfer Process

In general, a transfer process begins when a sender (e.g. a research institution) creates and codes a certain knowledge content (e.g. information, research results, technologies). This content is then transmitted through some transfer channel to the receiver (e.g. a company) who decodes and interprets the content according to his/her cultural background, values and reference systems.

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Finally, the knowledge adopter may return a signal to the provider, which confirms that the transmitted content has or has not been understood.

A technology transfer process consists of the transfer phases *INITIATION*, *TRANSFER*, *ABSORPTION* and *INTEGRATION* and is accompanied by an initial *PROLOGUE* and a concluding *EPILOGUE* (see fig. 1).

3.3. Technology Transfer between research infrastructures and industry

Considering the escalation of technological competition, the shortening of product life cycles and the increase in the cost of modern research, an intensification of technology and knowledge transfer from research institutions, especially to small and medium enterprises (SMEs), is becoming increasingly important.

In general, such collaboration with academic and non-academic research institutions can bear several advantages for companies:

- Companies can focus on their core competences and the enforcement of their products in the competitive market.
- There is no need for one's own research infrastructure which is necessary for the development of new products and processes. This seems to be especially beneficial for SMEs, as they often face the problem of lacking in-house research infrastructure. High quality development requires the input of experts from different disciplines and from academia.
- The pressure on companies to innovate at ever shorter intervals in order to survive in the international competition is increasing. The basis for this development and the ability to compete is largely provided by new scientific findings of academia.
- The increasing importance of multi-disciplinary-based innovations requires a sourcing of a lack of know-how from research institutions.
- Modern technology fields such as nanotechnology, optical technology, new production technologies, etc. are interdisciplinary and highly science-bound. Therefore they require close cooperation with research institutions.

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3.4. Types of interaction between research institutions and companies

Technology and knowledge transfer between research institutions and companies can take place in many different ways. Basically, three main types of interaction can be distinguished: transfer of human resources, transfer of research results and technology, and transfer of information. Figure 5 presents some possibilities of interaction and shows their prevalence according to a survey carried out by Schartinger et al. with Austrian universities and innovative firms.

Survey of university departments: Types of interaction	% of respondents
Supervision/financing of Ph.D.s and Masters theses	38 %
Lectures by firm members at universities	35 %
Contract research	32 %
Joint research	31 %
Employment of university researchers in the business sector	30 %
Joint Publications	28 %
Training of firm members	27 %
Spin-off formations of new firms	14 %
Temporary movement of university members to the business sector	9 %

n = 421

Survey of innovative firms: Types of interaction	% of respondents
Employment of graduates	67 %
Supervision/financing of Ph.D.s and Masters theses	42 %
Contract research	32 %
Joint research	23 %
International research networks	30 %
Employment of university researchers in the business sector	7 %
License agreements	7 %

n = 99

Source: Surveys 1998/99. Percentage of respondents that mentioned to engage at least once in the corresponding type of interaction.

Figure 5: Types of interaction between universities and firms in Austria 1995-1998 [Source: Schartinger et al., 2001]

Analysis of the survey reveals that the transfer of human resources in the form of university graduates seems to be the most favored type of interaction.

A similar picture of the various forms of interaction shows a survey carried out by Eibel with members of the research staff at the Karl-Franzens-University Graz, Austria. The following figure represents the obtained results in regard to the relevance of the different types of interaction for this university and provides practical insight into its transfer activities.

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Types of interaction (according to elicitation with members of research staff, KFU)	Median
Joint accomplishment of research projects	2,49
Publications	2,46
Congresses and conferences	2,33
Informal contacts	2,13
Bachelor-, Masterthesis, Dissertations	1,66
Consulting and furnish of opinions	1,48
Personal transfer	1,45
Contract research	1,44
Testing of results concerning applicability and usability	1,22
Joint use of equipment	0,74
Proprietary use of results obtained in R&D	0,51
Spin-offs	0,49
Other	0,09
0 = not important, 1 = important, 2 = rather important, 3 = very important	

Figure 6: Types of interaction between Karl-Franzens-University Graz and industry, ranked acc. to their relevance [Source: Eibel, 2008]

3.5. Benefits for companies when collaborating with RI´s

As already touched on in this chapter, companies can benefit from collaboration with research institutions in quite various ways. In order to get a more differentiated picture on how research infrastructures favorably contribute to the innovative capacities of firms, figure 7 summarizes results of a survey carried out by Schartinger et al. with innovative Austrian firms:

	% of firms answering 3 or 4	Mean values on a 1–4 scale (1 = not important, 4 = very important)			Own R&D-department	
		By firm size (number of employees)				
Potential types of benefits	$n = 99$	1–50	51–200	201 and more	Yes	No
Highly skilled personnel (university graduates)	63.7	2.22***	2.52***	3.26***	3.05***	2.18***
Ideas for new products and processes	47.2	2.53	2.40	2.04	2.19	2.50
General and useful information	42.7	2.32	2.24	2.33	2.29	2.31
Direct support in development process	41.1	2.08**	2.28**	2.67**	2.37	2.25
New instruments and techniques	37.9	2.22	2.20	2.42	2.39	2.17
Results of basic research	33.3	2.19	2.04	1.96	2.18	1.98
Consulting services	32.8	1.86**	1.96**	2.33**	2.02	2.04

Source: Survey of innovative firms, tip. ***level of significance ($p < 0.01$), **level of significance ($p < 0.05$).

Figure 7: General benefits from universities [Source: Schartinger et al., 2001]

It can be obtained from figure 7 that the following seven main channels are the most important types of benefit from collaboration with research infrastructures for companies. In order of importance: the employment of educated and highly skilled personnel, ideas for new products and processes, the provision of general and useful information, direct support in the development process, creation of new instruments and techniques, the provision of results of basic research and the usage of consulting services.

This result corresponds with most other studies on this issue and confirms the widely acknowledged importance of RI´s and the significant role they play in boosting innovative capacities of firms. Please note that the valuation of benefits differ depending on firm size as well as on the existence of an in-house R&D department (see column 2 and 3 in fig. 7 for details).

3.6. Recommendations

The following recommendations concerning the RI utilization model can be summarized:

- Definition of transfer process and form an integrated business model
- Definition of roles in the transfer process, especially SME´s should have a special attention
- Definition of types of interaction between RI´s and companies
- Definition of benefits of collaboration with RI´s
- Define stakeholder, clients around RI´s and form a “science park”
- Public authorities are essential stakeholders for a science park which have to be strongly involved, because of PPI as an input factor

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4. Stakeholder analysis in the Technology Transfer Process

In the RI2Integrate project stakeholder consultations were also carried out. When planning a scientific know-how transfer into a business practice (that is, a technology transfer process) between research institutions and companies, it is quite important to consider all the stakeholders that are directly or indirectly involved in the transfer project. This seems necessary as they can significantly influence the project's progress and outcome.

