

Marine IT

Unlocking Marine Knowledge

Open Stakeholder Workshop

*Exploring the Challenges and Solutions to
Effective Knowledge Capture and Transfer*

23rd May 2012 - Brussels

A Satellite Event of Green Week 2012

Marine TT at a glance

Title	European Marine Research Knowledge Transfer and Uptake of Results
Programme	FP7, Cooperation, Environment (including Climate Change)
Instrument	Coordination and Support Action (Supporting)
Total budget	€871,336
EC contribution	€782,000
Duration	February 2010 – July 2012
Coordinator	AquaTT Limited, Ireland - www.aquatt.ie
Partner	EurOcean, Portugal - www.eurocean.org
Web	www.marinett.eu
Knowledge Gate	www.kg.eurocean.org

Project objectives

MarineTT will step up to the challenge to unlock the knowledge potential of previously funded research activities using an innovative approach:

- Gain a more comprehensive overview of the knowledge generated by reviewing knowledge outputs and identifying which could be potentially exploited.
- Devise and trial an innovative evaluation mechanism to identify the knowledge outputs with the most potential for exploitation.
- Connect and transfer knowledge to key stakeholders.

MARINETT WORKSHOP REPORT From Marine RTD to Measurable Value Creation

An Open Stakeholder Workshop to Explore the Challenges and Solutions to Effective Knowledge Capture and Transfer

– 23rd May 2012 –

- The Royal Flemish Academy of Science and the Arts, Brussels, Belgium.
A Satellite event to the European Commission **Green Week**

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MARINETT WORKSHOP REPORT

From Marine RTD to Measurable Value Creation

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Context for Workshop

"We need to get more innovation out of our research. Cooperation between the worlds of science and the world of business must be enhanced, obstacles removed and incentives put in place." Europe 2020 Flagship Initiative Innovation Union COM (2010) 546 final

The European Commission have provided a significant investment in marine research and development in the last 12 years across FP6 and FP7. Latest figures estimate that more than €1.98 billion have been provided to almost 985 projects (€863M for 471 FP6 projects and €1,123M for 514 FP7 projects; Source: EurOcean). If correctly exploited, the research outcomes could drive Europe's Knowledge Economy and secure an international reputation for Excellence in Marine Research. The EC is demanding improved systems and methodologies for knowledge capture and transfer both within FP7 and the upcoming successor programme – HORIZON 2020.

MarineTT is an FP7 Support Action that has been piloting new methodologies and tools for capturing, analysing and transferring knowledge from past and in-progress EC projects. The overall aim is to develop improved systems that can measurably demonstrate value creation from research investments.

MarineTT believes that there are potentially multiple and interlinked barriers to innovation from research knowledge. While effective knowledge transfer is a significant challenge, we suggest that there are also problems in the **research system** (from conception of research calls to measurement of impact and at every step in between).

To get significant innovation from research a review of each step of the research lifecycle is needed to identify where the critical barriers exist and then identify potential ways to overcome such barriers.

Within this context it was decided to organise the MarineTT workshop "From Marine RTD to Measurable Value Creation – an Open Stakeholder workshop to Explore the Challenges and solution to effective Knowledge Capture and Transfer", which will be followed up with a 2nd workshop in July 2012 focusing on "How to get more Innovation from Research". This report outlines the methodology and results of the first event.

1. Workshop structure

Workshop Overview

The MarineTT workshop – “To explore the Challenges and Solutions to Effective Knowledge Capture and Transfer” - was based on the observations and insights to knowledge transfer from European funded Marine research and its influence on innovation, as experienced by MarineTT through the execution of the project.

The results of this workshop will be incorporated into a MarineTT “Best Practice Guidelines for Knowledge Transfer” which will be developed following a 2nd MarineTT Workshop that will build on the initial Marine community effort by broadening the scope to include other sectors.

Outcomes from both MarineTT workshops will identify the barriers to effective Knowledge Management and identify potential solutions. This will be communicated to decision makers to help inform future research design to ensure impact from research.

