FORESIGHT WITHIN ERA-NETS: EXPERIENCES FROM THE PREPARATION OF AN INTERNATIONAL RESEARCH PROGRAMME

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Abstract

In this paper, we address challenges of organizing future-oriented consultation processes within European coordination tools for 'Open Method of Coordination' – such as ERA-NETs – which are promoted by the European Commission towards the establishment of the European Research Area. Specifically, we report experiences from a recent consultation process that was organized within WoodWisdom-Net (ERA-NET) in order to create an international research agenda, based on the recognition of long-term challenges of the European forest sector and the attendant identification of gaps and new opportunities in wood material science and engineering. This consultation process involved eighteen funding organisations from eight European countries, as well as over 400 participants who represented relevant stakeholder groups, most notably leading researchers and industrialists. Methodologically, the process was based on the Internet-based solicitation and assessment of research issues, the deployment of Robust Portfolio Modelling (RPM) in the identification of promising research issues, and facilitated workshops where the results of Internet-based activities where discussed, validated and extended. In addition, extensive network analyses were conducted to support the identification of possible collaboration networks and the development of joint calls for proposals. Drawing on the results from the WoodWisdom-Net consultation process, we discuss the broader potential of Internet-based decision support tools and participatory workshops in promoting foresight activities within ERA-NETs and European coordination tools.

Keywords: Decision support, foresight, European Research Area, innovation policy, networking, Robust Portfolio Modelling

1. Introduction

Increasingly, foresight activities exhibit elements of international collaboration and are also launched as multi-national efforts (e.g., Webster, 1999; Jewell, 2003), as the engagement of stakeholders from several countries may be help anticipate scientific, technological and societal developments, for example. A strong focus on international collaboration, however, may result in high expectations concerning shared vision-building and formation of new research and technology development (RTD) networks. Such expectations are not necessarily easy to fulfil due to the complexities that are driven by vertical and horizontal coordination challenges of national innovation systems (Könnölä, et al 2006b). Yet, despite considerable methodological advances (see e.g. TFAMWG 2004), not much attention has been devoted the challenges of coordinating international foresight activities (Könnölä, et al. 2006b)

In addition to explicitly initiated local, national or international foresight projects, foresight activities can also be embedded in RTD programmes and other instruments of innovation policy (Salo & Salmenkaita, 2002). Here, we examine the organisation of foresight activities within European coordination tools – such as "Integrated Projects", "Networks of Excellence", "ERA-NETs", "European Technology Platforms" and "Technology Initiatives" – which seek to foster European collaboration in innovation policy. Specifically, we focus on the design and implementation of an embedded foresight process that was organized in the ERA-NET programme on wood material sciences (WoodWisdom-Net). Building on the experiences from this process, we discuss the deployment of Internet-based methods and multi-criteria analyses based on Robust Portfolio Modelling (briefly RPM Screening; see Könnölä et al., 2006b). Particular attention is given to the development of a foresight design that responds to scalability requirements (e.g., the ability to accommodate inputs from large number of participants) and the management of multiple interfaces present in European-wide innovation policy coordination.

2. Foresight within ERA-Nets

The ERA-NET scheme[1] seeks to strengthen the coordination and cooperation among national and regional research programmes organised by ministries and national funding agencies in the member states. To-date, a considerable number of ERA-NETs have been launched, each with a focus on a specific field of science and/or technology, for the purpose of supporting mutual learning, opening-up of national innovation systems and the development of new collaborative forms of European RTD funding.

ERA-NET activities pose several cooperation challenges. Because the participating funding organizations have evolved through path-dependent processes that reflect the characteristics of their respective national innovation systems, they may be intent on advancing their national interests. The funding organizations have different priorities for research themes and resource allocation; they also operate subject to different regulatory and institutional constraints that limit what kinds of organizations and activities they can fund (e.g., availability of funding to foreign researchers). Furthermore, they have different management practices as concerns the launching, monitoring and evaluation of RTD projects, which means that ERA-NETs must operate in the presence of a multitude of governance cultures. These and yet other complexities are further amplified by the many options that can be pursued in the implementation of shared

[1] http://cordis.europa.eu/coordination/era-net.htm

research agendas, ranging from the relatively weak coordination of national programmes to the institutionalisation of a new legal entity for allocating a common pot of resources through competitive calls for proposals.