In terms of technology transfer processes, a stakeholder can be understood as an individual or organization that is actively involved in the project, that is funding it and that has a particular interest in the projects' successful outcome. It should be kept in mind that each stakeholder may have a positive or negative influence on the project and its outcome, and will always be affected by the result. Awareness of the external and internal stakeholders as well as the creation of positive relationships by managing stakeholders' interests, expectations, objectives, requirements, etc. is of high importance to ensure a project's smooth progress, to gain stakeholder support and to avoid conflicts among different stakeholders or stakeholder groups. Thus, stakeholder management is required in order to run a transfer process successfully and to achieve its strategic objectives.

In general, a stakeholder management strategy is based upon information that is usually gathered in three different steps, which are explained briefly as follows.

1ST STEP – STAKEHOLDER IDENTIFICATION:

Especially for communication purposes, it seems important to identify the individual stakeholders as well as the correct individuals within a stakeholder organization. Essentially, the main task of this step is to provide a comprehensive list of all stakeholders that will be involved in, have an influence on or be affected by the transfer process, or that will have a certain interest in the technology transfer's outcome. In doing so, the use of idea generating techniques (such as brainstorming) can prove quite useful.

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2ND STEP – STAKEHOLDER ANALYSIS:

After a successful identification of all relevant stakeholders of a certain transfer process, the stakeholder analysis needs to be carried out in a subsequent step which includes:

1) Defining the relationship type and acknowledging the stakeholders' expectations, objectives, requirements, values, attitudes, etc.
2) Conversion of gained knowledge and available information into a stakeholder matrix (prioritizing and positioning of stakeholders according to their level of power and interest in the project).

In practice, the first stage of the analysis is often illustrated graphically in the form of a stakeholder diagram (see fig. 8).

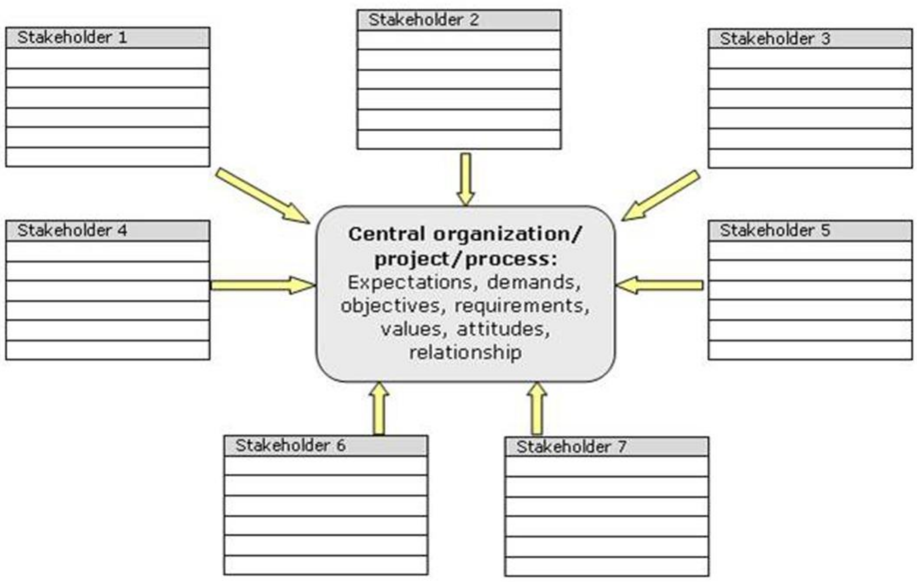

Figure 8: Diagram of a stakeholder analysis [According to: Fritz/Geist, 2009]

Fundamentally, there exist three types of stakeholders: First, the *PRIMARY STAKEHOLDERS*, which comprise all parties that are directly affected by the transfer project and its outcome, second, the *SECONDARY STAKEHOLDERS*, which are only indirectly affected by the project and its results and third, the *KEY STAKEHOLDERS*, which involve all parties that have a considerable influence on the project and its outcome or are otherwise of high importance to the project. Please note that stakeholders of the latter type can belong to the first two groups as well.

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In the second stage of stakeholder analysis, information gained on the stakeholders needs to be analyzed and converted into a power-interest grid of stakeholders. In short, the respective position of a stakeholder is plotted in the matrix according to his level of power and interest in the project, thus indicating a proposed action or behavior in regard to that particular stakeholder (see fig. 9).

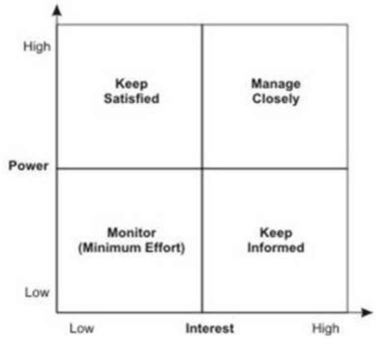

Figure 9: Power-interest grid of stakeholders [Source: Thompson]

3RD STEP – STAKEHOLDER ENGAGEMENT, MOTIVATION, COMMUNICATION AND MONITORING:

In the last step of analysis, previously gained knowledge about the relevant stakeholders is used to assess their specific motivation for the transfer project in order to ensure their involvement and commitment and to prevent obstructions.

4.1. Recommendations

The following recommendations concerning the involvement of stakeholders can be summarized:

- Identify and define stakeholders
- Categorize stakeholder (private (companies), research organizations, companies and NGO´s) into primary, seocondayr abnd fundamentally stakeholders
- Involve the stakeholders actively
- Define public stakeholders separately especially under the context of public procurement

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5. Barriers, obstacles and resistances as well as supporting factors in knowledge and technology transfer processes between science and industry

In the RI2Integrate project a report was carried out, which analyzed the collaboration between research infrastructures, SME´s, NGO´s and intermediares and were the technology process was also analyzed. The results of this intensive survey are summarized in this chapter.

Concerning the guideline the interest is evident how the technology process works. As already presented a technology transfer starts with the creation and codification of research results and/or technologies and proceeds with the transmission as well as the adoption of the transferred content on the part of the receiver. In other words, transfer activities have to pass through several transfer phases which are defined as *PROLOGUE*, *INITIATION*, *TRANSFER*, *ABSORPTION*, *INTEGRATION* and *EPILOGUE* .

Considering this simplified depiction of a transfer process (see also fig. 12), it becomes apparent that several barriers, obstacles and resistances may arise during a knowledge and technology transfer from research institutions to companies. Hence, it is an essential task of technology transfer facilitators to identify transfer-inhibiting factors and to set appropriate measures in order to improve and intensify transfer activities in companies.

