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# Economic evaluation of the Finnish cluster programmes

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# Foreword

This report is one of the background studies commissioned by the expert group, appointed by the Ministry of Trade and Industry and the Ministry of Education, to assess the impact of the Government Additional Appropriation to Research Work, effective in 1997-99.

The comments obtained throughout the work from the expert group are appreciated. Several cluster co-ordinators, industry representatives, policy makers and other experts have substantially contributed to the study, which is greatly acknowledged.

Cluster policies, programmes and projects are novel public initiatives. Many of the experiences are positive but many aspects require reconsideration. This report is intended to be a part of an open and vivid future-oriented discussion concerning technological and scientific networks and clusters, and the role of the public sector as a promoter of these activities.

The author is solely responsible for the contents of the report.

Tuomo Pentikäinen

# Executive summary

1. There are eight Finnish cluster programmes under six ministries. The programmes were planned to take place during the period 1997-99. In practice, most programmes started during 1998 and they will last until 2000 or 2001.

2. The total financial volume of the programmes is more than FIM 600 million. One fourth (FIM 170 million) of funding is 'ear marked' cluster-specific funding, which was allocated to ministries. TEKES and the Academy of Finland are other major public financers. Ninety seven per cent of funding is domestic, 60 per cent is competitively allocated and public, and one fourth is private.

3. This report is mainly based on a deeper analysis of two cluster programmes: The Finnish Forest Cluster Research Programme (*Wood Wisdom*) and the *Well-Being cluster* programme. The study is based on a survey-analysis that was targeted to sub-projects of these programmes, on project managers' reports of funding and co-operation structures, and on interviews.

4. *Wood Wisdom* has been successful in generating and fostering co-operation between public financers; particularly TEKES, the Academy of Finland and the Ministry for Agriculture and Forestry. The *Well-Being cluster* has managed to facilitate new co-operation between authorities and other public organisations within social and health care sectors.

5. The participation of companies is rather low in both programmes, and the participations are dominated by 'not-for-profit' companies. Companies carry only little R&D risk and they do not find the programmes attractive.

6. The governance of the both studied programmes has been organised by temporary *ad hoc* co-ordination. Programme co-ordination, especially in the case of the Well-Being cluster, is rather heavy and costly. However, the interviewees and the survey respondents found this kind of organisation effective and even necessary. Respondents agreed that co-ordination should eventually be shifted so that it is the responsibility of the underlying organisations, but that it is still too early to do that.

7. Cluster-specific financial instruments are not yet mature. Typically, participating financers use their existing instruments without far-reaching

synchronisation. As a corollary, no or only very little co-financing or syndication occurs. However, in both studied programmes there are interesting attempts to improve the financial instruments.

8. In *Wood Wisdom*, the programme co-ordination together with financers organised 'co-ordination meetings' where applications were directed to appropriate financers. Together with cluster co-ordination these meetings refocused projects and grouped separate projects into larger consortia.

9. The *Well-Being cluster* has a financing model, where a temporary *ad hoc* organisation receives and reallocates funding. It guarantees great flexibility but it may be questioned due to its non-transparency and the fact that outside financers did not see the model as attractive.

10. The programmes are currently not attractive to private profit-oriented financers. Possibilities for a broader financer-base as well as development of financial instruments should be taken under serious consideration.

11. Currently, there are major fields in the Finnish economy that are not addressed appropriately in the cluster programmes. In particular, the telecommunications, base metal, chemical and pharmaceutical industries as well as construction should be better covered in the forthcoming cluster policies.

12. It may be questioned whether ministries are the right 'home-base' of cluster programmes, or whether some other organisation might be more suitable for truly inter-sectoral and innovative networking that would be attractive even for the private sector.

13. In the future, the cluster policy's goals, instruments and evaluation criteria need to be made more clear and transparent.

14. Collection of evaluation and monitoring data, co-ordination and minimisation of overlapping bureaucracy and development of appropriate evaluation tools and indicators are topical future tasks.

15. There is still a need for top-down cluster initiatives, but the real structuring of the programmes and projects could be organised more on a bottom-up basis.

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# 1 Introduction

The systematic increase of public research and development (R&D) funding has been a central policy aim in Finland. In 1996 the Cabinet Economic Policy Committee made a decision to gradually increase public R&D expenditure during the period 1997 to 1999. The annual increase was intended to be FIM 1.5 billion in 1999 when compared to the level of 1997 budget appropriations. (Science and Technology Policy Council of Finland, 1997a). This would increase the public R&D expenditure by nearly 27 % and the whole R&D expenditure by nearly 9 % when compared to the situation in 1995 (Statistics Finland, 1999).

In the 1990's, industrial clusters have been a major focus in the debate about the Finnish technology policy. The discussion began after the publication of Michael Porter's *The Competitive Advantage of Nations* (1990). In the early 90´s, the Research Institute of the Finnish Economy (ETLA) and the Finnish National Fund for Research and Development (SITRA) started an extensive research project on Finnish industries' competitive advantage. The aim of the project was to identify the major reasons for growth and competitiveness of Finnish industries. The research was based on Porter's (1990) cluster approach. In 1995 ETLA and SITRA published the results of the study, which identified and analysed nine specific clusters as a synthesis of circa 60 substudies.

Based on these analyses, the Cabinet Economic Policy Committee made a decision to allocate a part of the increased R&D funding to the development of Finland's industrial clusters. This funding was intended to be from FIM 40 to 50 million annually during the period 1997 to 1999. Co-ordination of this funding was given to sectoral ministries that started eight cluster programmes. The Ministry of Agriculture and Forestry launched research programmes on a forest cluster (*Wood Wisdom*) and on food products, the Ministry of Transport and Communications started telecommunication and two transport cluster programmes, the Ministry of Social Affairs and Health focused on the *Well-Being cluster*, the Ministry of Environment launched an environmental cluster programme, and the Ministry of Labour adopted a cluster approach as a part of the National Programme for the Development of Working Life. (Science and Technology Policy Council of Finland, 1997a)

No strict rules for cluster funding were published. However, improved co-operation between cluster members, increased knowledge flows and spillovers, networking, and deepening co-operation between and within public and private sectors were

required. In general terms, clusters aimed to generate growth, improve industries' competitiveness and productivity, increase employment, generate new innovations and improve social welfare. Moreover, cluster programmes were intended to offer, at least as a general rule, only marginal funding to R&D projects, and it was assumed that cluster members would seek other public and private funding. (Science and Technology Policy Council of Finland, 1997a,b)

Public R&D funding as well as cluster programmes are instruments of government's technology policy. The well-known justification of government intervention arises from market failure, i.e., from understanding that private actions fail to lead to an efficient and desired outcome. Some of the major reasons for market failure are positive or negative externalities, imperfect competition, incomplete and asymmetric information, socially unoptimal risk behaviour and other undesired impacts of high transaction costs. (See e.g. Brown and Jackson, 1990.)

A further market imperfection may arise from government's multiple roles. In the welfare sector, for instance, government is on the one hand a regulator and a supervisor by means of various legislative and incentive systems. On the other hand, however, government may also be a major supplier, demander and financer. Sensible co-ordination of government different roles may prove difficult. Thus, in addition to traditional market failure, government failure may occur, too. (Brown and Jackson, 1990).

There may also be strategic reasons for government interventions, for instance when defence industries are concerned. Furthermore, there are several macro-level or institutional features that arguably can be most effectively affected by government measures. These features are naturally context specific, but they may include removal of technology diffusion barriers, macro-level co-ordination of innovation systems, harmonisation of regulatory and legislative environment, and minimisation of adverse effects of government failure. (OECD, 1998a,b)

By understanding that market imperfections lead to socially unoptimal outcomes, government role has been seen to remove these imperfections. This is the major rationale behind most technology-political activities (see e.g. Wolf, 1990). Choice of appropriate, let alone optimal, government's measures is naturally a very complicated task. Furthermore, it is not clear whether removal of some market imperfections leads to an increase in welfare, if – which is usually the case – all imperfections cannot be removed (see e.g. OECD, 1998a). However, despite these

uncertainties and governance difficulties, science and technology policy is seen to be very important in all industrialised countries. The Finnish government, for instance, has gradually increased its R&D funding so that in 1998 it totalled more than 3 % of the government's budget, and with private R&D funding it totalled slightly less than 3 % of GDP (Statistics Finland 1999a,b).

In this study the Finnish cluster programmes are studied from an economic point of view. The purpose is to get an insight into the goals, instruments and structure of the cluster programmes. Secondly, it is analysed whether the necessary condition for government intervention is fulfilled; i.e., whether cluster programmes were carried out as a corrective measure against market failure. Thirdly, the effectiveness or additionality of cluster programmes is studied.

# 2 Study objectives and restrictions

The purpose of the study is to perform a microeconomic evaluation of the Finnish cluster programmes. These programmes have existed for only two to three years, many of the projects have been running for even a shorter time, and some of the projects are still in planning phases. It is clear that the existence and availability of data restricted the available study methods and design. In particular, official statistics of the performance of cluster members are not available. Furthermore, it is obvious that the complete impact of cluster programmes has not materialised yet.

However, these restrictions are not unique to our study, but occur in most early evaluations and in most process evaluations. Early evaluations can be justified by several arguments (see, e.g., Berg and Lindberg 1997; Kuhlmann et al. 1999), but we found three arguments particularly applicable in this case. First, early evaluation reveals information that is useful in project management. Second, taking part in an early evaluation offers a potential learning process for the participants of the evaluation. Third, early evaluation reveals the characteristics of the current data gathering mechanisms of the cluster programmes and offers a possibility of improving them.

We chose two specific cluster programmes for our analysis: *Wood Wisdom* programme and the *Well-Being cluster*. The rationale behind this choice was twofold. The purpose was to consider one research oriented and one diffusion oriented programme. Furthermore, the purpose was to choose such programmes that were relevant because of either their current or potential importance for the Finnish economy. Only the two programmes of the Ministry of Agriculture and Forestry were research oriented, whereas the prevalence of research-making organisations in the other programmes was low. Based on these arguments, the choice between the two research oriented cluster programmes (*Wood Wisdom* and food products programmes) was obvious. Of the six diffusion oriented programmes, the programme of the *Well-Being cluster* fulfilled the requirements best (see ETLA and SITRA 1995).

The study questions are:

1. What are the Finnish cluster programmes? A general view and a deeper analysis of the two case programmes – the *Wood Wisdom* programme and the *Well-Being cluster*.

2. What are the intermediate and ultimate goals of the cluster policy, and how do they match with the specific goals of the two case programmes?

3. What are the financial, organisational and other instruments that are used to achieve these goals; firstly in general and secondly in the chosen case programmes?

4. What is the effectiveness or additionality of the cluster programmes? Especially, have the intermediate goals already been achieved? Are there changes in the networking of the cluster members? What is the expected ultimate outcome of the programmes? What is the actual role of public policy in clusters?

As a secondary question, it is analysed whether existing data sources are sufficient and applicable for sound evaluation, and possible improvements are suggested.

All the cluster programmes are still in early stages, so the focus is on intermediate outcomes and implementation processes rather than on final effectiveness.

Obviously, cluster policy had to be defined. It would have been difficult and even artificial to isolate cluster programmes from 'conventional' industrial policies, where removal of market imperfections or correction of market failure have always had a major importance, too. For instance, encouragement of knowledge flows or improvement of co-operation, which are typical aims of cluster policy, are also natural goals of conventional technology policies. (See e.g. Arrow 1962, Johnson 1988 and OECD 1998a). Furthermore, cluster programmes receive public and private funding from several sources, which makes it difficult to isolate and evaluate the marginal or incremental contribution of cluster policies.

In this study, the focus is on specific cluster programmes that were launched by 'earmarked' cluster-specific funding during the years 1997 to 1999 (the Science and Technology Policy Council of Finland 1997a,b). The role of the cluster-specific funding differs between the programmes. In *Wood Wisdom* it is about one tenth of programme's aggregate public funding and only 5 per cent of reported total funding. On the other hand, in the *Well-Being cluster*, public funding covers more than 97 per cent of the total reported expenditure, and the earmarked funding totalled approximately one half of that.

Project portfolios, budgets and partcipating organisations change continuously in all cluster programmes. In this evaluation it has been reported the situation in October 1999 for the *Well-Being cluster* and in March 1999 for *Wood Wisdom* and in August-September 1999 for all other programmes, because the latest available project reports were from these periods.

# 3 Data and methods

Aggregate data about cluster policy, including information on total budgets, division of funding between ministries, and general aims of the policy were available in the publications of the Science and Technology Policy Council of Finland (1997a,b) and in the intermediate reports of clusters' performance (SITRA 1999).

Wood Wisdom's co-ordinator, in co-operation with SITRA, has collected follow-up data of all sub-projects of the programme. This includes quantitative data about the projects' financing, organisation, duration and workload. The database is located in SITRA and it is updated yearly as cluster programmes continue. Only the first cross-section of the database was available for this study, and we used the financial and organisational information from it. Some information about the projects' expected outcomes and co-operation structures was included in the database, but this information could not be used due to high non-response and the absence of follow-up.

SITRA's database was complemented by a targeted survey. A questionnaire was sent to a representative from each participating organisation in each project. In *Wood Wisdom* the survey was sent to 156 receivers with a response rate of 71 per cent while in the *Well-Being cluster* the questionnaire was sent to 61 respondents and the response rate was 56 per cent.

In the survey, we gathered organisation-level information concerning the goals, instruments, expectations and effectiveness of cluster programmes. We concentrated particularly on the expected and materialised additionality of the cluster policy. (A translation of the questionnaire is in the Appendix 1)

In order to get a fuller picture of cluster policies' goals, instruments and additionality, we performed a few targeted interviews with government, financer and end user representatives. There were 11 interviewees, and they are listed in the references.

Because detailed information about the financing of the cluster programmes was not available, we asked cluster co-ordinators to report the financial structure in a standard form. (See Appendix 2)

Methodologically the study is descriptive. There are descriptive results of the organisation, size, governance and relevance of the clusters. Major inter-cluster differences are reported, too. In particular, the expected and already realised additionality of the programmes is analysed.

# 4 Results

## 4.1 The Finnish cluster programmes

The Finnish cluster programmes are public financial instruments. Each programme is organised under a sectoral ministry, and each programme has its own publicly assigned and funded co-ordination. The core of the Finnish cluster programmes is organised by increasing the appropriations of the sectoral ministries. 'Earmarked' cluster-specific funds is only a part of funding and other public and private financing sources have been used in all programmes. However, public funding dominates in all programmes. In addition to ministries, TEKES and the Academy of Finland were major financers. Reported financing is mostly domestic, with only 5 per cent of funding being international (from different EU-sources).

Private funding was important only in *Wood Wisdom* and in the KETJU-programme on transport logistics. Information about private funding was available only as an aggregate measure, and decomposition by individual financer or domestic and international sources could not be made.

Figures concerning own funding were collected from cluster co-ordinators and they were based on project co-ordinators' reports. The figures could not be decomposed, and it remains unclear whether own funding described participating organisations' real monetary inputs on programmes or whether imputed expenses and overheads were reported, too. At the aggregate level of all cluster programmes this is a minor problem, but it must be noted when individual programmes are considered or compared.

The division of appropriations between ministries and cluster programmes, major financers, domestic and international public funding, and aggregate measures of private and own funding can be seen in Table 1. Additionally, starting dates of programmes, numbers of participating organisations as well as numbers of sub-projects are reported.

*Table 1. Overall information and the division of funding of the Finnish cluster programmes*

| cluster programme | background information | | | | Financing by financer FIM 1,000,000 | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | starting date | # of projects | # of partici-pating companies | # of partici-pating units | public cluster specific funding | | | | | | other domesticpublic funding | | | int. Public funding | | Public total | private funding | own funding | grand total |
| | | | | | KTM[1] | MMM[1] | STM[1] | LM[1] | TM[1] | YM[1] | Academy of Finland | TEKES | other | EU | other | | | | |
| *Wood Wisdom* | 1.5.1998 | 113 | 12 | 61 | 2.4 | 12.5 | | | | | 27.2 | 75.0 | | n.a. | n.a. | 117.1 | 87.5 | | 204.6 |
| The *Well-being cluster* | 1.11.1998 | 17 | 8 | 30 | | | 25.5 | | 0.7 | | | | 15.5 | 12.2 | | 53.6 | | 1.6 | 55.2 |
| Food cluster | 11.12.1997 | 12 | 17 | 29 | | 12.0 | | | | | 0.3 | 0.5 | 1.9 | | | 14.7 | 0.5 | 11.7 | 26.9 |
| KETJU[2] | 1.12.1998 | 30 | 60 | 70 | 1.4 | | | 12.0 | | | 0.8 | 20.0 | | 3.8 | | 38.0 | 46.0 | | 84.0 |
| TETRA[2] | 1.1.998 | 48 | 29 | 71 | | | | 11.0 | | | 0.3 | 1.0 | 34.5 | 1.5 | | 48.3 | 7.5 | 7.4 | 63.2 |
| NetMate[2] | 7.4.1998 | 10 | n.a. | n.a. | 0.6 | | | 9.0 | | | | | 0.6 | 0.6 | | 10.8 | 1.3 | 1.3 | 13.4 |
| Workplace development | 05.1997 | 13 | 86 | n.a. | | | | | 30.0 | | | | | | | 30.0 | | 50.0 | 80.0 |
| Environmental cluster | 1.1.1998 | 60 | 70 | 180 | 1.5 | | | | | 25.0 | 5.7 | 13.0 | 3.6 | | | 48.8 | 5.8 | 25.5 | 80.1 |
| total | | 303 | 282 | | | | | | | 25.0 | 34.3 | 109.5 | 56.1 | 18.1 | | 361.3 | 148.6 | 97.5 | 607.4 |

[1]KTM = Ministry of Trade and Industry, MMM = Ministry of Agriculture and Forestry, STM = Ministry of Social Affairs and Health, LM = Ministry of Transport and Communications, TM = Ministry of Labor, YM = Ministry of the Environment

**The *Wood Wisdom* programme**

We analysed in greater detail two specific cluster-programmes: The Finnish Forest Cluster's Research Programme (*Wood Wisdom*) and The *Well-Being cluster*. *Wood Wisdom* was started by an open competition, which had two rounds. In September 1997 the first round, 'preliminary application round', took place. It was followed by co-ordination meetings during which individual proposals were collected to larger consortia, consortia and projects were classified according to their position in the production chain, and overlapping parts were streamlined. The final competition, the 'second application round', took place in December 1997. Later on, the project portfolio was complemented by targeted application rounds. In December 1998 first targeted round was closed, and a second targeted round was opened on January 31, 2000. For practical reasons, this evaluation is restricted to those projects that were included in the programme by March 1999.

At the operational level, 12 firms or units of firms participated in 32 different projects; other major participants were 33 university departments that took part in 67 projects, and 12 research organisations that had 51 participations. Altogether 61 different units or departments and 306 researchers took part in the operational activities of the programme (Metsäalan tutkimusohjelma, 1999).

At the non-operational level, we analysed the participation to steering groups. Participation of companies and especially industrial companies was much more common at the steering group than at the operational level. Fifty companies took part and they had 117 participations. Government sector representatives and especially members of public funding organisations were understandably present at steering groups, while, on the other hand, universities and research organisations participated less actively than at the operational level.

*Table 2. Wood Wisdom's participants by organisation type and level of participation. Numbers of different participants and total numbers of participations.*

| | **projects** | | **steering groups** | |
|---|---|---|---|---|
| | **freq.** | **participations** | **freq.** | **participations** |
| companies | 12 | 32 | 50 | 117 |
| universities (departments) | 10 (33) | 67 | 8 (12) | 39 |
| research organisations (departments) | 4 (12) | 51 | 2 (8) | 17 |
| government (general or municipal) | 0 | 0 | 4 | 5 |
| public financing organisations | 0 | 0 | 5 | 30 |
| other | 4 | 6 | 25 | 51 |
| total | 61 | 156 | 104 | 259 |

*Wood Wisdom* comprised 4 research areas, 17 research themes, 33 research consortia and 113 individual projects. The project level was the level of actual activities, and financing was typically allocated to projects. However, steering groups were in most cases organised for research themes, consortia or other combined sets of projects and not for separate projects. In some cases consortia also received the funding as a lump. Research areas were merely classificatory units; they did not receive funding and no specific co-ordination or governance occurred at that level. Finally, the whole cluster programme had a common full-time co-ordinator who took part in all steering groups, communicated with financers, organised annual meetings of the whole programme and communications. As was evident from interviews, the position of the co-ordinator was very strong and important in this programme. Figure 1 presents a schematic presentation of the organisation. A detailed list of participants and projects is in Appendix 3a.

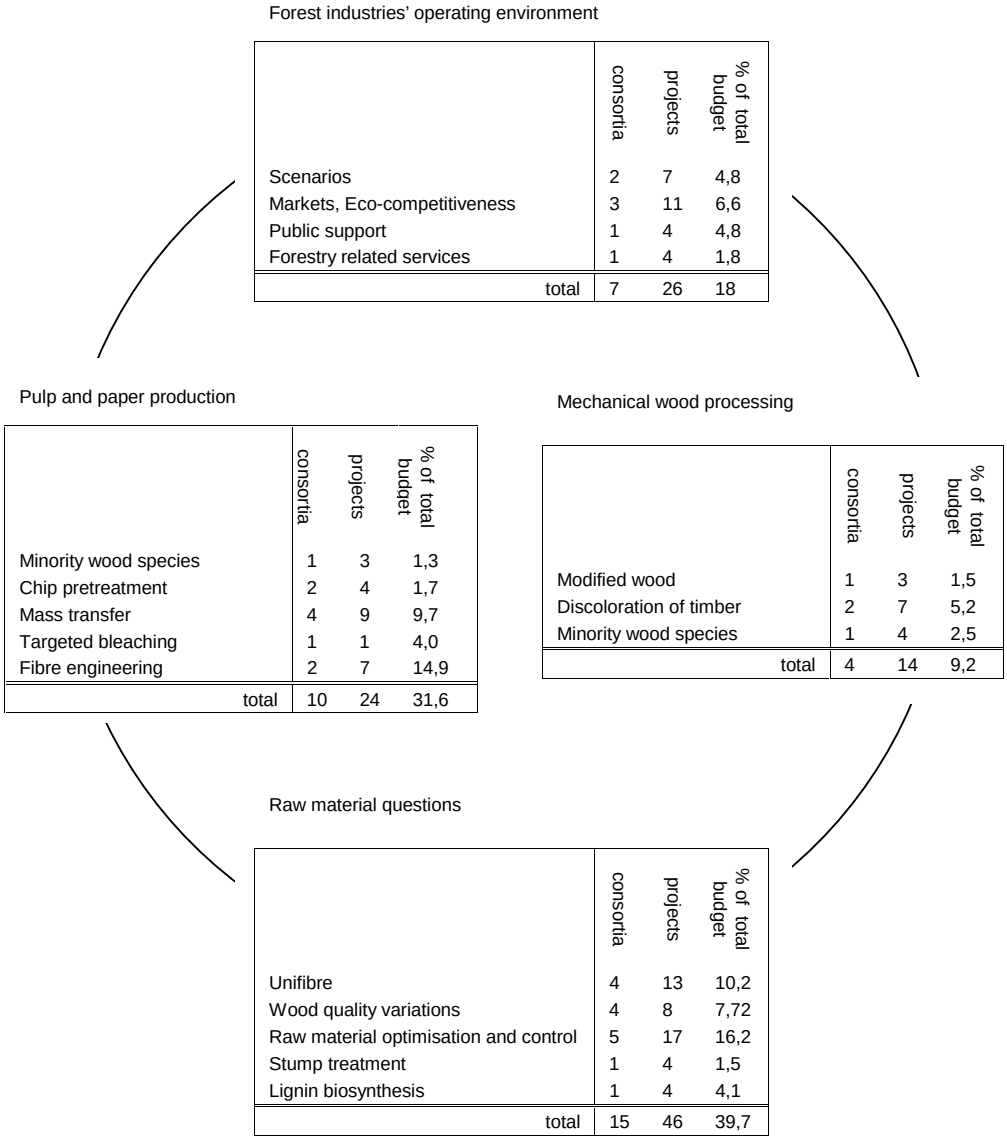



*Fig. 1. Organisation of* Wood Wisdom *Research areas, themes and their volume.*

At the operational level, the programme was clearly research oriented. The number of participating companies was low. Company participations were dominated by Metsäteho Oy (13 participations) and KCL Oy (8 participations). Both are joint research ventures of Finnish forest companies. Direct participation of profit oriented industries and especially of major Finnish pulp and paper factories was

very low. Metsä-Serla Oyj, Koskisen Oy, Fortum Power and Heat, and Lännen Laboratoriot Oy had one participation each. In the programme there were three profit oriented SMEs and one non-profit small research joint venture (Etlatieto Oy).

