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Evaluation Innovation Oriented Research programme Self- Healing Materials 2005-2009

Summary



Evaluation Innovation Oriented Research Programme Self-Healing Materials (IOP SHM) 2005-2009

Summary of final report

Technopolis Group The Netherlands, 2009

Frank Zuijdam (project leader)

Hanneke Bodewes

Bastian Mostert

Geert van der Veen

Summary

Background and evaluation approach

The Innovation Oriented Research Programme on Self-Healing Materials (IOP SHM) started in 2005. Self-healing materials are able to repair damage - either by themselves or by limited external influence. These materials have an enormous innovative, technological and commercial potential, since they can contribute to sustainability by longer life cycles and less maintenance costs. The IOP SHM programme finances innovative research in the field of self-healing materials with potential applications in the future. Both knowledge institutes and companies are involved in the programme.

The IOP SHM programme started in 2005 for a period of four years, with the possibility of extending the programme for four more years, depending on the outcomes of an evaluation of the first period (mid 2009). However, the timing of this evaluation is too early to be able to draw conclusions about the results and impacts of the programme. This is because projects that were started after the first call in 2006 haven't finished yet, and projects that were granted in the second call are still in the start-up phase.

The Ministry of Economic Affairs has asked Technopolis Group to evaluate IOP SHM in February 2009. Four main elements of the evaluation are:

1. Management processes and programme organisation
2. The extent to which the programme can be expected to reach its objectives
3. The positioning of the programme in relation to other (innovation) programmes and initiatives
4. Conclusions and recommendations for a second four-year period

The evaluation lasted from February to the end of April, 2009, and consisted of four phases. The first phase was desk-study of relevant documents (programme plans, annual reports, etc.). A web survey was sent out to project leaders, researchers, and companies in the second phase. For further assessment of the results of questionnaires, interviews were held with 22 stakeholders. Based on the analysis of first results a workshop was organised for the advisory committee of the IOP SHM programme in March 2009. During this workshop first evaluation findings were presented and a discussion was held about specific topics that were relevant for a second four-year period of the programme. Finally, the fourth phase involved reporting on all findings.

Overall conclusions

All relevant stakeholders are committed to the IOP SHM programme. It is considered to be an important instrument since it enhances research concerning self-healing materials, organises the research field, and creates complementarities with other programmes related to materials research. It also stimulates public-private networks around this topic. All stakeholders are satisfied with the management and organisation of the programme.

Conclusion about management and organisation of the programme

Overall, stakeholders are satisfied with organisation and management processes of the programme. Project leaders are satisfied with calls and selection procedures in 2006 and 2008. Tender information and selection procedures were found to be clear and transparent. There were remarks about the second phase of the selection process, in which the advisory committee prioritises proposals. In this phase not only the score of separate proposals on selection criteria is relevant, but also the distribution of proposals over four material classes (polymers, metals, concrete, ceramics) and types of research (material development, theory, application). This portfolio-management step in the second phase of the selection procedure should be communicated more explicitly to applicants writing a research proposal.

The programme plan for the first four-year period includes a matrix with on one axe the intended distribution of research over four material classes and on the other axe the intended distribution of type of research. When analysing the portfolio of projects, it can be concluded that the advisory committee has successfully steered the distribution over different material classes. No important deviations from the intended distribution were found. This is not the case for the distribution of projects over type of research. It is not clear how this played a role in the selection process and the programme office didn't monitor the type of research.

It can be concluded that the IOP SHM programme developed a balanced set of activities to reach its overall objectives. However, some specific activities should be evaluated in light of the programme objectives. It is for instance unclear whether the advanced network creates added value and project monitoring can and should be improved. In addition, it should be monitored whether activities actually lead to implementation and results (educational module for high schools, demonstration projects) to assess whether the activities are worth the effort.

The efficiency of the IOP SHM programme was also looked at in the evaluation. It was found that overhead costs are relatively low. However, because no financial overview was available of the programme office (calls and programme manager), it is not possible to draw definite conclusions on the programme's efficiency.

Conclusions about expectations and results

The IOP instrument is intended to fund innovative fundamental research, which addresses strategic needs of the Dutch industry. Although valorisation and embedment are important objectives of the programme, it is less focused on generating applications on short term, which is in line with stakeholders' expectations. It can be derived from the evaluation that the scientific aspects are considered to be most important for both researchers and industry partners. The companies that are involved consider their participation in the IOP SHM to be a good way to stay up-to-date on technological developments. In the future, these developments can be transformed into opportunities for application.