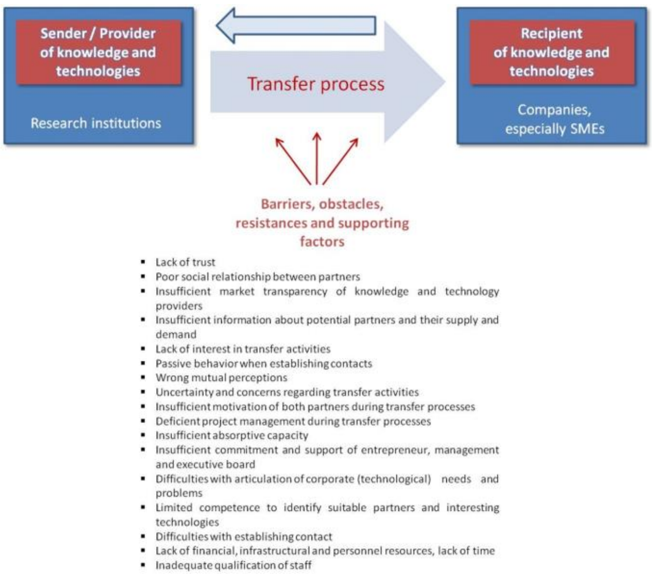

Figure 12: Basic knowledge and technology transfer model, indicating inhibiting factors [According to: Lockett, 2006]

In order to gain an overview of which barriers, obstacles and resistances may possibly appear in transfer processes and in which phases of transfer they typically occur, some examples of inhibiting factors are presented briefly as follows.

LACK OF TRUST & POOR SOCIAL RELATIONSHIP BETWEEN PARTNERS: Particularly in the first two phases of transfer (that is, *INITIATION* and *TRANSFER*) lack of trust and poor relationship between transfer partners pose significant barriers for a successful knowledge and technology transfer. Under such a condition important information may possibly be retained, and doubt created whether certain information from the partner is correct or not. Fear that the partner does not want to share knowledge the same open way as well as doubt that the transferred knowledge might not represent the actual state of knowledge or even be incorrect testifies to a relation of mistrust and can lead to a rejection of the transmitted content and advice from the sender by the receiver. In addition, lack of trust on the part of the sender can result in impaired motivation to actively support the recipient's absorption of knowledge. Under such conditions, especially the transfer of tacit knowledge requires much more effort from both transfer partners.

INSUFFICIENT MARKET TRANSPARENCY OF KNOWLEDGE AND TECHNOLOGY PROVIDERS & INSUFFICIENT INFORMATION ABOUT POTENTIAL PARTNERS AND THEIR SUPPLY AND DEMAND: Insufficient or lacking advertising effort of research institutions within the first phase of transfer often leads to the hindrance that their innovative offer is not visible for companies in the market. In practice, required information about the R&D activities of research institutions is often not available or is difficult for companies to access, especially for SMEs. In addition, companies often face difficulties in finding contact persons and in knowing whom to approach with a request. A significant barrier to knowledge and technology transfer also arises from the fact that companies often do not know about the potential collaboration means with research institutions. Similarly, the latter often hold only insufficient information about specific needs of companies and thus are not always aware of the companies' specific technological demand.

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LACK OF INTEREST IN TRANSFER ACTIVITIES & PASSIVE BEHAVIOR WHEN ESTABLISHING CONTACTS: Lack of interest and passive behavior when establishing contacts are transfer-inhibiting factors which may already impede transfer activities previous to the *INITIATION* phase. Especially SMEs are often of the opinion that there is no need for innovation in their business and they therefore behave passively and do not ask for research projects and results of research institutions. In many cases, transfer activities fail because companies expect to be approached actively by scientists. In addition, companies often show a lack of interest in scientific projects and specific know-how of research institutions and are oftentimes reluctant to commit concerning long-term cooperations. On the other hand, companies' R&D questions are often not interesting enough for research institutions (e.g. scientific problem is not cutting edge or does not represent state-of-the-art) and additionally they often bemoan low proficiency levels in industry as well as the compulsive compliance with industry and regulatory standards. Lack of interest on part of scientists also arises due to both poor (financial) incentives for scientists to collaborate with industry and the transfer-inhibiting set of regulations as well as the administrative and legal framework at academic research institutions.

WRONG MUTUAL PERCEPTIONS: Particularly SMEs often complain about lacking willingness and motivation of scientists to work together and to deal with the problems and needs of small and medium enterprises. They often have the perception that research institutions preferably collaborate with big enterprises on large-scale projects and that therefore the size or name of a business is a quite important factor for scientists in order to agree to a conjoint project. In addition, scientists of academic research institutions are often perceived as 'long haired weirdo's' and as detached from the 'real world', suggesting theories in an unprofessional manner in their 'ivory towers'. Research institutions, in contrast, often perceive deficient research interest on the part of companies, e.g. for conducting research beyond state-of-the-art.

UNCERTAINTY AND CONCERNS REGARDING TRANSFER ACTIVITIES: Uncertainties and concerns regarding transfer activities can arise both on the part of companies and research institutions within all phases of transfer. However, this inhibiting factor

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typically has its strongest impact in the *INITIATION* phase and decreases continuously over time. Already within the *PROLOGUE,* concerns about reliability, trustworthiness and competence of the respective research institution may arise in companies. For instance, companies oftentimes worry that they might only be serving to prove grounds for insecure theories as results of collaborations with research institutions are rather insecure in early stages and sometimes difficult to realize in companies (i.e. exploitation, patenting). Additionally, they often worry that confidentiality with respect to their know-how is not guaranteed when collaborating with research institutions, which potentially results in unintended know-how spillovers to competitors, thus losing competitive advantage. Uncertainty regarding transfer activities may also arise in companies by reason of concerns about growing (technological) dependency due to partial or even total reduction of in-house R&D activities. On the part of research institutions, concerns about both impaired scientific independence (e.g. neglected basic research) and hindrances to academic publication activities often impede transfer activities with industry.

INSUFFICIENT MOTIVATION OF BOTH PARTNERS DURING TRANSFER PROCESSES: Insufficient motivation of both partners during a knowledge or technology transfer typically leads to a time delay of the whole transfer process, passiveness in collaboration as well as rejection or insufficient acceptance and absorption of the transmitted content on part of the receiver. For instance, unwillingness of academic research institutions to collaborate with industry often originates from the certain status of knowledge and technology transfer in universities known as 'third mission' as well as from lacking (financial) incentives for scientists to engage in transfer activities. In addition, academic advancement is usually structured around publication of research results in journals; thus, concerns about hindrances to academic publication activities when collaborating with industry oftentimes results in decreasing motivation of scientists to initiate transfer activities.