In this setting, foresight processes within ERA-NETs hold promise as they can help the stakeholders overcome possible barriers by supporting shared vision-building, networking and priority setting. Yet, undue concentration of coordination – with the Commission at its core – may provoke resistance in the member states (Prange, 2003; Kuhlmann and Edler, 2003). Thus, coordination efforts may be best enacted within various multi-actor governance structures where transparent and accountable intermediary interfaces enhance learning processes and new collaboration activities (Kuhlmann & Edler, 2003).

Within the ERA-NETs, the general objectives of an embedded foresight process can be defined as i) *vision-building* for clarifying shared interests and joint benefits of international collaboration, ii) *networking* for mobilising the RTD communities in different countries and iii) *priority setting* for formulating promising research themes and corresponding resource allocations. Here, tentative interests in prospective collaboration can be probed by inviting stakeholders from different countries to explore what research themes should be pursued through international joint RTD activities, in view of expected S&T developments, industrial needs and societal demands. The resulting information helps funding organizations in the formulation of their own research agendas, clarifies linkages between national and European agendas, and prepares the broader RTD community for later calls for proposals and other actions. At best, embedded foresight can overcome some of the administrative barriers in the preparation of international programmes; it can also contribute to the development of complementary value networks based on different technological competencies (Könnölä et al., 2006b).

Broadly seen, ERA-NETs and other European coordination tools are indicative of the transformation of the EU innovation policy from financially oriented measures to the facilitation and monitoring of stakeholder processes which do not necessarily have a central agent for controlled agenda setting and resource allocation (Könnölä et al., 2006b). Overall, this transformation represents a shift from optimisation-oriented innovation policies for the mitigation of market failures towards coordination-oriented policies (Metcalfe, 1995; Könnölä et al., 2006b) where policy-makers interact with RTD stakeholders in learning processes and build new coalitions and institutions with the help of distributed strategic intelligence (Smits & Kuhlmann, 2004). This transformation can be assisted by coordination tools and embedded foresight activities that help RTD stakeholders recognize how the benefits of international collaboration can outweigh the efforts needed to overcome regulatory, institutional, administrative and cultural barriers.

It is against this background that we describe our experiences in implementing an embedded foresight process in WoodWisdom-Net, one of the ERA-NETs. Specifically, we discuss how several methods (e.g, Internet-based group-support systems, facilitated workshops, RPM Screening) were employed to foster vision building, networking and priority setting in the development of a shared research agenda for an international research programme.

3. Shaping of Research Agendas in WoodWisdom-Net

WoodWisdom-Net[2] was started in 2004 as one of the ERA-NETs supported by European Union. Its goal is to "deepen the collaboration between the European funding organisations in the field of wood material science in order to coordinate the use of research funds, and to integrate research resources from different countries in order to promote the competitiveness and sustainability of the European forest cluster." The main activities of WoodWisdom-Net consist of i) benchmarking and dissemination of good practices, ii) identification of complementary research activities, ii) identification of practical networking and opening mechanisms for future cooperation, iii) implementation of joint evaluation and foresight activities, iv) identification of research areas and instruments that are needed to improve competitiveness and sustainability of the forest cluster, and v) implementation of trans-national research programme to improve competitiveness and sustainability of the forest cluster. Among these objectives, the last one involves the deepest mode of collaboration in that the 18 partners from eight countries (Austria, Denmark, Finland, France, Germany, Norway, Sweden, United Kingdom) plan to launch a co-funded research programme in field of wood material science. Provisionally, the calls for proposals of this programme will be prepared in 2007. Research activities are due to start in 2008.