In general, stakeholders point out that most of the major expectations have not been realised completely. This is due to the fact that the programme has only produced limited research results and valorisation has not taken place yet. At this moment it is too early to expect applications and valorisation of the knowledge developed. The industry expects these kinds of applications between three and ten years from now. The period in which results are to be expected is different for each of the four material classes.

The IOP SHM is considered to be an important instrument in the field of self-healing materials by all stakeholders. By setting up a national initiative focusing on self-healing materials, consistency and (public-private) networks are created in this research domain. All people involved in the evaluation are satisfied about the collaboration and knowledge transfer within the programme. By means of the IOP,

material research has been given the chance to further develop itself. Based on a strong foundation (of material research) and a concentrated allocation of resources, the Netherlands can play a significant role in the field of self-healing materials at the international level.

Conclusions about the positioning of the IOP SHM

The IOP SHM programme cannot be considered as a standalone initiative, but is related to the innovation programmes M2i (Materials Innovation Institute) and the Polymer Innovation Programme (PIP). To a lesser extent it is linked to the other innovation programmes, FOM and STW. However, there is no overlap between the IOP SHM programme and these other programmes: the IOP SHM programme is rather complementary to these programmes since they are based on different strategic choices or varying types of research.

The IOP SHM programme is also complementary when looking at it from a financing point of view. It is often the only source of financing for researchers in the field of self-healing materials. Without financing from this programme, the main part of the research performed would not have taken place. The programme is therefore of great importance for the researchers involved.

Possibilities for cooperation with other initiatives were also considered in this evaluation. All stakeholders involved recognise the importance of coordination. The IOP SHM programme managers have spoken to representatives of the most important initiatives. Further cooperation with the programmes M2i and PIP is being discussed. So far, there has not been contact with the Societal Innovation programmes (MIPs). During the second four-year period these coordination initiatives should lead to actual cooperative activities.

Recommendations

The main overall conclusion is that the IOP SHM programme currently functions as may be expected. However, recommendations can be made related to specific programme activities.

Recommendations regarding the organisation of the tender

1. The tender information should not only be clear about selection criteria, but also about the intended division over material classes and types of research.
2. In case the advisory committee decides to use an intended division over three types of research, it should be clearly communicated how these types of research are defined. The programme office should monitor whether the intended division is indeed realised.
3. In a second four-year period, project applicants should have freedom to choose between post-doc researchers and PhD students.
4. If it is decided to add a fifth category 'functional materials' to the existing four material classification system, it should be clearly defined what is meant by 'functional materials' and why this should be added to the programme.

Recommendations regarding the creation of networks

5. Continuation of the Advanced Network should be reconsidered depending on its effectiveness.

6. In the second four-year period regular meetings for researchers can be organized to increase knowledge transfer.

Recommendations regarding embedment

7. Industry should be more systematically involved at the project level, for example by making financial commitments obligatory.
8. Self-Healing Materials should be part of academic teaching programmes to make future researchers aware of this new research domain and its opportunities.
9. The teaching module for secondary schools should be widely implemented. For further embedment in education, cooperation with the Platform Bèta Techniek should be considered.

Recommendations regarding positioning of the programme

10. Cooperation with PIP and M2i should be intensified. Especially the valorisation activities of these programmes could be ground for cooperation with the IOP SHM programme.
11. Further agreements could be made with other organisations like STW, about complementary research and/or cooperation in the field of self-healing materials.
12. The scenario committees are a valuable instrument in involving industry and looking for future applications of self-healing materials. Organising these committees is recommended for the second four-year period as well.

Recommendations regarding monitoring

13. Project monitoring should be further structured by means of a clear and short template. This template should include a description of how companies are involved in the project.
14. Future monitoring of the IOP SHM programme should be based on relevant indicators that can be derived from a Logical Framework Analysis. Targets should be set for these indicators.
15. It is recommended to systematically evaluate meetings and other activities of the programme.

Technopolis BV
Herengracht 141
1015 BH Amsterdam
The Netherlands
T +31 20 535 2244
F +31 20 428 9656
E info.nl@technopolis-group.com
www.technopolis-group.com