DEFICIENT PROJECT MANAGEMENT DURING TRANSFER PROCESSES: Another barrier to successful knowledge and technology transfer may originate from insufficient project management during transfer processes. Good project management is essential to success, and particular emphasis should be given to structured objective

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setting, good progress monitoring, clear reporting systems, effective communication, clearly defined responsibilities and roles within the project and deploying only trained, high quality project managers. It is to be noted that the existence of deficient project coordination is particularly evident in the phase of *TRANSFER*, as in this phase all those involved are working together most intensively and therefore are in need of efficient project planning.

INSUFFICIENT ABSORPTIVE CAPACITY: The ability of a company to recognize the value of new, external knowledge, to assimilate it, and to apply it to commercial ends is critical to its innovative capabilities. This ability can be understood as a firm's absorptive capacity which is largely a function of the firm's level of prior related knowledge. Thus, correct interpretation and ideal learning of new knowledge is hardly possible without an existing stock of (shared) expertise and skills. In practice, absorption is also often impeded through the characteristics of knowledge (i.e. explicit vs. tacit knowledge), incompatibilities of language and coding schemes as well as poor relationship and mistrust between partners.

A successful transfer, however, requires little information and knowledge asymmetries between both partners and highly qualified staff particularly on the part of the receiver. Especially in SMEs absorption of new knowledge and technologies is often impeded through the absence of a corporate learning and innovation culture, of in-house R&D activities and of prior transfer experiences.

INSUFFICIENT COMMITMENT AND SUPPORT OF ENTREPRENEUR, MANAGEMENT AND EXECUTIVE BOARD: Insufficient commitment to and deficient support of transfer activities at the management level can be identified as a significant barrier to a successful knowledge and technology transfer. This inhibiting factor often arises from a low strategic importance of knowledge and technology transfer activities within a company, which can be based upon a lack of a positive approach to innovation and to change processes as well as upon strong corporate habits, ways of thinking and structures. Insufficient motivation at the management level to actively support transfer processes similarly leads to decreasing willingness to cooperate with the involved and to absorb new knowledge on the part of the company's personnel due

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to inadequate project priority. Thus, insufficient commitment and support of entrepreneurs and management mostly causes flagging teamwork between both transfer partners which typically impedes successful transfer outcomes.

Difficulties with regard to articulation of corporate (technological) needs and problems: Especially SMEs frequently face difficulties in articulating technological needs as well as economic and technical problems. They usually have a diffuse awareness of the need of change and innovation but at the same time are incapable of identifying, formulating and defining corporate needs and problems accurately. Thus, an active approach to research institutions as well as fruitful discussions about (technological) problems and solutions are often impeded. In any case, poorly articulated (technological) needs and problems make problem solving and transfer processes more difficult and cost-intensive.

Limited competence to identify suitable partners and interesting technologies & difficulties to establish contact: Limited competence to identify suitable partners and interesting technologies primarily occurs in SMEs and poses a significant barrier to knowledge and technology transfer in the phase of *initiation*. Especially SMEs often have inadequate mechanisms for monitoring technological developments within and outside their field and face difficulties in identifying and locating interesting technologies. This fact may also result from insufficient information or difficulties in analyzing documents (e.g. publications, patents). Moreover, their external relationships are oftentimes limited to the region; therefore, they mainly search for transfer partners in their surroundings. Suitable partners may also not be identified due to strong reliance on recommendations of the informal social network (e.g. circle of friends, industrial sector acquaintances) without reflecting on differing situations and frameworks. Once a suitable partner and an interesting technology are identified, it often seems to be unclear for companies which steps need to be taken in advance to initiate a transfer. Empirical evidence shows that particularly SMEs are oftentimes not very well experienced in establishing contacts and fear to ‘disturb’ scientists of research institutions with their research questions and requests.

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Lack of financial, infrastructural and personnel resources, inadequate qualification of staff & lack of time: In practice, particularly SMEs are often not in the position to complete successful knowledge and technology transfers and to conduct in-house R&D due to insufficient qualification of staff. Due to their limited number of employees, small and medium enterprises often denote shortages of advanced scientific know-how but at the same time face difficulties in attracting and financing highly qualified experts for in-house R&D activities. In addition, SMEs often hold only limited possibilities to obtain venture-capital for (technology) transfer activities due to their lower equity and scarcer liquidity compared to big enterprises. Another barrier to successful knowledge and technology transfer is lack of time on part of key personalities. This factor is especially evident in SMEs as the entrepreneur is mostly too involved in day-to-day business.

As one can assume from the explanations of this chapter, not only barriers, obstacles and resistances but also supporting factors may arise during a knowledge and technology transfer from research institutions to companies, which both facilitate transfer processes and typically lead to more successful transfer outcomes. Figure 13 presents the most important supporting factors for a successful collaboration between research institutions and companies according to a survey carried out by Eibel with members of the research staff at the Karl-Franzens-University Graz, Austria.

Important factors for a successful cooperation (according to elicitation with members of research staff, KFU)	Median
Mutual trust between the partners	2,63
Related comprehension of different interests and functions	2,29
Adherance to a timetable	2,27
Frequent personal contact	1,87
Related qualifications	1,61
Stipulation agreement	1,36
Acceptable regional distance	0,95
Other	0,86
0 = unimportant, 1 = important, 2 = rather important, 3 = very important	

Figure 13: Supporting factors in (technology) transfer processes [Source: Eibel, 2008]

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It can be obtained from figure 13 that the existence of mutual trust between transfer partners in particular is a central factor of success in transfer processes. Similarly, mutual understanding and acceptance of different interests and functions as well as adherence to timetables seem to be transfer-supporting factors of outstanding significance. Results of the survey also reveal the particular importance of frequent personal contact, since by this means mutual trust can be created more easily, inhibitions and prejudice overcome and cultural differences not only perceived, but also accepted and (if possible) exploited. It should be noted that especially the transfer of tacit knowledge requires face-to-face communication which is usually facilitated by short physical distances between transfer partners. Finally, as already mentioned in line with this chapter, an organization implicitly requires related qualifications to its partner in order to assimilate and use transferred knowledge and technologies.

Thus, a prior related knowledge base of transfer partners can also be seen as an important supporting factor for knowledge and technology transfer.

According to experiences of the interviewed research staff, a successful knowledge and technology transfer can therefore be primarily achieved through a trustful collaboration with continuous personal contact. The development of a close relationship among transfer partners seems to be of outstanding importance, as it contributes to both an intensification of transfer activities and to a reduction of transfer related barriers, obstacles and resistances.