Workshop Objectives

In order to ensure that barriers to knowledge capture and transfer identified by MarineTT accurately represent the issues faced by stakeholders, MarineTT organised a workshop seeking stakeholder input. A total of 26 participants from different marine stakeholder groups (Research, Policy, Industry and Knowledge Management) attended the event (Appendix 1).

The objectives of the workshop were to:

- Map the barriers to knowledge capture, transfer and uptake of research for innovation that exist in the current research environment
- Identify the interdependencies between barriers
- Prioritise the critical challenges to uptake of research results and subsequent innovation
- Develop a collective plan of potential options that could be implemented across the system to resolve the critical barriers.

2. Workshop Methodology

Participants were asked to identify barriers to knowledge transfer along the entire length of the research lifecycle. MarineTT identified the following stages in the research life cycle:

1. Research Prioritisation
2. Design of Funding Calls
3. The Application Process
4. Proposal Evaluation
5. Proposal Negotiation
6. Research Implementation
7. Knowledge Capture
8. Knowledge transfer
9. Impact Measurement

Participants were invited to complete a survey prior to the workshop. The survey required respondents to:

- Put forward what they perceive the barriers to knowledge transfer to be along the full research life cycle
- Select and rank the most critical barriers
- Clarify the meaning and significance of the top ranking barriers they identified

Interactive Management (IM) methodology was used in the workshop to generate an understanding of the issues of knowledge transfer. The IM process is designed to facilitate informed choice making, with all stakeholders invited to contribute and work toward a collective understanding of a shared problem and to develop options for resolving the problem. The goal of Interactive Management is to help participants to:

- Develop an understanding of the issues they face
- Establish a collective basis for thinking and working cooperatively
- Produce a framework for effective action

The following trigger question was used to help participants generate, clarify and discuss possible barriers:

“What are the main barriers to effective knowledge transfer and uptake of research results?”

During the workshop participants worked together towards:

- Developing a structural map to illustrate the barrier relationships, which in turn would identify the critical barriers that drive other barriers in the system
- Generating options for resolutions of these critical driver barriers
- Clarifying the meaning of these options
- Prioritising options based on their potential impact and feasibility

Survey results

A total of 67 barriers to knowledge transfer and uptake for innovation were identified by the group (Appendix 2). These barriers were categorised based on similarity and a total of 27 categories were devised. Based on the rank ordering of barriers provided by participants, the top 12 ranked barriers to knowledge transfer and innovation from research were identified (see Table 1). The barriers were clarified and explained by MarineTT, and the list of barriers was reviewed and agreed by participants in advance of structuring relationship between barriers.

www.marinett.eu

Table 1. Top ranked barriers to knowledge transfer and innovation from research

No.	Barrier
1	Lack of understanding on how to carry out knowledge transfer
2	Lack of investment in knowledge transfer and uptake
3	Lack of incentives for knowledge generators to transfer knowledge
4	Lack of transparency and accessibility to publicly funded research
5	Ineffective knowledge transfer strategies resulting in low impact from research
6	Publicly funded research agendas do not always address the needs of end-users
7	The system of working in closed research consortia and not collaborating/sharing externally can limit innovation
8	Lack of flexibility in the research implementation phase which restricts consortia from adapting or responding to interim results
9	Failure to engage in systematic analysis of research knowledge outputs that are essential to identifying potential end-user(s), applications of the knowledge and understanding of realistic timelines for innovation
10	The gap between the worlds of science and end-user groupings (Industry, Policy and wider Society)
11	End-users do not always have the capacity or motivation to take up results and use them
12	The established scientific research infrastructure and culture is not designed for rapid and responsive innovation

Relationships between barriers

In order to identify the structural links (inter-dependencies and inter-relationships) between the 12 barriers, Integrated Management software was used to organise pairs of barriers. In order to determine the relationship within and between pairs of barriers, the Interactive Management software generated over 40 questions in the form:

“In the context of getting innovation from research does Barrier A severely aggravate Barrier B?”