The activities in WoodWisdom-Net are carried out in five work packages (WP). Within the WP for strategic activities, the tasks for the *shaping of research agendas* are concerned with the identification of research areas that are relevant for European cooperation. Because these agendas are crucial to the overall success of WoodWisdom-Net, the WP Coordinator felt that a systematic participatory bottom-up consultation process would be helpful. Drawing upon experiences from earlier collaboration with the Systems Analysis Laboratory at Helsinki University of Technology in the development of a Scandinavian co-funded Wood Material Science Research programme (Salo & Liesiö, 2006), the project plan for the WoodWisdom-Net consultation process was developed in close collaboration with the Coordinator. Because the WoodWisdom-Net programme will involve RTD communities from eight countries, this process was designed so that it relied heavily on Internet-based decision support tools (see the consultation process homepage[3]).

More specifically, the consultation processes sought to respond to the general objectives of embedded foresight in the following ways, among others:

- Networking: The engagement of RTD stakeholders from all the countries was a prerequisite for identifying research issues that reflected relevant scientific and technological developments, on one hand, and industrial needs and societal demands, on the other hand. These issues were elaborated both from national and European perspectives, which served to highlight the benefits of creating international RTD networks.
- Priority-setting: The plans to establish an international research programme meant that the funding organizations had to define focal research themes for European RTD collaboration.

[2] http://www.woodwisdom.net/

[3] http://www.woodwisdom.tkk.fi/

- Vision-building: Although the consultation process focused on thematic content (rather than regulatory, institutional, organisational and cultural differences), it also shed light on possible modes and conditions for future collaboration, even though these were not at the nexus of the broader consultation.

3.1 Management of Multiple Interfaces

To attain the above objectives, the consultation processes had to recognize multiple interfaces among the RTD stakeholders from eight different countries. One of the key considerations in this process (and arguably in many other international consultation processes, too) was the multiplicity of interfaces which was coupled with design requirements such as scalability, modularity, iterative re/decomposition and dependability (see Könnölä et al. 2006b for details):

- *Scalability* is needed to process contributions from stakeholders who are concerned with different facets of innovation systems at the local, sectoral, national and international level. In WoodWisdom-Net, scalability meant that the consultation process had to deal with varying amounts of contributions from large number of stakeholders in different countries. Moreover, the overall consultation process had to be decomposed into manageable sub-processes.
- *Modularity* refers to a process design where analogous sub-processes – or modules – can be completed relatively independently from other sub-processes. In WoodWisdom-Net, modularity was pursued, for example, by developing a framework for the field of wood material science, consisting of four research areas and 23 sub-areas[4]. Stakeholder participation, too, was based on the definition of explicit roles and responsibilities for the different phases of the process.
- *Iterative de/recomposition* contributes to scalability by allowing i) the decomposition of complex problems into smaller manageable sub-problems for subsequent analysis and ii) the recomposition of results from these analyses through processes of interpretative synthesis. In the WoodWisdom-Net, decomposition was facilitated by the framework for research sub-areas, as well as by the treatment of research areas and research themes as relevant 'units of analysis' that experts could be assess with the Internet-based decision support tool. Recomposition, on the other hand, was carried out in workshops, in order to i) identify similarities and interdependences between proposed research issues, and to ii) generate more holistic perspectives on the emerging agenda.
- *Dependability* is vital in foresight processes that consist of interdependent modules (e.g., phases for different stakeholder groups in the WoodWisdom-Net consultation process). In the presence of interdependencies, it is imperative that the preceding tasks are completed before new ones are started. In WoodWisdom-Net, some 'slack' was built into the process schedule as a risk mitigation measure, because the possibility that some process phases might be delayed could not be ruled out. Moreover, the tasks in the last phases were not fully specified at the outset (e.g., workshop activities), because it was expected that results from the earlier phases would be helpful in planning these tasks (Salo et al., 2004).

[4] These research areas and sub-areas are listed on page http://www.woodwisdom.tkk.fi/task1.htm

3.2 Process design

Roles and Responsibilities

In the design of foresight processes, it is helpful to assign clear and predefined roles to the participants, as this lends more structure and transparency to the processes (for example Salo et al., 2004; Könnölä et al., 2006a): thus, for instance, the participants were segmented in view of their expertise and background organisations. The process management consisted of the representatives from funding organizations, the national coordinators and the project team:

- *Representatives from funding organisations* were the targeted client of the consultation process. The design of the consultation process was thus presented on several occasions to the Steering Group of WoodWisdom-Net which also provided feedback on it. These Representatives had several roles in the process, both as active participants and users of the information that was produced.
- In each country, the *National Coordinator* of the consultation process was responsible for effective communication. For example, he/she invited Researchers and Industrial leaders to participate in the different phases of the process.
- *Project Team* consisted of the WoodWisdom-Net Coordinator, Secretary and the research team at TKK (Helsinki University of Technology) which was responsible for most activities in the design and implementation of the process (i.e., scheduling, provision of IT infrastructure, compilation of results from Internet-based consultation activities, facilitation of workshops).