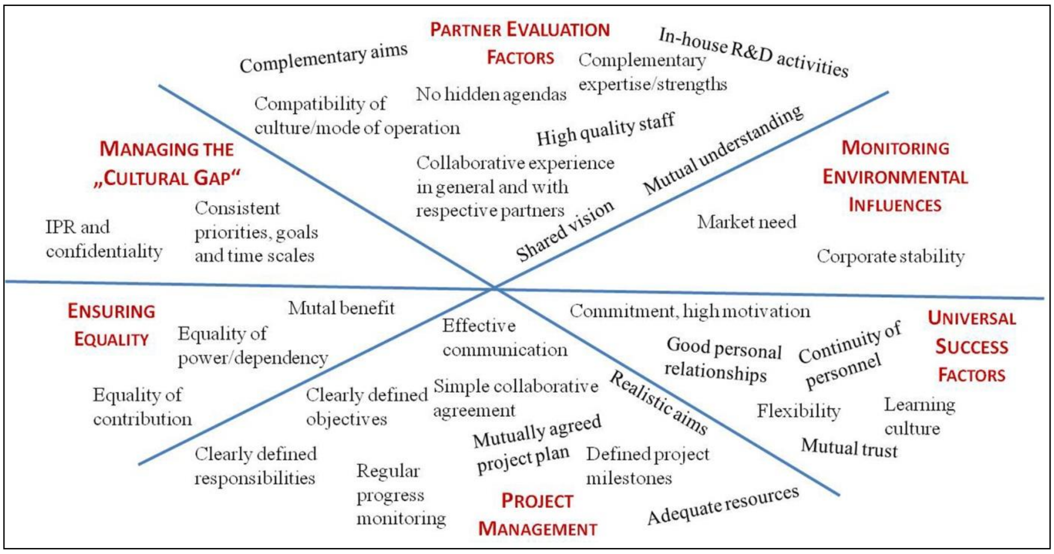

Figure 14: Good-practice model for knowledge and technology transfer activities – implications for collaboration management [According to: Barnes et al., 2002]

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6. National Expert groups

6.1. General- National Expert groups

The RI2Integrate foresees that each participating partner establish a so called as national expert group within their region. National expert groups can be seen as networks or cluster with which the research infrastructure will collaborate closely.

Reason for national expert groups

Networking offers an important route to address problems as well as to improve their competitive position. By coordinating their activities, enterprises can collectively achieve economies of scale beyond the reach of individual small-scale firms and obtain bulk purchase inputs, achieve optimal scale in the use of machinery and pool production capacities to meet large-scale orders. Inter-enterprise cooperation also enables companies to specialize in their core businesses and give way to an external division of labour thus improving their efficiency in production. Joint work also encourages enterprises to learn from each other, exchange ideas and experience to improve product quality and take over more profitable market segments. Evidence from developing and developed countries shows that cooperative relations and joint action are more likely when enterprises operate in proximity and share business interests such as markets for products, infrastructure needs or challenging external competition. Within such groups, or clusters, enterprises' joint initiatives are stronger, because of the critical mass of interested parties, more cost-effective due to shared fixed costs and easier to coordinate, wit

Definition national expert groups

National expert groups are sectoral and geographical concentrations of enterprises, intermediares, research infrastructures and NGO´s that produce and/or research a range of related or complementary products and, thus, face common challenges and opportunities. These concentrations can give rise to external economies such as emergence of specialized suppliers of raw materials and components or growth of a pool of sector-specific skills and foster development of specialized services in technical, managerial and financial matters. National expert groups are groups of

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firms, RI´s, NGO´s and intermediares that cooperate on a joint development project complementing each other and specializing in order to overcome common problems, achieve collective efficiency and penetrate markets beyond their individual reach.

Building up of a national expert group

When starting the work within a national expert group the initial task is to build trust among stakeholders— enterprises and other institutions. In most cases, existing levels of trust among the cluster stakeholders are low. Often, entrepreneurs, as well as SME support institutions, local government and nongovernmental organizations blame each other for the overall stagnation of the local economy. Smallscale enterprises are dissatisfied with the privileges that large-scale enterprises supposedly enjoy and with services offered by support institutions, and all agree that public support is lacking. Improving relations that have deteriorated over time—if ever they existed—is a condicio sine qua nonnot only to combine forces towards common targets but also to understand where problems really lie and define development options based on actual opportunities.

Sensitizing and connecting different kind of actors as well as producing network diagnostics are preliminary steps towards identification of a shared vision for the national expert group and implementation of a joint action plan. These two steps are, by nature, a work-in progress which evolves on the basis of learning by-doing. At the early stages of a network, a network action plan is little more than a collection of activities loosely coordinated. As network development proceeds and a broader vision for the national expert group starts to emerge, activities increasingly focus on a larger group of local actors and on longer-term issues. At all stages, however, local actors fully and actively participate in the definition of joint activities, they are called to monitor progress in implementation; and they ensure that mutual commitments are maintained.

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From the examples in the RI2 project lessons can be drawn as to the crucial factors must keep in mind to promote successful national expert groups:

- Proximity

  Although the importance of proximity is debatable in the era of globalization, for inter-enterprise cooperation it is still an important factor. Experience shows that especially for micro- and small-scale enterprises, it promotes joint endeavours. It lowers transaction and learning costs not only because of physical closeness, but also because of the homogeneity of participants' social background which facilitates trust.

- Incentives

  The best incentives for establishment of a national expert group are market opportunities and crises. Enterprises are very much encouraged to change their behaviour when they see an imminent reason for it. Crises can be triggered by, for instance, entry of new, stronger competitors. Market opportunities are, by far, among the best positive incentives for groups to organize. However, finding markets is a starting point rather than the end of the process. To exploit new opportunities, most of the time a serious restructuring of production or organizational capabilities is needed.

- Progressive establishment of trust

  The establishment of trust is an on-going process, which translates into progressive integration of more participants into joint activities as well as establishment of more ambitious common objectives over time. Starting small and growing over time as trust increases is, usually, the best way to prevent conflicts and disappointments. The establishment of national expert groups plans with clear outputs and responsibilities is an important step. They help clarify mutual roles and obligations, thus testing members reliability and performance. They should not, however, become bureaucratic requirements taking up too much of the enterprises/brokers attention and time.

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- Openness

  National expert groups are open systems with flexible structures. They must look outside their boundaries to understand global trends and adjust their strategies. External linkages, participation in global production chains, exposure to international best practices and benchmarking are of crucial importance to avoid isolation and implosion.

Management of National Expert groups – five fields of action

The management team of national expert groups is primarily responsible for the efficiency of the initiative. They support the initiative in their daily work. As this is a cumulative process, the overall performance of the initiative is considerably influenced by the management and the team.
The main tasks for the management of a national expert group can be divided into five fields of actions.

1. Information and communication

As already described the establishment of an information and communication system is essential for the success of the national expert group. All members as well as non participating companies and organizations should be informed about the national expert group itself, its members, the current activities and targets achieved. For this purpose, the following communication channels should be used:

Development of a communication platform and Jour-Fixe

For exchanging information, experience and knowledge, a communication platform should be established. The platform should be animated by means of regular meetings and an internal forum dedicated to the partners.

