



Acronym: COLUMBUS

Title: Monitoring, Managing and Transferring Marine and Maritime
Knowledge for Sustainable Blue Growth
Grant agreement n° 652690

Deliverable 8.2

Report on existing knowledge transfer initiatives including their positive and negative attributes from an end user point of view *08-2016*

Lead parties for Deliverable: NERC-NOC

Due date of deliverable: M12

Actual submission date: M18

Revision: V.1

Project co-funded by the European Commission within the H2020 Programme (2004-2020)	
Dissemination Level	
PU Public	X
PP Restricted to other programme participants (including the Commission Services)	
RE Restricted to a group specified by the consortium (including the Commission Services)	
CO Confidential, only for members of the consortium (including the Commission Services)	

All rights reserved

This document may not be copied, reproduced or modified in whole or in part for any purpose without the written permission from the COLUMBUS Consortium. In addition to such written permission to copy, reproduce or modify this document in whole or part, an acknowledgement of the authors of the document and all applicable portions of the copyright must be clearly referenced.

Acknowledgement

The work described in this report has been funded by the European Commission under the Horizon 2020 Framework Programme.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 652690. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

Contents

1	INTRODUCTION	4
1.1	Background	4
1.2	Aims and Objectives	4
1.3	Structure of Report.....	4
1.4	COLUMBUS Definitions of Terms	5
2	METHODOLOGY	6
3	RESULTS AND DISCUSSION	7
3.1	Survey Demographics	7
3.2	Discussion from Survey Results Analysis on KT	10
3.3	Discussion from Stakeholder Workshop and Selected Interviews	17
4	CONCLUSION & RECOMMENDATIONS.....	19
5	CASE STUDIES OF SUCCESSFUL KT WITHIN TASK 8.2 PARTNERS.....	21
5.1	CEFAS, UK	21
5.2	CETMAR, Spain	24
5.3	NOC, UK.....	26
6	ANNEXES	29
	Annex A. – ACRONYMS.....	29
	Annex B. – Agenda for Stakeholder Workshop during EGU2016 on Knowledge Transfer and Research Impact	29
	Annex C. –Demographics of Respondents to KT Survey.....	30
	Annex D. – Transcript of Knowledge Transfer online survey	30



EXECUTIVE SUMMARY

The COLUMBUS project is a Horizon 2020 funded Coordination and Support Action, capitalising on the European Commission's significant investment in marine and maritime research. Adopting proven methodologies and building on significant past work the COLUMBUS project's main aim is to ensure accessibility and uptake of research, or "Knowledge Outputs", from European marine and maritime research projects by four targeted end user groups: science, policy, industry and wider community.

The activities resulting in this report are part of Task 8.2 within Work Package 8 of the COLUMBUS project. Such activities included consulting with research knowledge user groups from the marine and maritime sectors to ascertain their perceptions, needs and preferences for effective knowledge transfer mechanisms and initiatives. Findings in this report are based on a compilation of answers, provided by a variety of end users across the EU, which were collected through an online survey, a stakeholder workshop and one-to-one interviews with selected key individuals within the marine and maritime sector. The online questionnaire was developed to capture a larger and more diverse sample of research knowledge stakeholders across Europe. Hosting the workshop and one-to-one interviews provided several advantages over the online survey including allowing for fluid conversation, the ability to clarify questions, and capture verbal and non-verbal cues. Furthermore, stakeholders provided more in depth responses during the workshop and interviews, having a willingness to engage in open discussion and explain in more detail their experiences and views. Findings from these methods have helped shape the perception aspect of this report.

Across all three information collection methods, there were recurring messages conveyed by participants regarding the barriers and challenges they face within their experience of implementing and/or conducting knowledge transfer activities. The most common challenges listed were the lack of funding, support and resources for training, identifying and engaging in knowledge transfer activities which are not linked directly to a project. Moreover, participants stated that there isn't enough funding or long term support to collect, process/prepare knowledge and measure absorption and impact of knowledge transferred in order to translate scientific results into industry or societal needs. Other highly frequent barriers mentioned were insufficient stakeholder engagement, which therefore adds to the gap in linkages and/or alignment between scientific research strategy and knowledge/technology outputs to meet end user needs. Participants stated that there is a need for more awareness of knowledge transfer initiatives and opportunities, and for further guidance and support for such activities on a regional, national and transnational level.



1 INTRODUCTION

1.1 Background

Humanity is standing at the dawn of a century that will be largely affected by how the ocean and its resources will be managed. Marine and maritime research has a critical role to play in the understanding of the seas and the advancement of technology so that sustainable economic potential can be developed. COLUMBUS ensures measurable value creation from research investments contributing to the long term European Strategy for Blue Growth to support long term economic growth in the marine and maritime sectors as a whole.

The Legacy Work Package (WP8) within the COLUMBUS project is tasked to examine the barriers to efficient Knowledge Transfer (KT) and to develop standardised KT methodologies. To achieve measurable benefits, COLUMBUS believes the research system needs to be examined to identify potential improvements and efficiencies to allow it to respond to the demand set by policy makers. As important, researchers and funding agencies alike, need the tools and resources to effectively improve their ability to carry out responsible research and innovation (RRI).

1.2 Aims and Objectives

The overarching objective of Task 8.2 within WP8 is to gain an understanding of the interpretations of different knowledge user groups in order to identify characteristics and components of effective Knowledge Transfer mechanisms and initiatives.

The main aim of this report is to highlight the key findings gathered during engagement with knowledge user groups across academia, industry, policy and NGO/non-profit sectors regarding their perception and experience of Knowledge Transfer. Furthermore, to communicate the KT mechanisms and initiatives that end users found most effective, barriers and challenges they have encountered and their needs in order to improve their ability to carry out effective KT.

1.3 Structure of Report

The following sections will provide results, insights and discussions gathered during the activities within Task 8.2. Section 1, *Introduction*, includes the principal aims of this report, as well as definitions of key terms within COLUMBUS that will be used throughout. Section 2, *Methodology*, will provide the set of procedures of consultation activities used to collect information for analysis. Section 3, *Results and Discussion*, will provide the principle results, supporting graphs and main discussion that derived from analysis of all three information collection mechanisms. This section is separated into three subtopics: *3.1* will showcase demographics of the respondents who participated in the survey; *3.2* includes some of the statistical results and more in depth analytical discussion of the 'Knowledge Transfer Experience' sections from the questionnaire, while *3.3* will summarise the



conversations, interactions and perceptions collected during the stakeholder workshop and interviews. Section 4, *Conclusion and Recommendation*, highlights the main conclusions drawn from the combined responses of end user groups. In order to provide examples of successful Knowledge Transfer, Section 5 will showcase *Case Studies* from three of Task 8.2 partners, CEFAS, CETMAR and NOC. Lastly, the *ANNEX* sections provide additional information in support of the main report, for the convenience of the reader.

1.4 COLUMBUS Definitions of Terms

Knowledge Transfer (KT): term used to describe the overall process of moving knowledge from its sources to potential users of knowledge which results in eventual impact. KT consists of a range of activities which aim to capture, organise, assess and transmit knowledge, skills and competence from those who generate them to those who will utilise them, the end user.

Knowledge Output (KO): a unit of knowledge or learning, which has a potential application, generated by or through research activity. They are not limited to de-novo or pioneering discoveries, but may also include:

- New methodologies / processes
- Adaptations / Insights
- Applications of prior know-how / knowledge

End User / Knowledge User: the individual(s) who take up and apply the knowledge output to result in eventual impact.

Knowledge Output Pathway: This can be one step or a series of steps required to carry a knowledge output to its eventual impact. Where there are a series of steps, it will include detailed mapping of the steps, the users involved at each step and their predicted role in the pathway to eventual impact.

COLUMBUS aims to clarify the terms used for **Research Impact** to help establish clear pathways for effective knowledge transfer.

- Within COLUMBUS, **Eventual Impact** is the ultimate end benefit of the application of the knowledge output. It is defined as an enhanced situation that is contributing to “Blue Growth”. This is not to be confused with the impact of an intermediary user taking up knowledge and transferring it down a step in the knowledge output pathway to eventual impact. This is termed “Transfer Impact”.
- Research Councils UK (RCUK) describes **Research Impact** as the demonstrable contribution that excellent research makes to academic advances, society and the economy.¹

¹ <http://www.rcuk.ac.uk/innovation/impact/>



Technology Readiness Level (TRL): The Innovation Seeds website describes TRL as a metric for describing the maturity of a technology. The scale, which was originally created by NASA in the 70s, now consists of 9 levels characterising the progress in the development of a technology, from Level 1 (idea phase) to Level 9 (ready to be deployed in the marketplace)², (www.innovationseeds.eu).

2 METHODOLOGY

In order to identify characteristics and components of effective Knowledge Transfer, the methodology within Task 8.2 incorporated three main ways of engagement with research knowledge end users from across Europe:

- An online survey questionnaire
- A workshop on Knowledge Transfer and Research Impact with scientific audience during EGU2016 conference in Vienna
- Selected one-to-one interviews by phone, in person and during specific stakeholder events

All methods of consultation aimed to gather specific information from the end users:

1. End User Representation:

- sector (industry/academia/policy/NGO)
- level of experience (early career/experienced/senior or executive)
- organisation (size and location)

2. Knowledge Transfer Experience & Perception:

- understanding of KT (terminology, mechanisms and applicability, accessibility, usefulness)
- involvement with KT
- successes, main barriers / challenges
- needs to implement or conduct effective KT

Consultation with end users was carried out between February and July 2016. The timeframe was selected in order to capitalise on the stakeholder engagement opportunities at key events identified during these dates. These key events were:

- AGU Ocean Sciences Meeting 2016 – Feb 21 -26 in New Orleans, USA
- Oceanology International 2016 – March 15 – 17 in London, UK
- European Geosciences Union General Assembly (EGU) 2016 – April 17 – 22 in Vienna, Austria

During the above events targeted one-to-one interviews were conducted, as well as more informal discussions with delegates who were presenting and/or exhibiting. The AGU and EGU were mainly

² http://www.innovationseeds.eu/Virtual_Library/Knowledge/TLR_Scale.kl



focused on end users within the academic, scientific research, and policy sectors; while Oceanology International was specifically a marine and maritime industry event.

Also, during the EGU a workshop was held on Knowledge Transfer and Research Impact, ([see agenda in Annex B](#)), which was open to all delegates and advertised through several networks including the EGU communications. The online survey was launched after the event, in order to reach a larger and more diverse range of stakeholders across all of Europe. The survey was disseminated through the various networks between the Task partners and COLUMBUS project partners.

Within the timeframe, further interviews were conducted with a selected few individuals within academia, industry and policy, who were identified by the Task partners to have expertise in knowledge transfer, to gather some of their valuable input. Lastly, analysis of all input from the survey respondents, workshop and interview discussions was conducted in order to present within this report the perceptions, experiences and further needs of end users for effective KT.

3 RESULTS AND DISCUSSION

The main aim of this part of the report is to highlight the findings from stakeholder engagement activities aforementioned which were conducted during the timeline for Task 8.2.