Furthermore, the process engaged an extensive set of RTD stakeholders from eight countries, most notably Researchers and Industrial leaders:

- *Researchers* consisted of leading researchers at universities, research institutes or industrial research organizations on wood material science and related sciences. They submitted research issues and assessed these issues in view of their perceived novelty. They were also asked to indicate how interested they would be in participating in a possible research project on any given research issue, if such a project were to be launched at a later time.
- *Industrial leaders* consisted of R&D and business managers in the forestry-related industry. They assessed the proposed research issues with regard to their industrial relevance and suitability for WW-Net.

Furthermore, from each participating country, prominent Researchers and Industrial leaders were invited to three interactive workshops to discuss and synthesize results to support the work of funding organisations in the formulation of calls for proposals.

Phases of the Consultation Process

The process design relied on the earlier experiences on the cyclic foresight process design (Salo et al., 2004; Könnölä et al., 2006). The process consisted of consecutive phases with specified roles and responsibilities for stakeholders. In general, the foresight design relied heavily on

extensive consultations in the Internet- and carefully planned workshops. Its phases are summarised in Table 1.

Table 1. Phases of the WoodWisdom-Net Consultation Process.

Task	Participants	Schedule
1. Solicitation of research issues	Researchers	Mid-July – Mid-October '05
2. Assessment of research issues	Researchers	December '05 - Mid-January '06
3. Assessment of research issues	Industrial leaders	Three last weeks of January '06
4. Initial screening of research issues	Project team	January - February '06
5. Three one-day workshops for Researchers and Industrial leaders	10-12 Researchers and Industrial leaders / workshop	Mid-February, '06
6. A one-day workshop for funding organizations	Representatives from funding organizations	End of March, '06

Over 400 stakeholders from all participating countries participated in process. In Task 1, the Researchers proposed a total of 317 issues. These issues were assessed by Researchers and Industrial leaders, and particularly the ones that had been favourably evaluated were discussed in a series of four workshops. Based on the results of the last workshop, three working groups were formed, each consisting funding organizations with shared interests in the topic of the working group. More generally, network-building was supported by listing the participants on the website for the consultation process[5].

1. Solicitation of research issues

In the first phase, National Coordinators invited Researchers in their respective countries to submit research issues through the Internet questionnaire[6]. These questionnaires were implemented by using Opinions-Online© decision support tool[7] which allowed the Researchers to submit as many issues as they wanted. For the purpose of information management, Researchers were asked to indicate which research area and sub-area the issue would fit best. Links between research issues and the framework were helpful as the participants could more readily identify those issues that they were most interested in.

For each issue, Researchers were first asked to provide a short title to the issue and a short description (about 200 words). Researchers were also asked to justify the issue by describing the anticipated results and impacts (e.g., enhancement of competitiveness), and to describe why the issue should deserve collaborative European research funding. Finally, they were asked to indicate whether the issue was characterized as basic or applied research. The questionnaire

[5] See http://www.woodwisdom.tkk.fi/registration.htm

[6] See http://www.woodwisdom.tkk.fi/task1.htm

[7] See http://www.opinions.hut.fi/

was open from mid-June 2005 until mid-October 2005. In total, well over 200 Researchers from the participating countries submitted research issues.

2. Assessment of research issues from the research perspective

In the second phase, National Coordinators invited Researchers to assess the solicited research issues. Researchers were first asked to choose of which sub-areas they were interested in, where after they could assess all those issues they were interested in. Within each of the 23 sub-areas, some 10 to 50 Researchers assessed the issues, and more than 200 Researchers in total participated in the assessment activity. The questionnaire was open from December 2005 until mid-January 2006.

