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Foresight within ERA-NETs: Experiences from the preparation of an international research program

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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) with the aim of creating 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 organizations 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 Modeling (RPM) in the identification of promising research issues, and facilitated workshops where the results of Internet-based activities where discussed, validated and synthesized. 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 Modeling

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1. Introduction

Increasingly, foresight activities exhibit elements of international collaboration and are even launched as multi-national efforts (e.g., [1,2]), in the recognition that the engagement of stakeholders from several countries may help anticipate scientific, technological and societal developments, for example. A visible focus on international collaboration, however, may foster high expectations concerning shared vision-building and formation of new research and technology development (RTD) networks. Such expectations are not necessarily easy to fulfill due to the complexities of vertical and horizontal coordination in national innovation systems [3]. Indeed, it is striking that despite methodological advances (see e.g. [4,5]), not much attention has been devoted the challenges of coordinating foresight activities at the international level [3].

Apart from explicitly initiated local, national or international foresight projects (see. e.g. [6]), foresight activities can be conducted within RTD programs and other instruments of innovation policy [7]. In this paper, we examine issues in the organization of foresight activities within European coordination tools – such as “Integrated Projects”, “Net-works of Excellence”, “ERA-NETs”, “European Technology Platforms” and “Technology Initiatives” – which seek to foster European collaboration in innovation policy. Specifically, we report the design and implementation of an embedded foresight process that was organized in the ERA-NET program on wood material sciences [8]. Building on the experiences from this process, we discuss the deployment of Internet-based methods and multi-criteria analyses based on Robust Portfolio Modeling (briefly RPM Screening; see [9,10]). 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[3] seeks to strengthen the coordination and cooperation among national and regional research programs organized by ministries and national funding agencies in the member states. To-date, a large 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; this means that ERA-NETs must operate in the presence of a multitude of governance cultures. These and yet other complexities are amplified by the many administrative options that can be pursued in the implementation of shared research agendas, ranging from the relatively weak coordination of national

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

programs to the institutionalization 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 such processes can, at best, help the stakeholders overcome possible barriers by supporting shared vision-building, networking and priority setting (see, e.g., [11]). Yet, undue concentration of coordination – with the Commission at its core – may provoke resistance in the member states (see, e.g., [12, 13]). 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 [13].

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 mobilizing 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 programs; it can also contribute to the development of complementary value networks based on different technological competencies [3].

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 [3]. Overall, this transformation represents a shift from optimization-oriented innovation policies for the mitigation of market failures towards coordination-oriented policies ([3],[14]) where policy-makers interact with RTD stakeholders in learning processes and build new coalitions and institutions based on the use of distributed strategic intelligence [15]. 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 experiences from the implementation of 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 program.

3. Shaping of research agendas in WoodWisdom-Net

WoodWisdom-Net[4] 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 organizations in the field of wood material science in order to coordinate the use of research funds, and to integrate research resources from

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

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, iii) identification of practical networking and opening mechanisms for future cooperation, iv) implementation of joint evaluation and foresight activities, v) identification of research areas and instruments that are needed to improve competitiveness and sustainability of the forest cluster, and vi) implementation of transnational research program to improve competitiveness and sustainability of the forest cluster. Among these objectives, the last one involves the deepest mode of collaboration as the 18 partners from eight countries (Austria, Denmark, Finland, France, Germany, Norway, Sweden, United Kingdom) eventually have decided to launch a co-funded research program in the field of wood material science. Provisionally, the calls for proposals of this program 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 program [16], the project plan for the WoodWisdom-Net consultation process was developed in close collaboration with the Coordinator. Because the WoodWisdom-Net program will involve RTD communities from eight countries, this process was designed so that extensive use was made of Internet-based decision support tools (see the consultation process homepage[5]).

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 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 program meant that the funding organizations had to define focal research themes for European RTD collaboration.
- Vision-building: Although the consultation process focused on thematic content (rather than regulatory, institutional, organizational 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

In order 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

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

(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 [3] 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 – i.e. 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.[6] 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 assessed 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 [17].