3.1 Survey Demographics

The COLUMBUS KT Survey was developed as an online questionnaire for the convenience of participants and to ensure that statistical data was collected whilst preserving the anonymity of respondents. The survey was disseminated through several project networks, industry contacts, early career forums, and within the institutions of the COLUMBUS partnership in order to reach a variety of candidates with different areas of expertise and levels of experience from the target sectors, (industry/academia/policy/NGO).

There were 172 participants to the online survey, whose responses and input were analysed and are discussed further in this report. Although the survey reached a variety of end users across Europe, there was a significantly higher response from end users within the academic and scientific research community (73%). The remaining survey respondents were divided across industry (11%), policy (9%) and NGO &/or Citizens (7%) sectors, (Fig. 1).



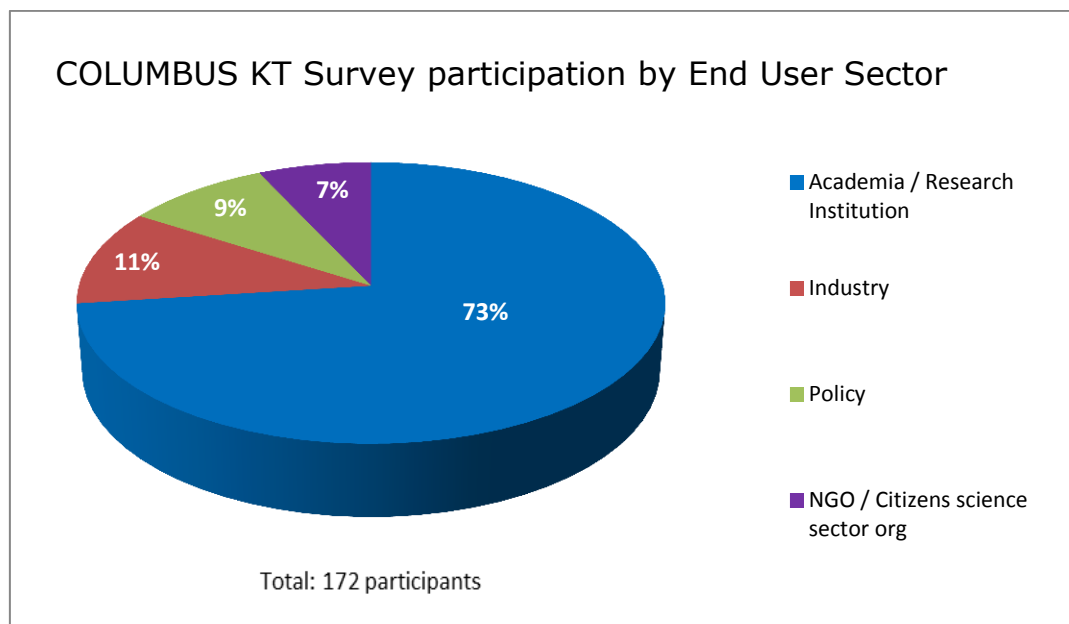


Figure 1. The percentage of participants of the COLUMBUS KT Survey by research knowledge user sector. Out of 172 respondents, nearly a quarter were from the Academia / Research sector.

During dissemination of the survey the aim was to reach candidates from different stages in their careers in small, medium and large organisations/companies. The results illustrate that all levels of experience were reached, but with a higher percentage coming from more senior or executive roles, (Fig. 2). Additionally, half of the survey participants work in large organisations or companies (> 250 employees), while the other half was split between medium sized (50-250 employees) and small sized (< 50 employees) organisations, (Fig. 3).

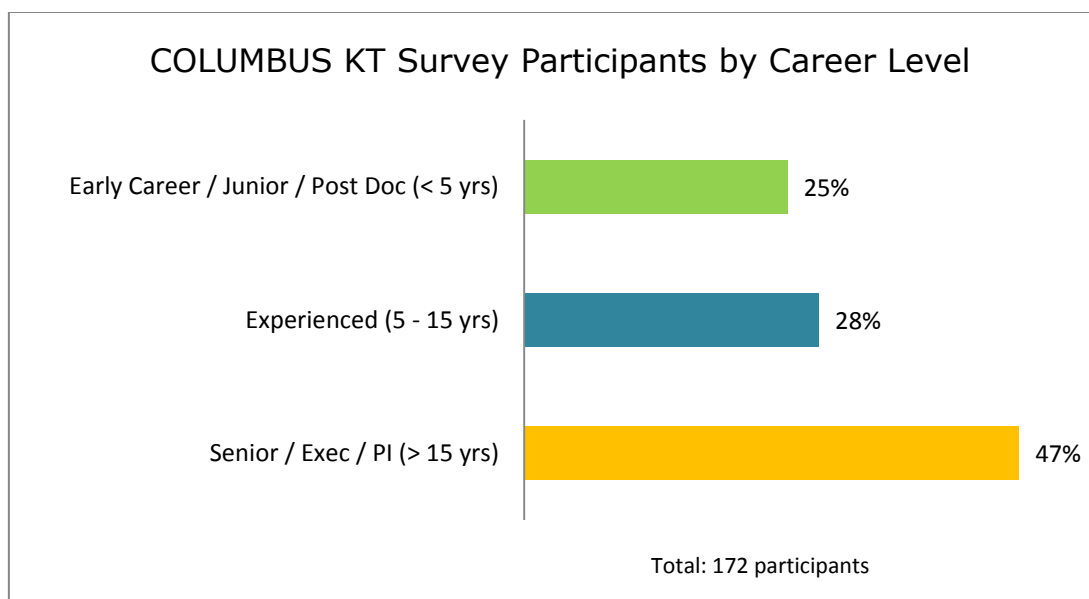


Figure 2. Percentages of participants to the COLUMBUS KT Survey per career level.



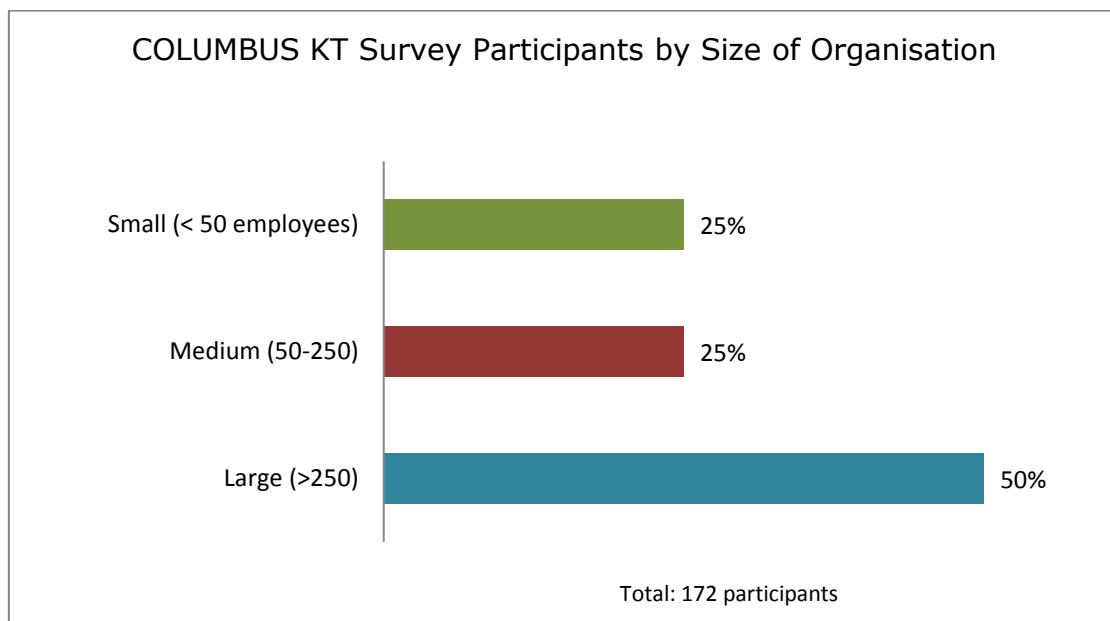


Figure 3. The size of organisation the participants to the COLUMBUS KT Survey work in.

Although the survey was circulated to candidates in organisations all around Europe, the organisations, institutions or companies where respondents work in were mainly located in urban areas (69%). However, there were a few respondents from organisations located in small towns (19%), as well as remote (6%) and rural areas (6%), (Fig. 4). Furthermore, the majority of responses came from participants located within the EU/EEA area, in particular from Spain and the UK, (Fig. 5).

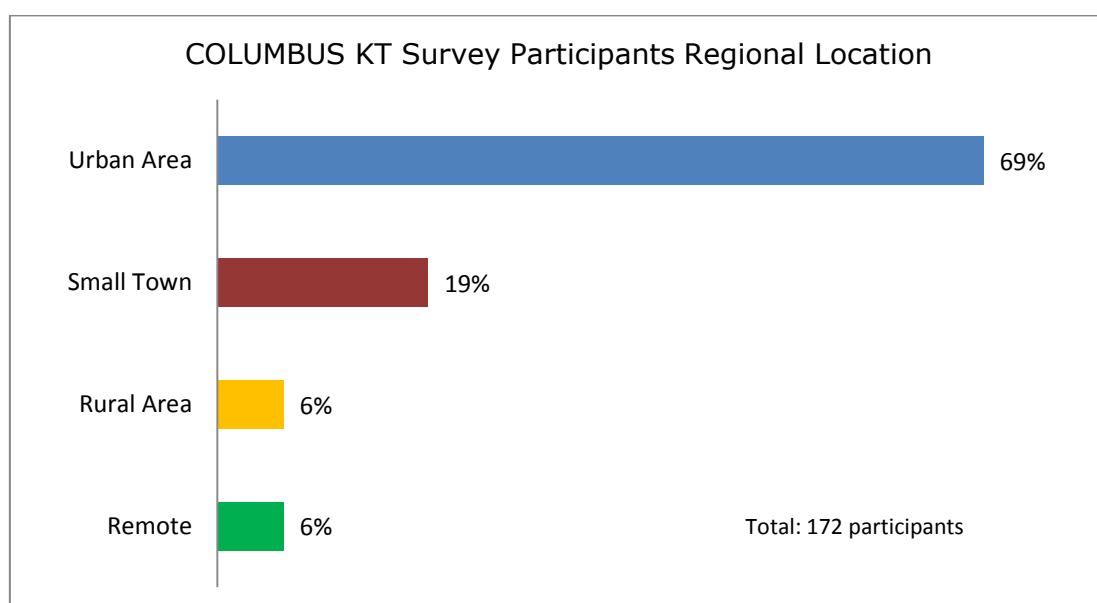


Figure 4. The regional areas in which participants' organisations are located in.