Three universities shared a vast majority of the participations. The University of Helsinki, The Helsinki University of Technology and The University of Joensuu dominated with 23, 17 and 13 participations, respectively. Six other Finnish and one Norwegian university participated. The Finnish Forest Research Institute and VTT were the dominant research organisations with 27 and 22 participations respectively. Two other domestic research organisations participated.

Companies had a dominant presence in the steering groups. In particular, the major multinational paper, pulp and mechanical wood industries, Metsäliitto Group, Stora-Enso Oyj, UPM Oyj, Schauman Wood Oy and Koskisen Oy participated actively in steering groups (18, 13, 19, 6 and 4 participations, respectively). Research joint ventures KCL Oy and Metsäteho Oy had 11 participations. There few participations of SMEs were from the fields of construction industries, consulting and forest sectors' information systems. A complete list of steering group members is in Appendix 3b.

**The *Well-Being cluster***

Whereas *Wood Wisdom* was located in a well-established network of universities, research organisations and companies, the situation of the *Well-Being cluster* was quite different. It was a tightly specified combination of IT-related projects within health and social sectors. The projects had a common focus in streamlining patients' or customers' service chains. A majority of the programme's activities were organised under the *Satakunnan Makropilotti* programme.

The origins of the *Well-Being cluster* were in a long series of studies concerning the utilisation of 'new technologies' in the production of social and healthcare services. A major objective had been to develop IT-based user-friendly and cost-effective services. Outsourcing of some parts of the production processes to private firms and increased co-operation with companies had been noted in some documents, but this had not been a major aim of these initiatives. (Sosiaali- ja terveysministeriö 1995, 1998a, 1998b).

In April 1997, major financers and other public institutes published a detailed open call for candidates for a regional pilot project. These institutes were the Ministry

for Social Affairs and Health, the Ministry for Trade and Industry, TEKES, the National Social Insurance Institute, the National Research and Development Centre for Welfare and Health, the Public Health Institute, the Finnish Institute of Occupational Health and the Association of Finnish Local and Regional Authorities. The call was directed at municipalities and federations of municipalities. It was announced that private service providers and other companies should be incorporated into the programme as soon as the municipal competition was closed. In August 1998, among 19 candidates, the region of Satakunta was chosen as the pilot area. The first projects were launched in November-December 1998 and most of them were started during the year 1999. In addition to *The Makropilotti* programme, two other closely related projects have been included in this evaluation. Both these projects were financed by the 'earmarked' cluster funds of the Ministry for Social Affairs and Health.[1]

At the operational level, *Satakunnan Makropilotti ry* was the most important single organisation. It is the co-ordinating association of *The Makropilotti* programme's activities, and it was established in 1998 by the regional and national authorities and seven local municipalities. A majority of the *Makropilotti* programme's activities are directly organised under the association. For instance, typically it is the association and not separate projects that negotiates funding, signs financing contracts and reallocats granted funds to projects. This must be taken into account when analysing project-level financing and organisational maps. *Satakunnan Makropilotti ry* had 16 participations in 15 projects. Other organisations with multiple participations are the town of Pori with 10, Satakunta Hospital District with 6, the National Agency for welfare and health (STAKES) with 2, and local hospitals and health centres with 6 participations. Eight companies participated in the programme. ICL Data and Outokumpu Pori Copper took part in two projects; Porin Prinet, two small software firms, a pharmacy, an ambulance operator and a private clinic had one participation each. In addition to *The Makropilotti*

[1] In contrast to other cluster programmes, it is not possible to make an unambiguous selection of those programmes that belong to the *Well-Being cluster* programme and those that do not. The Ministry of Social Affairs and Health has a long series of studies and projects of the use and applicability of IT-based services within health and social sectors. Thematically these projects do not differ from those projects that were included in this evaluation. Furthermore, the *Well-Being cluster* does not have a clearly defined cluster co-ordination. Our selection criterion was to consider those programmes that were organised around the cluster-specific additional funding during 1997-2000. Our selection was appropriate in order to keep the *Well-Being cluster* (at least to some degree) comparable with other cluster programmes However, it should be emphasised that our (or any other) definition of the *Well-Being cluster* must be considered to some degree artificial.

programme-activities, there were two other projects financed by the funds of the *Well-Being Cluster*: One in STAKES and one in Pohjois-Savon Ammattikorkeakoulu.

Altogether, there were 61 participations in 17 projects by 30 organisations. Fifteen of the projects were organised in six themes under the *Makropilotti* programme, and two projects were organised outside the *Makropilotti* programme. At the operational level, organisations were mainly local or national authorities (18 organisations with 44 participations). Two polytechnics (ammattikorkeakoulu) participated in three projects; eight companies had altogether ten participations. STAKES was the only research organisation that participated. There were no university participants and no direct international links (with the exception that two of the companies were multinationals). An overall summary of the project portfolio is presented in Table 3, and a complete list of projects and organisations is in Appendix 4.

*Table 3. The* Well-Being cluster. *Numbers of projects, types of participants and numberss of participations (in parentheses) classified by themes.*

| **theme** | **# of projects** | **companies** | **research organisations and polytechnics** | **municipal or other authorities (including *Satakunnan Makropilotti ry*)** | **other** |
|---|---|---|---|---|---|
| Independent living | 4 | 0 | 2 (3) | 5 (8) | 1 (1) |
| Information and client services | 2 | 3 (3) | 1 (1) | 1 (2) | 0 |
| Information security and protection | 2 | 2 (2) | 0 | 10 (13) | 0 |
| Regional data network | 1 | 2 (2) | 0 | 3 (3) | 0 |
| Regional direction models | 2 | 0 | 0 | 1 (2) | 0 |
| Seamlessness | 4 | 3 (3) | 0 | 9 (16) | 0 |
| projects outside *Makropilotti* | 2 | | 2 (2) | | |
| total | 17 | 8 (10) | 3 (6) | 18 (44) | 1 (1) |

## 4.2 Goals of the cluster programmes

The overall goals of the cluster programmes were clearly specified by the Science and Technology Policy Council of Finland. (1997b). The primary goal was to "generate new innovations, businesses and employment". Intermediate goals were

to improve co-operation between authorities, public financers, legislators and the private sector. The Science and Technology Policy Council emphasised a 'holistic' approach to the value chain so that private actions would sum up as a mutually beneficial process. Furthermore, 1997-99 cluster-specific funding was seen as a seed, which would "create new and permanent co-operation structures, improve the co-operative ability of the whole research system, and increase relevance and flexibility of activities". The council's main emphasis was on sectoral ministries and public financers. However, they emphasised that one of the central practical goals of the programmes was that they should be attractive to companies. The underlying ultimate goals, albeit hardly measurable, were "to generate growth, improve industries' competitiveness and productivity, increase employment, generate new innovations and improve social welfare". (Science and Technology Policy Council of Finland, 1997a,b; 1998a,b).

***Wood Wisdom***

Interviewees stressed that *Wood Wisdom* was clearly research oriented and they stressed that all its pragmatic goals should be expected and found at the beginning of the value chain. Two particular points were made. First, the programme was seen as a way to improve co-operation between public financers, especially TEKES, the Academy of Finland and, according to some interviewees, the Ministry of Agriculture and Forestry. Interviewees pointed out that co-operation between these financers had been insufficient (if there had been any) before the cluster programme. Another point was that the programme was seen as a way to offer all participants a holistic picture of the value adding chain. It was seen especially as a way to increase the co-operation at the pre-competitive end of the value chain.

Some interviewees saw even the commercial aspects as important goals; they emphasised particularly improved research-industry links, better incentives for performing industrially relevant research, and the networking of different public and private financers during the innovation life cycle from pre-competitive research to product or process innovations. Some interviewees, however, stressed explicitly that the programme was merely research oriented and that commercial aspects were not goals. Industry representatives took part in the planning and steering, but their importance increased during the latter phases of the programme. Three interviewees claimed that this was due to a radical change towards a more commercial orientation.

The survey respondents were asked to answer three sets of questions concerning their organisations' goals for the cluster programme. The first set concerned their knowledge-related goals, the second their commercial goals, if there were any, and the third set included various cluster-related statements. As can be seen from Figure 2, all knowledge-related aims, probably with the exception of educational goals, were reported as important. Figure 3 shows the distribution of respondents' commercial goals. The respondents were asked to skip the whole set, if they did not have commercial targets. The main message of Figure 3 is that, on average, respondents did not have commercial aims. If we concentrate on those who really responded, i.e., on those who reported having commercial aims, product and process innovations and improvements (including computer programmes) arise as the most important ones. Both these figures clearly support the classification of the *Wood Wisdom* programme as a basic- research oriented one.

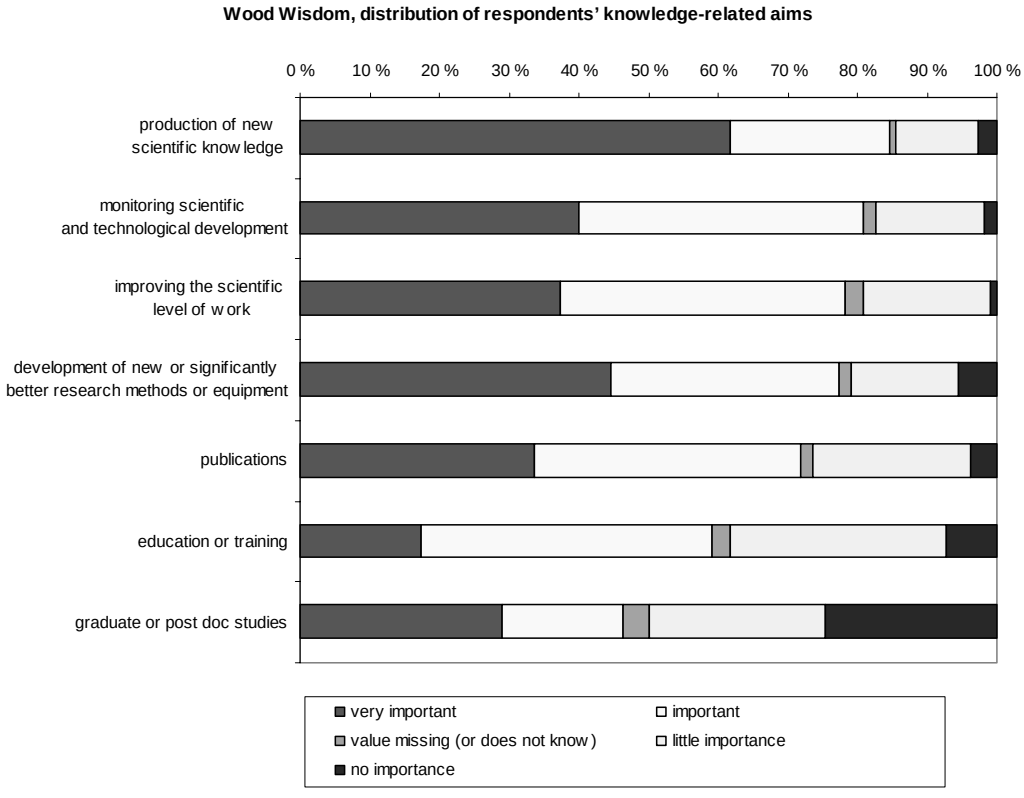



*Fig 2.* Wood Wisdom. *Distribution of knowledge-related goals (n=110).*

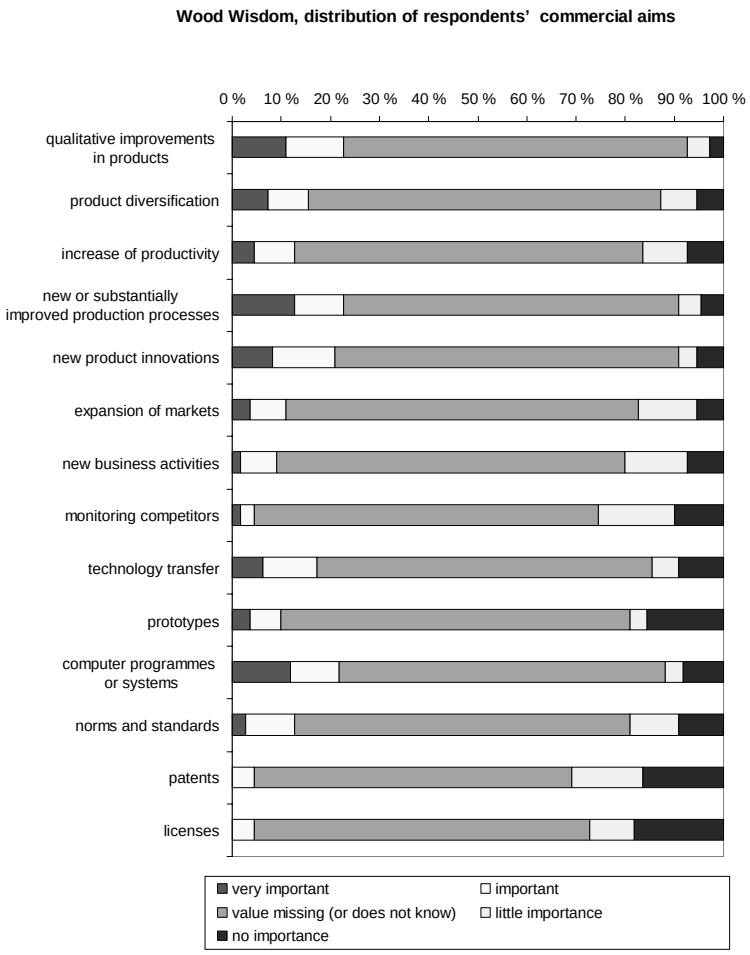



*Fig 3.* Wood Wisdom. *Distribution of commercial goals.*

The third set of questions revealed an interesting outcome. Several network-related aims were central motives for participation in the programme. Contacts with other researchers and research financers were considered to be especially important. Public funding was seen as a positive signal to financers, clients and those within the 'own' organisation. Correspondingly, public funding was seen as a means to improve or strengthen respondent's position in an existing network. Nearly 40 % of respondents reported that an important motive for participation was to look for access to a new network. On the other hand, statements that are typically important in 'near-market' applications were not seen to be important. In particular, risk sharing, client contacts, financial costs and even proprietary rights were ranked rather low. Moreover, cluster programmes tend to have a fairly heavy organisation,

and we asked whether this co-ordinated governance was considered important. At the project level co-ordinated governance did not receive much support. (See Figure 4)

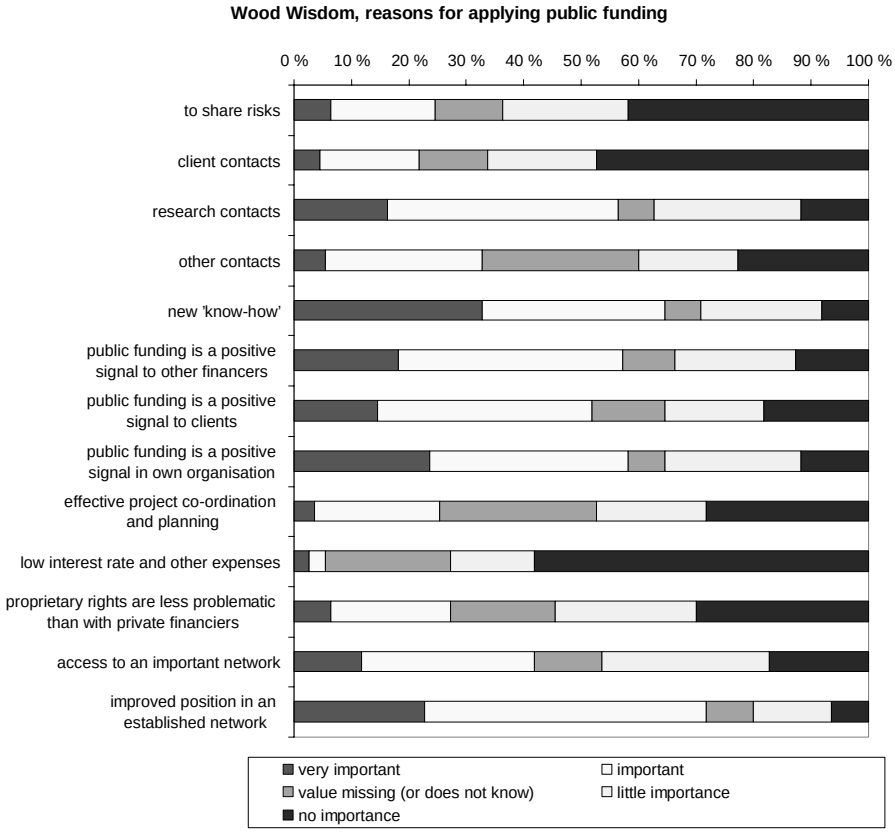



*Fig 4.* Wood Wisdom. *Expectations for public funding (n=110).*

**The *Well-Being cluster***

The *Well-Being cluster*, or the *Makropilotti* programme's, principal goal was to increase the quality of services of the public health care and social sectors by means of new media, principally information technology (IT). Documents and interviewees shared the view that there was a huge need for harmonisation of overlapping social and health services. Part of this harmonisation would be technical integration of currently independent registers, information systems and databases. Another part would be the improvement of co-operation, facilitating inter-organisational discussion and harmonisation, and offering incentives for networking. Both these aspects were central goals of the *Makropilotti programme.*

In Figure 5, this can be seen at the right hand side of the figure. The *Makropilotti* programme was an attempt to build up the 'client pool', a co-operation structure between a set of relevant public sector players.

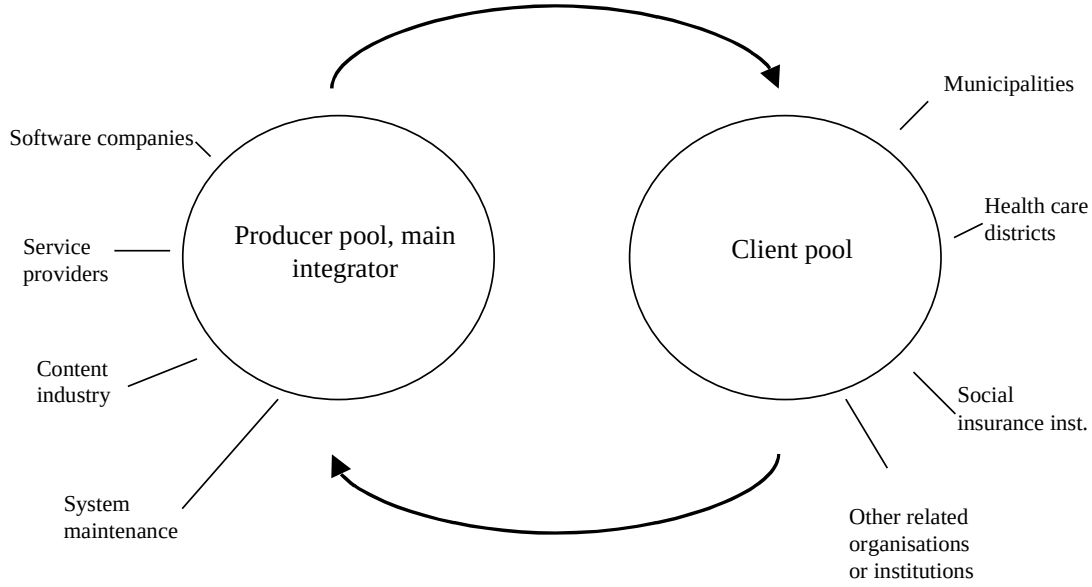



*Fig 5. A schematic presentation of the Makropilotti programme.*

Another part of the well-being cluster is the producer or company sector. In the *Makropilotti* programme there were attempts to form a specific producer pool that would have integrated and negotiated contracts with the public sector. Interviewees offered a mixed view whether the firm perspective really was a goal of the *Makropilotti* programme. Some emphasised that the programme was merely an attempt to improve the quality of public services; i.e., the right hand side of the figure. They argued that the whole demand-sector is nearly completely public and that probable profits will ultimately be paid by municipal or general governments. As a corollary, they concluded that the whole question of commercial relevance was wrongly specified. They claimed that the meaningful question would have been whether increased costs were in some sensible proportion with probable benefits, which are unlikely to be monetary. They emphasised that, in a long run, the Makropilotti programme may well improve efficiency and create indirect savings, particularly as far as specialised health care is considered. However, they did not see this as a central goal of the activities. Some argued that the costly learning process of the Makropilotti programme can be effectively copied to other

applications and regions. Some, however, thought that each new application would be so unique that the *Makropilotti* programme offers only little if any transferable knowledge. In practice, it is far too early to evaluate The *Makropilotti* programme's real impact locally, let alone it's transferability to other areas.

Other interviewees, however, saw a huge market and even export potential for the IT-solutions that were and will be developed during the programme. They saw the programme as a possibility for studying, developing and testing new business concepts, modular and integrated IT-technologies, and a completely new 'producer-client' model in a friendly, shared-risk environment. Furthermore, they saw this kind of programme as a good reference for companies.

Even though there were some ambitious ideas for commercial concepts, they did not make it through to the project portfolio. On the contrary, the projects and their goals were clearly within the public sector. One interviewee made a strong croticism that in the planning phase there was a spontaneously established consortia of circa 30 companies that were actively interested in taking part in the programme, but that the whole consortia vanished because the *Makropilotti* programme was not willing to start negotiations with them. The few company participations were software or other sub-contracting services that *Satakunnan Makropilotti ry* had ordered, and there was minimal, if any, risk sharing or R&D from the companies.

According to the survey, this programme did not have as clear a knowledge-orientation as did *Wood Wisdom*. However, 'Education or training' and 'Monitoring scientific and technological development' were ranked important by a majority of respondents. Furthermore, except for 'Advanced academic studies', all other knowledge-related aims were ranked as important or very important by at least one third of respondents. (figure 6)

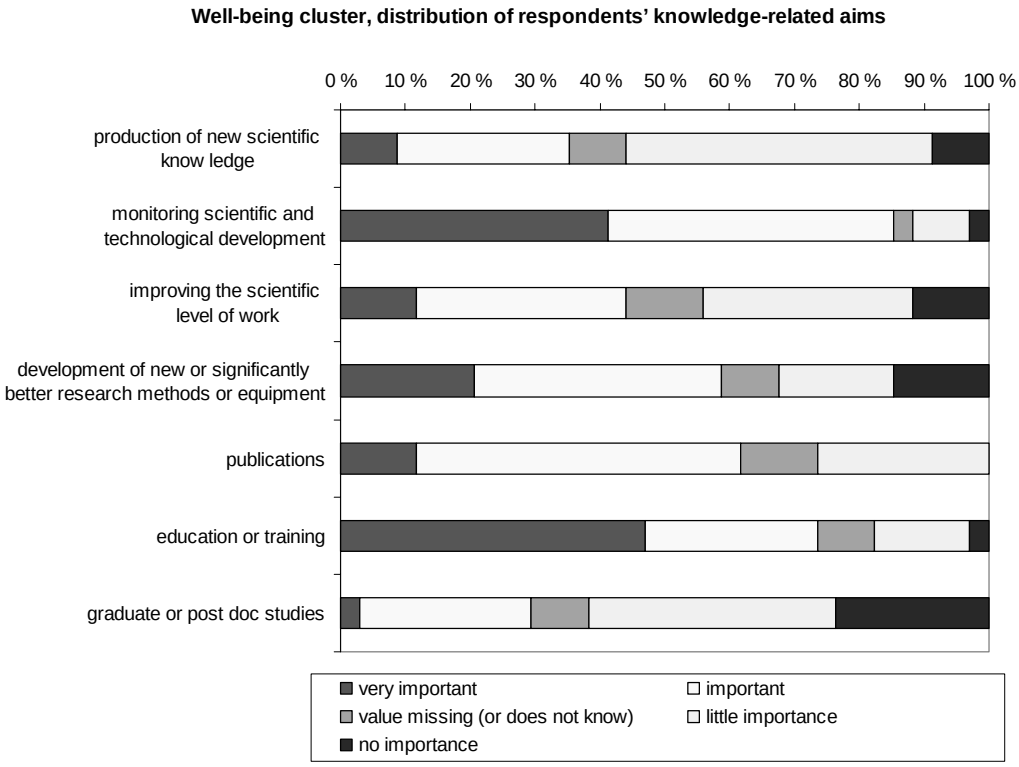



*Fig 6. The* Well-being cluster. *Distribution of knowledge-related goals.*

On the other hand, 40-50 % of respondents indicated that they had commercial aims. This is much more than in *Wood Wisdom*, for instance. Productivity or product improvements and innovations, as well as computer programmes and systems were the most important commercial aims. However, it should be kept in mind that very few of the respondents were directly connected to the profit-making sector. Several direct or indirect critics revealed that respondents found it difficult to answer to this set of questions. (Figure 7)

In the third set of questions we asked for reasons for applying for public funding. The fact that *The Makropilotti* programme *ry* and not individual projects had applied for funding may have caused the relatively high non-response rate to this question. Network or co-operation related goals were ranked as rather important, even though nearly 40 per cent reported that client contacts were not important. Except for financial costs and proprietary rights, all other statements were

considered very important or important by more than half of those who really answered. The distribution can be found in Figure 8.