3.2. Process design

3.2.1. Roles and responsibilities

In the design of foresight processes, it is helpful to assign clear and predefined roles to the participants, because this lends structure and transparency to these processes (see [3,17]): thus, for instance, the participants in the WoodWisdom-Net consultation process were segmented in view of their expertise and background organizations. The process management consisted of the representatives from funding organizations, the national coordinators and the project team:

- *Representatives from funding organizations* 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

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

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 Coordinator and Secretary of WoodWisdom-Net, as well as 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 organizations in the formulation of calls for proposals.

3.2.2. Phases of the consultation process

The process design relied on earlier experiences form cyclic foresight processes [3,17]. Specifically, the process consisted of consecutive phases with specified roles and responsibilities for stakeholders, whereby inputs were solicited and synthesized through extensive Internet-based consultations and carefully planned workshops. The main phases are summarized in Table 1.

Over 400 stakeholders from all participating countries participated in the process. In Task 1, the Researchers proposed a total of 317 issues. These issues were assessed by Researchers and Industrial

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

leaders, and especially those that were favorably evaluated were discussed in a series of four workshops. Based on the results of the last workshop for funding organizations, three working groups were formed such that each consisted of funding organizations with shared interests in the topic of the working group. To some extent, network-building was also supported by listing the registered participants on the website of the consultation process.[7]

3.2.2.1. Solicitation of research issues. In the first phase, National Coordinators invited Researchers in their respective countries to submit research issues through the Internet questionnaire.[8] These questionnaires were implemented by using Opinions-Online© decision support tool[9] which allowed the Researchers to submit as many issues as they desired. For the purpose of information management, Researchers were asked to indicate which research area and sub-area the issue would fit best within a taxonomical framework that was developed for the research issues. This framework was helpful in that it helped the participants identify the issues that they were most interested in.

For each issue, Researchers were first requested to provide a short title and a short description (about 200 words). Researchers were also asked to justify the issue by describing expected results and impacts (e.g., enhancement of competitiveness), and to describe why the issue would merit collaborative European research funding. Finally, they were asked to indicate whether the issue was characterized as basic or applied research. The questionnaire was open from mid-June 2005 until mid-October 2005. In total, well over 200 Researchers from the participating countries submitted research issues.

3.2.2.2. Assessment of research issues from the research perspective. In the second phase, National Coordinators invited Researchers to assess the research issues that had been submitted in the first phase. Here, Researchers were first asked to choose which sub-areas they were interested in, whereafter they could assess those issues that they were interested in. Within each of the 23 sub-areas, some 10 to 50 Researchers provided assessments while more than 200 Researchers in total took part 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 eventual projects on the issue. Novelty was assessed using a seven-point Likert-scale, while participation was evaluated by choosing one of the following statements: 0 — No interest, 1 — Some interest, 2 — Considerable interest and 3 — Tentative commitment. 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.

3.2.2.3. Assessment of research issues from the industrial perspective. In the third phase, National Coordinators invited Industrial leaders to assess the submitted research issues. Industrial leaders were first asked to choose which sub-areas they were interested in, whereafter they could assess the issues they deemed interesting. The questionnaire was open in January 2006. Within each of the sub-areas, 5–15

[7] See http://www.woodwisdom.tkk.fi/registration.htm.
[8] See http://www.woodwisdom.tkk.fi/task1.htm.
[9] See http://www.opinions.hut.fi/.

Industrial leaders evaluated issues, and a total of some 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.

3.2.2.4. Initial screening of research issues. After the research issues were submitted and assessed, the Project Team analyzed issues based on 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 Modeling (RPM) methodology for the analysis of innovation ideas and innovative concepts [9,10,18,19].