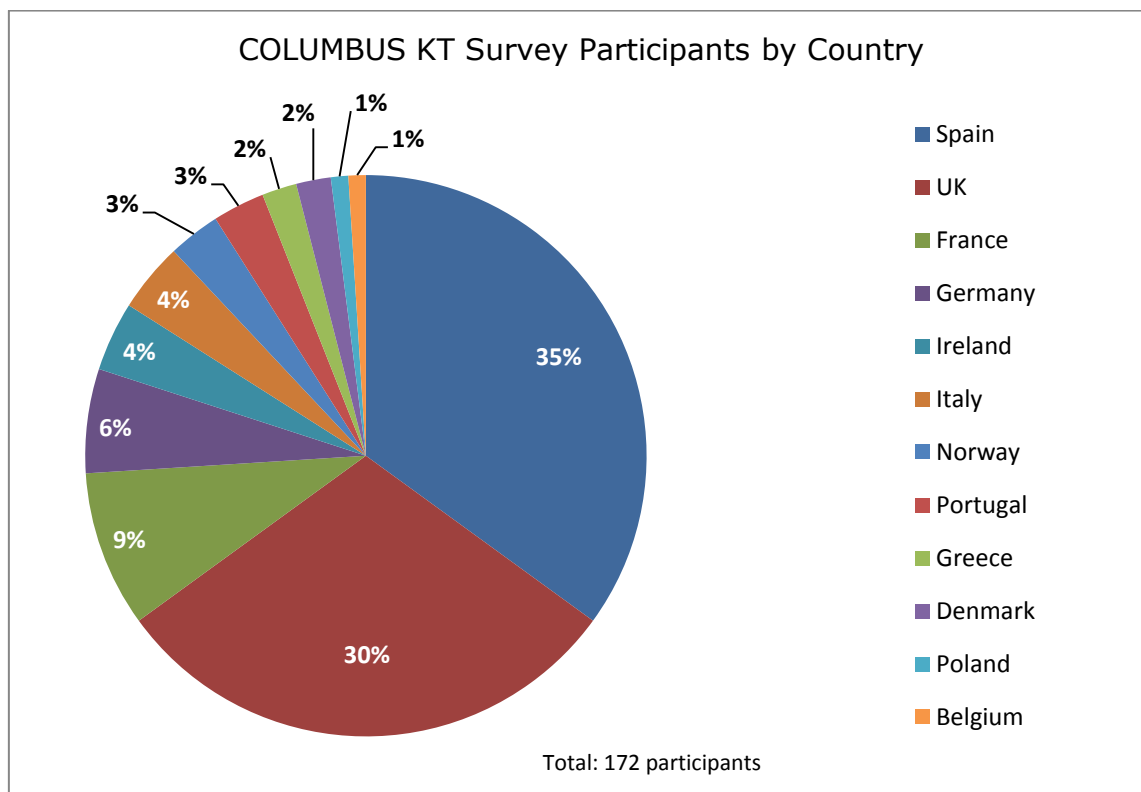


Figure 5. Pie chart illustrating the countries in which survey participants' organisations are located in. The majority of respondents to the survey are based in institutions/organisations/companies from Spain and the United Kingdom.

3.2 Discussion from Survey Results Analysis on KT

From all 3 methods of stakeholder engagement, it was found that 76% of participants have been involved in some way with knowledge transfer initiatives, mainly as a collaborator, organiser, intermediary or educator. When asked to describe their perception of knowledge transfer activities almost all respondents (99%) agreed that KT is making knowledge outputs available and accessible for potential users. Regarding technology transfer the majority (90%) agree that it is an effective KT mechanism, (Fig. 6). However, 10% responded they did not know if technology transfer is a mechanism of KT or its effectiveness to transfer knowledge. This 10% were respondents mainly within the academic sector, across a variety of regions and countries, who perhaps do not have experience in technology fields, or working with the industry sector. Other high yielding responses for descriptions of KT mechanisms were: communicating scientific results and building science-policy interface.



Mechanisms of Knowledge Transfer

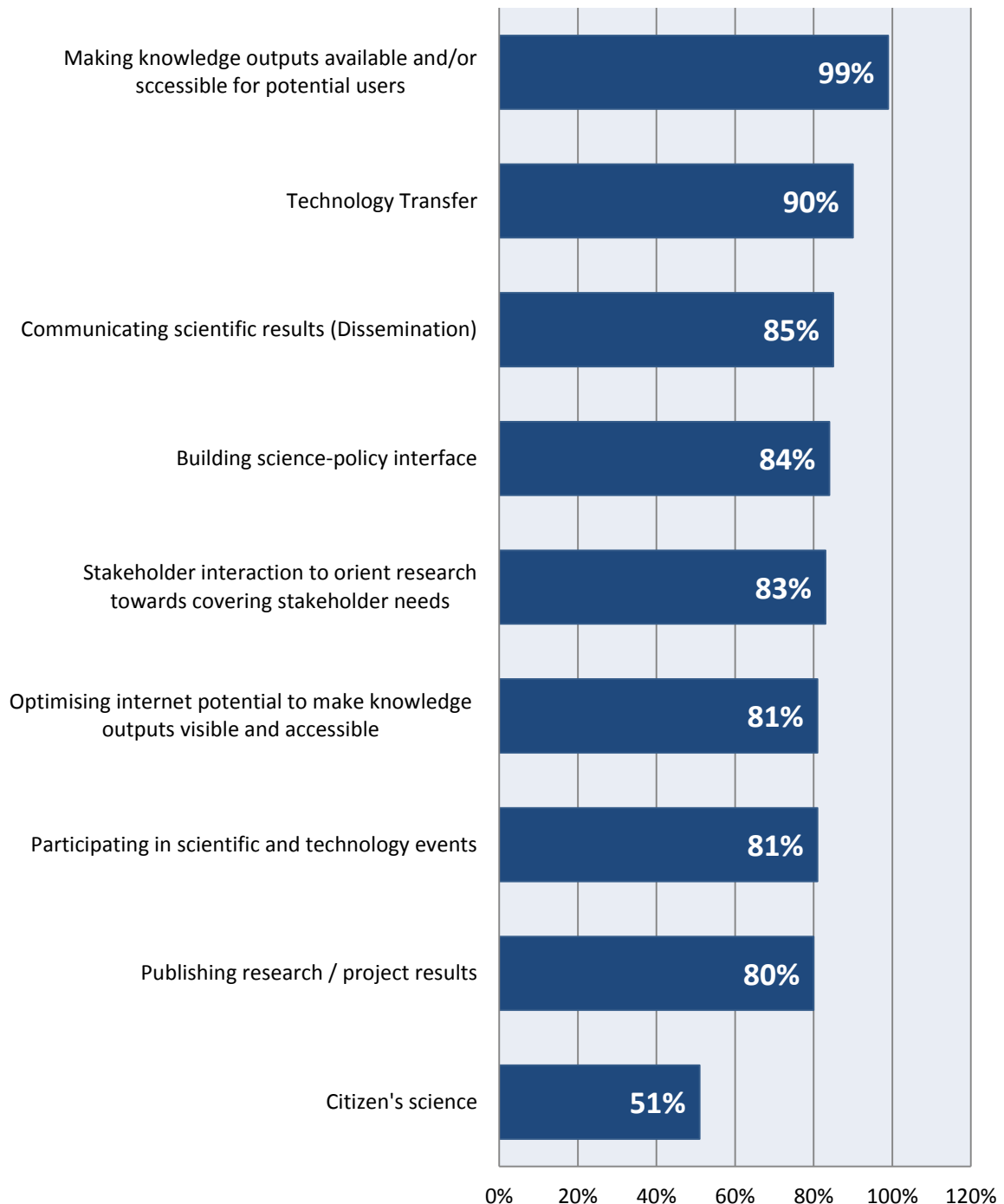


Figure 6. Participants were asked to choose all the mechanisms which they perceived to be part of Knowledge Transfer.



During analysis, it was interesting to look further into the responses aforementioned, in order to understand the perceptions of each knowledge end user sector. Slight differences were found between the top 3 choices for each end user sector in their perception of Knowledge Transfer. The majority of respondents within the industry, academia and policy sectors find that ‘making knowledge outputs available and/or accessible for potential users’ as a mechanism of KT, with a higher percentage being within the policy sector (86%). However, second and third top choices vary between the sectors:

Industry sector’s top 3 choices:

1. Making knowledge outputs available and/or accessible for potential users (67%)
2. Technology Transfer (65%)
3. Publishing research / project results (62%)

Academia / Scientific Research sector’s top 3 choices:

1. Making knowledge outputs available and/or accessible for potential users (65%)
2. Technology Transfer (58%)
3. Building science-policy interface (57%)

Policy sector’s top 3 choices:

1. Making knowledge outputs available and/or accessible for potential users (86%)
2. Communicating scientific results to any audience (Dissemination) (85%)
3. Stakeholder interaction to orient research towards covering stakeholder needs (79%)

NGO/Non-profit sector’s top 3 choices:

1. Participating in scientific and technology events (51%)
2. Technology Transfer (50%)
3. Building science-policy interface (49%)

When end users were asked to specify in what ways they perceived or have found KT to be useful, the top reasons were because KT accelerates scientific and technological progress, yields environmental benefits, yields economic benefits, and because it yields societal and policy benefits, respectively, (Fig. 7). When these results were examined per end user sector, the results show that participants across all sectors strongly agree that Knowledge Transfer is useful because it accelerates scientific and technological progress. Three sectors, industry, academia and NGO/non-profit, rated this reason as the top benefit, however, within the policy sector survey participants selected that yielding environmental benefits is the best outcome from knowledge transfer activities.

End users were also asked to specify KT mechanisms that they found most effective from their experience. The majority stated that capacity building in translating science and coaching in implementing KT activities, hosting/attending demonstration activities, and access to research facilities were vital for increasing the effectiveness of a KT. Access to information/research



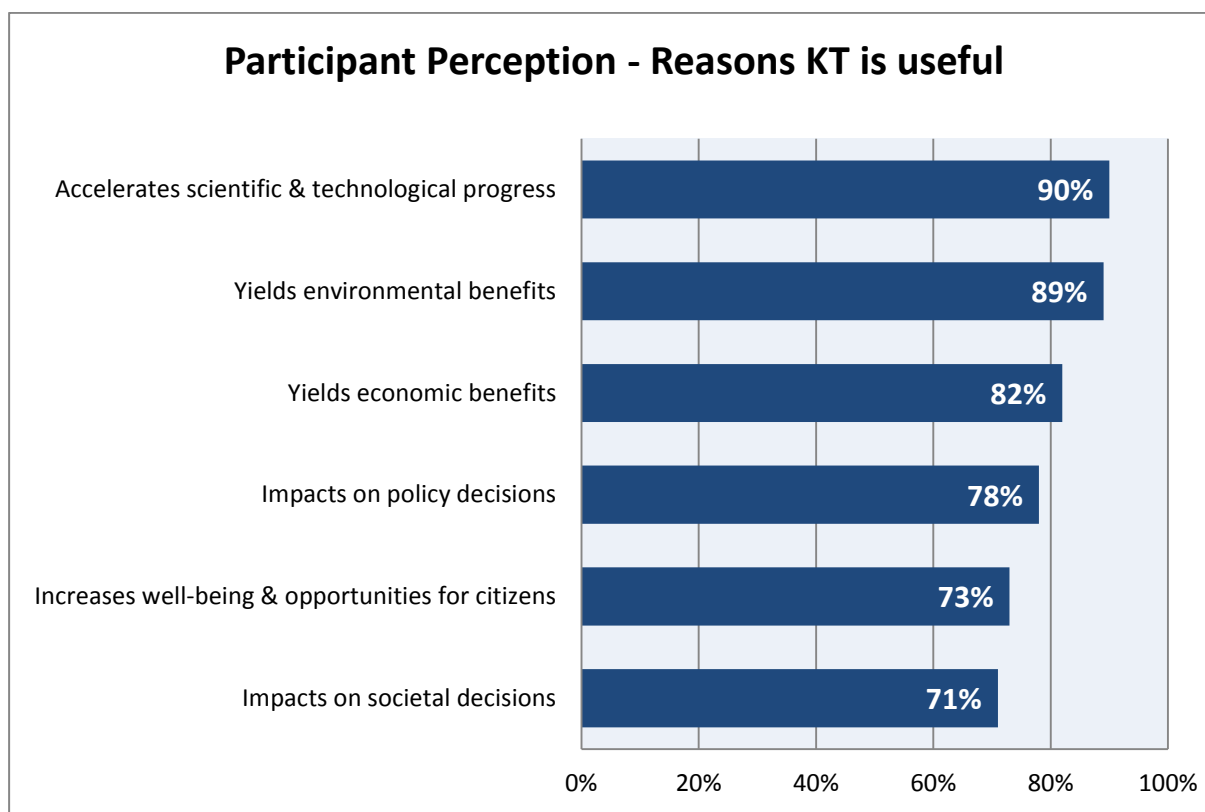


Figure 7. Participants were asked to choose all the reasons they perceived to be why knowledge transfer is useful.