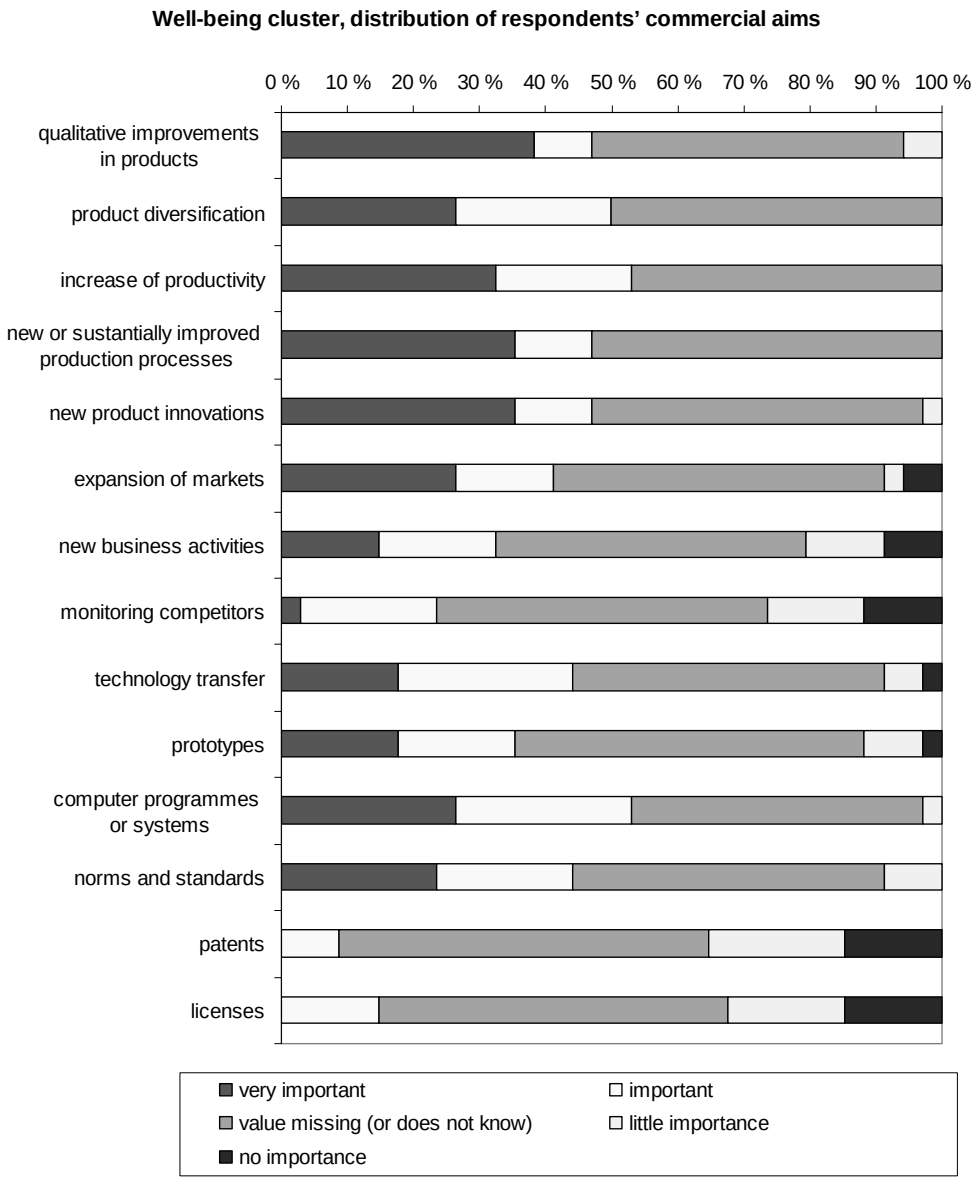



*Fig 7. The* Well-Being cluster. *Respondents' commercial aims.*

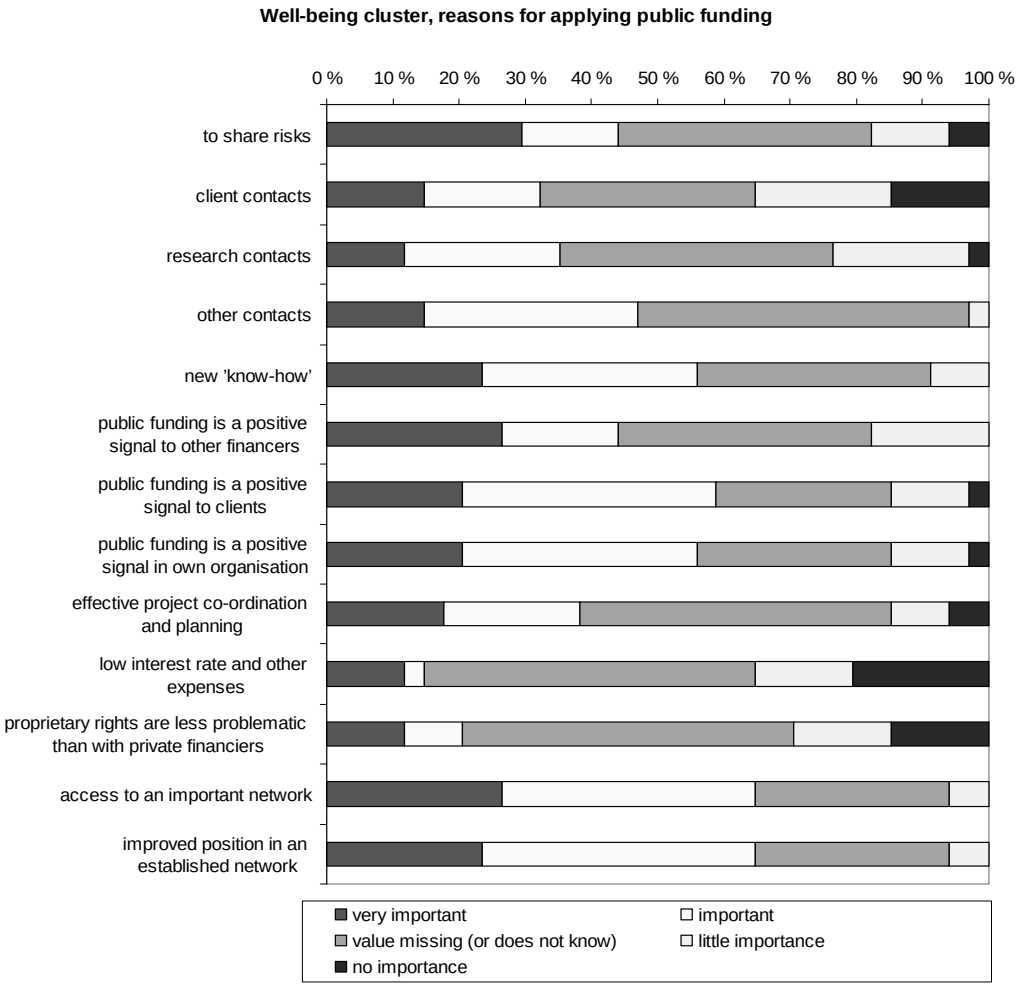



*Fig 8. The* Well-Being cluster. *Expectations for public funding.*

## 4.3 Instruments of the cluster programmes

Cluster programmes are sectoral financial programmes. The core of the programmes was an earmarked cluster funding that was allocated to sectoral ministries (as can be seen in Table 1). In principle, the financial instruments were very straightforward: Public resources were allocated as grants to a set of projects. Public or private loans, risk investments or venture capital was not reported in any of the programmes.

In *Wood Wisdom* there were no cluster-specific financial instruments, but each funding organisation, particularly ministries, TEKES and the Academy of Finland, followed their normal granting procedures and competition rules. Even though there was co-operation and co-ordination between financers, neither the aim nor the realisation was a harmonised syndicated financing. Quite to the contrary, only in a few cases did two or more financers participate in a common project. However, the programme co-ordination together with financers organised 'co-ordination meetings' where applications were directed to appropriate financers. Together with cluster co-ordination these meetings even refocused projects and grouped separate projects to larger consortia.

What differentiates *Wood Wisdom* from conventional public programmes is its centralised co-ordination. All interviewees shared the view that this programme offered, for the first time, a holistic and synergetic view of the value chain. The Finnish forest sector has always been very polarised. On the one hand, there are two major fields in the applied wood sciences: Mechanical wood processing and pulp and paper sciences. Traditionally these sectors have had very little in common. On the other hand, there have been several financing or governing institutions that have lacked co-operation; particularly the Academy of Finland, the Ministry for Agriculture and Forestry and TEKES. This programme was seen as a well-functioning way to create links and incentives for mutually beneficial co-operation.

The interviewees agreed that a specific publicly financed body is required to facilitate this co-operation. Most interviewees stressed that forest cluster policy is not yet (if it ever will be) mature enough to be incorporated as a normal activity of the participating public organisations. They found a separate co-ordinating unit important even though they were not willing or able to evaluate whether the current organisation was the most appropriate one.

In the *Makropilotti* programme there was a new way to apply and allocate grants. The Ministry for Social Affairs and Health organised a competition for cluster funds. This competition was not organised for projects but for larger consortia that were asked to provide prospects about how they would arrange the specified activities of the *Makropilotti* programme. From 19 candidates, the Satakunta region won the competition, and the *Satakunnan Makropilotti ry* was established as an *ad hoc* association to reallocate the grants. Within the *Satakunnan Makropilotti ry* the project portfolio was not organised on a competitive basis. Furthermore, most projects were financed by funds that were reallocated by the *Satakunnan Makropilotti ry*. As a corollary, project-level funding was not competitive and

project-level follow-up information was not collected by any of the financers. In principle, the idea was that projects would have applied for other funding from public and private sources. In practice, this expectation was not fulfilled as can be seen from Table 1.

Most interviewees found that it was necessary to have a specific co-ordinating unit for *Well-Being cluster*'s activities. However, the current co-ordination was very heavy, companies found it difficult to make contracts with a temporary association, and funding was very non-transparent because it was mainly organised internally.

### 4.4 Characteristics and effectiveness of the cluster programmes

Overall, participants of cluster programmes were generally satisfied with the programmes, new and even innovative forms of co-operation were piloted, and public intervention was found important and effective. However, the organisation of the programmes was heavy, time schedules were tight and planning periods were far too short. Moreover, the general goals of cluster policy were so loose that they can hardly be used as appropriate evaluation criteria. Actually it seems to be fair to ask whether we should speak about any cluster policy, or whether we should evaluate eight separate programmes with separate goals, instruments and characteristics. Probably the most obvious common factor in the cluster programmes, at least in the chosen case clusters, was that they were targeted very clearly on public sector organisations, that they were publicly governed, that companies or other private sector bodies were hardly able to influence the structure of the programmes, and that the participation of companies was low. Moreover, it seems fair to say that cluster programmes may well have a positive impact on co-operation between public organisations, but it seems unlikely that they would boost any kind of structural changes in industries or that they would generate new businesses.

We asked the survey respondents to evaluate the strategic importance of the funded projects. The answer patterns were similar in the both programmes, and virtually all projects were either of high strategic importance or they were expected to appear important in the future. It must be remembered that a majority of respondents were from publicly funded project organisations so that this answer pattern was expected. (Figure 9).

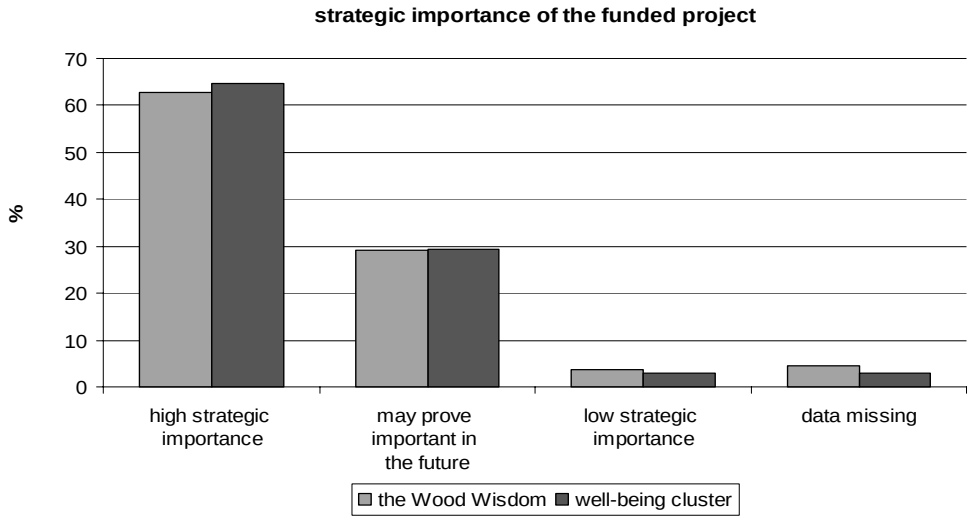



*Fig. 9. Strategic importance of the funded projects.*

Keeping in mind that the prevalence of truly profit-oriented partners was low, that *Wood Wisdom* tended to focus on research and the *Makropilotti* programme tended to build co-operation between different public bodies, it is interesting that projects were reported to have rather well articulated commercial targets. (Figure 10)

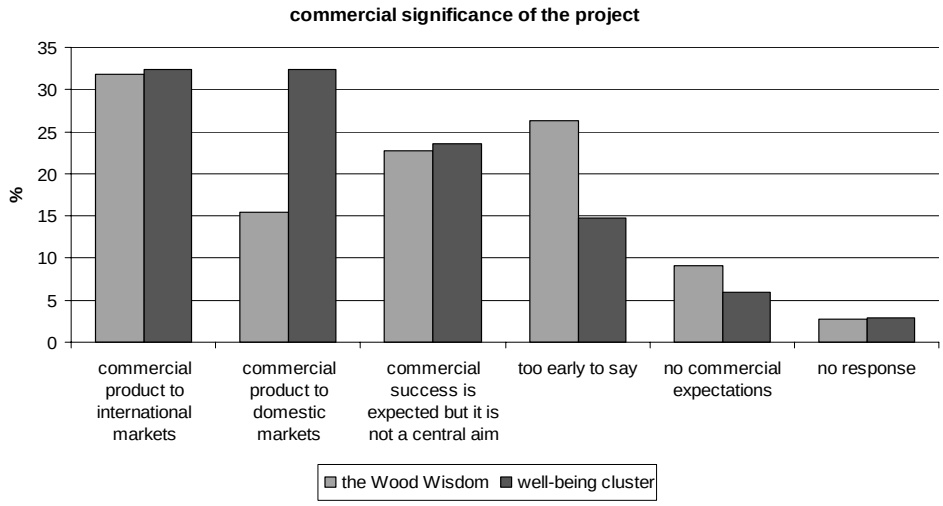



*Fig 10. The commercial significance of the projects.*

However, the next two questions revealed that commercialisation was typically expected to occur in the future, whereas in only a few cases within *Wood Wisdom*

has a commercial product already been developed. Moreover, in only 10 to 20 per cent of cases did the respondent report that it was the commercialising organisation itself, whereas in most cases they reported that some other partner within the programme will do the commercialisation. More than one third of the respondents of *Wood Wisdom* reported that it was too early to say or that commercialisation was not a focus. (Figures 11 and 12)

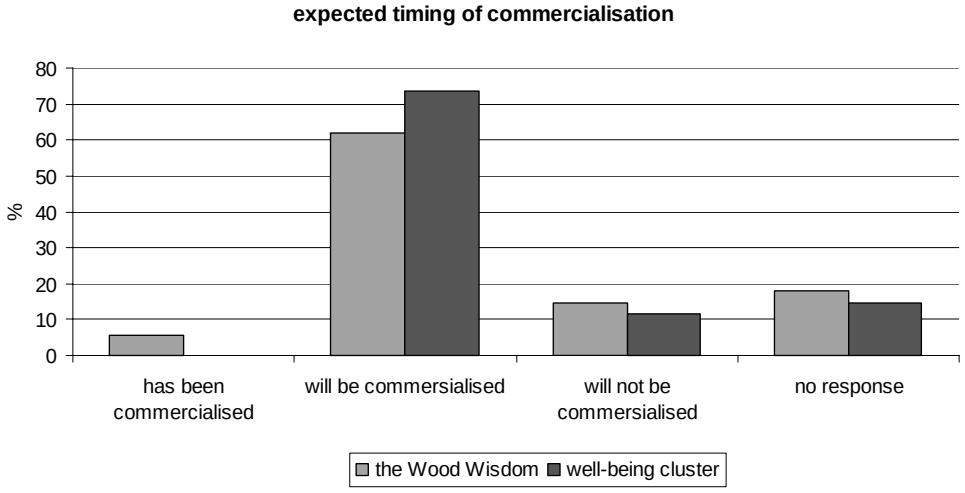



*Fig 11. Expected time of commercialisation.*

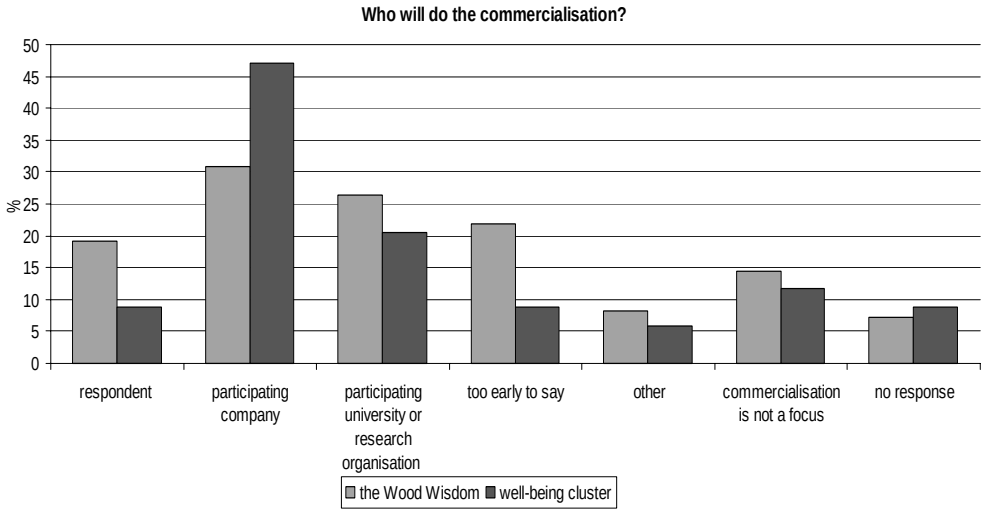



*Fig 12. Type of commercialising organisation.*

Finally we asked about some basic characteristics of the public financial instruments. There was a large variance in the cluster funds' proportional share of the projects' total budgets. In *Wood Wisdom* this reflects the variety of financial instruments of the underlying financers: TEKES, the Academy of Finland and the Ministry for Agriculture and Forestry. It should be noted that in the *Well-Being cluster* the responses should be considered with some caution, because most of projects were funded internally by the *Satakunnan Makropilotti ry*, and projects were not necessarily aware of the principal sources of the funding. (Figure 13)

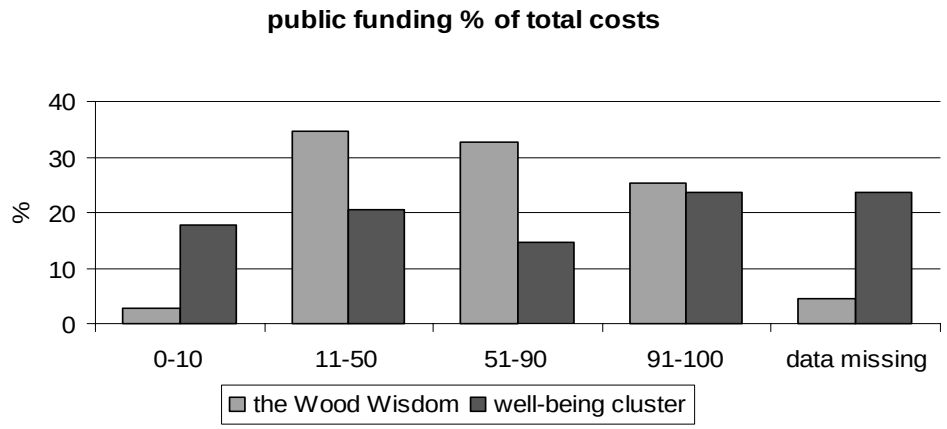



*Fig. 13. Cluster programmes' funding as a proportion of projects' total budget.*

According to the respondents, the terms and conditions, scheduling and volume of funding seemed to be appropriate. (Figures 14 and 15)

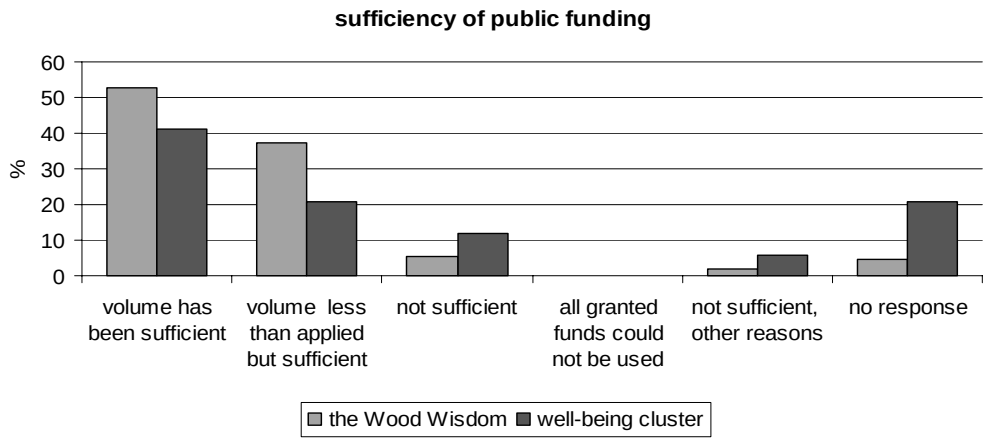



*Fig 14. Sufficiency of cluster funding.*

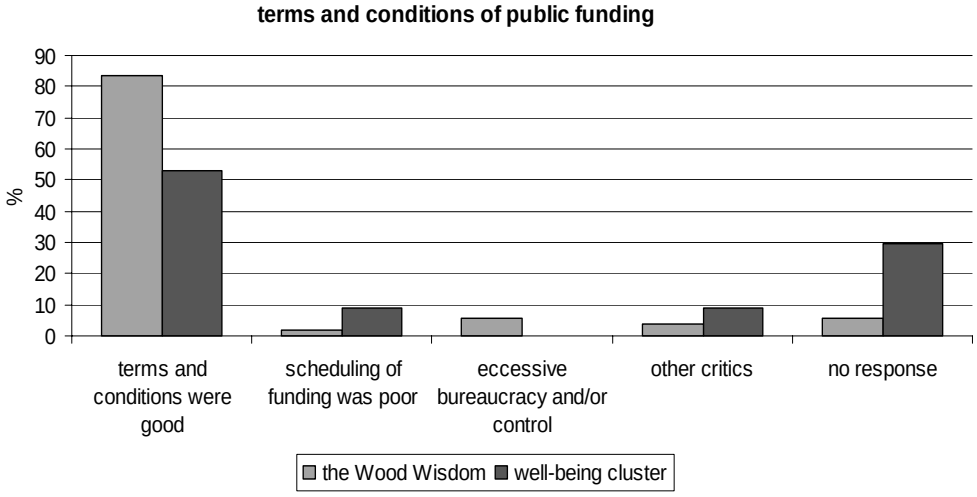



*Fig 15. The terms and conditions of cluster funding*

When asked about the additionality, more than 50 per cent of respondents in both programmes reported that without public funding the projects would not have been carried out. One fifth of the respondents of *Wood Wisdom* reported that public cluster funding had facilitated a broader scope or allowed for a larger network of partners, whereas the response to this statement was very low in the *Well-Being cluster*. It is interesting that 10 to 20 per cent of respondents reported that public cluster funding had changed the targets of the project. Unfortunately, this interesting feature could not be analysed more deeply. (Figure 16)