Initially, RPM has been developed for project portfolio selection problems 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 program. Thus, RPM was not employed in a normative sense for making definitive 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 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 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 estimations on how costly potential research projects on the issue might; thus, there were no *a priori* grounds for assuming that some issue would call for more funding than another. Therefore, in the model, it was assumed that each issue, if pursued, would consume an equal amount of funding 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 (i.e., international collaboration) was more important than Industrial relevance, which in turn was deemed more important that Novelty. This rank-ordering – which emphasized 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)]. Furthermore, the usual normalization requirement was imposed on the criterion weights (i.e., the sum of criterion weights was set 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 which would offer a higher overall value for all feasible criterion weights; see [18] for details). Arguably, a rational decision maker would not choose a dominated portfolio, because it would be possible to find another non-dominated portfolio that would offer a higher overall value. Based on the identification of non-dominated portfolios, it is possible to determine for each issue its Core Index (CI), defined as the ratio between i) number of non-dominated portfolios the issue belongs to and ii) the number of all non-dominated portfolios. Thus, if CI of an issue is 1, this issue is contained in all non-dominated portfolios; and conversely, if its index is 0, it does not belong to any non-dominated portfolios. In effect, it follows that issues with a CI value of one should be selected, while those with a CI value of 0 should not be selected. In this sense, the CI values provide a comparative performance measure that accounts for the available preference information, as well as bounds on the number of issues that are to be highlighted through high CI values.

The analysis was carried out separately for each sub-area. The core index values were illustrated through histograms. Results for the sub-area 1.3 are shown in Figure 1 where the labels for the issues are shown on the horizontal axis and the corresponding CI values are shown on the vertical axis.

For each sub-area, the participants in the ensuing workshops (as described below) did not have to delve into all proposed issues; rather, they could focus on issues that were seemed most interesting in view of the evaluation criteria and the derived CI values. This, however, did not mean that only issues with high CI value would have been discussed in the workshops: the values served merely as one of the many inputs for discussion and the workshop participants were welcome to highlight any other issues that they regarded interesting on any other grounds.

3.2.2.5. 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

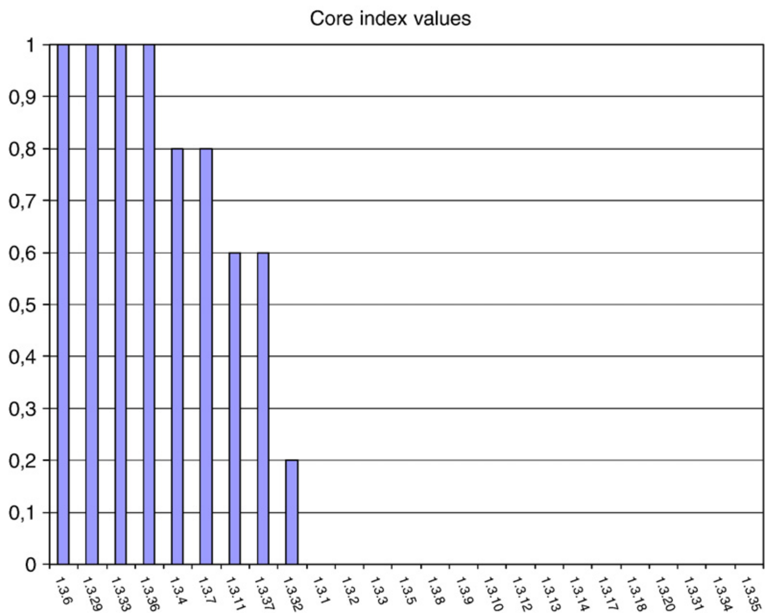

Fig. 1. Core index values for research issues in sub-area 1.3 (Creating new functionalities or improved to materials/products).

program. 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, and 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 structure differed somewhat from 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 was helpful 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 become familiar with the proposed research issues, experts assessments and corresponding CI values. A separate set of background materials was prepared for each workshop, based on the workshop theme. Some sub-areas (e.g., creating new functionalities or improved to materials/products) were covered in several workshops, which helped bring 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 WoodWisdom-Net Coordinator. At the beginning, the workshop agenda was briefly presented to the participants. Then, the participants were invited to comment on the proposed solicited issues and their assessments (approx. 1.5 h), 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 issues with a high CI value, ii) to highlight issues which had a low CI value but which seemed nevertheless interesting, iii) to suggest other research topics that were not among the proposed issues (approx. 2.5 h). After these discussions, the workshop participants filled a questionnaire form where they were asked to evaluate the relevance of each research sub-area for European collaboration by using a seven-point Likert-scale and 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. 1 h). Towards the end of the workshop, the results from these questionnaires were compiled separately for each country and presented to the participants who were then invited to discuss them (approx. 1 h).