Participants deliberated on all questions and decided ‘yes’ or ‘no’. Decisions were made by consensus or where a consensus could not be reached it was decided by majority voting. Responses were fed into the software system which filled a matrix of relations that was then translated into a graphical representation of the relationship between barriers in the set (see Figure 1 below). The structural map is a representation of the barriers identified and selected by the group, and the way participants to the workshop consider them to influence one another. The structural map presented is a key output of the workshop.

The barriers and the structural map developed in this workshop relate only to the input given by the participants prior to and during this specific workshop and can in no way be considered a definitive or fully comprehensive map and structure of barriers to innovation.

Reading the structural map

The structural map is read from left to right. Barriers placed on the left of the structure typically have more influence on the set than those on the right side of the structure. As an example “A” significantly aggravates “B” and if “A” is addressed it will be easier to address “B” – it is important to note that addressing or resolving “A” will not necessarily resolve or address “B”. “B” can stand on its own, or be aggravated by other factors which were not shown in the result of the group’s thinking. Barriers that appear together in one box in Figure 1 are reciprocally inter-related. In other words, the group working to generate the structural model agreed that “A significantly aggravates B” and “B significantly aggravates A”.

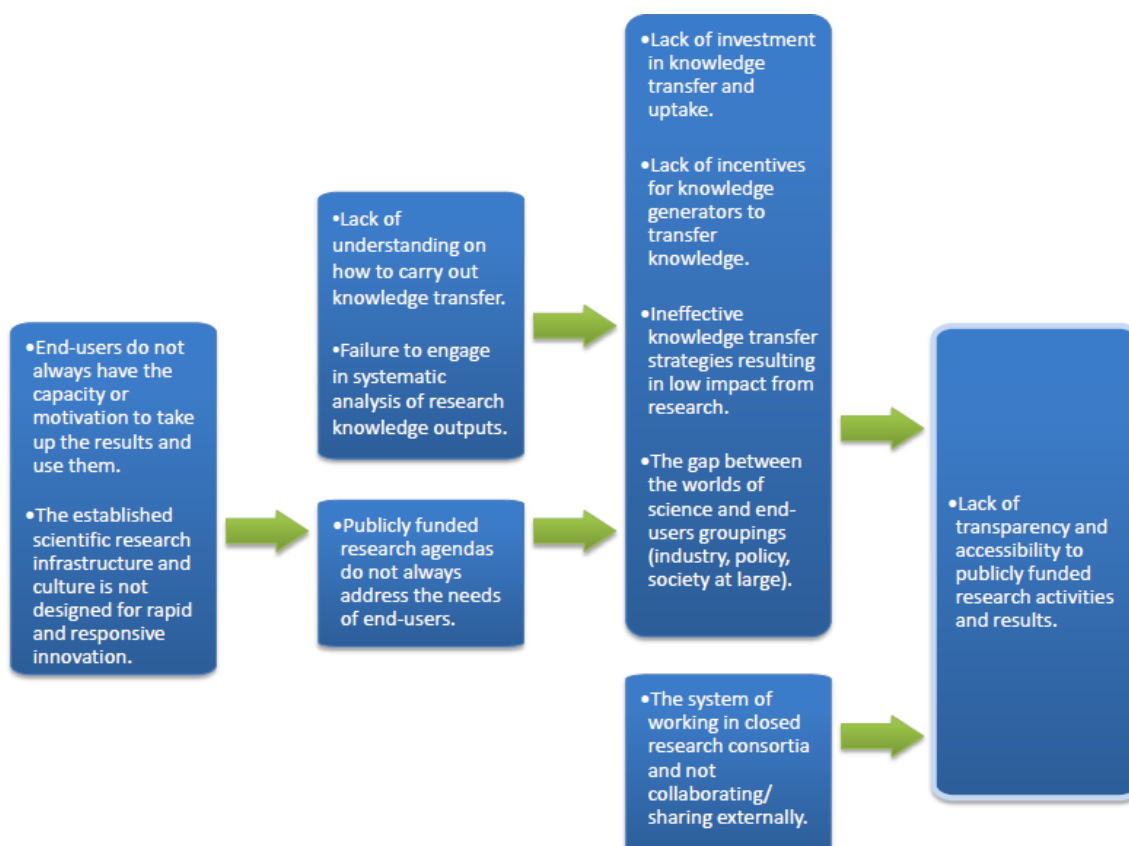


Figure 1: Structural map of critical barriers to knowledge transfer and innovation