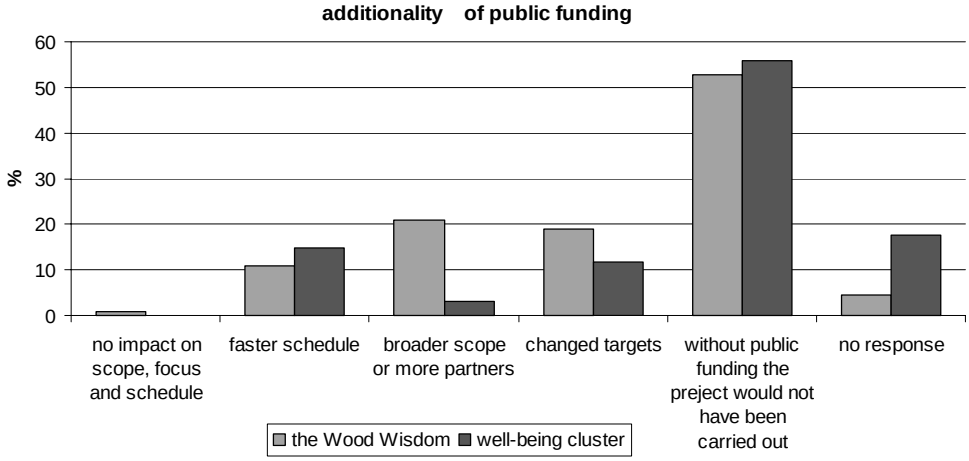



*Fig 16. Additionality of public funding in the cluster programmes.*

Circa 60 per cent of respondents reported that, in comparison to their earlier R&D, the project network incorporated more partners or the co-operation with existing partners had become tighter. Moreover, 10 per cent of *Wood Wisdom*'s and 30 percent of the *Makropilotti* programme's respondents reported that the network was so completely changed that comparisons were not meaningful. Slightly over one fifth of *Wood Wisdom*'s and virtually none of the *Makropilotti* programme's respondents saw no changes in network's breadth or tightness. (Figure 17)

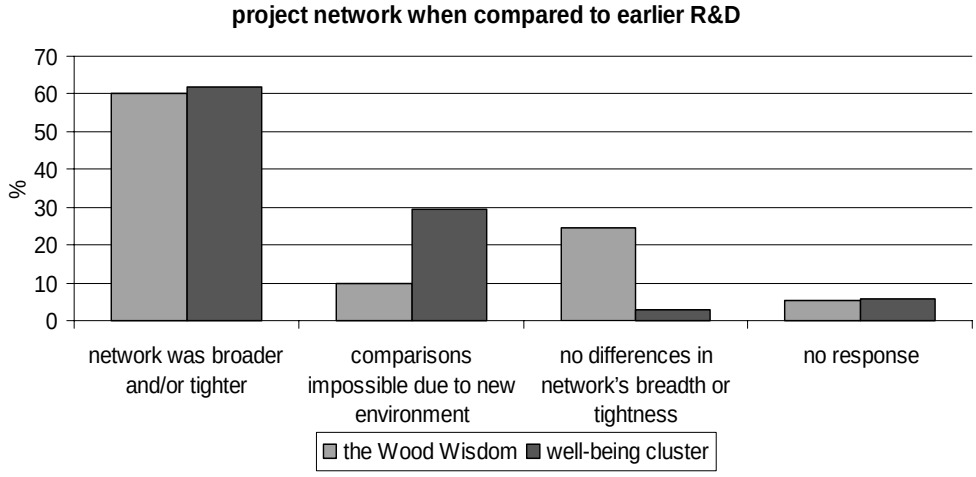



*Fig 17. The project network when compared to earlier R&D.*

When asked more specifically about the partners, there were clear differences between the programmes. In *Wood Wisdom*, the co-operation occurred mostly with existing partners but in new combinations. However, more than half of the respondents even within this programme reported that partners were mainly or totally new. In the *Well-Being cluster* most of co-operation occurred with new partners. (Figure 18)

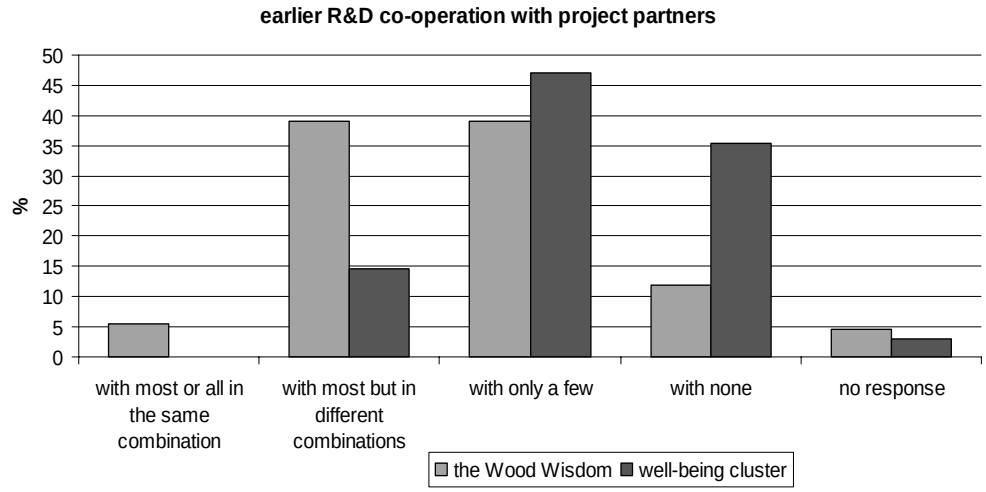



*Fig 18. Novelty of project co-operation.*

Project focus was reported to have faced major changes when compared to earlier R&D. In particular, a broader scope was reported by approximately half of the respondents in the both programmes. In *Wood Wisdom*, circa one fourth of respondents reported that the programme had facilitated a more pragmatic focus, a longer-term orientation or a new R&D environment. The lower response to this item in the *Well-Being cluster* may be due to a very new environment, which may have made comparisons difficult. (Figure 19)

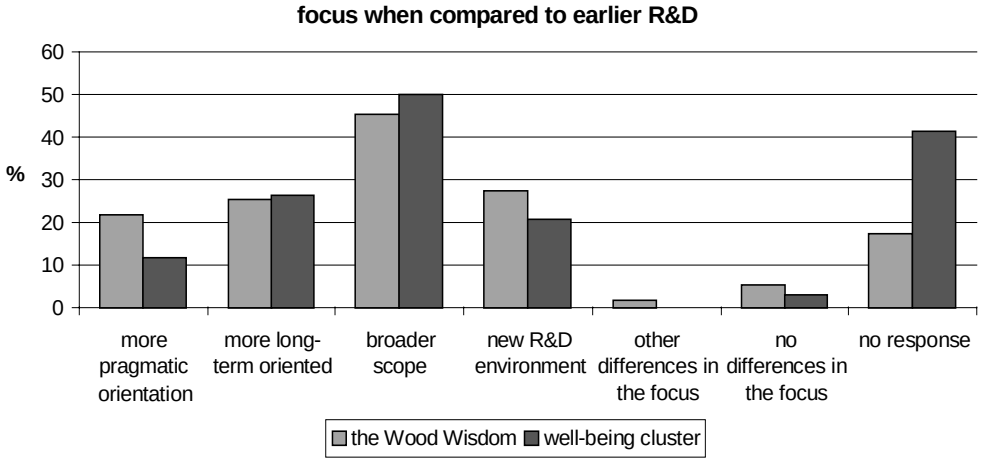



*Fig 19. Project's focus as compared to earlier activities.*

More than 25 per cent of *Wood Wisdom*'s and more than 15 per cent of the *Well-Being cluster*'s respondents reported improved co-operation with industry. This is interesting because industry participations at the project level were rare. In *Wood Wisdom* this may indicate that project performers found the active participation of industry in steering groups positive. This feature would be a topical question for case studies. Moreover, increased co-operation with research organisations was reported. In *Wood Wisdom*, university co-operation increased, whereas, due to a very low basic research intensity, in the *Well-Being cluster* this did not happen. In the *Well-Being cluster* the relatively high response to 'other partners' indicates the high prevalence of municipalities and other authorities. However, the high non-response in this programme to these questions could not be easily explained. (Figure 20)

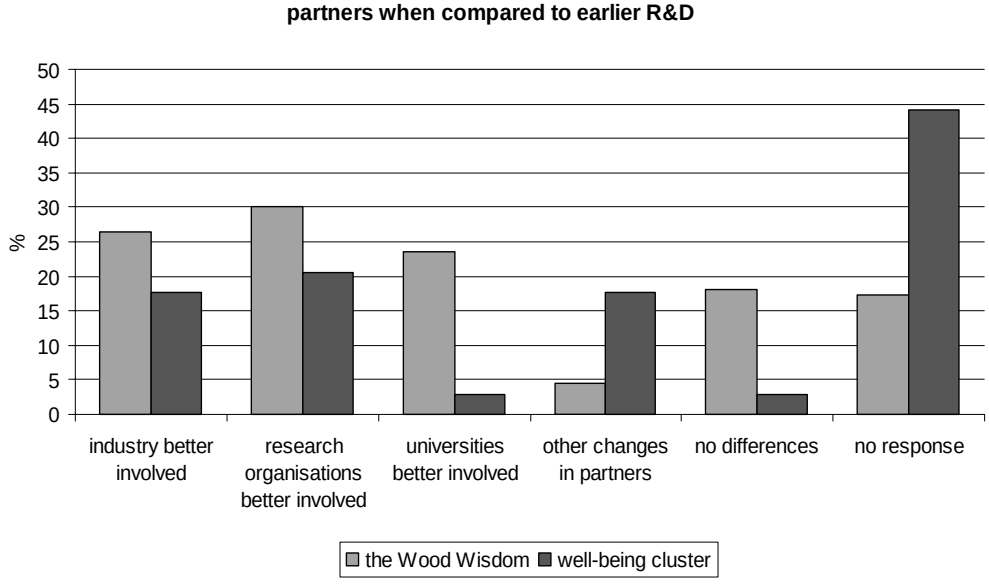



*Fig 20. Changes in the types of project partners.*

### *Wood Wisdom*

*Wood Wisdom*'s interviewees stressed that the programme's main impact was improved co-operation between public financers and public research organisations. They emphasised that in many instances, particularly at TEKES and at the Academy of Finland, a need for improved co-operation and a more holistic handling of the whole value chain had already been realised before the programme started. *Wood Wisdom* was a welcome answer to these needs. Due to a tight time

schedule and organisational inertia, the programme succeeded mainly in the development of new co-operation between public bodies. Building of even that co-operation was more difficult than what had been anticipated. Furthermore, only one of the interviewees thought that the new co-operation would already be mature enough so that it could be shifted to the responsibility of underlying organisations. Mostly interviewees thought that this new co-operation requires still, and may require permanently, specifically organised co-ordination, funding and incentive-systems.

When asked about the low prevalence of firm participations, the views of the interviewees were mixed. From the private sector the response was quite critical. They stressed that the current type of programme is not attractive to firms because it is too academic, that firms do not have appropriate possibilities for affecting the scope and funding of the programme, and that the programme's usefulness for firms may be questionable. Public sector representatives agreed with these critics, but a common view was that the focus of this programme had been on the public sector. However, it should be kept in mind that the Finnish forest industry is inflexible and polarised toward global pulp and paper giants and to a diverse set of other industries. Resistance against structural changes and new co-operation arises from the industry, as well.

We asked the survey respondents to evaluate the achievement of knowledge related aims. They were asked to evaluate the current achievement and the expected achievement within five years. In *Wood Wisdom* all those aims that were reported to be important were also reported to have been achieved at least partially. The response profile for current achievement was identical with the expected profile within five years. (Figure 21)

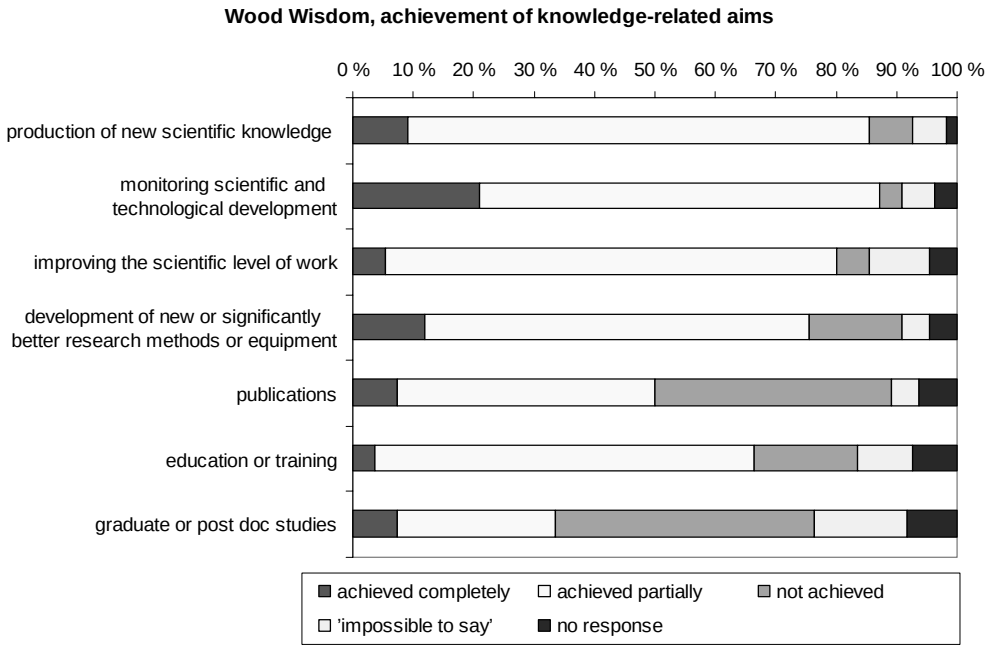
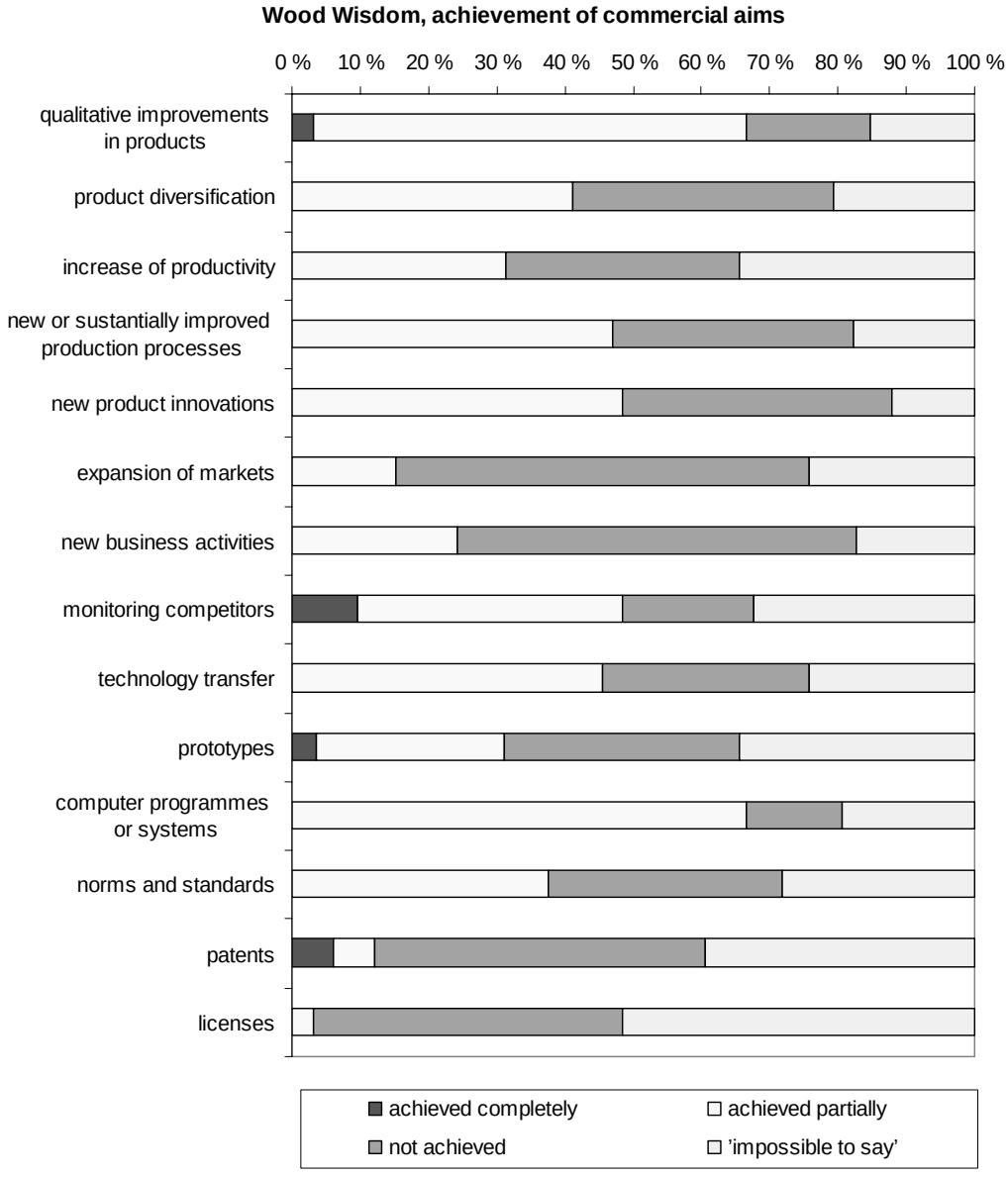
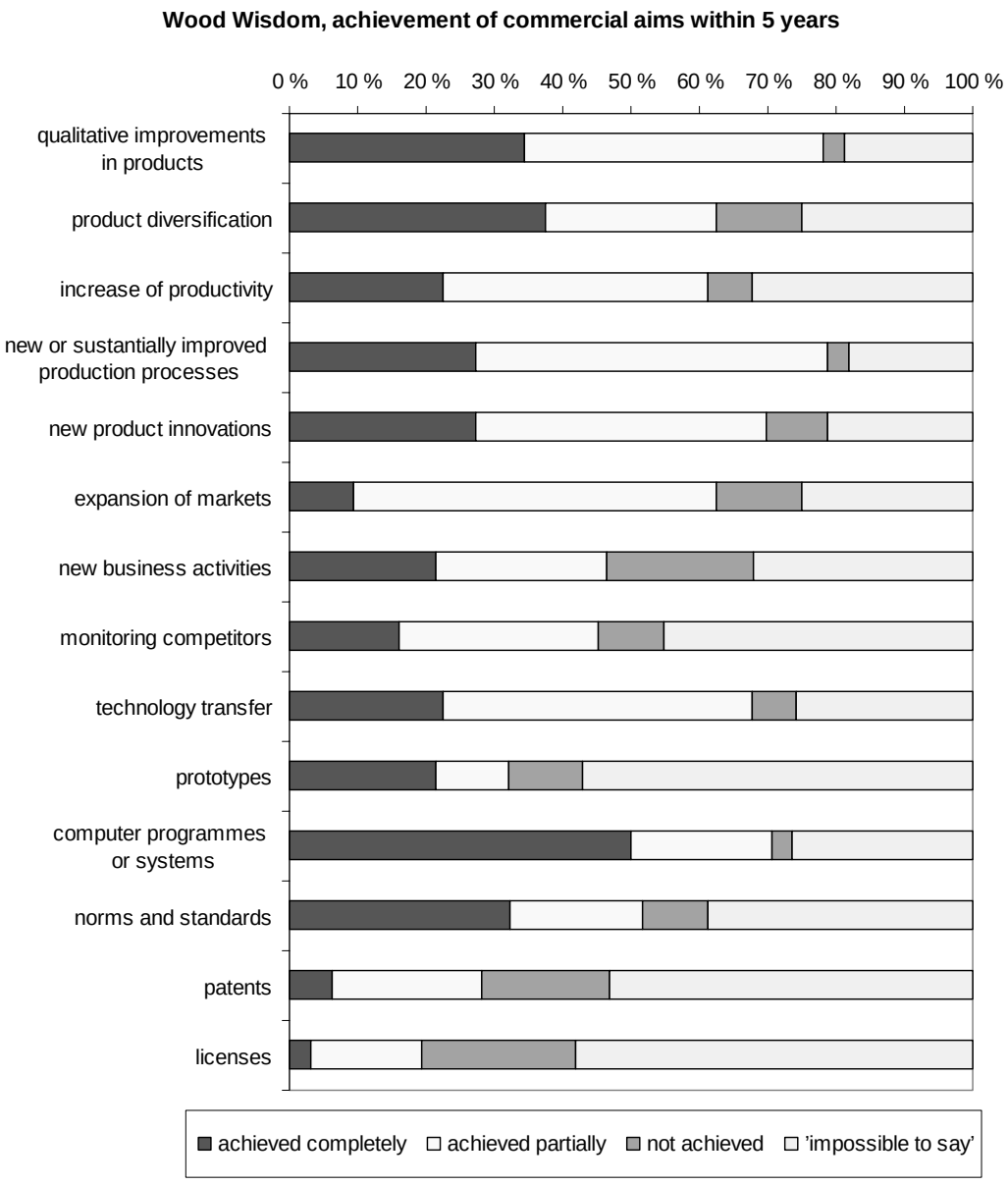



*Fig 21.* Wood Wisdom. *Achievement of knowledge-related goals.*

Circa 70 per cent of the respondents indicated that their organisation did not have commercial aims for the programme. Those who did, had already realised some achievements, but the main commercialisation was expected to occur within five years. The distributions of current commercial achievements as well as expected achievements within five years are in Figures 22 and 23. It should be noted that these distributions are only for those respondents who reported having these commercial aims. The population for each question is circa 33.




*Figures 22. Wood Wisdom. Achievement of commercial aims currently.*




*Figures 23. Wood Wisdom. Achievement of commercial aims within 5 years.*

We asked respondents to report problems or risks that they expected or feared to occur in the cluster programmes. We asked them also to evaluate the fulfilment or realisation of risks currently and within the next five years. In *Wood Wisdom*, the risks that were anticipated before the programme, the risks that were already realised and the risks that were expected to be realised in the future were nearly identical. Overall, the programme was not seen as risky. However, bureaucracy was feared, since it has already been experienced and it was expected to increase in the future. Ten to 20 per cent of respondents expected risks with information security or counterproductive co-operation, and they expected that these risks will increase in the future. (Figure 24)

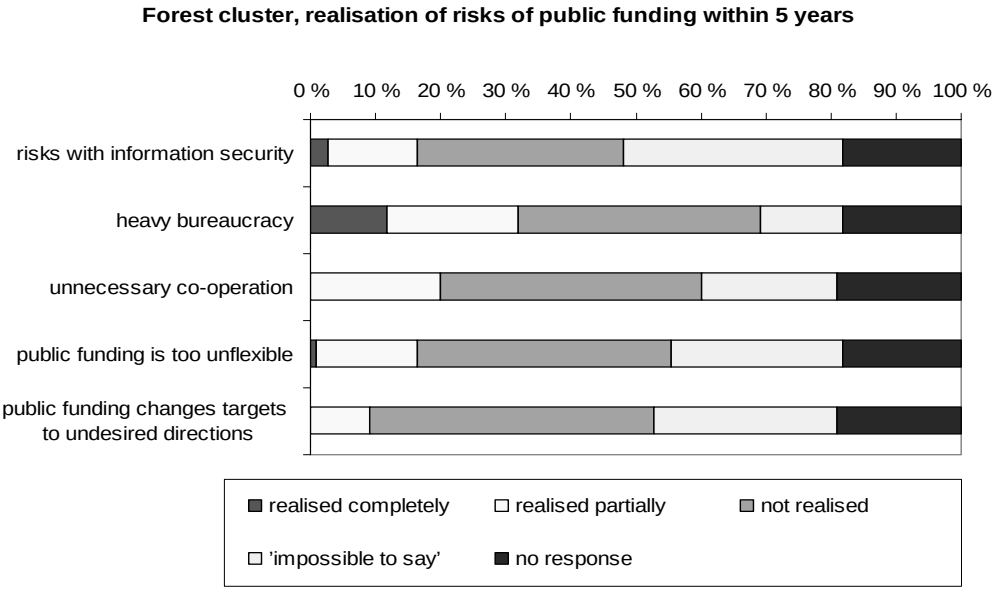



*Fig 24. Risks of* Wood Wisdom.