outputs, and technology R&D were also high scoring mechanisms. Respondents had the opportunity to provide further comments, advice and examples of effective mechanisms from their experience and through their expertise. From the academic sector many commented that having access to KT experts was invaluable to the implementation of KT pathways for translating research for policy and societal need, as well as to the success of funded proposals and commercialisation prospects. Knowledge exchange forums were also mentioned, where science can be communicated to either wider or targeted audiences, such as workshops, Massive Open Online Courses (MOOCs), and KE clusters or networks.

Interestingly, 30%, mainly from the academic sector (22% of that 30%), responded that they did not know about the effectiveness of Knowledge Transfer Partnerships. Other areas that respondents listed as areas that they did not know the effectiveness of were IPR consultancy (32%) and Knowledge Transfer brokers (24%) such as KT offices within their institutions, government agencies, consulting companies, etc. This suggests that although these mechanisms and expertise are available, there is a lack of awareness of them and, more so, a lack of understanding of how beneficial they are for achieving successful knowledge transfer in general.

Participants who had experience of KT between research and industry sectors listed that the main areas of cooperation were through technological R&D, business collaborations and educational/skill exchange. Such cooperation has worked the best when private companies had an invested interest,



were engaged early in the application process and joint strategies could be developed. Furthermore, research providers found that having collaborations with industry assisted in securing certain funding opportunities and progressed technological developments further than if they had applied only as the research institution. However, more than half of the respondents said that they have limited or no 'know-how' regarding consulting in both 'Conflict of Interest' (64%) and 'Cooperation and Knowledge Transfer' (62%) between public research and private companies. Therefore, it may be that KT between research and industry is taking place through already established collaborations and relationships or from individual initiative. Furthermore, such know-how may be provided through KT or Enterprise offices within organisations or brought in through third party consultants.

In the next section of the questionnaire, the participants were asked to identify any barriers for efficient KT process and their perception on the challenges for successful KT. Respondents across all the end user groups strongly agreed (66%) that there isn't enough engagement with stakeholders/end users, rating this to be the top barrier for efficient KT. Additional barriers identified include the lack of resources and/or expertise in KT within their organisation and/or region (51%), and getting the scientific/engineering community engaged in KT opportunities (49%), (Fig. 8)

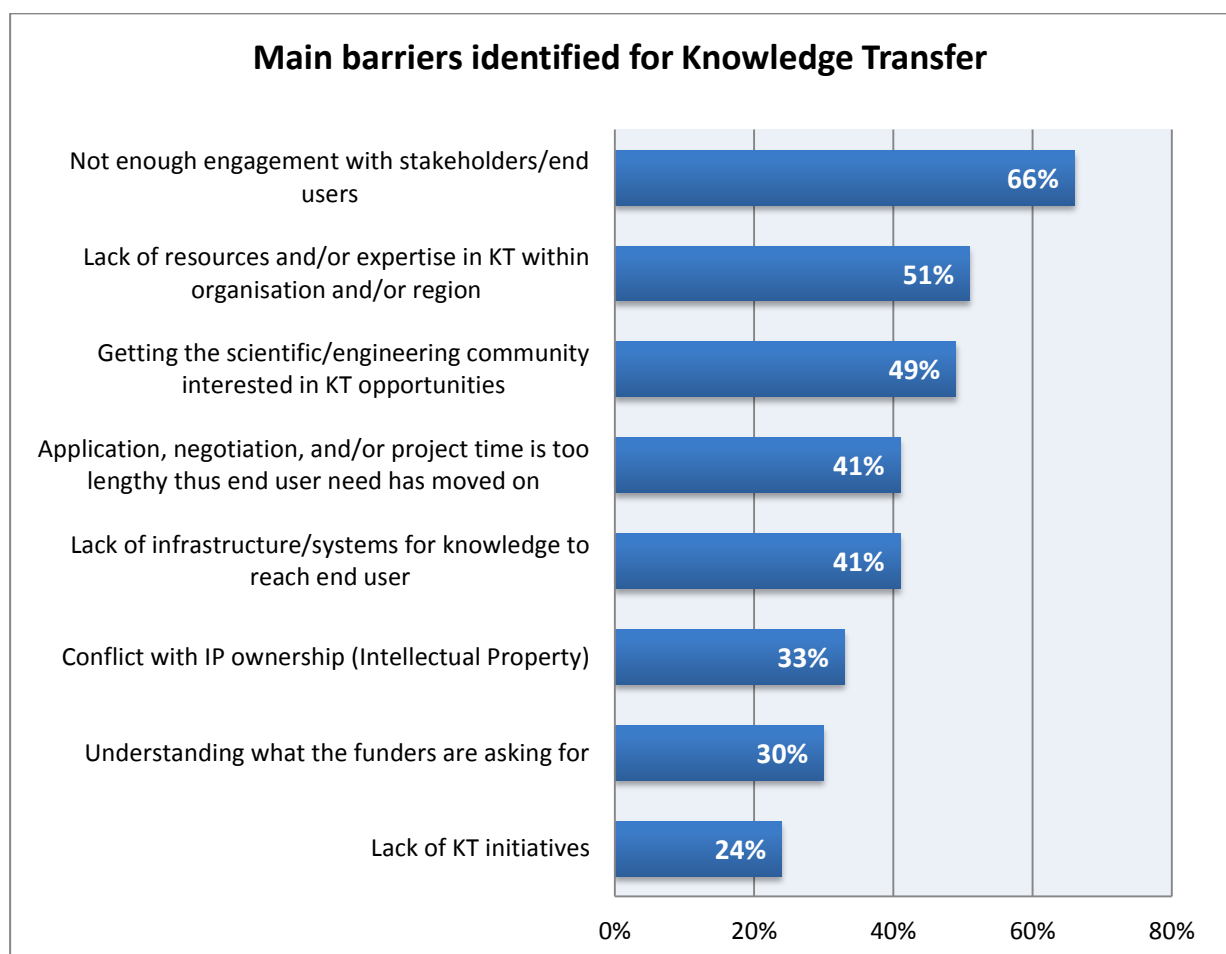


Figure 8. Survey participants identified the above as the main barriers to effective knowledge transfer.



These identified barriers echo also within the listed challenges that participants perceive or have experienced regarding KT activities, from all the three stakeholder engagement activities, (survey, workshop and interviews). The main challenge that recurs across all end user sectors is the lack of funding, support, resources and long term strategy for knowledge transfer activities, on an organisational and transnational level, (41% of participants have stated this as a the main challenge). An additional challenge faced by end users was the ‘culture shift’ needed within the scientific/research community to be more receptive to KT initiatives, (Fig. 9).

As mentioned above, 49% of survey participants stated this factor as a main barrier and additionally 16% listed in the ‘Perceived Challenges’ section that scientists within research institutions are resistant towards KT activities in particular with industry partners. Furthermore, 14% stated that there is a need for early, as well as ongoing, engagement with stakeholders in order to ensure the appropriate KO’s are prepared from research knowledge that meet end user needs. Lastly, other challenges include the alignment of and linkages across end user needs, scientific research and the opportunities on KT from funding providers (12%), and the need for a more coordinated approach (9%) with more streamlined processes and less bureaucracy (8%), in order to expedite KT more efficiently and effectively.

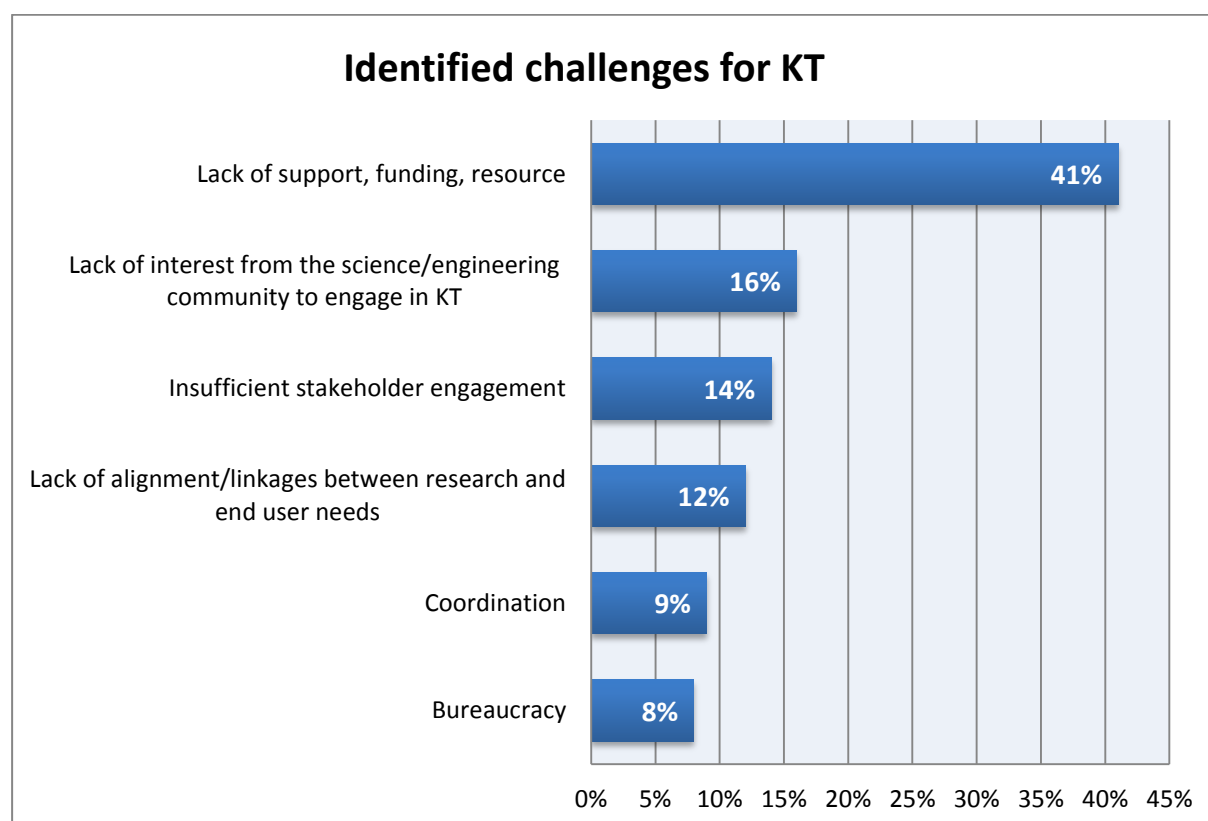


Figure 9. Participants identified the above as the main challenges to successful knowledge transfer.