Hold a Jour-Fixe

Participants should be operative employees of the initiative and representatives of academia and industry. In the beginning, the meetings should take place every 3-4 weeks which will be extended to 3-4 months once the initiative runs successfully.

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Regular company visits

Managers of national expert groups should organise 5-10 visits per month which should be documented by a visit report. The reports should give an overview of the activities and needs of a company. This information may be an important basis for the generation of co-operation projects.

Regular events

For the success of a national expert group it is essential to organise regular events. These events aim at promoting growth and establishing an exchange with other networks:

- Workshops
- Expert round tables
- Specialist events
- Fairs
- National expert days

Newsletter and monthly branch and network news updates

All participants should be kept informed about relevant news regarding the national expert group initiative. This could be achieved by means of a monthly newsletter in an informal email sent out by the project team. Newsletters are usually elaborated quarterly and available in printed and electronic format.

National expert group data base

The establishment of a national expert group data base is very important to efficiently administrate the partner and national expert group initiative information. The database should contain at least general information on the partners (e.g. address, turnover, number of employees) and information of service type.

Homepage

The aim of the homepage is to inform about content, members and activities within the national expert group initiative. The homepage should comprise at least an informative part (general information about the national expert group initiative) and a tool for searching partners.

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2 Training

Human resources represent an essential key factor for the success of companies. Therefore, a successful national expert group initiative considers programmes for advanced vocational training and should initiate and support a range of educational measures to improve competency among the employees of the member firms. Apart from catalysing inter-firm networks and university-industry linkages, processes may strengthen the incentives for SMEs to upgrade their internal competencies.

The educational measures are realised in the form of:

- Advanced vocational training sessions
- Workshops and seminars
- Study trips for employees
- Inter company learning

3. Co-operation

Since competitiveness of regions is not determined by single companies, but more and more by the innovation ability of entire industries and branches, co-operations are essential to improve this ability. With the help of co-operation projects, synergy potentials can be exploited and thereby not only single companies are strengthened but also the entire economic structure in a crucial and sustainable way.

Target group companies often have high interest in co-operation projects with other firms or with R&D institutions. An important area of activity for the national expert group initiative is therefore the initiation, development and support of co-operation projects. These kinds of projects can deal with the following areas:

- R&D - Qualification
- Production - Organisation
- Marketing - Information Technology
- Logistics – Internationalisation

Initiation and support of co-operation projects

The national expert group initiative should initiate, foster and support co-operation among companies, universities as well as research infrastructures.

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Set-up of special supporting schemes for co-operation projects

It is essential to set up an appropriate supporting framework to attract companies for cooperation. It would be very helpful if the allocation of grants could be used.

Co-operation support

The establishment of an internal contact agency, partner agency for co-operation projects and the development of a monitoring system are very useful.

4. Marketing and PR

Marketing and PR strengthen the involvement of the existing members and attract new companies or research organisations to join the national expert group. These activities should therefore be carried out on a regular basis. They can include national and international lobbying for the specific sector and comprise the following tasks:

- Generation of a regional identity
- Creation of information and marketing materials, presentations and information brochures
- National and international PR by means of commercials, advertisements/articles in trade journals
- Measures to strengthen the branch image
- Trade fairs, company visits, presentations for major customers
- Lobbying

5. Internationalisation

The elimination of trade barriers and the strengthening of transport and communication systems, along with the harmonisation of market regulations offer greatly improved conditions of resource flows and enhanced specialisation of value chains across national borders. For industry as well as for regions it is nowadays essential to open new markets and to find and attract new partners for co-operation. Therefore, a national expert group initiative should support its members during internationalisation activities. The national expert group initiative should also be open for further international expansion. Following activities have to be considered:

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Access to international events, topics and trends

A national expert group initiative should be open to new trends and topics. Participation in international events is essential.

Participation in international projects

It is important that partners of the national expert group initiative participate in international projects in order to increase their competitiveness by means of these international activities.

6.2. Selected examples of National expert groups

Project partner: Central Bohemia Innovation Centre (SIC), IOP (ELI Beamlines)
Country: Czech Republic

Topic of the national expert group (NEG):
Technology transfer and economic development of region
Detailed description of topic from a technical point of view:
Technology transfer is the process of cooperation research organization and private sector on development/innovation of market product. The process of technology transfer process has many specific parameters, mainly because of these two sectors have the different motivation and goals of their activities. The key outcome of NEG will be to find out the problems of technology transfer in the Czech Republic and some recommendations to mitigate them. Together with NEG we also named some examples of good practise in the Czech Republic. The hypothesis is that more effective technology transfer could raise the economic development of region/Czech Republic.
Description of the NEG
NEG has been compiled by two main aspects – regional relation and topic – technology transfer. Association Transfera.cz is the platform which includes many technologies transfer departments from universities and research centres in the Czech Republic, for example Charles University, Masaryk University, Institute of Chemistry and Technology, Czech Technical University in Prague and my others…

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So this association could give us the feedback from the academic sector.

They also compiled NEG from some regional members – research centre HILASE and some innovative companies from the Central Bohemia region. Generally, the NEG associates the whole topic of technology transfer from theoretical background and also practical feedback from regional business sector.

Project partner: IFIN-HH, MHTC

Country: Romania

Topic of the national expert group (NEG): Embeddedness of large research infrastructures and technology transfer

Detailed description of topic from a technical point of view:

The research areas and their potential applications under scrutiny within the proposed topic stem from: a) present, operational state of the art research infrastructures and the Magurele Platform; b) the Extreme Light Infrastructure – Nuclear Physics (ELI-NP), European RI under implementation in Magurele, Romania. The envisaged research topics cover a broad range of Science, both frontier fundamental physics, new nuclear physics and astrophysics as well as applications in nuclear materials, radioactive waste management, material science and life sciences. The current NEG includes representatives of the research community, NGOs, innovative SMEs and government, renowned experts willing to contribute to developing specific tools for the stimulation of the symbiosis between research and industry, to find the bottlenecks and suggest ways to develop a stronger and more efficient cooperation.

The technology and knowledge transfer, the stimulating effects on high tech industries, the exciting opportunities for companies to perform frontier research as well to foster research for the benefit of innovative companies, the direct and indirect effects on the economic environment at local and regional scales – all these positive impacts are viable only for those who will be prepared and able to exploit the existence of ELI-NP. The contribution of the NEG to accomplish these goals is sought and expected.