For each issue, Researchers were first asked to assess the issue with regard to *Novelty* (i.e., the extent to which they felt that the proposed issue was novel in wood material science). Second, they were asked to estimate how interested they would be in participating in projects related to the issue. Novelty was assessed using a seven point Likert scale, whilst participation was evaluated by choosing one of the following statements: 0 – No interest, 1– Some interest, 2 – Considerable interest and 3 – Tentative commitment. The Researchers that were interested in working on a particular research theme were also asked to identify themselves and, moreover, to describe how they would like to contribute to a possible project later on.

3. Assessment of research issues from industrial perspective

In the third phase, National Coordinators invited Industrial leaders to assess the submitted research issues. Industrial leaders were first asked to choose of which sub-areas they were interested in, where after they could assess the issues they considered interesting. The questionnaire was open in January 2006. Within each of the sub-areas, 5-15 Industrial leaders evaluated the issues. A total about 50 Industrial leaders participated the assessment phase.

The Industrial leaders assessed the issues with regard to *Industrial relevance* and *Suitability for WW-Net* using a seven point Likert scale. The purpose of the first criterion was to measure how relevant the research issue would to industrial uses, while the second criterion sought to capture the extent to which the issue was seen to call for RTD cooperation at the European level.

4. Initial screening of research issues

After the research issues were submitted and assessed, the Project Team analysed the issues using the assessment data. For each issue, key statistics were calculated (e.g., average evaluation ratings for each criterion, corresponding standard deviations). Within each sub-area, issues that tended to receive most support with regard to the three evaluation criteria (i.e. *Novelty*, *Industrial relevance* and *Suitability for WW-Net*) were identified with RPM Screening, which is a variant of the Robust Portfolio Modelling (RPM) methodology for the analysis of innovation ideas and innovative concepts (Liesiö et al., 2006; Könnölä et al., 2006b).

Originally, RPM has been developed to support project portfolio selection in settings where incomplete information about criterion weights and criterion-specific scores may have to be accounted for. In the context of WoodWisdom-Net, it was employed by regarding research issues as tentative ideas for possible projects that might be promoted in the international programme. Thus, RPM was not employed in a normative sense for making choices among the issues that had been proposed within the research sub-areas; rather, it was employed for the purpose of synthesizing the wealth of information that was collected from the experts during the assessment phase, and for drawing attention to those issues that were deemed particularly interesting in view of the this assessment.

In technical terms, RPM Screening is based on an additive preference model where the overall value of an issue is expressed as the weighted sum of its criterion-specific scores. The value of entire portfolios consisting of research issues is additive, too, because the value of a portfolio is obtained by summing the values of its constituent issues. In WoodWisdom-Net, there were no particular grounds for assuming that some issue would call for more resources than another; thus, it was assumed that each issue, if pursued, would consume an equal amount of resources. Within each sub-area, it was envisaged that the identification of the 5–10 most relevant issues would be useful in building the workshop agendas; consequently, the RPM analysis was carried out by identifying alternative portfolios of 7 research issues that could be regarded as attractive in view of incomplete preference information about the relative importance of the assessment criteria. This preference information was elicited from the Coordinator who noted that the criterion *Suitability for WW-Net* was be more important than *Industrial relevance*, which in turn was deemed more important that *Novelty*. This rank-ordering – which emphasised that there would have to be a strong rationale for pursuing research issues through international collaboration – implied linear constraints on the criterion weights (i.e., weight(Suitability for WW-Net) > weight(Industrial relevance) > weight(Novelty)). In addition, the criterion weights were required to fulfil the usual normalization condition (i.e., sum of weights equal to one). A lower bound of 0.083 (one fourth of the average weight of 0.333) was placed for all criterion weights to ensure that all criteria would be relevant.