The main value of the structural map is that it indicates the “keystone” barriers to knowledge transfer and uptake which, if addressed, would alleviate other barriers in the set. In this context, the critical barriers that were considered to most influence other barriers in the system were:

- The established Scientific Research Infrastructure and Culture is not designed for rapid and responsive innovation
- End-users do not always have the capacity or motivation to take up results and use them
- Lack of understanding on how to carry out knowledge transfer
- Publicly funded research agendas do not always address the needs of end-users

3. Generating Options

Participants were broken into three working groups and asked to generate a list of options to address barriers identified. Each group was given one common critical barrier to develop options for;

- ***The established Scientific Research Infrastructure and Culture is not designed for rapid and responsive innovation***

Each group also identified options for one other of the following barriers;

- ***Lack of understanding on how to carry out knowledge transfer***
- ***Publicly funded research agendas do not always address the needs of end-users***
- ***End-users do not always have the capacity or motivation to take up results and use them***

Clarification and prioritisation of the options

The author of each option was asked to clarify his/her thinking on selection of the option and participants were invited to seek clarification about each option. After clarification, participants were asked to vote on the various options and indicate those five options which they considered to be most significant or most important in relation to removing the barriers to knowledge transfer and improving innovation from research.

An initial set of 54 options for resolution of the four critical barriers are listed below – votes for each option are given in brackets.

The established Scientific Research Infrastructure and Culture is not designed for rapid and responsive innovation

Working Group 1

- ✓ Incentives for academics to valorise results - not only publish (5)
- ✓ Define value creation from research and reward institutions who achieve it (5)
- ✓ Identify the most critical aspects of culture and infrastructure and the extent to which they are open to change (4)
- ✓ Share results early in the research process to speed up Innovation (3)
- ✓ Co-operate with Industry or end-users throughout projects (3)
- ✓ Make a business development plan an integral part of the research proposal (2)
- ✓ Make recommendations even in the context of doubt and uncertainty (2)
- ✓ Require more outputs from doctoral research (little and often) (2)
- ✓ Research should be designed for solutions not publications (act like engineers) (1)
- ✓ Identify best practice from other industries i.e. Business schools that can be used within traditional academia (1)
- ✓ Include/emphasis entrepreneurship in higher education (1)
- ✓ Fund capacity building to provide institutional strategy (KT offices) and KT skills (amplifiers)(1)

Working Group 2

- ✓ More emphasis on M.Sc. rather than Ph. D. level researchers to facilitate transfer to industry (6)
- ✓ Train young researchers on: IPR issues, -Economic impact of their research, -Impact to the Industry (improve capacity to communicate with Industry) (6)
- ✓ Foster the change of academia/science paradigm from "science work" to "science results" (4)
- ✓ Foster start up creation through the development of entrepreneurship mentoring programmes together with Industry and other stakeholders (3)
- ✓ Mapping skills to enhance collaboration that will result in rapid response (3)
- ✓ Develop and implement best practice for knowledge transfer for funded projects (2)
- ✓ Assistance from the Commission in identifying the end users (Policy) in relevant DGs (e.g. Env, Mare, etc.) (2)
- ✓ Library of successful knowledge transfer actions (MarineTT?) to improve proposed KT initiatives in new proposals (2)
- ✓ Shortened times for project development and duration of projects, where relevant (2)