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The technology and knowledge transfer, the stimulating effects on high tech industries, the exciting opportunities for companies to perform frontier research as well to foster research for the benefit of innovative companies, the direct and indirect effects on the economic environment at local and regional scales – all these positive impacts are viable only for those who will be prepared and able to exploit the existence of ELI-NP. The contribution of the NEG to accomplish these goals is sought and expected.

Project partner: FH JOANNEUM GmbH
Country: Austria
Topic of the national expert group (NEG): Industrial Cyber Security
Detailed description of topic from a technical point of view:
The 21st Century is the era of dynamic cyber threats to global public services, utilities, and commercial operations in every sector. Technology and data have become so deeply entrenched in many companies that if it is compromised the damage to their operations, brand reputation and bottom line can be catastrophic. Because of that we will design and implement a secure industrial national expert group which shows core competencies in both cyber security and industrial automation.
Description of the NEG
The national expert group of Styria consist in the following:
Research organizations: FH JOANNEUM Gmbh, Technical University of Graz
Intermediares: SFG- Styrian business development agency, Land Steiermark, Wirtschaftsinitiative Leoben, AC Styria
Companies: BBG Baugeräte GmbH, INTRATEC – HPG Informationstechnologie GmbH, Hintsteiner GmbH
NGO`s: bit management Beratung GmbH- business unit CPC Austria, Enter IZB Hak Mürzzuschlag

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Project partner: INOVAcija

Country: Croatia

Topic of the national expert group (NEG): Mariculture

Detailed description of topic from a technical point of view:

Zadar County, with marine area of about 3,643 km2, is Croatia's most successful Adriatic county regarding the production and export in the sector of mariculture. The tradition of fish processing industry in Croatia is more than 130 years old and is one of the first industries on the Croatian coast and islands.

The beginning of contemporary mariculture in Zadar County dates back to 1973 when was appointed the first experimental cage for the reception of young fish caught in nature was installed.

After 1995, the Zadar County has experienced a significant interest in increasing the spatial capacities for the development of aquaculture. In addition to sea bass and sea bream, the tuna farming was established, and the cultivation of mussels was started.

Today, Zadar County has a modern mariculture and occupies the leading position in Croatian mariculture with breeding of 7,500 tons of fish (without tuna) and 2,000 tons of Bluefin tuna.

Description of the NEG

Fish farming in cages is accompanied by technological difficulties, among which the fouling organisms on breeding installations (cage aquaculture facilities) are most common. Fortunately, dominant organisms in fouling are the mussel and the phenomenon of other commercial shellfish as fouling organisms is observed.

Growing shellfish and fish in polyculture has several important aspects. It is primarily the sanitary quality of products, and then finding a technological model for economically profitable exploitation of fouling and the establishment of breeding process to semi-finished or finished product.

Membership of NEG consists of competent experts from intermediaries' institutions, NGO's, R&D centres and one SME who is Croatia's lead in cage fish production. They will be able to follow mariculture development in Zadar county and evaluate its impact on community and environment.

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6.3. Recommendations

The following recommendations can be expressed towards the establishment of National expert groups:

- Build trust amongst the stakeholders before establishing a NEG
- Invite different kind of stakeholders to the NEG
- Take care to have a governmental involvement in the NEG
- The main stakeholders are the basis for a NEG
- Have in mind the crucial factors for establishing a NEG: proximity, incentives, progressive establishment of trust, openness
- Manage NEG according to the following five actions: information and communication, training, co- operation, marketing and PR, internationalisation
- The NEG should be an integrated part of the ecosystem/ sciencepark

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7. Initiatives/events/projects of Research Infrastructures

As an own task in the project RI2Integrate the project team analysed different kind of economical support initiatives and projects in order to find ideas for the three involved ELI partners. The initiatives/ projects differ a lot, but they show creativity how research infrastructures are opening themselves and are seen as an attractive partner for the society.

7.1. EXAMPLES of Existing initiatives

Project partner: INOVAcija

Country: Croatia

The general objective of the project "Blue Education for Sustainable Management of Aquatic Resources – BLUE SMART" is to create new skills and competences in blue economy sector and increase the employability of current and future sectors' workers in the County of Zadar. The activities that the project will implement address two specific objectives: 1) establishment of a new graduate study "Sustainable Management of Water Ecosystems" at University of Zadar 2) design of a Training Course for the Vocational Education and Training in „Introduction to sustainable aquaculture practice"

Project partner: ELI-ALPS

Country: Hungary

The Open Laboratory project is organized by the Hungarian Chamber of Commerce and Industry by coordinating the Chamber of Commerce and Industry of Pécs-Baranya County with the support of the Ministry of National Economy.

By building up a database and streamlining business to business, a breakthrough can be achieved in the development of the internal and external innovation processes of research centres.

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Among the many cooperating partners, the Southern Great Plain Region organization is also included. The cooperating partners are the following:

• Chamber of Commerce and Industry of Csongrád County,

• University of Szeged.

Open Laboratory is an embodiment of cooperation between the university and the corporate sector, where it is based on the basis of joint operation and specializes in the provision of R&D&I services.

The aim of the project is to research human and tool capacity database on an innovative resource map. The regional chambers generate new collaborations by systematizing the research and innovation human and device capacities of the universities, research centres, innovation centres, innovation-accredited clusters and innovative companies in their interest, and providing them a unified approach to companies.

Project partner: CTRIA

Country: Hungary

The event offers a wide range of social dialogue and discussion on the effects of science on daily basis. The event starts with a presentation performed by a scientist from which conversation and discussion can be unfold with a cup of coffee.

The whole event can be seen as an interview where the visitors can first get acquainted with the motivation of the researcher's career that encouraged them to build up their professional career in the world of science. The conversation addresses the importance of the discipline represented by the invited researcher, thereby revealing its role in the society. Finally, the individual work and results of the researcher will be presented.

In addition to the coffee, visitors can also bring experiences to the audience to help them become more receptive to a recent subject.

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Project partner: IFIN HH, MHTC

Country: Romania

PN III – P2 – Increase of competition capacity by using RDI expertise and results

P2-2.1 is a component subprogram of the 3-rd National Plan for Research and Innovation aiming at increasing the capacity to compete by using research, development and innovation expertise and results through enterprise – research and innovation entities partnerships.

Its main objectives are to support the:

- setting up of partnerships for industrial research and experimental development funded by the business sector;
- creation of new or improved products, technologies, methods, services and of adequate conditions for their implementation;
- increase of value added and technological level in enterprises;
- promotion of an innovation business culture;
- optimal use of research infrastructures and personnel;
- national and international patenting;
- maximization of investment value;
- training of research personnel in enterprises.

Project partner: Development Agency of Serbia

Country: Serbia

Research station Petnica is independent institution which deals with development of scientific culture, scientific literacy, education and culture. Activities of the Research center Petnica have in focus young population- elementary, high school and university students and also trainings of teachers and professors for new techniques, methods and contents in the field of science and technology.