Lastly, participants were offered the opportunity to inform on which tools, mechanisms, services would be useful to them for conducting KT effectively, if they were made available to them, (Fig. 10). The most frequent and highly emphasised response was to have more expert support, more training and further capacity building, particularly in:

- Developing Impact Plans for project outputs
- Funding opportunities for Knowledge Transfer initiatives
- Stakeholder identification and engagement

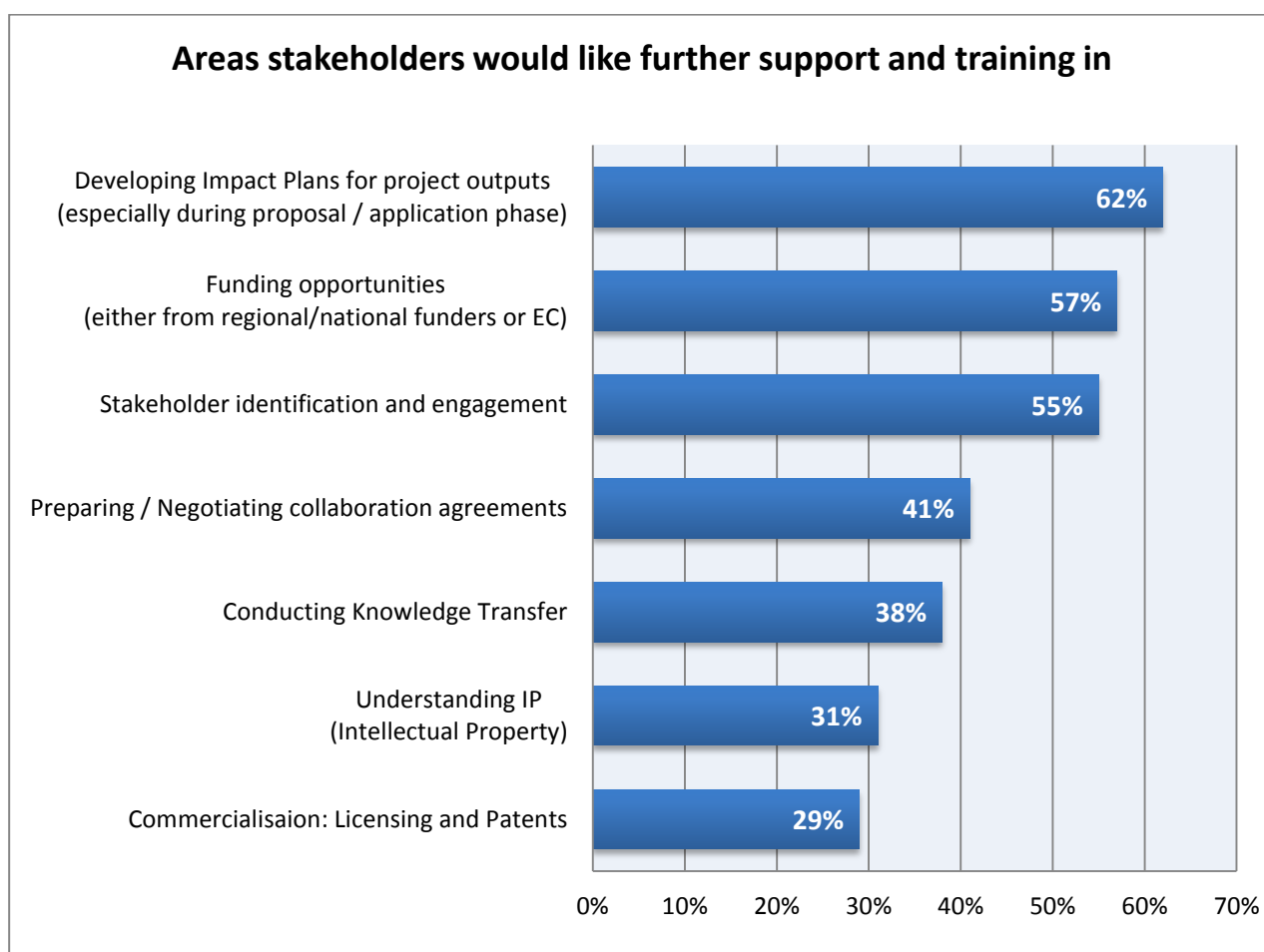


Figure 10. Participants were asked to identify areas in which they would like further training and support in.

Other mechanisms and tools end users listed as useful if made available were legal advice in particular when dealing with commercialisation agreements, access to KT experts and consultants and/or KT networks, technology transfer guidance, a KT best practices handbook, open access to scientific publications, and thematic network type projects in particular for technology transfer activities.



3.3 Discussion from Stakeholder Workshop and Selected Interviews

As part of Task 8.2, a stakeholder workshop was held during the EGU2016 in Vienna on Knowledge Transfer and Research Impact. The workshop attracted over 40 participants, mainly scientists, principal investigators and project managers of European scientific projects across a variety of Geoscience disciplines. There were four introductory presentations, one on explaining Knowledge Transfer and guidance for effective KT Pathways to reach Eventual Impact, and an additional three presentations on European projects showcasing their methodologies, lessons learned and 'how-to' guidance for successful KT. Lastly, an open discussion was held with stakeholders regarding different knowledge transfer mechanisms, how to access and implement KT initiatives, the importance of developing robust and thought out KT pathways, and an exchange of experience of overcoming barriers and identifying specific needs provided by the audience.

The workshop discussions were fruitful and highlighted several points from the audience, mainly the lack of funding commitment for KT activities outside project timelines. Another challenge was the lack of clear guidance of what KT encompasses, a general lack of know-how for identifying, initiating, implementing and expediting KT initiatives, and minimal skill in developing KT Pathways. Stakeholders from the workshop stated they would like to have access to expertise and advice on the KT opportunities available, procedures/processes needed to follow for successful KT, and legal advice in particular for IPR consultation, from within their organisations, the EC and/or established networks, such as the European Enterprise Network (EEN) and the UK's Knowledge Transfer Network (KTN), etc.

One-to-one interviews were conducted by selecting 21 key individuals with experience and expertise in KT, technology transfer, science to policy influence and development of science communication strategies. Although the sample was small, the individuals held high level positions, as company directors or executives, principal scientists, academic advisors and directors, and officers within European secretariat offices, with many years of experience in collaborative projects, technological developments and policy guidance, (Fig. 11).

The interviews were conducted using a variety of methods in order to accommodate the interviewees' demanding schedules and fit into the Task's timeframe. There were 12 one-to-one interviews held during three specific stakeholder events, the AGU Ocean Sciences Meeting 2016 in New Orleans, Oceanology International 2016 in London, and the EGU2016 in Vienna; 11 were with industry stakeholders and one with an academic whose expertise was in KT from science to industry. Further face-to-face interviews were organised as either one-to-one or group meetings; two being with stakeholders from the industry sector, one in academia and one in policy, and the group interview with individuals specialising in KT from science to policy. Lastly, 2 phone interviews were held, one with an executive in the industry sector with expertise in technology development and experience with several successful technology transfer projects, and the other with a European secretariat officer specialising in marine and maritime policy.



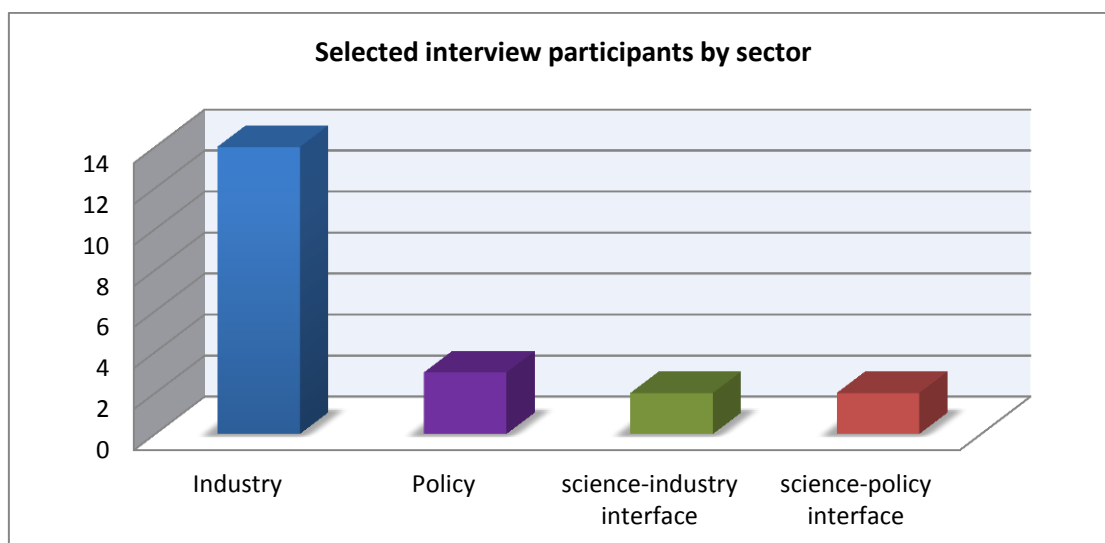


Figure 11. Demographic of selected interviewed individuals by their respective sector.

These interviewees gave invaluable input on their experiences and challenges faced when working in collaborative projects, lessons learned for effective and impactful KT, and provided some ‘tips’ they found useful over the years.

From the industry perspective several mentioned that often there are ‘hold ups’ when collaborating with universities or public research institutions, such as bureaucratic and administrative bottlenecks, unrealistic expectations and lengthy negotiations over IP ownership and licensing returns, agreeing on appropriate commercial pathways, complex application processes and regulations from public funding agencies. They have also found that research project timelines are often longer than that within industry and that the market has moved on by the time a high TRL output is produced. However, overall they do agree that Knowledge Transfer and Technology Transfer activities help to establish long term strategic partnerships with world class scientific experts, facilitate in developing collaborative projects, and could promote financial revenue.

All interviewees emphasised the significance stakeholder engagement has on the success of a project, a company and KT activities. It is imperative to identify stakeholders early in a project’s timeline, from the pre-proposal phase, and to have regular and sustained engagement with them throughout the project or technology development timeline. Doing so will assist in monitoring stakeholders’ needs are still the same at different stages of the project, to make any changes to fit changing market or end user needs, and even to create platforms where stakeholders could input on the progress of the project. Forums that the interviewees found useful were through workshops as well as webinars, which are more geographically convenient and low cost. Science experts advised that it is imperative to have well thought out Pathways to Impact plans in funding proposals and/or business cases, which incorporate appropriate and effective KT activities to demonstrate how outputs will reach Eventual Impact, meet end user needs and provide solutions for socio-economic challenges.