Working Group 3

- ✓ Provide money for bottom up initiatives: e.g. fishermen apply for funding and may or may not involve research institutions- in this way it is in the interest of researchers to pro-actively be involved in this process (5)
- ✓ If statement 12 is true(see barriers listed in Table. 1): Establish forums between research communities, funding providers and end users to determine what applied research is needed, examine feasibility of proposals, assign partners, allocate funding, work out IP issues (2)
- ✓ Discussion forums to share practical results (2)
- ✓ Re-create (to shorten) research call and project lifecycle (1)
- ✓ Long term vs. short term agenda (1)
- ✓ Innovation conferences (0)
- ✓ Stimulate positive perceptions of research and innovation- shout louder about case studies (0)
- ✓ Make results of past projects publicly available (0)
- ✓ Multidisciplinary teams involved in research (0)

Lack of understanding on how to carry out knowledge transfer

- ✓ Make training in knowledge transfer mandatory for post graduate degrees and members of a project consortia (5)
- ✓ Workshop at beginning of project with identified end-users to examine the best practice knowledge transfer options- targeted and specific knowledge transfer (5)
- ✓ Participatory approach - identification of end-users from the project start (4)
- ✓ Define knowledge transfer- develop a common definition throughout the EU (2)
- ✓ Compulsory industry endorsement of research proposal (2)
- ✓ Allow some money in projects to be used for eventualised/adaptations to the original plan (based on the needs of end-users) (0)
- ✓ Involve science communicators in the beginning of every project (0)
- ✓ Best practice guidelines and workshops (0)

Publicly funded research agendas do not always address the needs of end-users

- ✓ Participation of: -Industry (Associations/Technology Platforms) - all end-users, in the design of the research agenda and in the evaluation of the proposals for their industrial relevance and impact (5)
- ✓ Ongoing public consultation: -forum for end-users to identify their needs, - rewards/review by funders, -Science shop (5)
- ✓ Systematic identification of end-user and their needs to design the research agenda - end-users are consulted (5)
- ✓ Publicly funded data should be made freely available from accessible locations - portals, data centres etc. to enable end-users not targeted by original research agendas to develop "niche" innovative products (4)

- ✓ Encourage knowledge mediators and research impact organisations as catalysts in technology transfer (4)
- ✓ Sensitise policy makers to the relevance of listening to the end-users, engaging them in a participatory process (3)
- ✓ Mapping skills and competences of European research community (2)
- ✓ Research lifecycle needs to be shortened –including the project development process and the length of project to respond quickly to developments. If relevant to respond quickly (2)
- ✓ Increased transparency in the evaluation process. A possibility to appeal if a direct stakeholder need is established/proven/supported (0)
- ✓ Increase responsiveness/flexibility of research programs (0)

End-users do not always have the capacity or motivation to take up results and use them

- ✓ Illustrate or translate results by success stories (6)
- ✓ Build relationship to facilitate trust (5)
- ✓ Better appeal to end-user motivations (5)
- ✓ Make format and language user friendly (4)
- ✓ Work with end-users throughout the process (4)
- ✓ Involve opinion makers to spread a buzz (TV personalities) (3)
- ✓ Make information open access (scientific papers) (2)

4. Conclusions

Workshop participants identified a number of barriers to knowledge transfer along the entire length of the research life cycle and options to remove these barriers and thus increase the likelihood of innovation from research. Barriers identified and options proposed can be broadly categorised as Institutional Barriers and options, Structural Barriers and options, Strategic Barriers and options and Communication Barriers and options.

Institutional Barriers – deal with the barriers stemming from the current management structure of research institutions. Changes to the current research incentive system and the need to develop new metrics to record impact from research would help increase the likelihood of effective knowledge transfer and impact from research. Good knowledge transfer must be recognised and should be rewarded. It is clear that the current metrics of evaluating research (H index etc.) satisfy only the individual researchers and their host organisation. A change in the current researchers incentive system is required if effective knowledge transfer is to be valued.