Respondents were asked to evaluate the current and expected effectiveness of the public cluster funding. In *Wood Wisdom*, pre-competitive and network related aspects were ranked as important and their achievement was reported or expected. Moreover, public funding was seen as a very important signal both to other financers and to clients and within their own organisation. Even commercial effectiveness, risk sharing and client contacts were expected to be achieved by 40 per cent of respondents. It was very clear that respondents had already faced some of the impacts, but that a major part of impacts were expected to materialise in the future. On the other hand, financial benefits like low interest rates or effective assistance in project co-ordinaton were not expected. (Figures 25 and 26)

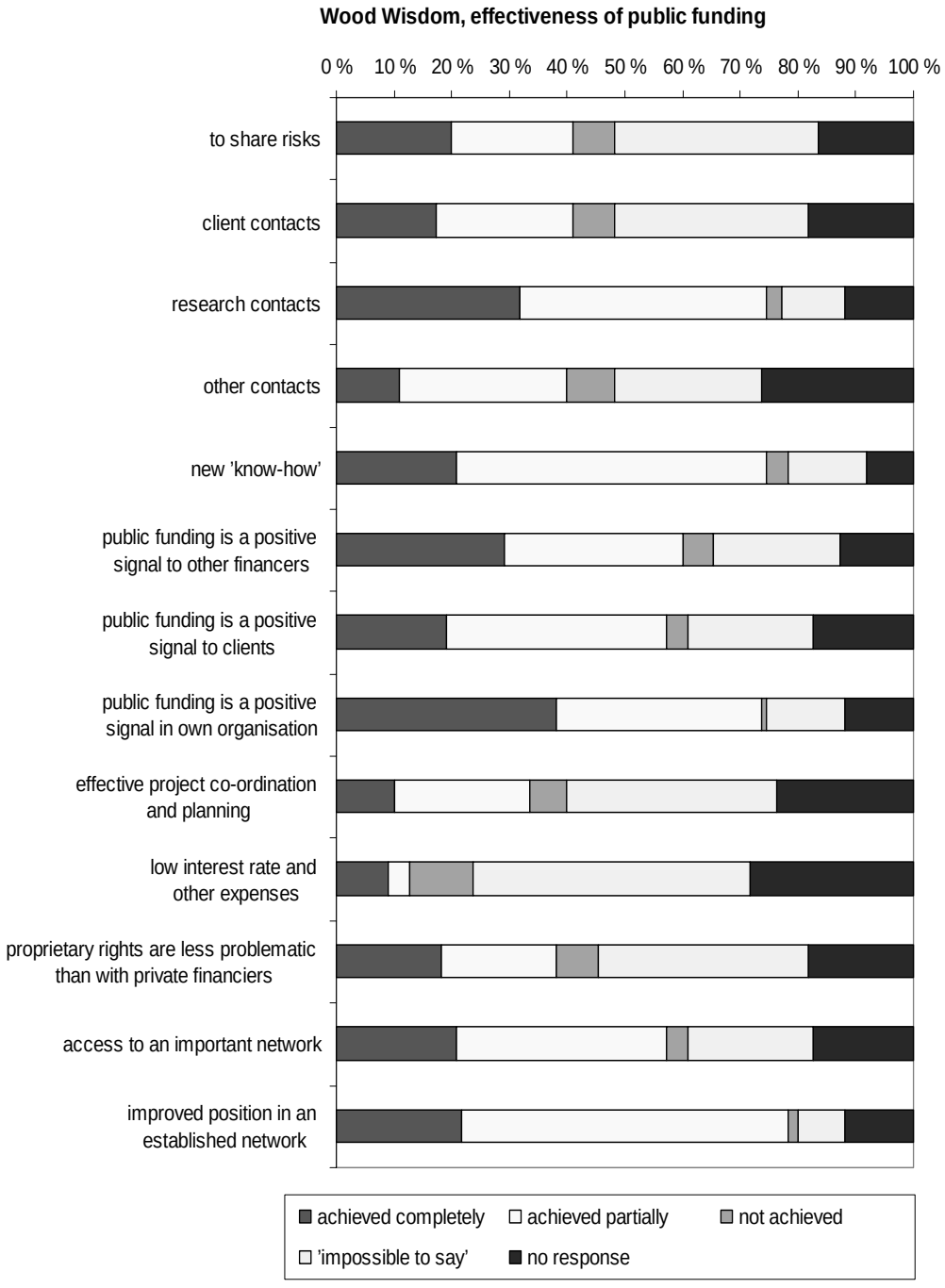



*Figure 25. Effectiveness of public funding currently*

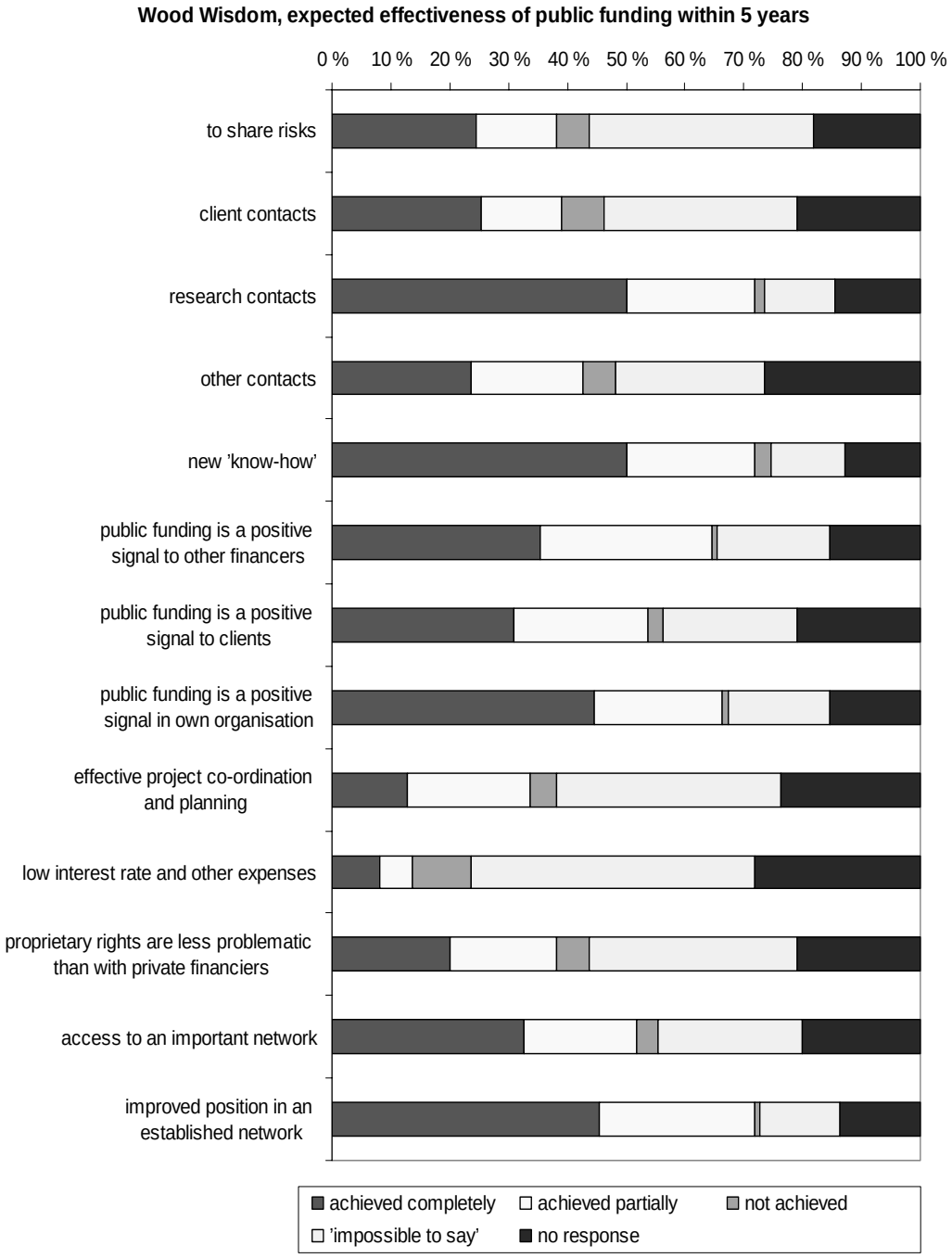



*Figure 26. Effectiveness of public funding within 5 years.*

The next set of questions concerned the adequacy of public cluster funding, and the respondent's views on some statements concerning effectiveness. In *Wood Wisdom*, 60 per cent of respondents saw public funding to be a suitable financing source because they considered their project to be 'basic research'. Approximately one third of respondents reported that their project was so long-term that public funding was a dominant alternative. Nearly 60 per cent reported that available public funds were not the primary reason for carrying out the project. However, the same proportion indicated that public funding had affected the scope, scale or organisation of the project.

Nearly nine out of ten respondents agreed that targets had been achieved at least partially. About 80 per cent reported that the programme had improved established contacts, and that public support was important in facilitating networking. Good networking was considered to be an important source of competitive advantage, and public promotion was seen to be crucial in targeting R&D toward new and emerging fields. Moreover, respondents were really dubious as to whether appropriate networking would arise without public support. (Figure 27)

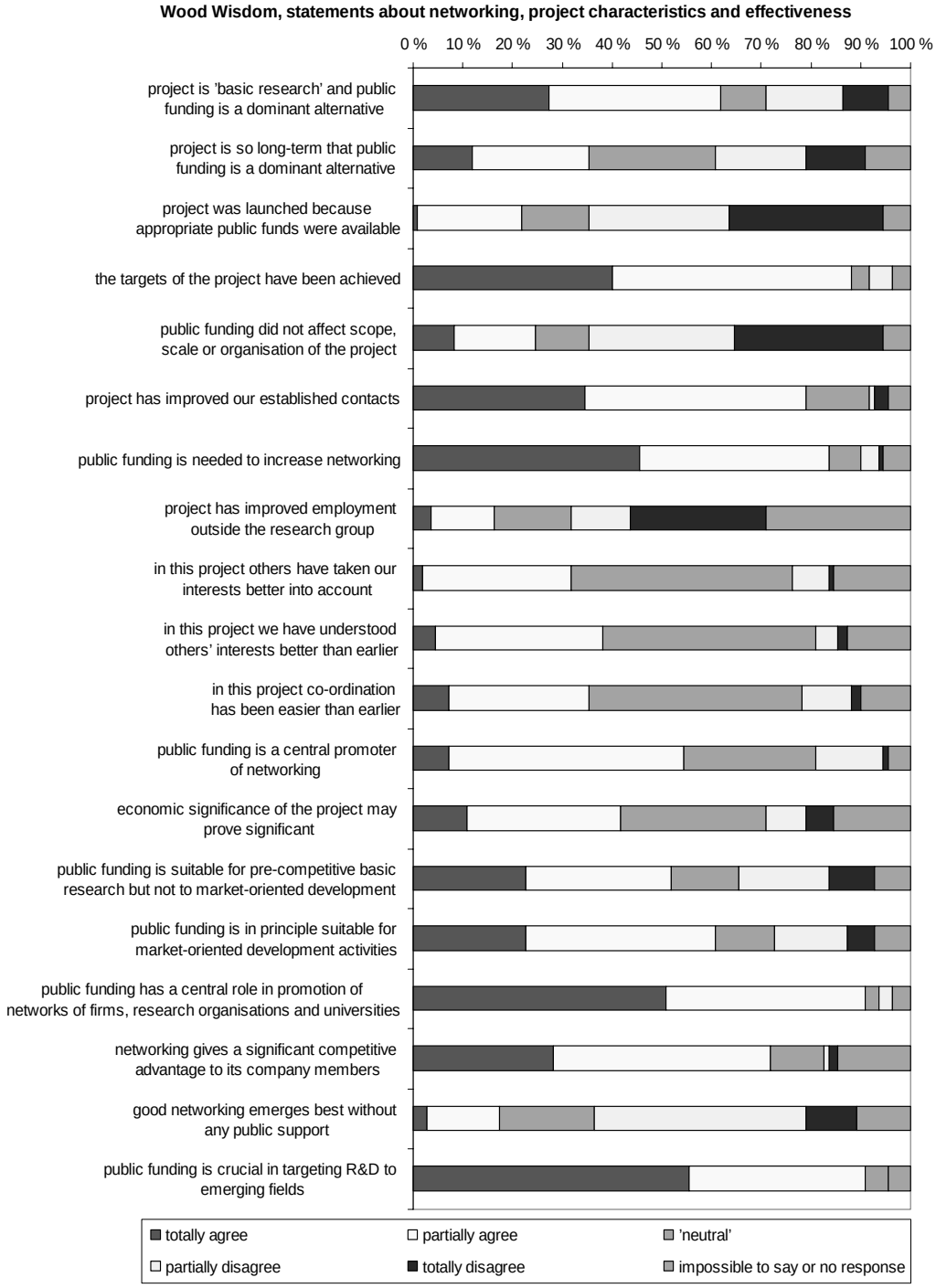



*Fig 27.* Wood Wisdom, *statements about networking, project characteristics and effectiveness.*

**The *Well-Being cluster***

The most evident characteristic of the activities of the *Makropilotti* programme was that the programme was far too ambitious for the tight schedule and the limited resources. However, the programme created a remarkable amount of truly new co-operation between public organisations. A major part of the programme was the building up of a local information-system architecture and interfaces that would facilitate the technical part of 'seamless' service chains. It still remains to be proved whether the local architecture project was an effective one, and whether it offers concepts that can be copied or scaled to other applications. Furthermore, the *Makropilotti* programme has built up a really extensive *ad hoc* organisation that co-ordinates the activities and works as a common arena for the diverse set of public partners of the programme. This heavy organisational structure was unique in cluster programmes, but even its effectiveness cannot be truly evaluated, yet.

*A priori*, it was expected that the local architecture development would boost profit seeking R&D among IT-firms. However, virtually all firm-activities were 'typical' commercially priced software, database or maintenance orders with minimal, if any, risk sharing or private R&D from the companies. One reason for this seemed to be that, unlike public partners of the programme, firms did not see the concepts as copyable and scaleable products, but as unique and customised ones. Correspondingly, firms were not really willing to carry R&D risks. Furthermore, the firms' negotiating partner was the *Satakunnan Makropilotti ry*, which - being a fixed term association - was not seen as an attractive partner. Moreover, due to a far too short planning and implementation period there seemed to be unnecessary communication problems, like the rejection of the readily built consortia of 30 companies. The programme co-ordinators have seen these problems, and they have plans concerning the further development of the programme. The plans include probable establishment of a public development company that would negotiate with a private 'main integrator' company, as is presented in Figure xx. However, currently these are merely plans.

In the *Well-Being cluster*, the current achievement of knowledge-related aims was rather low. Only a small number of respondents reported a complete achievement of any of the goals, and even partial achievement was much lower than that in *Wood Wisdom*. It must be kept in mind that the *Well-Being cluster* was not research oriented, which must be considered as an explanatory factor. However, respondents reported only a low achievement of even those knowledge related aims that were reported to be important; particularly education and training, following scientific

and technological development, and development of new or significantly better research methods or equipment. A message to take note of is that respondents expected that the achievement profile would continue the same even after five years. I.e., even the poorly achieved important aims are not expected to be achieved within the next five years. (Figure 28)

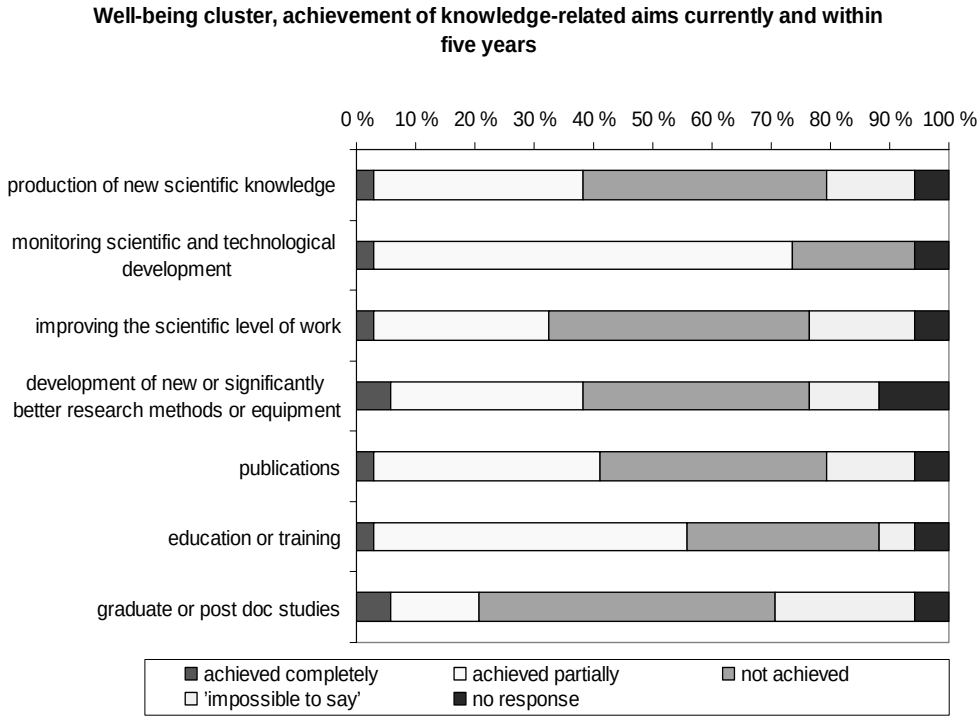



*Fig 28. The* Well-Being cluster. *Achievement of knowledge related aims.*

In the *Well-Being cluster* more than half of the respondents reported that the project had commercial aims. Understandably, most of these aims have not yet been achieved, at least not completely. However, respondents expected commercial success , or at least a partial fulfilment of the commercial aims, within the next five years. (Figures 29 and 30).

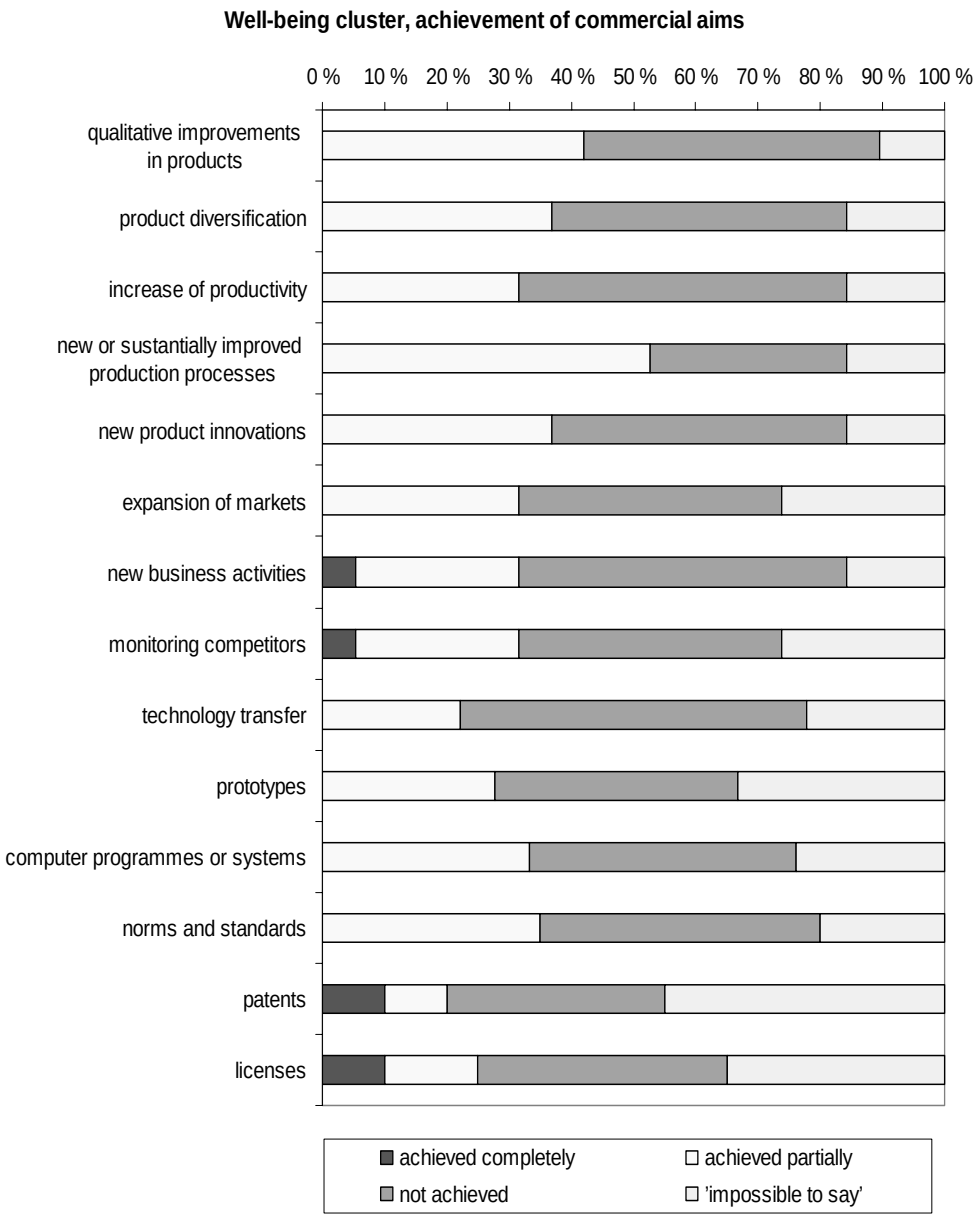



*Figure 29. The* Well-Being cluster. *Fulfilment of commercial aims currently*

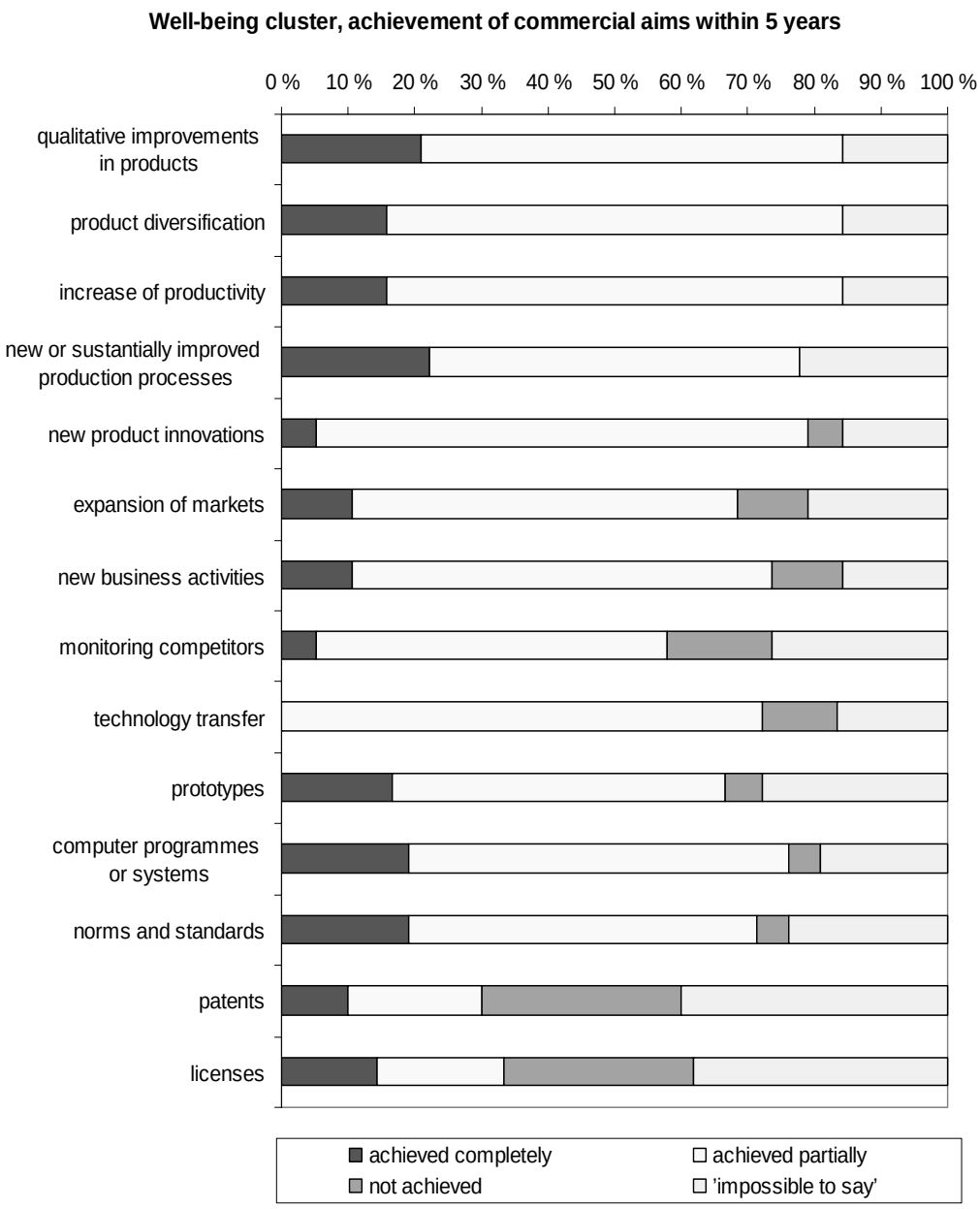



*Figure 30. The* Well-Being cluster. *Fulfilment of commercial aims within 5 years.*