3.2.2.6. Workshop for funding organizations. Based on the 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 proposals. 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 h). Second, within each research sub-area, participants were encouraged to comment on the issues within it (approx. 1 h). 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 program. In addition, they were asked to specify if this funding would be allocated to basic or applied research (approx. 1 h). Finally, based on the indications of these tentative funding interests, the workshop participants (and thus funding organizations) were divided into a three working groups with shared interest (approx 1.5 h). These working groups, together with the extensive set of materials that had been produced for them, can be regarded as one of the main results of the international consultation process.

4. Conclusion

In this paper, we have discussed the use of decision support methodologies in the development of a shared research agenda in WoodWisdom-Net, an ERA-NET on wood material research that is an example 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 generated can be made available to the participants from other countries. Extensive participation in a bottom–up process also increases the visibility of coordination tools such as WoodWisdom-Net: this, in turn, is likely to foster active participation in later research programs and mitigates the risk of ending up with 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 end-users of research results (e.g., industrial firms). Taken together, these features of structured consultation contribute to a closer 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, may assist in the formation of new collaborative networks. For each research issue, such an analysis conveys which research groups are keen on participating in corresponding project consortia, if the issue is indeed identified as one of the 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 be driven by earlier collaborative relationships, resulting in unnecessary path-dependencies.

The organization of international consultation processes entails major challenges, too. From the administrative perspective, the geographical distances between participants from many countries make it impossible to organize participatory workshops for them all: thus, there is a need for decisions about which participants will be invited to workshops and in what phases of the process. Moreover, because survey-like results are obtained from heterogeneous participants through a relatively narrow communication channel (in terms of media richness), sufficient time will be needed for deliberative discussions of intermediate results. In addition, there are many more interfaces to be accounted for (e.g., participating countries, thematic sub-areas, levels of aggregation, modalities of research), which in turn leads to processual requirements such as modularity and scalability. In this context, systematic methods like RPM Screening can lend structure to consultation processes so that inputs from one level of analysis (e.g., sub-area of research) can be meaningfully synthesized and taken forward to another level of analysis.

A challenge in using the Internet as a platform for structured deliberative consultation processes is that such processes are new to many participants. From the communication perspective, this means that without sufficient instructions, the participants may not be 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 carefully explicated and communicated. Even funding organizations are faced with a learning challenges, because bottom–up processes differ considerably from top–down planning processes in which funding organizations are in a position to control the agenda: for example, bottom–up processes may produce results that cast doubt on previously established priorities, and possibly even undermine the perceived autonomy of funding organizations.

The promising experiences from the WoodWisdom-Net consultation process, together with those from related processes for the Forest-Based Sector Technology Platform [3], suggest that further work on the development of consultation processes within European coordination tools should be pursued. Indeed, despite the strong track-record of national foresights in many European countries, not much work has been done to clarify how foresight elements should be combined to enhance the coordination tools that are crucial to the establishment of the European Research Area. Here, selected foresight activities and selected process elements – such as decision support for the bottom–up thematic prioritization and the formation of new networks – may shift the locus of activities closer to national actors. This is congruent with the on-going transformation where the EU is increasingly seen as the facilitator of the international collaboration activities. In order to facilitate this transformation, further work is needed to take stock of experiences, to develop suitable foresight methodologies for international consultation processes, and to build knowledge on how such processes can be best enacted so that the coordination tools can attain the objectives that have been placed on them.

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