Structural Barriers – refer to barriers that participants considered to be inherent in the research funding framework. The current design of funding calls, the duration of projects, the need to involve end users and to focus on the needs of end-users were highlighted as barriers to knowledge transfer and innovation from research. It is clear that the initial stages of research prioritisation and project design need to involve more active engagement and consultation with stakeholders, if research is to innovate and meet the demands of end-users. The rigidity of project design was also cited as a barrier to innovation. Research projects need to be flexible to respond to changes in the research focus based on interim findings. The composition of research consortia should also be flexible where new partners can be involved at any stage of the project as required. There is a need to constantly review the end user groups to ensure that research is focused on their requirements.

Strategic Barriers – relate to the need to develop a standard knowledge transfer framework. Currently there is no roadmap of knowledge transfer for European funded research and as such the methods of knowledge transfer vary widely from project to project. One of the critical issues is the need for standard and universally accepted definitions of knowledge transfer and dissemination. Mandatory training for project members and clear identification of end users in the early stages of a project so that tailor made transfer would also be essential elements of any standard knowledge transfer framework. Increasing the accessibility of the knowledge through appropriate mediums and language should also be included as good practice on knowledge transfer.

Communication Barriers – General discussion at the workshop focused on the need to identify, engage and communicate with end-users early on in the research projects. The lack of channels or opportunities to engage with end-users was cited as a barrier to knowledge transfer. It was generally considered that innovation would be enhanced if there was an open dialogue between researchers and end-users throughout the lifetime of the project. Building trust and understanding between researchers and end-users is central to effective knowledge transfer. Other communication barriers include the lack of access to research results. Increasing the accessibility of the knowledge through appropriate mediums and language should also be included as good practice on knowledge transfer.

5. Next Steps

Although the 12 critical barriers to knowledge transfer and uptake of results for innovation have been identified and 54 options for resolution proposed, it is necessary to clarify the options and strategies for implementation. Issues such as the ease of feasibility and cost of implementation of these solutions need to be developed. Identification of the responsible persons for implementation needs to be undertaken. Only once these issues are evaluated can the options for resolution of the barriers be critically compared and prioritised.

The next MarineTT workshop **“How do we get more Innovation from Research? Bringing together and learning from Pioneering initiatives and novel approaches”** will further develop the ideas generated in this workshop and invite contribution from other projects in other sectors to fully explore barriers and solutions to improving the innovation from research investment. Outcomes from the workshop will be communicated to decision makers to help inform future research design to ensure impact from research.

Appendix 1: List of Participants

Surname	Name	Association	Country
Rodriguez Alfaro	Sebastian	DG MARE	Belgium
Bos	Oscar	IMARES	Netherlands
Caetano	Ana-Teresa	DG Research and Innovation	Belgium
Carvalho	Telmo	EurOcean	Portugal
Christofilogiannis	Panos	AQUARK	Greece
Costa	Cristina	EurOcean	Portugal
De Moor	Willem	JPI Oceans - Flanders Marine Institute	Belgium
Dhont	Jean	University of Ghent	Belgium
Garriga	Maica	EurOcean	Portugal
Grehan	Anthony	National University of Ireland, Galway	Ireland
Hill	Louize	Independent	Belgium
Hogan	Mike	National University of Ireland, Galway	Ireland
Joyce	John	Independent	Ireland
Lewis	Tony	University College, Cork	Ireland
Marmelstein	Gill	AquaTT	Ireland
Martin	Heather	British Antarctic Survey	UK
Milukas	Arnoldas	DG Research and Innovation	Belgium
Murphy	David	AquaTT	Ireland
Newman	Stephanie	Institute for European Environmental Policy	UK
Ni Cheallachain	Cliona	AquaTT	Ireland
Robins	Dawn	University of Chichester	UK
Santurtun	Marina	AZTI Tecnalia-Investigacion	Spain
Strietman	Wouter Jan	LEI, University of Wageningen	The Netherlands
Vielmini	Ilaria	AquaTT	Ireland
Vis	Cornelis	Bureau of European Policy Advisors	Belgium
Wawrzynski	Wojciech	ICES	Denmark

Appendix 2: Complete list of Barriers to Knowledge transfer and Innovation from research as submitted by workshop participants via an online pre-event survey.