In the *Well-being cluster*, respondents saw many more risks than in *Wood Wisdom*. Figure x shows the anticipated risks of the programme within the next five years. More than half of those who responded agreed that heavy bureaucracy will be completely or partly realised within the next five years, and nearly a half expected there to be unnecessary or counterproductive co-operation. Furthermore, inflexibility of public funding was anticipated. (Figure 31)

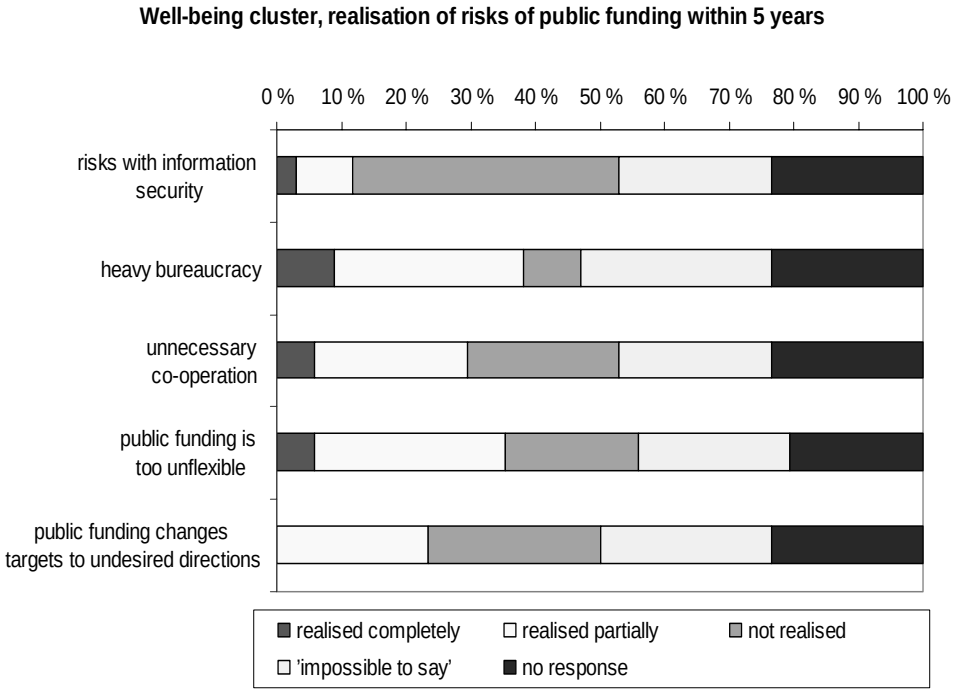



*Fig 31. The* Well-Being cluster. *Realisation of the risks of the programme within five years.*

The main effectiveness of the*Well-Being cluster* was reported and expected from network-related and other pre-competitive aspects. In particular, the programme has offered and was expected to offer access to an important network or to improve the position in an established one. Moreover, the public programme was seen as a positive signal to financers, clients and others within the own organisation. New know-how and research contacts were considered important. (Figures 32 and 33)

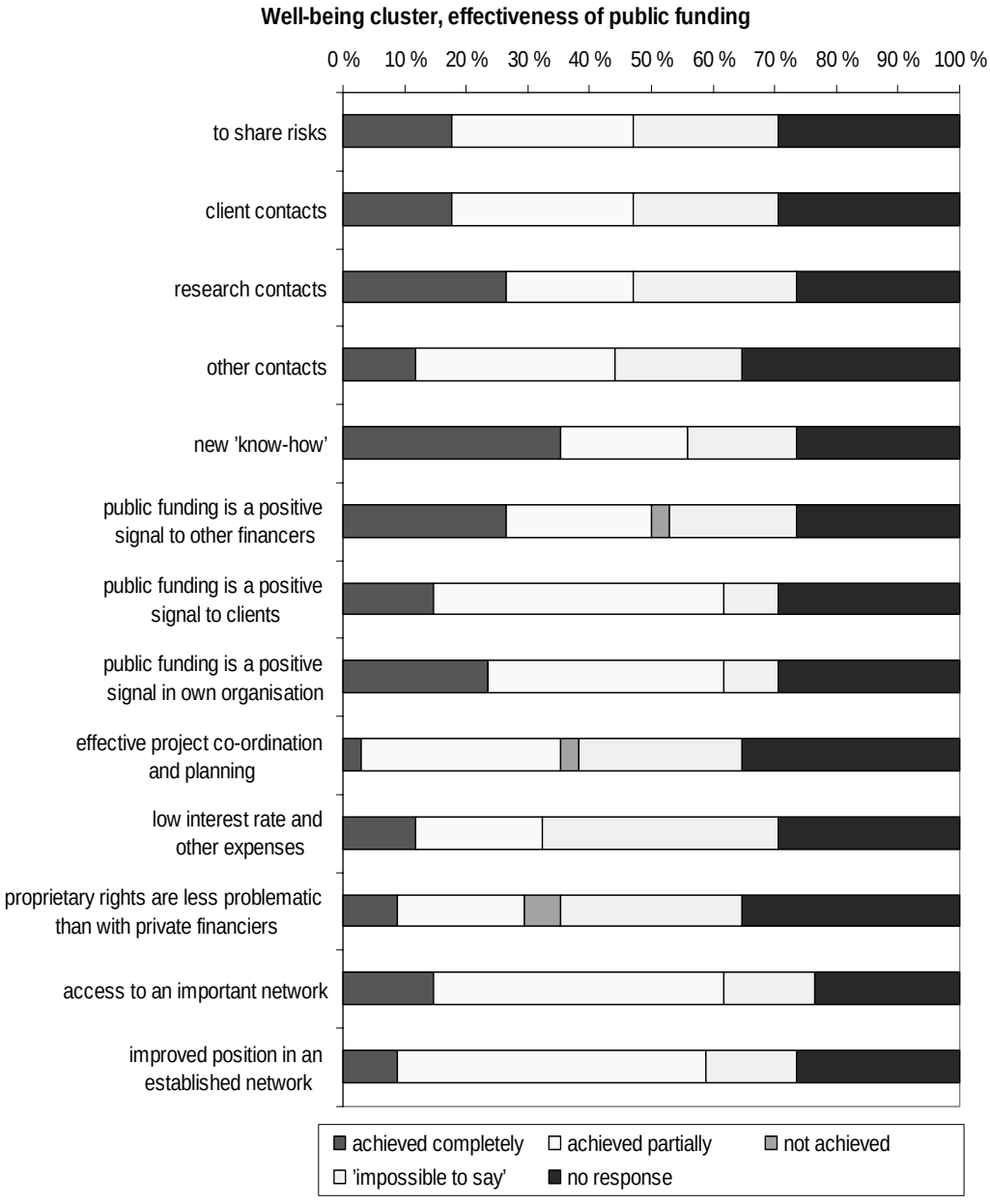
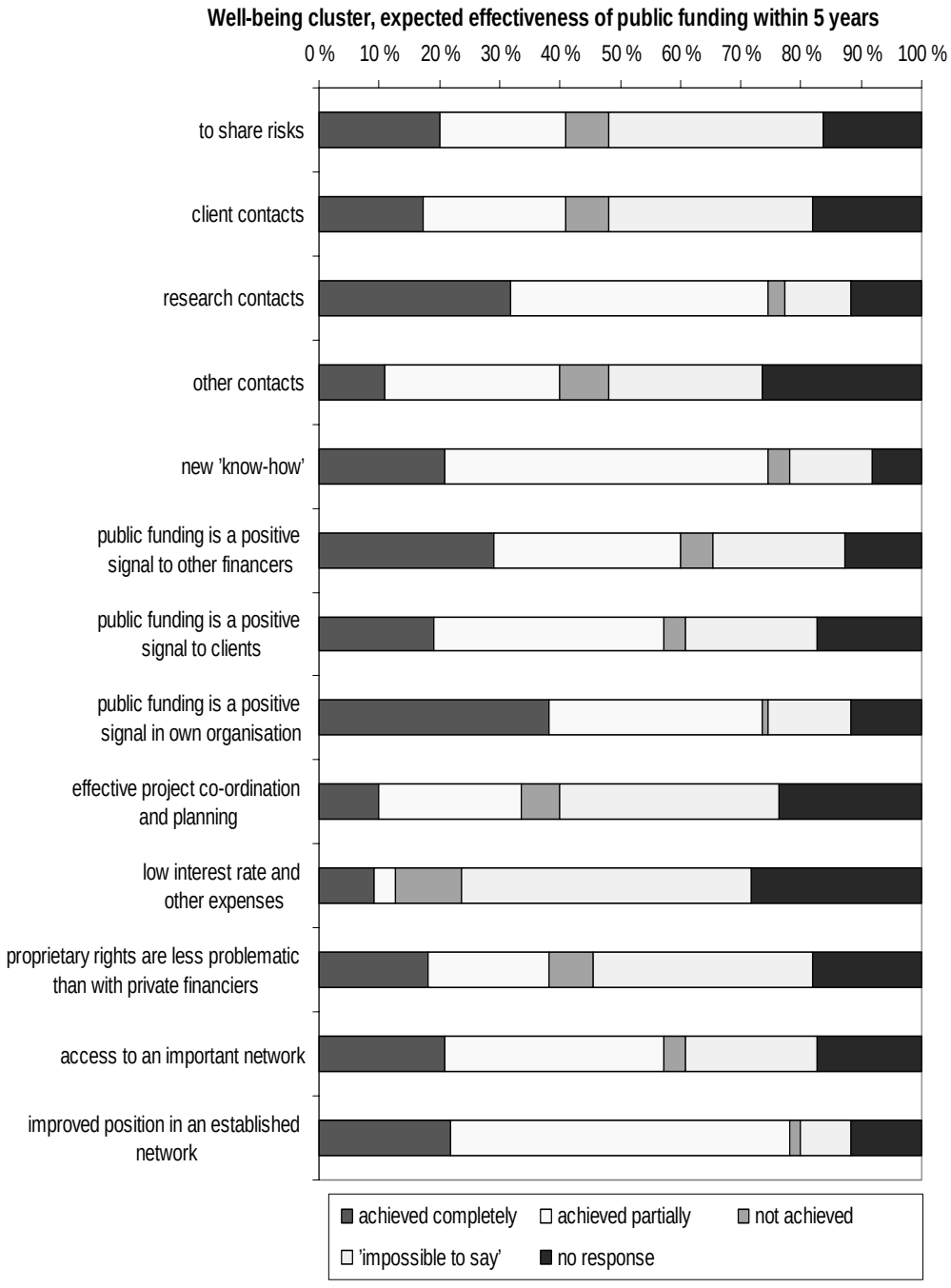



*Figure 32. The* Well-Being cluster. *Effectiveness of public funding currently*




*Figures 33. The* Well-Being cluster. *Effectiveness of public funding within 5 years.*

It is interesting that 60 per cent of the respondents of the *Well-Being cluster* considered their project to be basic research. The share is virtually the same in *Wood Wisdom*, for instance. Moreover, circa 40 per cent reported that public financing was appropriate because of the long-term nature of the project.

Fewer than ten per cent of respondents agreed that the project's targets had been achieved completely, whereas 60 per cent reported that they had been reached at least partially. The fact that most of the projects had been running for only a short period is obviously connected with this pattern. However, project participants do not seem to be as satisfied with their projects as participants in *Wood Wisdom*, for instance.

Networking was seen as an important source of competitive advantage, network-related goals had been achieved fairly well and the role of public funding was seen important in fostering good clustering. Moreover, just as in the forest sector, respondents were highly dubious about appropriate networking without public support. Public initiatives were seen to be extremely important in new and emerging fields. (See figure 34)

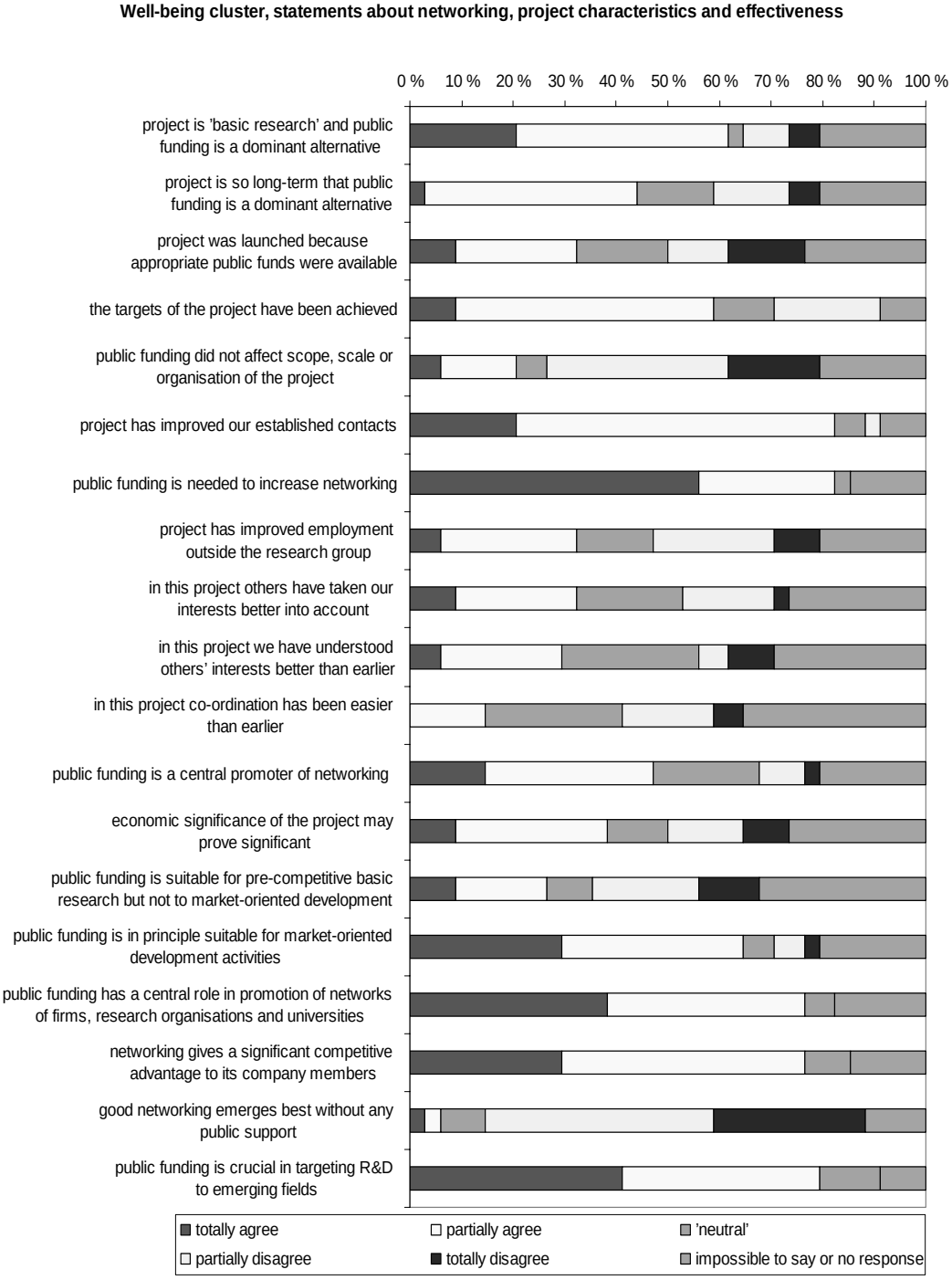



*Fig 34. The* Well-Being cluster, *statements about networking, project characteristics and effectiveness.*

# 5 Conclusions

The Finnish cluster programmes form a set of public programmes that are organised under sectoral ministries. In the beginning, the programmes were scheduled for the period 1997-1999. In practice, however, most programmes were started during 1998 and they will last until 2000 or later. Altogether there are eight programmes under six ministries. Programmes incorporate more than 300 separate projects that are performed by more than 400 organisational units. The total financial volume of the programmes is more than FIM 600 Million of which circa 60 per cent is public. A vast majority of programmes are domestic.

The major goal of the programmes is to create new and permanent co-operation structures, improve the co-operative ability of the whole research system, and increase the relevance and flexibility of activities. The underlying ultimate goals, even though they are hardly measurable, are "to generate growth, improve industries' competitiveness and productivity, increase employment, generate new innovations and improve social welfare".

In practice the programmes have been organised so that sectoral ministries have received circa FIM 170 Million as 'earmarked' cluster funding, and the ministries heve independently organised the cluster programmes. Most of the programmes have been organised on the basis of an open competition and in collaboration with other public financers, particularly with TEKES and the Academy of Finland.

This report is mainly based on a deeper analysis of two programmes: The *Wood Wisdom* Programme (The Finnish Forest Cluster Research Programme) and the *Well-Being Cluster*. Our purpose is to evaluate the effectiveness of the Finnish cluster programmes and policies. It is very early to evaluate the real impact or effectiveness of the programmes. Cluster programmes ultimate, hardly even intermediate, goals may not yet have been materialised. However, several central observations can already be made.

Participants of the cluster programmes reported that the programmes facilitated truly new co-operation and allowed a more holistic and co-operative view of the value-adding chain. Moreover, as a general rule, participants were enthusiastic and committed to the programmes, and they found that programmes were appropriately focused and timely public initiatives.

The programmes are organised, and to a large extent steered, by public bodies. As a corollary, the public sector plays a dominant role in the programmes. Most of the new co-operation occurs between ministries, government research organisations and public financers. It should be stressed that this co-operation has been found to be truly new and productive. However, the participation of private companies is remarkably low, and in some cases firm representatives even reported that their proposals or initiatives were 'unnecessarily' rejected.

An interesting outcome of the survey was that many public sector participants reported that the programme had improved connections to the industry although there were no direct or observable links. However, in interviews it became evident that the industrial sector was not willing enough to take part in the programmes. These aspects should be considered very thoroughly when new cluster policies are planned.

The political decision and the early phases of the programmes were set up very rapidly. On the one hand, this may have facilitated certain dynamics. On the other hand, this has created much unnecessary bureaucracy or problems that should have been solved beforehand. In particular, reporting between different financers should have been organised better. Similarly, most of the co-operation was built when the programmes were already started. This may be a reason why most of co-operation occurs with naturally 'close' partners and only a little really innovative or new collaboration occurs. Particularly, the occurrence of inter-sectoral or private-public collaboration is low.

Moreover, the financial instruments of cluster programmes were not yet mature. In *Wood Wisdom*, for instance, various financers allocated the new funds using the different existing rules. Even though the programme co-ordination together with financers organised 'co-ordination meetings' where applications were directed to appropriate financers, only little synchronisation of discrete financers' different instruments was made. This meant that there was only very little syndication of funding; especially at the project level. On the other hand, in the *Well-Being cluster* the co-ordinating association, the *Satakunnan Makropilotti ry*, received the funding as a lump and allocated it internally to projects. This system facilitated great flexibility and made a holistic programme governance easier. However, the system was very non-transparent to any outside controller, and it seemed to have caused problems in attracting outside funding. In the future, attention should be paid to the development of cluster-specific financial instruments that facilitate flexibility and transparency on a competitive basis.

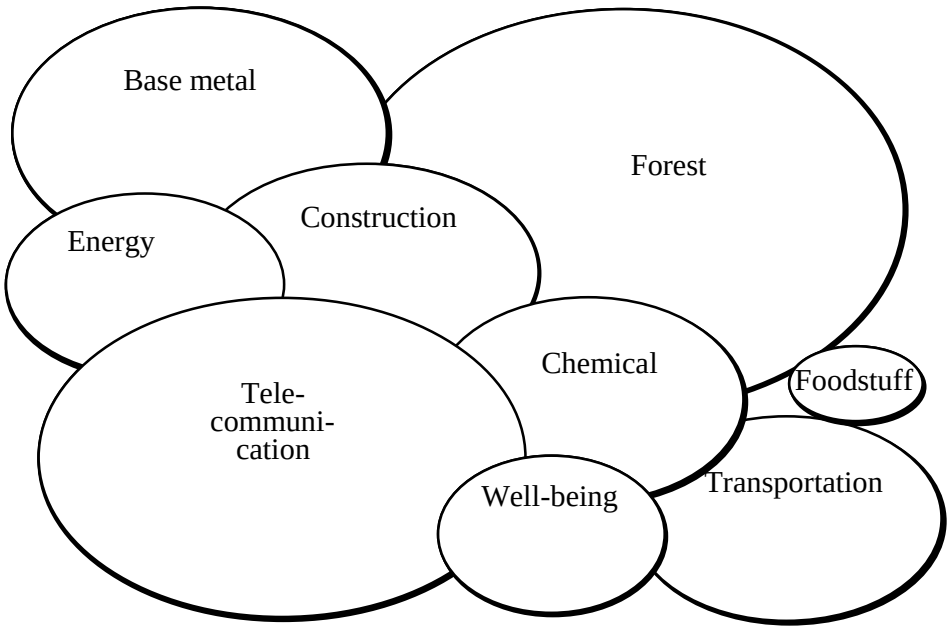
There were mixed views about the very purpose of cluster funding. Seed or catalyst funding was one view. Others stressed that there are several market failures that cause clustering to occur at an inefficient and at a socially undesirable level, and that there is a continuous need for public support for clustering. The dominant underlying idea seems to be that programmes, which were set up as 3-year project umbrellas, would work as seeds or catalysts of new co-operation, and that the actual governance of co-operation could be rapidly shifted to underlying organisations. It seems extremely unlikely that this could be done yet, nor in the near future. However, the current governance of cluster programmes is rather laborious and costly as it requires extensive temporary organisations that take care of governance. On the other hand, there clearly is no need for new permanent public organisations that would take care of clustering. It remains a major concern how to guarantee the continuity of the positive development within the programmes, how to avoid unnecessary bureaucracy, how to minimise the need for outside control, and how to facilitate multipolar governance.

Currently, a project is the basic unit of cluster programmes. This is understandable, because all major financers have traditionally been project financers. This has caused two types of problems in the programmes. First, real co-operation occurs between organisations and individuals, and it may be questioned whether short-term projects really are the best ways to facilitate new long-term co-operation. Furthermore, it can be asked whether publicly organised detailed programmes really facilitate new innovativeness or structural changes. A second difficulty concerns the governance or evaluation of cluster programmes. When a project is the basic level of governance and control, it is very complicated to pay attention to or even get information from the basic level of effectiveness or additionality, i.e., the level of the underlying organisations.