Experts strongly advise to work out well in advance the messages and information channel in order to reach target stakeholders and recommend, at least at first, to use few, but concise and relevant information about the knowledge a provider has to offer. It is also essential that the person in charge of strategic communication strategies is well informed and versed on the knowledge or technology available for transfer. Although dissemination efforts are important, bilateral and interactive communication is much more effective.

Interviewees commented that some tools and activities which they found useful for effective Knowledge Transfer included the implementation of well trained, knowledgeable and talented KT officers and/or Business Development teams who have an innate explorative attitude and are funded to explore and secure KT opportunities. Industry experts also mentioned that hosting training workshops for end users on the technology or instrumentation they provide are effective KT mechanisms with measurable impact. Lastly, other examples of successful and impactful KT from science-industry and science-policy are funded internships, in particular Knowledge Transfer Partnerships.

4 CONCLUSION & RECOMMENDATIONS

Between 2010 and 2012 the European Commission's (EC) DG Research and Innovation conducted an in depth Knowledge Transfer Study in order to support the monitoring and reporting process of the EC's 2008 Recommendation and Code of Practice (CoP) on Knowledge Transfer³. As stated on the DG Research & Innovation website, (www.knowledge-transfer-study.eu):

Europe seems to be better at producing high-level knowledge than at converting it into socio-economic benefits. In addition to the classical modes of transfer and dissemination of knowledge, such as research publications and exchanges of researchers, Public Research Organisations and Universities performing research need to more actively engage in the exploitation of publicly-funded research results, for instance through academia-industry collaborations, licensing and spin-offs.

In April 2008, the European Commission adopted a Recommendation on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations. The aim was to offer a coherent framework for the management of intellectual property by the public research sector, to promote knowledge transfer between the public and private sectors, both within and between Member States.

Findings from Task 8.2 consultations with research knowledge end users seem to echo those of the EU 2010-2012 KT Study, in particular the similarities in challenges, barriers and risks, as well as the

³ <http://www.knowledge-transfer-study.eu/home.html>



needs that knowledge providers and end users have for implementing and engaging in knowledge and technology transfer.⁴

From the online survey, stakeholder workshop and interviews common and recurring messages were found across all end user sectors. The analysis from all the information collection methods show that overall end users believe Knowledge Transfer activities are critical for the advancement of scientific and technological developments which facilitate the yield of environmental and socio-economic benefits. Industry end users who participated also commented that KT mechanisms are useful for stimulating innovation and can bring financial return.

Experts also agreed there is insufficient alignment of funding priorities, research interests, and commercial needs. Thus, they emphasised the need for careful identification of stakeholders early in the 'idea' and 'initiating' phases of projects. It was advised that early and sustained engagement is necessary for scientific/technological research and outputs to align with stakeholder and market needs, and to ensure the success of a project or technology development.

The majority of participants agreed that making Knowledge Outputs available and accessible to potential end users, technology transfer and communicating scientific results are mechanisms of Knowledge Transfer. Although these mechanisms are a part of KT, a measure for uptake is necessary in order to determine if and how they are impactful. Results show that there is a gap in 'know-how' of where to find KT opportunities appropriate for individual projects, what initiatives are available, and processes in order to implement and achieve effective KT. Over half of participants (60%) responded that they are not aware of, or do not have access to, any tools and mechanisms within their organisation/institution to identify knowledge requests and technology offers or respond to KT issues. Moreover, 70% of participants responded 'Yes' when asked if they feel such tools and mechanisms would be useful for their work if they were made available. Thus, similar to the conclusion found in the 2010-2012 KT Study, COLUMBUS Task 8.2 has found that **"there is a need for more KT about KT"**.⁵

There isn't a 'one size fits all' method of KT for every project or output. However, through the COLUMBUS project proven methodologies are being developed and ready to be applied. In order to achieve effective and impactful Knowledge Transfer there is a need for forums where examples of successful KT activities could be showcased and a need for improved capacity building in a variety of skills for the strategic development, implementation and delivery of knowledge transfer. Participants of Task 8.2 consultations, across all sectors, have asked for the implementation of and access to instruments and mechanisms in the forms of committed support for funding, expertise and training for Knowledge and Technology transfer provided by funding agencies, public research organisations, and established KT networks.

⁴ European Commission Directorate General for Research and Innovation (2013). Knowledge Transfer Study 2010-2012, Executive Summary, p9-22. Retrieved from <http://knowledge-transfer-study.eu/home.html>

⁵ European Commission Directorate General for Research and Innovation (2013). Knowledge Transfer Study 2010-2012, p21.



5 CASE STUDIES OF SUCCESSFUL KT WITHIN TASK 8.2 PARTNERS

5.1 CEFAS, UK

Marine Climate Change Impacts Partnership (MCIPP) case study

Background:

The United Kingdom Marine Climate Change Impacts Partnership (MCCIP) is a project that brings together scientists, government, its agencies and NGOs to provide co-ordinated advice on climate change impacts around the UK coast and seas. MCCIP was launched in March 2005 as a direct response to the UK effort known as Charting Progress: An Integrated Assessment of the State of the UK Seas. This work produces a thematic report card and helps to identify climate change and unsustainable fishing as the two main threats facing the UK's marine environment. The original aim of MCCIP was to facilitate the rapid transfer of marine climate change impacts evidence from scientific to user communities. A range of key partners, representing a wide range of marine interests from across the UK were identified and brought together, with the secretariat function contracted out to Cefas.

The objectives for MCCIP are to:

- Maintain a coordinating framework for marine climate change partners in the UK.
- Improve the knowledge base and consolidate evidence of marine climate change impacts, with emphasis on the spatial dimension where possible.
- Provide effective mechanisms for the efficient transfer of marine climate change knowledge from the scientific community to policy advisers and decision makers.
- Work with marine sectors to develop tailored advice on climate risks and adaptation.
- Provide consolidated overviews of UK science needs in relation to marine climate impacts to help guide researchers and funders.
- Actively engage with newly-developed (from a stakeholder mapping exercise) "Strategic Partners" and beneficiaries on requirements for climate change tools and information (e.g. UKCP marine projections) and with relevant international organisations on best practice approaches to knowledge transfer.
- Develop a communication plan to improve impact and disseminate products according to user needs.



Deliverable(s) / Aim that CS was trying to achieve:

The MCCIP model is a partnership between marine scientists and sponsors from the UK and devolved governments, their agencies and industry. The principal aim of the partnership is to develop a long-term multi-disciplinary approach to understanding the implications of climate change in our seas. The intended target audience of MCCIP are marine and coastal stakeholders including policy makers requiring marine climate change knowledge in an accessible format, enabling them to make informed decisions based upon quality assured science (e.g. MCCIP annual report card).

Key messages / feedback from stakeholders (customers):

Chair of the MCCIP Report Card Working Group, Dr Matthew Frost, said: *“This first major review of the implementation of marine biodiversity legislation in the UK in the light of climate change was a significant undertaking for MCCIP but one that we think is particularly timely. Our report shows that despite some potential challenges for implementation and a need for some further detailed analyses, much of the legislation does contain mechanisms that allow changes occurring as a result of climate drivers to be taken into account. We hope this work will be useful to all those with responsibility for implementing or developing legislation.”*

UK Minister for the Marine Environment, George Eustice, said: *“We are committed to improving our natural environment and delivering on our manifesto commitment to create and conserve the UK’s Blue Belt. The Marine Climate Change Impacts Partnership’s (MCCIP) valuable work is helping us to understand the potential impacts of climate change on our waters and the implications for marine life and habitats. Monitoring and gathering evidence is crucial to help us address climate change issues.”*

Scottish Government Cabinet Secretary for Rural Affairs and Environment Richard Lochhead, said: *“I welcome today’s report from the Marine Climate Change Impacts Partnership (MCCIP) – who are playing a vital role in helping us understand the impact of climate change on marine biodiversity. The findings will be useful as we seek to manage marine protected areas in the face of a marine climate that is slowly changing.*

“The Scottish Government is already taking action on legislating for the impact of climate change to our marine environment through the Marine (Scotland) Act 2010 and our recently adopted National Marine Plan. The report shows the value of working together to protect the marine environment and provide significant and robust scientific data which will help inform future policies to protect our marine environment.”



2013 Full Report Card:

Dr Matthew Frost of the Marine Biological Association and Chair of the MCCIP Report Card Working Group said:

“The marine environment is subject to a wide range of man-made pressures but can also change in response to natural processes. Disentangling these factors to enable identification of current and potential future impacts of climate change continues to be one of the greatest challenges facing marine scientists today. We have sought to clearly explain these challenges whilst continuing to report on the rapid and significant impacts of marine climate change.”

Marine Environment Minister George Eustice said:

“This report improves our understanding of how UK seas are already influenced by climate change and of potential changes in the future. Understanding these impacts, threats and opportunities is an essential basis for managing our marine environment.”

Success on knowledge transfer / strategy:

This is a valued initiative across different UK organisations. As MCCIP has matured it has moved beyond the initial phase of building a knowledge base and coordinating framework and is now more focused on maintaining those assets and refreshing them to meet new challenges and expectations. For example, the work on adaptation has begun to prove its value, having established an effective model for collaborating with industry. The priority going forward is to roll out the model and help a wider range of marine sectors make use of the best available science and best practice in adapting to climate change. This means ensuring a clear understanding of our audience and to reflect that in the products we develop and offer.

Lessons Learned:

This work is still on-going; the MCCIP project has created a product (e.g. report card) that is concise and covers a range set of topics of interest in relation to climate change effects. This work has been successful in synthesising and providing a ‘state of the art’ position on the impacts of climate change. The overall message is that the impacts up-take have been well received and used to inform the ‘State of our Seas’ MSFD intermediate assessment in 2017 and generated a wider number of publications to inform decision making from policy customers and regulators (e.g. issues associated with Marine Protected Areas, ocean acidification and aquaculture to name few examples). This work has also engaged with industry developments (e.g. fishing and aquaculture) and directing clear ‘expected climate change effect to safe guard these resources.

For further information, please visit: <http://www.mccip.org.uk/>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 652690. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

5.2 CETMAR, Spain

i) A knowledge transfer case from a coastal oceanography observatory network in the Iberian Peninsula (Observatorio Raia)

Background:

Throughout the various projects financed by the cross-border cooperation program Galicia-North region in Portugal (POCTEP), have developed some observational and predictive infrastructures, making available data, which are shaping the Observatory RAIA. The cross-border Observatory RAIA <http://www.marnaraia.org/> brings together a large number of entities of the Atlantic coast of the Iberian Peninsula, relevant in the field of operational oceanography. Its mission is to provide reliable and useful information about the state of the sea to public administrations, businesses and citizens in general, and to promote the development of tools and services for these groups to help reconciling the objectives of improving the competitiveness of those operating in the marine environment with its conservation.

As part of the above initiatives, the Observatory RAIA receives, and gives visibility, to the contributions of various entities with varied features and operating mechanisms. CETMAR is one of them, being the Unit on Marine Technologies the key department in charge of the Observatory since its early setup.