In RPM, the analysis in the presence of incomplete information is based on the computation of all non-dominated portfolios (i.e., portfolios such that there does not exist any other portfolio whose overall value would be higher for all feasible criterion weights; see Liesiö et al., 2006 for details). Clearly, a rational decision maker would not choose a dominated portfolio, because there would be another non-dominated portfolio which would surely offer a higher overall value. Based on the knowledge of non-dominated portfolios, it is possible to determine for each issue its Core Index (CI), which is computed as the ratio between i) number of non-dominated portfolios it belongs to and ii) the number of all non-dominated portfolios. Thus, if CI of an issue is 1, this issue is in all non-dominated portfolios; and conversely, if its index is 0, it does not belong to any non-dominated portfolios. This means that issues with a CI value of one would be surely selected, while those with a CI value of 0 would not be selected. Thus, the CI values provide a comparative performance measure that accounts for the specified preference information, as well as bounds on the number of issues that are to be highlighted through high CI values.

5. Workshops for researchers and industrial leaders

In mid-February, three workshops were organized to take stock of results from the Internet-based activities and to develop tentative recommendations about which research issues and sub-areas would be particularly suitable for the international research programme. In each country, the National Coordinators identified one representative from wood-material-based industry and one member of the research community and invited these to the workshops. Thus, a total of 16 experts were invited to each workshop. Most of them could attend, as the workshops were attended by 10-15 experts on wood material science.

Thematically, the workshops focused on the following topics: i) New value added products and production, ii) Sustainable forestry and iii) Wood products. This structured was not identical to the framework that was employed in the structuring of research areas and sub-areas. In effect, the thematic titles of the workshops were somewhat more traditional than those employed in the framework, which helped in lending a coherent agenda to each workshop.

Before the workshops, results from the Internet-based activities were compiled and distributed to the participants so that they could familiarise themselves with all proposed research issues, experts assessments and corresponding Core Index (CI) values. A separate set of background materials was prepared for each workshop, based on the workshop theme. Some research sub-areas (e.g., creating new functionalities or improved to materials/products) were covered in several workshops, with the aim of bringing in complementary perspectives to the proposed issues.

The director of the TKK group (the third author of this paper) facilitated the workshops, with support from the Coordinator of the consultation process. At the beginning, the workshop agenda was briefly explained to the participants. Then, the participants were invited to comment on the proposed solicited issues and their assessments (approx. 1.5 hours), whereby all research areas and sub-areas that were relevant to the workshop were covered. Within each sub-area, the workshop participants were expressly asked i) to comment on the issues that had a high Core Index value, ii) to highlight issues which had a low Core Index value but which nevertheless seemed interesting, iii) to suggest other research topics that were not among the proposed issues (approx. 2.5 hours). After these discussions, the workshop participants filled a questionnaire form where they were asked to evaluate the relevance of each research sub-area with regard to its suitability for European collaboration with a seven point Likert scale and, moreover, to list the five most interesting research issues per sub-area. The participants were also asked to make a tentative recommendation on how they would distribute funds (in terms of percentages) among the sub-areas, based on the quality of solicited research issues and the workshop discussions (approx. one hour). Towards the end of the workshop, the results from these questionnaires were compiled separately for each country and also presented to the participants who were invited to discuss them (approx. one hour).

6. Workshop for funding organizations

Based on results from all preceding phases, a workshop for funding organizations was organized at the end of March 2006 to examine these results and, more specifically, to form working groups of funding organizations who would collaborate towards the development of calls for proposals covering those research sub-areas that they were interested in funding. Practically all funding organizations in WoodWisdom-Net attended this workshop.

Before the workshop, all results from earlier activities were compiled and disseminated to the workshop participants. For example, the average value of evaluations with regard to suitability for WW-Net and proposed distribution of funding were calculated. Also, research issues that had been regarded as particularly interesting in the preceding workshops were explicitly listed. Separate analyses were presented at the aggregate level (i.e., by taking into account all evaluations) and at the country level (i.e., results from the preceding three workshops). Thus, the funding organizations could see how the results based on the representatives of their own country may have differed from those of all expert assessments.