Probably the most difficult question concerns the general focus of cluster policy. In 1996 Hernesniemi et al. forecasted the export shares of the Finnish clusters in the 2010's. Clearly, the current cluster programmes overlap to a certain degree with the 'Porterian' Finnish clusters as measured by Hernesniemi et al. (1996). However, it cannot be stressed too much that the current programmes tend to be publicly governed programmes where the presence and relevance of industries is rather low, and where certain important industrial fields — particularly the telecommunications, base metal, chemical and pharmaceutical industries as well as construction — are hardly addressed. As far as the cluster policies' purpose is to foster the competitiveness of the Finnish industries, there is a lot of work to be

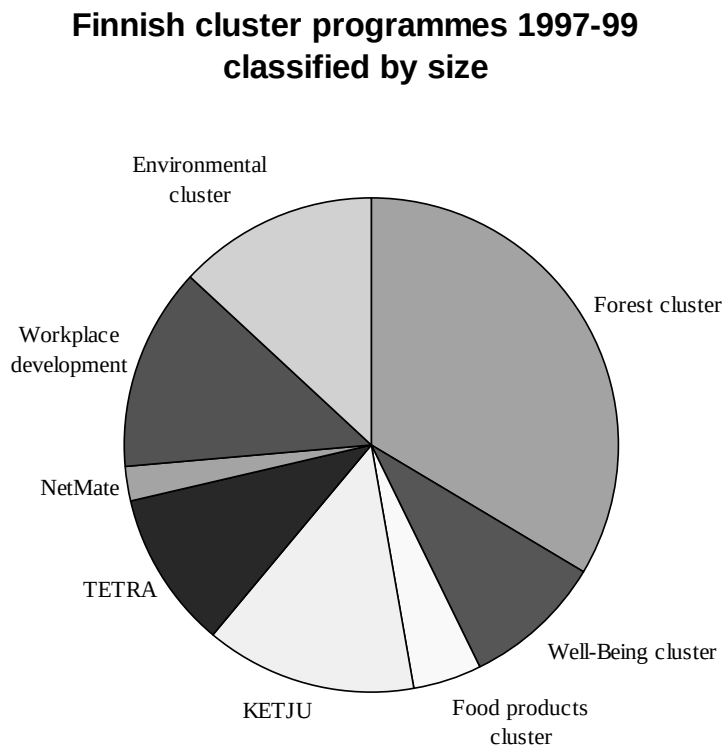
done to improve cluster policies' focus so that at least the most appropriate industrial sectors of the Finnish economy are covered. (Figures 35 and 36)

The proper 'home-base' of the cluster policy remains a topical question. From a governance point of view, it was easy to give the responsibility of actual activities to sectoral ministries. This action succeeded in creating new co-operation between public organisations. However, it did not succeed in attracting private organisations. In all future cluster policies, a flexible, non-bureaucratic and multipolar cluster-organisation should be taken into serious consideration.




Source: Hernesniemi et al. 1996. Published with authors' permission

*Fig. 35. Finnish industrial clusters in terms of the estimated export share in 2010.*




TETRA and KETJU are tarnsport cluster programmes. NetMate is a programme of information technology, particularly telecommunication.

*Fig 36. The Finnish cluster programmes of 1997-99 as measured by volume.*

The goals of the cluster programmes are not adequately defined. Actually the eight programmes have so diverse goals, instruments and characteristics that it might be more fair to consider them completely separately, and not to force them to any kind of a generic cluster model. This should not necessarily be interpreted as a criticism. However, there is a need for detailed discussion concerning whether there is a need for generic cluster policy. If there is, then its goals, boundary conditions and probably even instruments should be clearly articulated. On the other hand, an alternative is to continue with the current strategy, i.e., with diverse programmes that are governed and that should be evaluated separately. However, even in that case, the programmes' goals, instruments and evaluation criteria should be made transparent.

Moreover, financial and other necessary information is currently not gathered systematically. Typically only some questionnaire-based financial information is available, but its validity and reliability cannot be checked. A systematic follow-up method of financial, performance and effectiveness data needs to be constructed and implemented for further programmes. Routine follow-up systems that cross the borders of different financing and governing institutions need to be planned and implemented. In particular, the overlapping reporting systems of the ministries, TEKES and the Academy of Finland should be harmonised and, to an appropriate degree, a common data base architecture and interface should be developed. The current data base work carried out by SITRA, TEKES and the Academy of Finland is a step in the right direction, but without systematic development and a high-level mandate it will never be truly implemented. Furthermore, there is a need for improved indicators and measures of cluster policies.

To conclude, the cluster programmes have been a welcome step in the right direction. Now it is time to consider the cluster policy in such a manner that the good developments can be maintained and fostered whereas the obvious shortcomings of the current programmes can be solved. There is still a need for top-down cluster initiatives from the public authorities. However, the real structuring of the programmes should be organised more on a bottom-up basis.

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**Interviewees:**

Professor Kari Ebeling, UPM-Kymmene Group, director of corporate R&D

Lic. Tech. Christine Hagström-Näsi, Tekes, project manager

Mr Hannu Hämäläinen, STAKES, director of division

MD Pekka Jaatinen. Satakunnan *Makropilotti* ry, project manager

M.Sc. Pirkko Molkentin-Matilainen. Finnish Forest Industries Association, research manager.

Mr Jarmo Määttä, Satakunnan *Makropilotti* ry, general manager

Mr Jukka Ohtonen, FinOHTA, project manager

PhD Erkki Ormala, Nokia corporation, director, technology policy

PhD Leena Paavilainen, Wood Wisdom, co-ordinator

Dr Anneli Pauli, Academy of Finland, secretary general

Research professor Niilo Saranummi, VTT, Information Technology

# Appendix 1. English translation of the cluster questionnaire

**A: With the following questions we intend to map the goals of your R&D -project and to evaluate the achievement of the goals. Please, answer from the point of view of your organisation (company, research center, university etc.).**

**A1: Please describe how important the following knowledge-related objectives are for your organisation in this project? Please, assess how well the objectives have been achieved this far and how well they will be achieved in the future.**

**Do not forget to answer to every question.**

| | significance of the objective | | | | | level of attaining the objective | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | at the moment | | | | in five years | | | |
| | of great significance | Rather significant | Not so significant | of no significance | can not tell | fully attained | partly attained | not attained | can not tell | fully attained | partly attained | not attained | can not tell |
| New scientific knowledge | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Monitoring scientific and technology development in the field | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Improving scientific standards of our work | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Developing new or substantially improved research methods or equipment | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Publications | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Training of personnel | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Post-graduate degrees | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |

**A2: How important are the following business-related goals for your organisation in this project?**
**If you do not have any, please, move straight to the point A3.**

| | significance of the goal | | | | | goal attainment | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | at the moment | | | | in five years | | | |
| | of great significance | rather significant | not so significant | of no significance | can not tell | fully attained | partly attained | not attained | can not tell | fully attained | partly attained | not attained | can not tell |
| Qualitative improvements in products | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Product diversification | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Increase of productivity | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| New or substantially improved production processes | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| New product innovations | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Expansion of markets | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| New business activities | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Technology transfer | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Monitoring competitors | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Prototypes | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |

| | significance of the objective | | | | | level of attaining the objective | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | at the moment | | | | in five years | | | |
| | of great significance | rather significant | not so significant | of no significance | can not tell | fully attained | partly attained | not attained | can not tell | fully attained | partly attained | not attained | can not tell |
| Software | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Norms and standards | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Patents | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Licenses | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |

**A3: How big is the share of the granted public funding of the project's total costs in your <u>own organisation</u>?**

a) 0-10 %

b) 11-50 %

c) 51-90 %

d) 91-100 %

**A4: Please describe the strategic significance of the project for your organisation.**

a) Project is strategically significant

b) Project may become strategically significant in the future

c) Project is of little strategic significance

**A5: Please describe the commercial significance of the project for your organisation.**

a) The goal of the project is to develop an internationally successful product or service or to substantially improve an existing one

b) The goal of the project is to develop a domestically successful product or service or to substantially improve an existing one

c) Project is likely to have commercial significance but this is not the main goal of the project

d) It is too early to evaluate the commercial significance of the project

e) Project is not commercially significant

**A6: If you believe that project is going to be commercially significant, please estimate the timing of commercialisation.**

a) In _____ years and _____ months

b) The point of time is hard to make, because
_____
_____

c) The product or service has already been commercialised

d) The product in question is not to be commercialised

**A7: Who is taking care of commercialisation of your project?**

a) We ourselves

b) A company (other than we ourselves) that takes part in the project

c) Research centre, university or a like organisation (other than we ourselves) that takes part in the project

d) A company or some other organisation that does not take part in the project

e) It is too early to answer to the question, yet

f) The product in question is not to be commercialised

g) Other, please describe what

**B: In the following section we would like to inquire your assessment about <u>the effectiveness of the public funding that you received.</u>**

In this context public funding means public R&D -subsidy, loan etc. applied and recieved for this particular project. It does **not** mean direct, public budgetary funding that your organisation possibly receives.

**B1: How would you describe the volume of the allocated public funding that you have received?**

a) The funding has been sufficient

b) With this amount we have been able to build up a functioning project

even though we got less than what we applied for.

c) The funding was insufficient

d) Due to the difficult terms and conditions or other reasons we have not been able to utilise all the granted funding

e) The volume of the funding has not been of proper size, because,
_____

**B2: Has public funding been rightly targeted and allocated by reasonable terms and conditions?**

a) Yes, terms, conditions and targeting have been suitable for this project

b) No, the funding schedule has not fitted for our project

c) No, monitoring and overall bureaucracy have been too complicated

d) No, because _____
_____

**B3: What is/was the impact of public funding for your R&D -project?**

a) Schedule and scope of the project would have been the same even without public funding

b) Public funding speeded up the project

c) Public funding expanded the project

d) Without any public funding the objectives of the project would have been different

e) The project would not have been carried out without public funding

**B4: In comparison to your earlier projects, have the co-operative network been significantly tighter and/or broader in this project.**

a) Yes

b) Impossible to judge. The environment is so new to us that assessment is not possible

c) No, there are no differences in intensity or scale of collaboration compared to our earlier projects

**B5: Have you had earlier R&D -collaboration with your current project partners?**

a) With most or all of them in a similar combination

b) With most or all of them but in different combinations

c) With only a few of them

d) With none of them

**B6: If you have collaborated earlier with at least a few of partners, please indicate how collaboration in this project differs from earlier collaboration.**
(You may tick several alternatives in points A and B.)

**A) Focus of the project**

1) The project is now more pragmatic

2) The project has now a longer time-span

3) The projects has a broader context and covers more points of view

4) Project is in a new R&D -field

5) Otherwise, please explain how _____
_____

6) In the focus there are no significant differences compared to our earlier R&D -projects

**B) Project partners**

1) There are more industrial partners

2) There are more research centres

3) There are more universities

4) Otherwise, please explain how _____
_____

5) There are no significant differences compared to our previous R&D –projects

**C) The project differs from our previous projects in some other way. Please explain how.** _____
_____

**C: How important were the following reasons to apply for <u>public funding</u>? Please assess first the significance of each statement and then assess the level of achievement of the objectives currently and in the future.** Remember to answer to every question.

| | significance of the objective | | | | | level of attaining the objective | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | at the moment | | | | in five years | | | |
| | of great signi-ficance | rather significant | not so significant | of no signi-ficance | can not tell | fully realised | partly realised | not realised | can not tell | fully realised | partly realised | not realised | can not tell |
| We applied for funding in order to share the risk involved in the project | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Through public funding we looked for **customer contacts** that otherwise would have been hard or even impossible to find | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| We looked for **research contacts** that otherwise would have been hard or even impossible to find | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Through publicly funded project we looked for other useful contacts(what?) _____ | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Through a publicly funded project we looked for **information and know-how** that otherwise would have been hard or even impossible to find | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Getting public funding is a positive signal for other financers | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |

| | significance of the objective | | | | | level of attaining the objective | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | at the moment | | | | in five years | | | |
| | of great signi-ficance | rather signi-ficant | not so signi-ficant | of no signi-ficance | can not tell | fully realised | partly realised | not realised | can not tell | fully realised | partly realised | not realised | can not tell |
| Getting public funding is a positive signal for our customers | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| After getting public funding it is easier to "sell" the project in our own organisation | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| It is less expensive and/or more effective to coordinate and plan an R&D -project in collaboration with public financiers than with some other instances | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| We applied for public funding because its interest and other expenses are lower than in other alternatives | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| With public financiers there are less problems with proprietary rights and rights of usage than with private financiers | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Through a publicly financed project we looked for an access to an important network | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Through a publicly financed project we tried to strengthen our position in an important network or cluster | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Other, what? _____ | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |

**D: The following statements concern risks and problems possibly connected with public funding.**
**Please assess the significance of the following problems in your project.**
**Tick also the alternatives concerning realisation of these problems at the moment and in the near future.**

| | significance of the problem | | | | | realisation of the problem | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | at the moment | | | | in five years | | | |
| | of great signifi-cance | rather significant | not so signi-ficant | of no signi-ficance | can not tell | fully realised | partly realised | not realised | can not tell | fully realised | partly realised | not realised | can not tell |
| In a publicly financed project there is a risk that strategic information may end up in 'wrong hands' | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Reporting and other bureaucracy demanded by public financer are unnecessarily heavy | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| In publicly financed projects otherwise useless collaboration is established just to make getting public finance possible | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Public finance is not flexible enough. It does not take into account possible changes occurring during the project | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Using public funding is problematic because it tends to drive the project to unessential or even wrong directions | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |
| Other problems. What? | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 0 |

**E: The following statements deal with operational environment, goals, successfulness and role of public funding in your project.**

| | agree fully | agree to some extent | indifferent | disagree to some extent | disagree | can not tell |
|---|---|---|---|---|---|---|
| Our project is mainly basic research and it is hard to find other than public funding for it | 1 | 2 | 3 | 4 | 5 | 0 |
| Finding financers is difficult because our project extends over such a long period | 1 | 2 | 3 | 4 | 5 | 0 |
| The project was initiated because there was public funding easily available | 1 | 2 | 3 | 4 | 5 | 0 |
| This far, the project has proceeded as planned | 1 | 2 | 3 | 4 | 5 | 0 |
| We have welcomed public funding but it has not influenced the contents, breadth or organisation of the project | 1 | 2 | 3 | 4 | 5 | 0 |
| During this project, collaboration with our old partners has improved | 1 | 2 | 3 | 4 | 5 | 0 |
| It is important that networking inside and between industries and sectors is enhanced through public finance | 1 | 2 | 3 | 4 | 5 | 0 |

| | agree fully | agree to some extent | indifferent | disagree to some extent | disagree | can not tell |
|---|---|---|---|---|---|---|
| This project has improved employment outside our R&D team | 1 | 2 | 3 | 4 | 5 | 0 |
| In this project other parties have taken our goals better into consideration than in our earlier projects | 1 | 2 | 3 | 4 | 5 | 0 |
| It has been easier for us to understand other parties' goals than in earlier projects | 1 | 2 | 3 | 4 | 5 | 0 |
| Planning and coordinating, e.g. defining mutual goals, mapping resources and organising financial cooperation, have been easier than in our earlier projects | 1 | 2 | 3 | 4 | 5 | 0 |
| The role of public funding has been central in developing cooperation | 1 | 2 | 3 | 4 | 5 | 0 |
| Commercial value of the project may prove important for us | 1 | 2 | 3 | 4 | 5 | 0 |
| Other points of view. What? _____ | 1 | 2 | 3 | 4 | 5 | 0 |

F: Public science and technology funding has various goals. Partly they are hard to measure and they probably get fulfilled after a long period of time. In the following section we ask you to assess the following statements from the point of view of your project.

| | agree fully | agree to some extent | indifferent | disagree to some extent | disagree | can not tell |
|---|---|---|---|---|---|---|
| Public funding is likely to foster economic growth through our project | 1 | 2 | 3 | 4 | 5 | 0 |
| Public funding is likely to improve employment through our project | 1 | 2 | 3 | 4 | 5 | 0 |
| Public funding is likely enhance to the well-being of the whole society through our project | 1 | 2 | 3 | 4 | 5 | 0 |
| Public funding is likely to strengthen competitiveness of enterprises through our project | 1 | 2 | 3 | 4 | 5 | 0 |
| Public funding is likely to raise labour productivity through our project | 1 | 2 | 3 | 4 | 5 | 0 |
| Public funding fits well for 'pre-competitive' basic research but worse for R&D close to the markets | 1 | 2 | 3 | 4 | 5 | 0 |
| Basically, public funding fits for the entire production chain, from basic research untill end product and product support | 1 | 2 | 3 | 4 | 5 | 0 |

| | agree fully | agree to some extent | indifferent | disagree to some extent | dis-agree | can not tell |
|---|---|---|---|---|---|---|
| Role of the public funding is central when developing networks of companies, universities and research centres | 1 | 2 | 3 | 4 | 5 | 0 |
| Belonging to a network offers a significant competitive advantage for companies | 1 | 2 | 3 | 4 | 5 | 0 |
| Functioning network arises by itself and should not be directed by public authority e.g., by funding | 1 | 2 | 3 | 4 | 5 | 0 |
| Public funding has a very important role in directing R&D - activities into new and emerging fields | 1 | 2 | 3 | 4 | 5 | 0 |

**Please return the questionnaire in the attached envelope.**

**Thank you for your contribution**

# Appendix 2: Standard form of cluster programmes' finance

(English translation)

Name of the programme:

1) Programme's financing

| | | 1000 mk | |
|---|---|---|---|
| | | granted | expected to be granted by the end of year 2000 |
| Public funding | *Ear-marked cluster funding* | | |
| | KTM | | |
| | LM | | |
| | MMM | | |
| | STM | | |
| | TM | | |
| | YM | | |
| | *Other domestic funding* | | |
| | Academy of Finland | | |
| | Tekes | | |
| | - | | |
| | - | | |
| | - | | |
| | - | | |
| | *International funding by financer* | | |
| | - | | |
| | - | | |
| | - | | |
| | - | | |
| Private funding | | Domestic and international altogether | |
| Private and public altogether | | | |

| | | |
|---|---|---|
| Project partners' own funding | | |
| 2) Projects and performers | | |
| a) total number of projects | | |
| b) total number of projects carried out by companies (company as a project manager) | | |
| c) total number of participating organisations in the programme | | |
| c) total number of participating companies in the programme | | |
| | | |
| 3) Schedule | | |
| a) When did the programme begin (grants for the first projects) | | |
| b) How much (FIM and %) of already granted funds have been already used ? | | |
| - mk | | |
| - % | | |

# Appendix 3a. Projects and participating organisations by research themes, *Wood Wisdom*

| theme | project | organisation |
|---|---|---|
| Biosynthesis of lignin | Isolation of the lignin forming enzymes and their genes from Norway spruce | Helsingin yliopisto |
| Biosynthesis of lignin | Isolation of the lignin forming enzymes and their genes from Norway spruce | Helsingin yliopisto |
| Biosynthesis of lignin | The chemistry of lignin formation | Helsingin yliopisto |
| Biosynthesis of lignin | The role of peroxidase isoenzymes in wood lignin biosynthesis: localisation and function in soft- and hardwood | Helsingin yliopisto |
| Biosynthesis of lignin | The role of peroxidase isoenzymes in wood lignin biosynthesis: localisation and function in soft- and hardwood | Metsäntutkimuslaitos |
| Biosynthesis of lignin | Transfer of genes involved in lignin biosynthesis into Finnish forest tree species | Metsäntutkimuslaitos |
| Chip pre-treatment | Analysis of wood and pulps | Åbo Akademi |
| Chip pre-treatment | Bioprocesses for improving the pulping processes | VTT |
| Chip pre-treatment | Bioprocesses for improving the pulping processes | VTT |
| Chip pre-treatment | Chemical microanalysis of wood tissues and fibres | Åbo Akademi |
| Chip pre-treatment | Microbial pretreatments of wood chips | Helsingin yliopisto |
| Discoloration of timber | Chemical analysis and NMR imaging study of influence of drying process on discoloration and deformation of birch timber | Joensuun yliopisto |
| Discoloration of timber | Drying schedules of birch timber in vacuum drying | Mikkelin ammattikorkeakoulu |
| Discoloration of timber | Lipids and carbohydrates of silver birch wood | Metsäntutkimuslaitos |
| Discoloration of timber | Spectral changes and deformations in sawn birch timber during drying | Joensuun yliopisto |
| Discoloration of timber | The effect of drying methods and temperatures on discoloration of sawn timber of Norway spruce and Scots pine | VTT |
| Discoloration of timber | The effect of site and timber handling on the quality and end-use value of sawn timber of Norway spruce and Scots pine | Helsingin yliopisto |
| Discoloration of timber | The wood properties of Norway spruce and Scots pine and the chemical changes related to discoloration | Metsäntutkimuslaitos |
| Fibre engineering | Behaviour of reinforcement pulp in calendering | TKK |
| Fibre engineering | Effect of reinforcement pulp refining and charge on the structure and fracture of paper | TKK |
| Fibre engineering | Evaluation system for reinforcement pulps | Keskuslaboratorio Oy (KCL) |
| Fibre engineering | Fibre engineering | STFI |
| Fibre engineering | Fibre engineering | TKK |
| Fibre engineering | Fibre engineering | TKK |
| Fibre engineering | Fibre engineering | VTT |

| theme | project | organisation |
|---|---|---|
| Fibre engineering | Microscopic fracture mechanisms | Keskuslaboratorio Oy (KCL) |
| Fibre engineering | Reinforcement pulp in dried paper with controlled shrinkage or stretch | TKK |
| Fibre engineering | Web breakage pilot | Keskuslaboratorio Oy (KCL) |
| Forestry related services | Forestry-related services and the viability of rural areas | Joensuun yliopisto |
| Forestry related services | Requirements for forest machine operators | Metsäteho Oy |
| Forestry related services | Sawdust as thermal insulation in a small house | TKK |
| Forestry related services | The influence of local operating for conditions of service suppliers in forestry | Metsäteho Oy |
| Markets, eco-competitiveness | Analysis and use of research information in evaluation of environmental impacts concerning identification of environmental aspects in EMS | Metsäteho Oy |
| Markets, eco-competitiveness | Development of the ecological competitiveness of mechanical wood processing | Koskisen Oy |
| Markets, eco-competitiveness | Development of the ecological competitiveness of mechanical wood processing | LCA Engineering Oy |
| Markets, eco-competitiveness | Environmental marketing of forest products | Helsingin yliopisto |
| Markets, eco-competitiveness | Forecasting the international trade of industrial roundwood | Euroopan metsäinstituutti |
| Markets, eco-competitiveness | Forecasting the international trade of industrial roundwood | Helsingin yliopisto |
| Markets, eco-competitiveness | Forecasting the international trade of industrial roundwood | Metsäntutkimuslaitos |
| Markets, eco-competitiveness | Forest stand development and its energy, carbon and nutrient balances | Euroopan metsäinstituutti |
| Markets, eco-competitiveness | Forest stand development and its energy, carbon and nutrient balances | Joensuun yliopisto |
| Markets, eco-competitiveness | Functioning of roundwood markets in Finland and some competitor countries | HKKK |
| Markets, eco-competitiveness | Functioning of roundwood markets in Finland and some competitor countries | Metsäntutkimuslaitos |
| Markets, eco-competitiveness | Functioning of roundwood markets in Finland and some competitor countries | Pellervon taloudellinen tutkimuslaitos PTT |
| Markets, eco-competitiveness | Life-cycle data of the forest cluster's transports | LCA Engineering Oy |
| Markets, eco-competitiveness | Measurement and monitoring of forest biodiversity | Metsäteho Oy |
| Markets, eco-competitiveness | Process of wood production, logging and transport in LCA of forestry and forest products | Keskuslaboratorio Oy (KCL) |

| theme | project | organisation |
|---|---|---|
| Markets, eco-competitiveness | Process of wood production, logging and transport in LCA of forestry and forest products | Metsäteho Oy |
| Markets, eco-competitiveness | Short term forecasts of forest products demand | Etla |
| Markets, eco-competitiveness | Short term forecasts of forest products demand | Metsäntutkimuslaitos |
| Markets, eco-competitiveness | Short-term forecasting models for Finnish forest products' exports | Metsäntutkimuslaitos |
| Mass transfer | Analysis of the physical and biological mechanisms | Helsingin yliopisto |
| Mass transfer | Analysis of the physical and biological mechanisms | Helsingin yliopisto |
| Mass transfer | Fundamental investigations of penetration and delignification | Åbo Akademi |
| Mass transfer | Impregnation of wood for alkaline pulping | Åbo Akademi |
| Mass transfer | Liquor transfer in sulphate cooking | TKK |
| Mass transfer | Meaning of modification rules in sulphate cooking | Jyväskylän yliopisto |
| Mass transfer | Measurements of pulp and fibre structures | Helsingin yliopisto |
| Mass transfer | Modelling of water flow | Helsingin yliopisto |
| Mass transfer | Modelling of water flow | Jyväskylän yliopisto |
| Mass transfer | NMR measurements of water flow | TKK |
| Mass transfer | Strength losses and fibre deformations in kraft pulping of softwood | Keskuslaboratorio Oy (KCL) |
| Mass transfer | Strength losses and fibre deformations in kraft pulping of softwood | Keskuslaboratorio Oy (KCL) |
| Mass transfer | Strength losses and fibre deformations in kraft pulping of softwood | Lännen Laboratoriot Oy |
| Minority wood species | Assessment of the quality and industrial value of aspen for mechanical wood processing | Joensuun yliopisto |
| Minority wood species | Important physio-chemical traits of hybrid aspen in papermaking | Jyväskylän yliopisto |
| Minority wood species | Mechanical processing and end-use products of domestic birch, aspen and alder | Helsingin yliopisto |
| Minority wood species | Properties of domestic birch and grey alder for mechanical wood processing, and their prediction and control | Metsäntutkimuslaitos |
| Minority wood species | Quality of dried wood of cultivated birches | Joensuun yliopisto |
| Minority wood species | Quality of dried wood of cultivated birches | Joensuun yliopisto |
| Minority wood species | The inheritance of characteristics important to paper production in hybrid aspen and aspen and the multiplication of planting material | Metsänjalostussäätiö |
| Minority wood species | The inheritance of characteristics important to paper production in hybrid aspen and aspen and the multiplication of planting material | Metsäntutkimuslaitos |