The Transfer Case :

Having contributed to the standardization of data, to its substantial increase through the different projects carried out and, most important, to oceanographic data availability and visualization, has risen the options for the development of new products and services.

Moreover, once the potential for the observatory was visualized and validated by partners, it was carried out a desktop research on its potential for developing new products and services, which gave partners an insight on some of the potential markets for application.

Deliverable and Impact:

The observatory website nowadays shows a list of services being developed and focused on niche markets which may benefit on accurate predictions on oceanographic conditions at local/regional level. Those can be seen at: http://www.marnaraia.org/?page_id=428. The official meteorological service of Galicia (Meteogalicia) is one of the promoters of the Observatory and at the same time, now it provides a highly visible entry point for these services, through its official website.

Good examples of knowledge use and impact are happening at both sides of the border between Galicia and North of Portugal. One example of cross-border impact comes from the tool for surf practitioners. The tool has been developed in Portugal, it uses the data and the predictive models run



by Meteogalicia, and among the surf areas covered by the service, some beaches in the coast of Galicia are included. Moreover, the regional administration of Galicia is currently using the RAIA observatory data for Galicia's Contingency Plan for Accidental Marine Spills (CAMGAL), (<http://ww3.intecmar.org/plancamgal/>).

Observatorio Raia has been recently highlighted by the Programme Secretariat as one best-case project for the Cross-border cooperation programme in the last programming period.

Lessons learned:

Progressing in making good quality marine data available is essential for marine science progress; for the improvement of some public services (such as the meteorological services); and for boosting the emergence of a good number of niche-market oriented products and services. These range from predictions for best operating conditions for fish and shellfisheries professionals, to best conditions for the practicing of marine sports, etc.

High quality marine data availability has the capacity to yield impact from transfer on science, policy, industry and society. A systematic approach to exploring the transfer possibilities may contribute to multiply impact and to do it from early stages of development (setting soon in place new products and services).

ii) A knowledge transfer case emerging from an innovative approach to professional training (AIXOLA, run by CETMAR)

Background:

AIXOLA is a vocational training Centre started in 1997 and run by CETMAR since 2004. This centre specializes on offering lifelong learning demand-tailored courses with the ultimate aim of up-skilling and improving employment opportunities for professionals around the marine sectors.

The main aim of AIXOLA Centre is to train and to provide knowledge to people and companies in the marine sector to tackle and solve specific problems.

This kind of training approach needs high flexibility and a permanent focus on market demands. For this reason, CETMAR (with the support from Galicia's regional government, through its Ministry of the Sea) has been designing the training programmes of AIXOLA under the following set of basic premises:

- Integration of training on new technologies
- Attention to social demands
- Equality of opportunities
- Foster employability



All these premises are essential for the success of AIXOLA and the first of them is key to carry out knowledge and know-how transfer through training.

The Transfer Case:

An outstanding experience with this regard was a course on composites (glass reinforced polyester), coatings and resins in shipbuilding and repairing. A group of students, supervised by CETMAR and with the provision of advice and support for entrepreneurship, discovered an interesting market for application of the techniques they had been learning. The profiles of the students were diverse and complementary going from university graduates to low skilled professionals with just primary school certificates. The new materials' technologies apart from shipbuilding were applicable in the wind-energy sector. Galicia is an area of high density of wind-energy farms (161 in 2015). This generates an important demand for maintenance and repair services and therefore, the students identified as an opportunity for the start-up of a new company.

Deliverable and Impact:

This company was set up and is still running (currently has 50 workers) and demanding new professionals being trained at AIXOLA.

Lessons learned:

Training is one of the most traditional ways of knowledge transfer. Making it innovative, as in AIXOLA, integrating some innovative approaches as premises for the design of the training offer can yield benefits that far beyond upskilling.

The inclusion of entrepreneurship advice, follow up of projects and training increases the chances for the employability of the trainees through self-employment options.

The interaction of students with significantly different profiles can definitely highlight the value of complementarities and catalyse into new projects, new business, etc.

5.3 NOC, UK

Knowledge Transfer Partnership (KTP)

The National Oceanography Centre (NOC) has entered into a two year KTP with Marlan Maritime Technologies Ltd (Marlan) to develop innovative remote sensing services for the survey of intertidal zones.



Background:

The partnership builds on the existing collaborative R&D between Marlan, the NOC and the University of Liverpool which included a successful ERDF-funded collaboration as part of the University's Centre for Global Eco-Innovation (CGE) and resulted in a technique (previously prototyped by the NOC's Dr. Paul Bell being validated and refined by the Marlan sponsored CGE researcher Cai Bird during his PhD) being patented.

The Transfer Case:

The new project will see NOC's Dr Paul Bell and KTP Associate Dr Cai Bird work with Marlan over the next two years to develop and then test new techniques that will ultimately provide improvements to the quality and efficiency of delivering data services to the coastal engineering industry. These services will enable more cost effective monitoring, design and construction of coastal and maritime infrastructure.

The data is collected by Marlan using its remote sensing platform which includes a standard ship's radar to visualise the location of the 'waterline' between wet and dry regions. The rise and fall of the tide and consequent movement of the waterline is used to build up a three-dimensional map of the coastline covered by the tidal ebb and flow – the intertidal areas. This is an old idea dating as far back as World War One using aerial photos, brought right up to date using radars and newly developed robust software algorithms. This allows new maps of the intertidal beach areas to be produced automatically every couple of weeks, and those maps show how the coastline evolves over time. Beach surveys are difficult and expensive to produce, so are rarely performed routinely, and never at the rate this system can achieve. These evolving maps show how and when beaches change; providing the information needed for the management of key stretches of coastline or erosion hotspots.

Deliverable and Impact:

The services are expected to appeal to the UK's 50 coastal councils, as well as, for example, operators of ports, coastal power stations, desalination plants, transport infrastructure, sewage treatment works, coastal engineering consultancies, research groups and military sites. The patent also covers Europe, Australia and the USA, and so an additional 1.1 million km of coastline can be considered for potential sites.

Comments from KTP partners:

Alex Sinclair, Managing Director of Marlan Maritime Technologies Ltd commented "Currently, we can offer this service to just a handful of customers a year, but by the end of the project we expect to be able to meet the needs of potentially hundreds and then thousands of users worldwide. Everyone we talked with is excited at the prospect of having data like this which will provide deeper understanding



of the processes acting in complex coastal domains. We are delighted to be providing this information, which is such a valuable tool for protecting people, places and profits in maritime environments."

Kevin Forshaw, Associate Director, Innovation and Enterprise at the NOC commented "The NOC is confident that this partnership will see the benefits of coastal knowledge transferred from the science community to UK industry, and probably beyond, for the good of all coastal communities."

Dr Paul Bell added "The ability to conduct intertidal beach surveys every couple of weeks using a robust and automated remote sensing system will provide an unprecedented window on the way key areas of coastline respond to storms, recover in calmer weather, and evolve following any coastal engineering works. This Knowledge Transfer Partnership with Marlan will massively accelerate and facilitate the shift of this cutting edge development from the realms of a research project to a fully-fledged commercial service."

Prof. Andy Plater, support academic on the KTP from the University of Liverpool, emphasised, "Our success is down to the close research collaboration between the University of Liverpool, NOC and Marlan that emerged from our Centre for Global Eco-Innovation. The KTP will enable us to further develop the outputs of Cai's PhD research, and is a great example of the commercial and societal impact that can be achieved by connecting world-leading research expertise with the innovative thinking and inspiration of SMEs like Marlan."

NOC KTP Associate Dr Cai Bird added, "This knowledge transfer partnership represents an excellent and unique opportunity to see the direct implementation of our academic research into commercial systems. I am passionate about the potential for this technology to fill a crucial gap in the nearshore survey industry and look forward to developing and deploying radar survey systems over the duration of this project and beyond."



6 ANNEXES

Annex A. – ACRONYMS

KT – Knowledge Transfer

KO – Knowledge Output

NERC-NOC – The Natural Environment Research Council and one of its research institutions is the National Oceanography Centre www.nerc.ac.uk , noc.ac.uk

CETMAR – Centre

ECMAR – Centre

CEFAS – Centre for Environment, Fisheries and Aquaculture Science www.cefass.co.uk

EGU – European Geosciences Union www.egu.eu

AGU – American Geophysical Union sites.agu.org

Annex B. – Agenda for Stakeholder Workshop during EGU2016 on Knowledge Transfer and Research Impact

EOS21 – PROJECT MANAGEMENT IN GEOSCIENCES



SMP1 – WORKSHOP ON KNOWLEDGE TRANSFER & RESEARCH IMPACT

Thurs 21 Apr 2016, at 13:30 in Room 2.42

13:30	Introduction to session Session Convener - Luisa Cristini, National Oceanography Centre
13:40	Knowledge Transfer & Research Impact – How an impact plan can build on the success of your project – from proposal to legacy Sofia Alexiou, National Oceanography Centre, UK
14:00	Project management – challenges in dealing with academic and non-academic partners Daniela Henkel, GEOMAR, Germany
14:20	Stakeholders' expectations on connectivity research for water and land management addressed by a survey in the collaborative EU-COST Connecteur Network Anna Smetanova, INRA, France
14:40	Challenges of running the Contact Point for Copernicus National Marine Services Iris Ehlert, Copernicus Germany
15:00 - 15:30	Open discussion session with panel speakers Chaired by: Luisa Cristini, National Oceanography Centre & Anja Reitz, GEOMAR



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 652690. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