A major goal of this workshop was to proceed towards the development of calls for proposal. The agenda of the workshops consisted of three parts. First, results from all preceding tasks were briefly discussed, whereby the participants were invited to put forth their thoughts on them (approx. 1.5 hours). Second, within each research sub-area, participants were encouraged to comment on the issues within it (approx. one hour). Third, for each of the research sub-areas, the participating funding organization were asked to give a preliminary estimate about how much funding they might be willing to allocate to the sub-area in the forthcoming research programme. In addition, they were asked specify if this funding would be allocated to basic or applied research (approx. one hour). Finally, based on the indications of these tentative funding

interests, the workshop participants (and thus funding organisations) were divided into a three working groups with shared interest (approx 1.5 hours). These working groups, together with the extensive set of materials that had been produced for them, can be regarded as one of main results of the international consultation process.

4. Discussion

In this paper, we have discussed the use of decision support methodologies in the development of a shared research agenda in WoodWisdom-Net, which is one of the ERA-NETs and hence on of the coordination tools for EU innovation policies. While this structured consultation process was designed in view of the specific requirements WoodWisdom-net, the experiences from this process have implications for other ERA-NETs and consultation processes, too.

In effect, the bottom-up consultation process in WoodWisdom-Net – where the participating researchers and industrialists interacted with a large shared pool of research issues – can be contrasted with less transparent processes of international RTD priority-setting where the preliminary priorities are first defined at the national level, followed by the development of higher-level priorities through negotiations among the representatives of member states. Here, one of the benefits of a bottom-up process is that the wealth of information it generates is readily available to the stakeholders from other countries, too. Extensive participation in a bottom-up process also increases the visibility of coordination tools such as WoodWisdom-Net; this is likely to foster active participation in later research programmes and serves to mitigate the risk of having a weak response to calls for proposals, for example. Another benefit is that the funding organizations can define the priorities based on a realistic understanding of what issues researchers are keen on pursuing and how these issues are regarded by the users of research results (e.g., industrial firms). This makes it easier achieve a proper alignment between the priorities (as conveyed by calls for proposals) and the interests and competencies of the RTD community.

A particularly valuable aspect of bottom-up consultation processes is that the solicitation and assessment of research issues, together with an analysis of how interested the researchers are in working on these issues, helps build new collaborative networks. For each research issue, such an analysis conveys which research groups are positioned to take part in corresponding project consortia, if the issue is identified as one of the key priorities. Information of this kind be can be exploited to facilitate the formation of new collaborative networks, for instance by encouraging the research groups to respond to calls for proposals in a full awareness of what other groups in other countries have shared interests. Such a proactive approach stands in contrast with more ‘top-down’ processes where the aggregate priorities are not coupled with similar networking information and where the formation of consortia may therefore be driven by essentially by earlier collaborative relationships, resulting in unnecessary path-dependencies.

The organization of international consultation processes involves several challenges, too. Due to considerable geographical distances of a large number of participants from several countries, one cannot organize participatory workshops for them all. This makes it is necessary to employ Internet-based decision support tools which do not offer equally rich channels for interactive communication; hence, a simple-to-understand and goal-oriented process design is vital so that possible misunderstandings can be eliminated or at least reduced. At present, structured Internet-based consultation processes are still rather rare, wherefore participating researchers and other stakeholders are not necessarily well aware of what is required of them, what results they can expect and how these results will be exploited by decision makers; this is yet another

reason why stakeholder roles and responsibilities must be defined and communicated with care. Even funding organization may have reservations, because bottom-up processes may represent a departure from conventional planning processes: for example, such processes may produce results that cast doubt on previously established priorities, which in turn may undermine the perceived autonomy of funding organizations as concerns priority-setting.

More generally, the promising experiences from the WoodWisdom-Net consultation process, together with those from related processes for the Forest-Based Sector Technology Platform (Könnölä et al., 2006b), suggest that further work on the development and deployment of consultation processes in connection with European coordination tools should be pursued. Indeed, despite the strong trackrecord of national foresights in many European countries, relatively little work has been done on the question of how foresight elements could be brought to enhance the coordination tools that are vital to the establishment of the European Research Area. Thus, there is a need for novel future-oriented processes in connection with these coordination tools; in particular, and research efforts are needed to take stock of experiences, to develop suitable methodologies for international consultation processes, and to build knowledge on how these processes can be best enhanced so that the coordination tools can indeed attain the objectives that have been placed on them.

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