Every year Research station organizes whole variety of programs (courses, seminars, scientific camps, workshops). The lecturers on these events are experienced scientific workers and researchers from various institutes and faculties, with whom the station has long cooperation.

Educational activities of Research Station Petnica do not rely on official school programs or conventional teaching methods. Its educational programs are dedicated

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to students who are 14 - 20 years old, and they are covering a wide range of disciplines of natural, social and technical sciences. The most important aim of work is to help students to develop skills of observing and deducing, techniques of gathering data and facts, the ability of argumentation and communication, and also to raise the readiness for continuous learning, expanding knowledge and experiences. Every year, over 2000 students from Serbia and many other countries are participating in over 120 various programs.

Aims of educational activities of Petnica Research Station are:

- Recognition of highly skilled and motivated young people, from various parts of Serbia, especially the ones who live in provincial and undeveloped regions, in order to give them individual supplementary education;
- Enabling realization of personal research projects based on realistic problems for the most interested students, with help and assistance of professional scientists and adequate scientific equipment.
- Training of mostly younger teachers and professors for applying modern scientific ideas, concepts and teaching ideas in their work;
- Encouragement of cooperation and exchange of knowledge, experiences and ideas amongst the youngsters who are going in various schools faculties and are interested for science.

The schedule of Petnica was designed to enable the best possible results in short-term programs for students who already attend regular schools. There is an "annual cycle" of educational programs for high-school students, i.e. programs are implemented in four complementary groups. New students first attend a week-long winter course with intensive theoretical work (lectures, demonstrations, discussions). Spring courses are shorter and focused on practical training in instrument manipulation, fieldwork, data acquisition and processing (statistics), etc. During the two-week summer science camps the students are free to work on small (and sometimes not so small) research projects. During this time, they gain precious insight into the real scientific work, including all the difficulties and problems that exist in professional work. Fall courses give students a chance to meet again, to discuss results, to finalize their papers, and to hear scientists giving lectures on their work and presenting the latest news from the ever-expanding boundaries of modern

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science and technology. Participants who successfully complete their results in the form of science papers are invited to participate at the Petnica Annual Students' Conference, where they have a chance to present their results to other participants, collaborating teachers and scientists.

Project partners: Institute of Physics, Czech Academy of Sciences, ELI Beamlines

Central Bohemia Innovation Centre

Country: The Czech Republic

Operational programme is funding tool which combines the European funds and the public money from regional budget (Prague city) and private money of beneficiaries.

Funding earmarked for the Prague operational programme is divided into 4 areas, so called priority axes: the Prague operational programme is divided into 4 areas, so called priority axes (mentioned only the first one, the most relevant for the project).

Priority axis I - STRENGTHENING RESEARCH, TECHNOLOGICAL DEVELOPMENT AND INNOVATION

Within the priority axe there are finances available for investment projects funded by European Regional Development Fund

Focus:

Proof-of-concept – verification of feasibility of research outcomes, verification of outcome commercial potential, preparation for implementation of outcomes into practice, increase the technology and knowledge transfer between research organizations and the application sphere.

Innovation demand for the public sector – realization of public procurement for services in the field of research and development, the objective of which is to develop new solutions meeting the needs of the public sector

Innovation and specialized voucher types – promoting cooperation between research institutions and small and medium-sized enterprises, supporting business development and product / production innovation of start-ups

Technology parks and incubators – expansion and improvement of space capacities, specific equipment and facilities, human resources development and development of technology parks ad incubators

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Development of starting innovative enterprises– supporting innovative enterprises by using financial instruments (non-subsidy aid)

The ELI Beamlines and other research organisations mostly used this priority axis to fulfil the research demand of public sector (The Prague City). Research organisations develop, test and commercialize technologies which could be used for public services (waste management, public transport, security, smart city solution,…).

The funding scheme has this main advantage, that it includes testing of technology, customization, optimalization and also commercialization of output in the Prague region. So the all main stages of commercialization could be implemented during one project and the bureaucracy and administration is work could be managed altogether.

Project partner: FH JOANNEUM GmbH

Country: Austria

The FFG's BRIDGE Programme aims to close the "funding gap" between basic and applied research. BRIDGE acts as an umbrella structure for projects which are predominantly of basis research character. BRIDGE is operated in two different programme lines – BRIDGE 1 and BRIDGE Early Stage and open to all fields of technology.

The aim of the BRIDGE 1 program line is to develop the potentials of basic research and experimental. The line contributes to deepening the research cooperation between science and industry, facilitates access to scientific research to small and medium-sized enterprises (SMEs), encourages the transfer of researchers from universities to economic research, and intensifies research on high-quality industrial research and experimental development.

The aim of the BRIDGE early phase is to further develop the potential of basic research in consortial projects between science and business. The impetus and origin of the work must be based on the scientific partner. The line thus contributes to the deepening of research cooperation between science and industry, facilitates access to scientific research for small and medium-sized enterprises (SMEs), encourages the transfer of researchers from universities to economic research, and intensifies research on high-quality industrial research.

Project co-funded by European Union funds (ERDF, IPA, ENI).
www.interreg-danube.eu/RI2integrate

7.2. Recommendations

The following recommendations can be expressed towards the establishment of National expert groups:

- As well initiatives for companies as also initiatives for private people should be carried out in order to open the RI´s towards
- Own initiatives for students and NGO´s should be organized
- Development of a roadmap for RI related business ecosystem
- The development of a visitor centre, where the whole spectrum of the research area of the RI´s should be established

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8. Summary

The EU flagship R&D infrastructure investment (Extreme Light Infrastructure – ELI) is under development in the Danube Region. In addition to its scientific impacts, it offers the opportunity to decrease relative economic backwardness and uneven territorial distribution of research facilities.

One of the main roles of the new research infrastructures (including ELI) is the converting the scientific results into economic success while building bridges in their macro-regions. To maximize the positive effects of their operation, the government, industry, academia and civil participants all have to work together to drive structural changes and support macro-regional embeddedness.

In order to reach this ambitious goal, the Macro regional guideline for RI embeddedness shows a technology transfer in order to guarantee an effective collaboration between RI´s and companies, NGO´s and Intermediares.

It is important to identify and work with stakeholders so the guide shows a simple model how to identify and categorize them in order that a fruitful collaboration between RI´s and stakehlders is given.

Furthermore best practice initiatives from the project partner countries and the establishment of NEG (National Expert Groups) as initiatives of research infrastructures are discussed.

Following the addressed challenges, the Macro regional guideline for RI embeddedness will improve strategic frameworks and cooperation in order to build up excellent research infrastructure in the Danube region.

Project co-funded by European Union funds (ERDF, IPA, ENI).
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