Annex C. –Demographics of Respondents to KT Survey

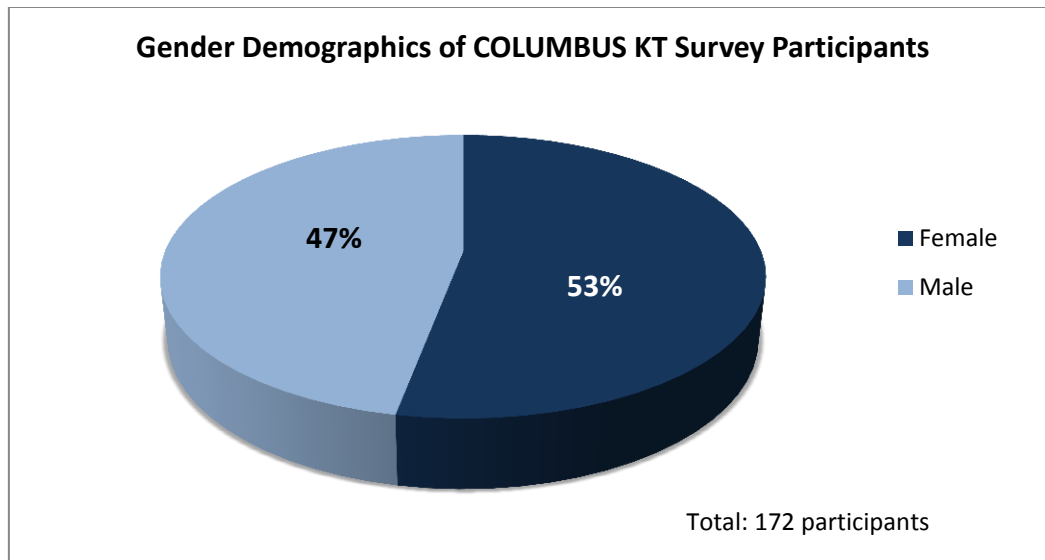


Figure 12. Overall gender demographic of participants in the COLUMBUS KT Survey

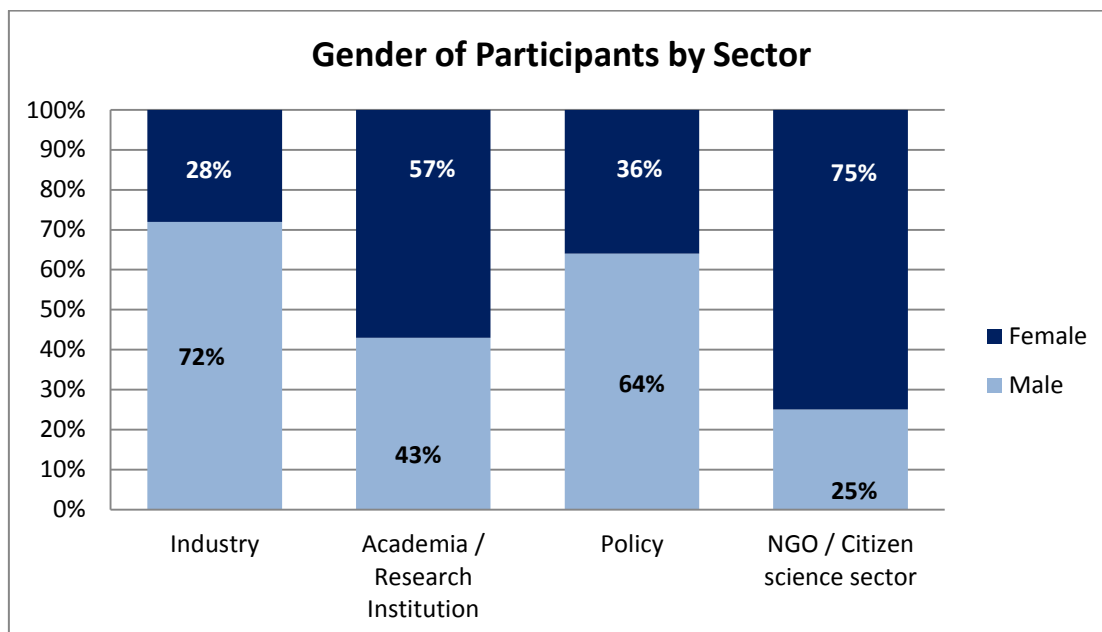


Figure 13. Gender demographics of COLUMBUS KT Survey participants per end user sector group.

Annex D. – Transcript of Knowledge Transfer online survey

In the following pages is a transcript of the online survey prepared for COLUMBUS D8.2



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 652690. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

Welcome

The COLUMBUS project is a Horizon 2020 funded Coordination and Support Action, capitalising on the European Commission's significant investment in marine and maritime research. Adopting proven methodologies and building on significant past work the COLUMBUS project's main aim is to ensure accessibility and uptake of research, or "Knowledge Outputs", from European marine and maritime research projects by four targeted end user groups: science, policy, industry and wider community.

Within COLUMBUS, Knowledge Transfer is the term used to describe the overall process of moving knowledge between its source, to potential users of knowledge which results in eventual impact.

This questionnaire was developed as part of the Legacy work package within the COLUMBUS project tasked to gain an understanding of the interpretations of different knowledge user groups in order to identify characteristics and components of effective Knowledge Transfer mechanisms and initiatives.

We would like to invite the research community, including early career scientists, as well as professionals within policy, society and industry sector groups, to participate in this survey as a conduit to expressing your experiences and needs concerning Knowledge Transfer. Your inputs is most valuable

A little about you

This section used for demographic purposes to draw correlations during analysis.

* 1. Please identify the main sector(s) in which you are involved in (>60% of your time)

- ☐ Academia / Research Institution
- ☐ Industry
- ☐ Policy
- ☐ NGO and/or Citizens Sector organisation

Other (please specify)

* 2. In what stage of your career are you currently in? (This is for scientific and/or industry career paths)

- ☐ Early Career / Junior / Post Doc (< 5 yrs)
- ☐ Experienced (5-15 yrs)
- ☐ Senior / Exec / PI (> 15 yrs)

* 3. What is the size of your organisation/company

- ☐ Small (< 50 employees)
- ☐ Medium (50-250)
- ☐ Large (> 250)

4. Is your organisation based in: (Please select one and specify)

	Yes / No	If 'Yes' Please specify country
EU / EEA	<input type="button" value="▼"/>	<input type="text"/>
Europe, but not (or not yet) within EU/EEA	<input type="button" value="▼"/>	<input type="text"/>
Outside Europe (please specify)		
<input type="text"/>		

* 5. How would you describe the region your organisation/company is based in?

☐ Urban area

☐ Small town

☐ Rural area

☐ Remote

Other :

* 6. What is your gender?

☐ Female

☐ Male

☐ Other

Your Perception and Experience of Knowledge Transfer

This section will help us gather your perceptions, experience, needs and preferences for effective Knowledge Transfer mechanisms and initiatives.

Definitions within COLUMBUS:

- **Knowledge Transfer** is the term used to describe the overall process of moving knowledge between its source, to potential users of knowledge which results in eventual impact.
- **Knowledge Output** is described as a unit of knowledge or learning, that has a potential application, generated by or through research activity.

* 7. Do you agree: The following mechanisms are part of Knowledge Transfer :

(1 - Strongly Disagree; 2 - Disagree; 3 - Don't Know; 4 - Agree; 5 - Strongly Agree)

	1	2	3	4	5
Technology Transfer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communicating scientific results to any audience (Dissemination)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Making knowledge outputs available and/or accessible for potential users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Participating in scientific and technology events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stakeholder interaction to orient research towards covering stakeholder needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Building science-policy interface	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Citizen's science	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Optimizing internet potential to make knowledge outputs visible and accessible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Publishing research / project results	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional KT descriptions, please list below

* 8. Knowledge Transfer is useful because:

(1 - Strongly Disagree; 2 - Disagree; 3 - Don't Know; 4 - Agree; 5 - Strongly Agree)

	1	2	3	4	5
It accelerates scientific and technological progress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It impacts on policy decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It impacts on societal decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It yields economic benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It yields environmental benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It increases well-being opportunities for citizens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other ways you feel KT is useful, please comment below:

* 9. Have you been involved in KT initiatives / programmes

☐ Yes

☐ No

* 10. If, so which role did you play?

(Please select all that apply, and/or comment below.)

- ☐ Organiser
- ☐ Beneficiary
- ☐ Intermediary
- ☐ Multiplier
- ☐ Funder/sponsor
- ☐ Collaborator
- ☐ Stakeholder/End-User
- ☐ Never been involved in any KT initiatives

Other (please specify)

* 11. Please indicate which KT initiatives you believe (or have found) work the best / least for effective KT by rating each of the following listed below: **(1= low score, worked the least ; 5 = high score, worked the best)**

	Don't Know	1	2	3	4	5
Knowledge Transfer Partnerships	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Capacity building (ie. training, internships, exchange programmes)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transferable tools (ie. handbooks, procedures, methodologies)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access to information and research outputs (ie. databases, portals)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access to research facilities (ie. labs, technology workshops, observation infrastructures and platforms)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technology R&D (ie. prototypes, instrumentation optimisation, TRL developments)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Don't Know	1	2	3	4	5
Demonstration activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Knowledge Transfer brokers (ie. brokerage events, university/institute KT offices, government agencies, consulting companies)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scientific/Technology outreach and literacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Developing and delivering contents for dissemination of research outputs and/or technology advances (ie. newsletters, websites, fact sheets)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IPR consultancy and development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please list any additional KT initiatives which work well for the work you do:

* 12. From your experience, are there any tools, mechanisms or services that, if they were made available/accessible, would have been useful to have for a more effective KT process? Please specify:

* 13. Is your organisation familiar with the terminology of Knowledge Transfer?

Yes	No	Uncertain
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 14. Does your organisation have tools and mechanisms to identify knowledge requests and technology offers?

Yes

☐

No

☐

Uncertain

☐

If so, could you please comment on these:

15. If not, would such tools and mechanisms be useful for the type of work you do?

Yes

☐

No

☐

Uncertain

☐

* 16. Which are the main barriers you identify for an efficient KT process.

(Please select all that apply)

☐

Understanding what the funders are asking for

☐

Not enough engagement with stakeholders/end-users

☐

Getting the scientific/engineering community interested in KT opportunities

☐

Lack of resources and/or expertise in KT within organisation and/or region

☐

Lack of KT initiatives in country/area

☐

Lack of infrastructure/systems for knowledge to reach end user

☐

Conflict with ownership of IP (Intellectual Property)

☐

Application, negotiation and/or project time is too lengthy thus end user need has moved on

Additional barriers you can identify:

17. In your opinion, what would you consider to be the main challenges for Knowledge Transfer in your organisation and/or region / country?

Engagement with Industry

This section will help us gain a perspective of the types of cooperation with the private sector, and identify any areas where training could help enhance engagement.

- * 18. What type of cooperation do you use in terms of KT between companies and public research?
(Please select all that apply)

- ☐ Business Collaborations
- ☐ Clusters
- ☐ R&D
- ☐ KTP or Knowledge Exchange agreements
- ☐ Education
- ☐ None

Other (please specify)

- * 19. How would you characterise your knowledge concerning consulting in the area of 'Cooperation and Knowledge Transfer' between public research and companies?

- ☐ None
- ☐ Limited
- ☐ Satisfactory
- ☐ Good / Excellent

- * 20. How would you characterise your knowledge of 'Conflict of Interest' between public research and companies?

- ☐ None
- ☐ Limited
- ☐ Satisfactory
- ☐ Good / Excellent

* 21. Please select any areas in which you feel training would assist you to ensure effective Knowledge Transfer:

(Select all that apply or comment below)

- ☐ Stakeholder identification and engagement
- ☐ Developing Impact Plans for project outputs (especially during proposal / application phase)
- ☐ Conducting Knowledge Transfer
- ☐ Understanding IP (Intellectual Property)
- ☐ Commercialisation: Licensing and Patents
- ☐ Preparing / Negotiating collaboration agreements
- ☐ Funding opportunities (either from regional / national funders, or European Commission)

Please list any other areas training would be useful for you in regards to Knowledge Transfer:

22. From you experience, were there any particular tools, mechanisms, initiatives which worked best in assisting you with effective cooperation and Knowledge Transfer with the industry / private sector

Thank you for your input

For final results and more information on COLUMBUS please visit: www.columbusproject.eu

- * 23. On behalf of all the partners within the COLUMBUS project, thank you for taking the time to participate in this questionnaire. A report which will include analysis from the results of this questionnaire will be made available on the COLUMBUS website once it is published, during the summer.

We wish to provide participants with feedback from this exercise. Please select Y/N if you wish to receive further results.

Yes, please

No, thank you

☐☐

Is so, please provide an email address where we can send a published report of our findings. (Please note, we do not share your information or subscribe you to any mailing lists, your details will be just to communicate results of this survey).