Note: Survey responses have not been modified but language has been edited for clarity

Difficulties in communicating the results of research to industry

1. The scale of indicators for the evaluation of research performance is out of date (i.e. publications cannot be the most valuable currency in an innovation-oriented research system)
2. Lack of incentive for academic scientists to participate in Knowledge Exchange
3. Lack of incentive to scientists to transfer knowledge. At the same time it is not esteemed in the community if you have good communication skills
4. Closed research consortia and not collaborating/sharing externally can limit innovation
5. Complexity of the industry making KT difficult
6. Lack of knowledge transfer framework
7. No clear system available for knowledge transfer
8. Scientists don't understand the applicability of their research
9. Scientists don't evaluate the results they have
10. Lack of EC guidelines in addressing end-users
11. Design of research calls do not meet stakeholders needs
12. No real understanding of the application of scientific results
13. Lack of knowledge on where to find information
14. Scientific Research Infrastructure and Culture is not designed for rapid and responsive innovation
15. Ineffective knowledge transfer strategies result in low impact from research
16. Challenges in communicating the practical benefits of research results
17. Improper means of communication
18. No clear demand for the knowledge outside scientific world
19. Transfer not effective in reaching end users
20. Lack of understanding of the needs
21. No real understanding on the primary user of these results
22. Transfer not effective in reaching end users
23. Lack of publically accessible centralised searchable database listing projects
24. Knowledge has a very limited geographical interface
25. A triple helix architecture is necessary to support RD&I
26. Innovation target recipients not receptive
27. Lack of interest in business sector in longer term environmental change
28. Lack of interest from scientists in communicating their results
29. Lack of acceptance of responsibility to transfer results
30. Possible lack of industry focus in the creation of research projects
31. Innovation target recipients not clearly identified
32. Researchers not aware of end-users/market
33. Stakeholders not aware of projects
34. Valley of Death
35. Lack of interest in long-term change by policy-makers
36. Industry, research, technology providers are very separate worlds
37. Cost of transfer of knowledge
38. Scientific publications main route of dissemination
39. Scientific/technical reports not user friendly
40. Time lag to publish
41. No understanding of market
42. No understanding of how to create an impact in the market
43. No user friendly place to learn more about current or past results
44. Not easy to access all results in related projects
45. Need to translate results
46. Lack of incentives to allocate a sufficient amount of funding to target users
47. Underestimation of the cost of transfer of knowledge: technical prototype is 1/3 of the cost, commercial prototype 2/3 of the cost
48. Part of project budget should be ring-fenced for knowledge transfer activities

Appendix 2: Complete list of Barriers to Knowledge transfer and Innovation from research as submitted by workshop participants via an online pre-event survey.

Note: Survey responses have not been modified but language has been edited for clarity

Difficulties in communicating the results of research to industry

49. Funding calls not based on needs
50. Funding calls not reflective of future needs
51. Top down approach - not very representative of Industry needs
52. Transfer of knowledge is not enough – need for science and industry interaction to ensure research is relevant to industry. Science should focus on industry needs ideally
53. Lack of involvement of stakeholders in the innovation process
54. Project Description of Work (DOW) should be dynamic and adaptable to changing policy and innovation environment
55. No communication between scientific community, Industry and policy makers
56. Lack of communication/teamwork between co-ordinator and partners
57. Lack of support for industry to uptake results i.e. investment
58. No comprehensive listings of end-users
59. Difficulty of the industry stalling funding
60. Many projects are designed so that companies have to innovate with your most fierce competitors
61. Scientists are pulled into too many directions: research, education, administration, publications
62. Industry operates at a different velocity (i.e. faster) than scientific research
63. Scientific education seldom instructs towards innovation
64. We need to re-organise our productive systems and support that transformation
65. Not enough focus on dissemination/transfer in design of proposals
66. Intellectual property as a defence for not disseminating