| theme | project | organisation |
|---|---|---|
| Minority wood species | The inheritance of characteristics important to paper production in hybrid aspen and aspen and the multiplication of planting material | Metsäntutkimuslaitos |
| Minority wood species | The physiological and genetic basis of wood quality in aspen hybrids | Helsingin yliopisto |
| Modified wood | Fast drying of wood | VTT |
| Modified wood | Heat treatment of wood | VTT |
| Modified wood | Impregnation of wood with tall oil | VTT |
| Public support | Competition and public expenditure in support of the forest sector in different European countries | Metsäntutkimuslaitos |
| Public support | Competitive preconditions for wood procurement and forest-based service enterprises | Metsäntutkimuslaitos |
| Public support | Competitive preconditions for wood procurement and forest-based service enterprises | Metsäntutkimuslaitos |
| Public support | Regional roundwood price indexes and the measurement of competition in the roundwood market | Metsäntutkimuslaitos |
| Public support | Succes factors of forest and woodworking SMEs in Europe | Metsäntutkimuslaitos |
| Raw material opt. and control | A process-based model for timber quality prediction | Helsingin yliopisto |
| Raw material opt. and control | A process-based model for timber quality prediction | Metsäntutkimuslaitos |
| Raw material opt. and control | Allocation wood procurement costs for timber lots | Metsäteho Oy |
| Raw material opt. and control | Assortment and measurements of wood in connection to wood procurement and wood handling at the pulp mill | Finntech Finnish Technology Ltd Oy |
| Raw material opt. and control | Assortment and measurements of wood in connection to wood procurement and wood handling at the pulp mill | Metsäteho Oy |
| Raw material opt. and control | Assortment and measurements of wood in connection to wood procurement and wood handling at the pulp mill | VTT |
| Raw material opt. and control | Databasis of timber procuremet enterprises and forest mensuration as basis for operational planning | Joensuun yliopisto |
| Raw material opt. and control | Description of commercial roundwood and its distribution when estimating future timber production possibilities | Metsäntutkimuslaitos |
| Raw material opt. and control | Effect of wood assortment on raw material quality, processes and end-product quality in the pulp and paper industry | Helsingin yliopisto |
| Raw material opt. and control | Improvement of chip length-thickness ratio | VTT |
| Raw material opt. and control | Integrated optimisation model for wood conversion chain | VTT |
| Raw material opt. and control | Marking of wood raw material and wood products for identifying purposes | VTT |
| Raw material opt. and control | Measurement of quality characteristics, dimensions and surface smoothness of sawn timber during automatic control of wood material flow | VTT |

| theme | project | organisation |
|---|---|---|
| Raw material opt. and control | Measurement technologies in wood handling at the mill | VTT |
| Raw material opt. and control | Process control system for log demand distribution | Helsingin yliopisto |
| Raw material opt. and control | Process control system for log demand distribution | Joensuun yliopisto |
| Raw material opt. and control | Pulping properties of stems | Metsäteho Oy |
| Raw material opt. and control | Pulpwood quality variation and assortment criteria | Metsäntutkimuslaitos |
| Raw material opt. and control | Scheduling stands for harvesting and log bucking | Metsäteho Oy |
| Raw material opt. and control | Tree data warehouse for wood procurement management | Metsäteho Oy |
| Raw material opt. and control | Wood product analysis | TKK |
| Scenarios | Environmental matters in Finnish and European forest clusters | HKKK |
| Scenarios | Environmental matters in Finnish and European forest clusters | Metsä-Serla Oyj |
| Scenarios | European Forest Sector Model | Agricultural University NLH |
| Scenarios | European Forest Sector Model | Euroopan metsäinstituutti |
| Scenarios | Globalization of forest industry and competitive position of Finland | Foreco Oy |
| Scenarios | Long-term strategies of the Finnish Forest Sector | Metsäntutkimuslaitos |
| Scenarios | The dynamics and internationalisation of the forest cluster - revisited | Etlatieto Oy |
| Scenarios | The Forest Cluster in the European Union | Etlatieto Oy |
| Scenarios | Total value of wood-based products in the forest sector | Fortum Power and Heat Oy |
| Scenarios | Total value of wood-based products in the forest sector | Joensuun yliopisto |
| Scenarios | Total value of wood-based products in the forest sector | Keskuslaboratorio Oy (KCL) |
| Scenarios | Total value of wood-based products in the forest sector | Oulun yliopisto |
| Scenarios | Total value of wood-based products in the forest sector | TKK |
| Scenarios | Total value of wood-based products in the forest sector | VTT |
| Stump treatment | Assessment of the present situation with stump treatments in Finland and developing a prototype of a well-working device for the treatment | Metsäteho Oy |
| Stump treatment | Controlling the efficacy of the P. gigantea preparation and investigation of the environmental effects of the use of the | Metsäntutkimuslaitos |

preparation in the forest

| theme | project | organisation |
|---|---|---|
| Stump treatment | Developing an operations model for monitoring the stump treatments in practical forestry | Metsäntutkimuslaitos |
| Stump treatment | Testing of the developed stump treatment device in harvesting machines | Metsäteho Oy |
| Targeted bleaching | The effect of chemical inhomogeneity of cell wall structure on delignification | Helsingin yliopisto |
| Targeted bleaching | The effect of chemical inhomogeneity of cell wall structure on delignification | Keskuslaboratorio Oy (KCL) |
| Targeted bleaching | The effect of chemical inhomogeneity of cell wall structure on delignification | VTT |
| Unifibre | Correlation of particleboard properties and particle characteristics | VTT |
| Unifibre | Determination of microfibril angles of wood by x-ray scattering methods | Helsingin yliopisto |
| Unifibre | Development of methods for characterisation of wood surfaces | TKK |
| Unifibre | Fibre-water interactions in relation to the functional properties of paper | TKK |
| Unifibre | Modelling of microcracking in wood | VTT |
| Unifibre | Optical methods in investigations of cracks in wood | Joensuun yliopisto |
| Unifibre | Stability of plywood | TKK |
| Unifibre | Stability of plywood | VTT |
| Unifibre | The chemistry of wood surfaces and their adhesion to synthetic polymers | VTT |
| Unifibre | The effect of wood anatomical structure on micro-cracking and crack growth | TKK |
| Unifibre | The relationship between wood material properties and properties of wood products | TKK |
| Unifibre | The relationship between wood material properties and properties of wood products | VTT |
| Unifibre | The surface chemistry and adsorption properties of wood and cellulose fibres | TKK |
| Unifibre | The surface morphology of thermochemically treated wood fibres | Åbo Akademi |
| Unifibre | Veneer drying | TKK |
| Unifibre | Veneer drying | VTT |
| Wood quality variations | Effects of environmental stress factors on chemical and structural quality of wood in Scots pine and Norway spruce | Kuopion yliopisto |
| Wood quality variations | Effects of silvicultural management on the physical and chemical properties of wood | Joensuun yliopisto |

| theme | project | organisation |
|---|---|---|
| Wood quality variations | Environmental effects on allocation of growth and wood quality | Metsäntutkimuslaitos |
| Wood quality variations | Genetic variation of decay resistance in Scots pine and Siberian larch wood | Metsäntutkimuslaitos |
| Wood quality variations | Genetic variation of decay resistance in Scots pine and Siberian larch wood | Metsäntutkimuslaitos |
| Wood quality variations | Genetic variation of decay resistance in Scots pine and Siberian larch wood | VTT |
| Wood quality variations | New nondestructive methods for evaluation of decay in wood | Joensuun yliopisto |
| Wood quality variations | New nondestructive methods for evaluation of decay in wood | Kuopion yliopisto |
| Wood quality variations | Structural post-drainage development of peatland stands | Helsingin yliopisto |
| Wood quality variations | Structural post-drainage development of peatland stands | Metsäntutkimuslaitos |
| Wood quality variations | Tree stands on peatland, quality of wood raw material and suitability for different use objects | Helsingin yliopisto |
| Wood quality variations | Variation of wood properties | Metsäntutkimuslaitos |
| | Current Research Information System (CRIS) for the Finnish Forest Cluster | Metsäosaamiskeskus / Joensuun Tiedepuisto Oy |
| | Current Research Information System (CRIS) for the Finnish Forest Cluster | Sordino Information Systems Oy |
| | GIS data capture by using harvester-mounted GPS | Helsingin yliopisto |
| | GIS data capture by using harvester-mounted GPS | Metsäteho Oy |
| | Teaching co-ordinator for "Forests in GIS" | Helsingin yliopisto |

# Appendix 3b. Steering group members, *Wood Wisdom*

| steering group | organisation | steering group | organisation |
|---|---|---|---|
| 1 | HKKK | 3 | Metsäalan tutkimusohjelma |
| 1 | Koskisen Oy | 3 | Metsäteollisuus ry. |
| 1 | Tekes | 3 | MTK |
| 1 | KTM | 3 | Opstock Oy |
| 1 | Turun kauppakorkeakoulu | 3 | Oy Metsä-Botnia Ab |
| 1 | MMM | 3 | Schauman Wood |
| 1 | Metsäalan tutkimusohjelma | 4 | Tekes |
| 1 | Metsä-Serla Oyj | 4 | Metsähallitus |
| 1 | Metsäteollisuus ry. | 4 | Metsäalan tutkimusohjelma |
| 1 | MTK | 4 | Metsämannut Oy |
| 1 | Paperiliitto ry | 4 | Metsä-Serla Oyj |
| 1 | Sanoma Osakeyhtiö | 4 | Metsäteollisuus ry. |
| 1 | Stora Enso Oyj | 4 | MTK |
| 1 | UPM-Kymmene Oyj | 4 | Stora Enso Oyj |
| 1 | Valmet Oyj | 4 | UPM-Kymmene Oyj |
| 2 | Keskuslaboratorio Oy (KCL) | 4 | UPM-Kymmene Metsä Oyj |
| 2 | TKK | 5 | Koskisen Oy |
| 2 | VTT | 5 | LCA Engineering Oy |
| 2 | Tekes | 5 | Tekes |
| 2 | Tekes | 5 | Mittatekniikan keskuksen akkreditointipalvelut FINAS |
| 2 | MMM | 5 | Tieliikenteen tietokeskus |
| 2 | Metla | 5 | Enso Oyj |
| 2 | YM | 5 | Finncarriers |
| 2 | Jaakko Pöyry Consulting Oy | 5 | Metsäalan tutkimusohjelma |
| 2 | Metsäalan tutkimusohjelma | 5 | Metsäteollisuus ry. |
| 2 | Vapo Timber Oy | 5 | Steveco Oy |
| 3 | Foreco Oy | 5 | Suomen kuorma-autoliitto |
| 3 | HKKK | 5 | TT |
| 3 | Oulun yliopisto | 5 | UPM-Kymmene Oyj |
| 3 | SP | 5 | VR Osakeyhtiö |
| 3 | HY | 6 | MMM |

| steering group | organisation | steering group | organisation |
|---|---|---|---|
| 6 | Metsätalouden kehittämiskeskus TAPIO | 10 | Valmet Oyj |
| 6 | Kilpailuvirasto | 11 | Tekes |
| 6 | Etelä-Pohjanmaan metsäkeskus | 11 | Ahlström Machinery Oy |
| 6 | Metsäalan tutkimusohjelma | 11 | Metsäalan tutkimusohjelma |
| 6 | Metsäteollisuus ry. | 11 | Metsä-Serla Oyj |
| 6 | MTK | 11 | Myllykoski Paper Oy |
| 6 | Suomen Yrittäjät ry | 11 | Stora Enso Oyj |
| 7 | Joensuun yliopisto | 11 | UPM-Kymmene Oyj |
| 7 | Metsäteho Oy | 11 | Valmet Oyj |
| 7 | MMM | 12 | Metsäntutkimuslaitos |
| 7 | Koneyrittäjien liitto ry | 12 | MMM |
| 7 | Metsäalan tutkimusohjelma | 12 | Jaakko Pöyry Oy |
| 7 | Stora Enso Oyj | 12 | Metsämannut Oy |
| 8 | TKK | 12 | Metsä-Serla Oyj |
| 8 | Tekes | 12 | UPM-Kymmene Oyj |
| 8 | MMM | 13 | VTT |
| 8 | Herrala-Talot Oy | 13 | Tekes |
| 8 | Suomen Puututkimus Oy | 13 | TKK |
| 8 | Suomen Sahat ry | 13 | Ratahallintokeskus |
| 9 | Helsingin yliopisto | 13 | Honkarakenne Oyj |
| 9 | VTT | 13 | Iivari Mononen Oy |
| 9 | Åbo Akademi | 13 | Lahontorjuntayhdistys ry |
| 9 | Tekes | 13 | Metsäalan tutkimusohjelma |
| 9 | Metsäalan tutkimusohjelma | 13 | Oy VR Rata Ab |
| 9 | Metsä-Serla Oyj | 13 | Stora Enso Timber Oy |
| 9 | Stora Enso Oyj | 13 | Suomen Puututkimus Oy |
| 9 | UPM-Kymmene Oyj | 13 | Vapo Timber Oy |
| 10 | Tekes | 14 | Metsäntutkimuslaitos |
| 10 | Ahlström Machinery Oy | 14 | Oulun yliopisto |
| 10 | Metsäalan tutkimusohjelma | 14 | Mahogany Oy |
| 10 | Metsä-Serla Oyj | 14 | Metsäalan tutkimusohjelma |
| 10 | Myllykoski Paper Oy | 14 | Niemen tehtaat Oy |
| 10 | Stora Enso Oyj | 14 | Oy Karelia Parketti Ltd. |
| 10 | UPM-Kymmene Oyj | 14 | Pohjois-Karjalan metsänhoitoyhdistysten liitto ry |

| steering group | organisation |
|---|---|
| 14 | Puuseppämestarit ry |
| 14 | Vilkon Oy |
| 15 | Keskuslaboratorio Oy (KCL) |
| 15 | TKK |
| 15 | Tekes |
| 15 | Oulun yliopisto |
| 15 | Metsäalan tutkimusohjelma |
| 15 | Metsä-Serla Oyj |
| 15 | Puuinfo ry |
| 15 | Schauman Wood |
| 15 | Suomen Puututkimus Oy |
| 15 | UPM-Kymmene Oyj |
| 15 | Valmet Oyj |
| 16 | Keskuslaboratorio Oy (KCL) |
| 16 | TKK |
| 16 | Tekes |
| 16 | Oulun yliopisto |
| 16 | Metsäalan tutkimusohjelma |
| 16 | Metsä-Serla Oyj |
| 16 | Puuinfo ry |
| 16 | Schauman Wood |
| 16 | Suomen Puututkimus Oy |
| 16 | UPM-Kymmene Oyj |
| 16 | Valmet Oyj |
| 17 | Keskuslaboratorio Oy (KCL) |
| 17 | TKK |
| 17 | Tekes |
| 17 | Oulun yliopisto |
| 17 | Metsäalan tutkimusohjelma |
| 17 | Metsä-Serla Oyj |
| 17 | Puuinfo ry |
| 17 | Schauman Wood |
| 17 | Suomen Puututkimus Oy |
| 17 | UPM-Kymmene Oyj |
| 17 | Valmet Oyj |
| 18 | Keskuslaboratorio Oy (KCL) |
| 18 | TKK |
| 18 | Tekes |
| 18 | Oulun yliopisto |
| 18 | Metsäalan tutkimusohjelma |
| 18 | Metsä-Serla Oyj |
| 18 | Puuinfo ry |
| 18 | Schauman Wood |
| 18 | Suomen Puututkimus Oy |
| 18 | UPM-Kymmene Oyj |
| 18 | Valmet Oyj |
| 19 | Helsingin yliopisto |
| 19 | Joensuun yliopisto |
| 19 | Keskuslaboratorio Oy (KCL) |
| 19 | Metsänjalostussäätiö |
| 19 | VTT |
| 19 | Oulun yliopisto |
| 19 | Metsämannut Oy |
| 19 | UPM-Kymmene Timber Oyj |
| 20 | Helsingin yliopisto |
| 20 | Joensuun yliopisto |
| 20 | Keskuslaboratorio Oy (KCL) |
| 20 | Kuopion yliopisto |
| 20 | Metsänjalostussäätiö |
| 20 | Metsäntutkimuslaitos |
| 20 | VTT |
| 20 | Oulun yliopisto |
| 20 | Metsämannut Oy |
| 20 | UPM-Kymmene Timber Oyj |
| 21 | Helsingin yliopisto |
| 21 | Joensuun yliopisto |
| 21 | Keskuslaboratorio Oy (KCL) |
| 21 | Metsänjalostussäätiö |

| steering group | organisation | steering group | organisation |
|---|---|---|---|
| 21 | VTT | 24 | Metsäteho Oy |
| 21 | Oulun yliopisto | 24 | Tekes |
| 21 | Metsämannut Oy | 24 | Koskitukki Oy |
| 21 | UPM-Kymmene Timber Oyj | 24 | Metsäalan tutkimusohjelma |
| 22 | MMM | 24 | Metsäliitto Osuuskunta |
| 22 | Metla | 24 | Stora Enso Oyj |
| 22 | Metsätalouden kehittämiskeskus TAPIO | 24 | UPM-Kymmene Metsä Oyj |
| 22 | Metsäalan tutkimusohjelma | 25 | Metsäteho Oy |
| 22 | Stora Enso Timber Oy | 25 | Metla |
| 22 | Vapo Timber Oy | 25 | Kemira Agro Oy |
| 23 | VTT | 25 | Metsäliitto |
| 23 | Tekes | 25 | MTK |
| 23 | Andritz Kone Wood Oy | 25 | Stora Enso Oyj |
| 23 | BMH Wood Technology Oy | 25 | UPM-Kymmene Metsä Oyj |
| 23 | Hackman TTT | 26 | Helsingin yliopisto |
| 23 | Metsäalan tutkimusohjelma | 26 | VTT |
| 23 | Partek Forest Oy Ab | 26 | Tekes |
| 23 | Ponsse Oyj | 26 | Oulun yliopisto |
| 23 | Stora Enso Oyj | 26 | Joensuun yliopisto |
| 23 | Sunds Defibrator Woodhandling Oy | 26 | Metsäalan tutkimusohjelma |
| 23 | Timberjack Oy | 26 | Metsä-Serla Oyj |
| 23 | UPM-Kymmene Oyj | 27 | Tekes |
| 23 | Valon Kone Oy | 27 | Metsähallitus |
| 23 | Vision Systems Oy | 27 | UPM-Kymmene Oyj |

# Appendix 4:
# The Well-Being cluster. Projects and participating organisations by research themes

| theme | project | organisation |
|---|---|---|
| Independent living | Assistive devices project | Satakunnan Makropilotti Ry |
| Independent living | Assistive devices project | STAKES |
| Independent living | Home-Hospital project | Satakunnan Makropilotti Ry |
| Independent living | Home-Hospital project | Porin kaupunginsairaala |
| Independent living | Home-Hospital project | Porin kaupungin sosiaalivirasto (City of Pori) |
| Independent living | Safety and personal affairs services | Satakunnan Makropilotti Ry |
| Independent living | Safety and personal affairs services | STAKES |
| Independent living | Safety and personal affairs services | Vanhustyön keskusliitto |
| Independent living | Self-care support | Satakunnan Makropilotti Ry |
| Independent living | Self-care support | Porin kaupungin terveysvirasto (City of Pori) |
| Independent living | Self-care support | Satakunta polytechnic |
| Independent living | Self-care support | Porin kaupungin vapaa-ajanvirasto (City of Pori) |
| Information and client services | Client service pages | Satakunnan Makropilotti Ry |
| Information and client services | Client service pages | Multimedica Oy |
| Information and client services | 'Sosterva-info' project | Satakunnan Makropilotti Ry |
| Information and client services | 'Sosterva-info' project | ICL Data Ltd |
| Information and client services | 'Sosterva-info' project | Pohjois-Savo polytechnic |
| Information and client services | 'Sosterva-info' project | Prizztech Oy |
| Information security and protection | Development of regional data security and information protection | Porin lääkäritalo Oy |
| Information security and protection | Development of regional data security and information protection | Outokumpu Pori Copper Ltd |
| Information security and protection | Development of regional data security and information protection | Satakunnan Makropilotti Ry |
| Information security and protection | Development of regional data security and information protection | Satakunta hospital district |
| Information security and protection | Development of regional data security and information protection | Satakunnan keskussairaala |
| Information security and protection | Development of regional data security and information protection | Kankaanpään kansanterveystyön kuntayhtymä |

| theme | project | organisation |
|---|---|---|
| Information security and protection | Development of regional data security and information protection | Porin kaupungin terveysvirasto (City of Pori) |
| Information security and protection | Development of regional data security and information protection | Rauman aluesairaala |
| Information security and protection | Development of regional data security and information protection | Social insurance institution |
| Information security and protection | Development of regional data security and information protection | Noormarkun sosiaalitoimisto |
| Information security and protection | Development of regional data security and information protection | Harjavallan sairaala |
| Information security and protection | Regional client card project | Satakunta hospital district |
| Information security and protection | Regional client card project | Porin kaupunki |
| Information security and protection | Regional client card project | Social insurance institution |
| Information security and protection | Regional client card project | Satakunnan Makropilotti Ry |
| Regional data network | Area architecture | Satakunnan Makropilotti Ry |
| Regional data network | Area architecture | ICL Data Ltd |
| Regional data network | Area architecture | Porin Prinet Oy |
| Regional data network | Area architecture | Luoteis-Satakunnan kansanterveystyön kuntayhtymä |
| Regional data network | Area architecture | Porin kaupungin sosiaalivirasto (City of Pori) |
| Regional direction models | Client direction model | Satakunnan Makropilotti Ry |
| Regional direction models | Regional service chain plan | Satakunnan Makropilotti Ry |
| Seamlessness | Electronic consultation | Satakunnan Makropilotti Ry |
| Seamlessness | Electronic consultation | Satakunta hospital district |
| Seamlessness | Electronic consultation | Satakunta hospital district |
| Seamlessness | Electronic consultation | Satakunta hospital district |
| Seamlessness | Electronic consultation | Satakunta hospital district |
| Seamlessness | Electronic consultation | Luoteis-Satakunnan kuntayhtymä |
| Seamlessness | First aid / primary care | Satakunnan Makropilotti Ry |
| Seamlessness | First aid / primary care | Porin Palolaitos (City of Pori) |
| Seamlessness | First aid / primary care | Satakunnan Hätäkeskus |
| Seamlessness | First aid / primary care | Porin kaupungin terveysvirasto (City of Pori) |

| theme | project | organisation |
|---|---|---|
| Seamlessness | First aid / primary care | Kankaanpään sairaankuljetus |
| Seamlessness | First aid / primary care | Kankaanpään terveyskeskus |
| Seamlessness | Medication information | Satakunnan Makropilotti Ry |
| Seamlessness | Medication information | Merikarvian terveysasema |
| Seamlessness | Medication information | Merikarvian apteekki |
| Seamlessness | Workplace health care services | Satakunnan Makropilotti Ry |
| Seamlessness | Workplace health care services | Outokumpu Pori Copper Ltd |
| Seamlessness | Workplace health care services | Porin kaupungin terveyskeskus (City of Pori) |
| Seamlessness | Workplace health care services | Social insurance institution |
| | Beginning life, Maternity clinic on the internet | Pohjois-Savo polytechnic |
| | PALKO- development project | STAKES |

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# Economic evaluation of the Finnish cluster programmes

From 1997 onwards there have been eight Finnish cluster programmes that cover a large spectrum of activities. The programmes are public financial initiatives, and their major goal is to create new and permanent co-operation structures, improve the co-operative ability of the whole research system, and increase the relevance and flexibility of activities. The underlying ultimate goals, even though they are hardly measurable, are to generate growth, improve industries' competitiveness and productivity, increase employment, generate new innovations and improve social welfare.

This study gives a micro-level view of the Finnish cluster programmes. It gives an insight into which organisations participate, who the financers are, what kinds of instruments are used, what the volume of funding is, how the governance is organised, and what kind of effectiveness can be expected.

This report is a comment on public cluster policy. A topical question is whether there is room for public cluster initiatives. If the answer is yes, then what kinds of instruments should be applied and in what manner. Finally, how should the governance and evaluation of cluster initiatives be organised.