



Tools and Actions for Impact Assessment and Policy makers Information



Survey on Impact study:
reflections, practices and requirements


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Lead Beneficiary:	Agence Nationale de la Recherche (ANR)
Author(s) :	Bérandère Virlon, Emilien Schultz
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About TAIPI:

During the 7th Framework programme (FP7), the European Commission set up a new initiative called “FET Flagships”, enlarging already existing Future and Emerging Technologies (FET) instruments.

In January 2013, two Flagships were selected out a Flagship Competitive call: the Human Brain Project (HBP) and Graphene. Launched in October 2013, these two Flagships aim to provide world-beating science and innovation over a 10 year period, during which they will receive each up to 100 M € per year. Both Flagships gather at least 15 member states as well as several associated countries and more than 150 institutions.

Therefore, this initiative, addressing highly important challenges that humanity is facing, thus receiving huge support from the European Commission and Member States, needs to be monitored and supported continuously in order to ensure the achievement of its objectives.

TAIPI – Tools and Actions for Impact Assessment and Policy makers is a Coordination and Support Action (CSA) started in January 2015 till December 2017. It aims to support and strengthen FET Flagships and the initiative itself by undertaking “impact assessment” activities and “collecting information need for policy making”. Assessment will be carried out on the basis of scientific, technological, economical and societal impact.

The information which will be collected while carrying out the impact assessment will contribute to the actions regarding the policy making support. It will allow to provide policy makers with necessary background information and scenarios needed to push or change existing policies or to establish new cross-themes policies. Finally the information collected and processed via the impact assessment will enable an evidence-based policy making.

In brief, TAIPI will generate a flow of useful information from the Flagships towards policy makers regarding the impacts of the Flagships on science, technology, economy and society.

<http://taipi.eu/>

TAIPI Coordinator:

ERDYN Consultants (France)

Patrick Haouat, Florian Knecht, Ingrid Clément, Pinar Temel, Kathy Sejourné, Sandra Mege, Olivier Fallou

TAIPI Partners:

Zentrum für Soziale Innovation GMBH (Austria)

Manfred Spiesberger, Katharina Büsel, Alexander Degelsegger, Klaus Schuch, Stephanie Smoliner-Konzett

SP Sveriges Tekniska Forskningsinstitut AB (Sweden)

Niklas Fernqvist, Johanna Ulmanen

Ecole Polytechnique Fédérale de Lausanne (Switzerland)

Livie Kundert, Kathleen Elsig

Agence Nationale de la Recherche (France)

Bérangère Virlon

1. INTRODUCTION

There is a growing demand from national, European and international political decision-makers to assess the impact of public policies, including science policy. Consequently, public research organisations, national funding agencies, the European Commission and large European research programmes are increasingly requested to produce analyses to estimate both the quantitative and qualitative effects of their actions on the research landscape, on industry and on society as a whole.

This need of accountability is explained by the financial constraints on the public budgets and the demands raised by citizens to government authorities to justify the benefits and relevance of public expenditures. Beyond classical evaluation, which means assessing the actions' implementation, the stake is to gain a broader knowledge on the range of their impacts: on economy, health, environment, well-being, etc. While many acknowledge such impacts, it is however complex to measure them in a reliable and unbiased way. Moreover, while various attempts to evaluate these impacts have been undertaken¹, there is no consensus yet on definitions and methodologies².

The aim of the TAIPI survey is to provide an insight into European funding organizations' practices on impact assessment. The objective is to gather information related to definition and conceptual framework of impact assessment, impact assessment organization, practices in impact assessment actually used inside the funding organizations to complement available guidelines³.

To this end, TAIPI conducted a survey the results of which are presented in the present report:

- A first part dedicated to the results of an online survey designed to capture an overview of impact assessment practices,
- A second part consisting on qualitative additional interviews to explore more specifically the local organizations.

¹ Van Noorden, R. (2015). Seven thousand stories capture impact of science. *Nature*.

² Penfield, T., Baker, M. J., Scoble, R., & Wykes, M. C. (2014). Assessment, evaluations, and definitions of research impact: A review. *Research Evaluation*, 23(1), 21–32.

³ For instance: ESF. (2014a). *Research Funders and Research Output Collection*, ESF. (2014b). *The Challenges of Impact Assessment* or Guthrie, S., Wamae, W., Diepeveen, S., Wooding, S., & Grant, J. (2013). *Measuring research A guide to research evaluation frameworks and tools*.

2. SUMMARY

A survey was designed to characterize the evaluation practices conducted by the FLAG-ERA organizations¹ to identify and quantify the effects ("impacts") of their funding policy.

The survey was launched at the end of April 2015 for a period of four weeks. It was sent to 113 FLAG-ERA contact points, corresponding to 38 organizations (26 countries and the European Commission (EC)).

19 organizations responded and 18 answers were fully-completed². These 18 answers were from 13 countries and the European Commission. About half of the contacted organizations didn't answer to the survey. It would be interesting to know if this is because they have not yet implemented impact assessment. This would give an idea of the extent of this activity in the European organizations.

Briefly analyzing responding organizations, it appears that:

- Majority of the respondents (14/19) answered to be well-involved in impact assessment studies
- Studies are characterized by a great diversity of definitions and methodologies
- Generally, they do not use a standardized framework to study the impacts but :
 - A formalized implementation exists or at least reflection is in progress
 - Several impact studies have been already conducted
 - Impact studies involve different teams: dedicated office for evaluation, scientific offices, and third party (researchers, private companies...)
 - Even if not fully standardized, data collection is automatized in most cases
 - Different types of impacts are considered (the most obvious one: scientific impact)
 - A mix of quantitative and qualitative methods are used
 - Specific indicators are developed to fit the agencies' missions
- These impact evaluations are used for strategic decisions, policy making, internal management and communication
- The final uses are slightly different depending on whether it is a ministry (national decisions, policies and laws, recommendations, culture of evaluation) or a funding agency (program management, communication, transparency)
- The suggestions made by the organizations about the Flagships are to develop a common set of indicators, as well as specific indicators depending on the area of research

¹ FLAG-ERA is an ERANET which gathers most regional and national funding organisations (NRFOS) in Europe with the goal of supporting the Future and Emerging Technologies (FET) Flagship concept and more specifically, the FET Flagship initiatives Graphene and Human Brain Project (HBP) <http://www.flagera.eu/>

² The number of respondents doesn't allow statistical significance but is larger than current studies available which are usually limited to case studies or a benchmark of model agencies

3. RESULTS OF THE ONLINE SURVEY

3.1 Outline of the survey

The survey targeted FLAG-ERA organizations which are involved in the coordination and funding of the two following Flagships “Graphene” and “Human Brain Project”. The survey has been designed to characterize the evaluation practices conducted by these organizations and identify/measure the "impact" of their funding policy. The questionnaire was then followed by 5 supplemental individual interviews with the persons in charge of the evaluation activities within organizations that regularly conduct impact studies.

The survey comprises 35 questions divided in 7 sections as described below; the complete version of the questionnaire is presented in Annex 1.

- 1- YOUR ORGANIZATION
- 2- CURRENT STATUS OF IMPACT STUDIES IN YOUR ORGANIZATION
- 3- IMPLEMENTATION OF IMPACT STUDIES IN YOUR ORGANIZATION
- 4- TOOLS AND METHODOLOGIES USED IN YOUR ORGANIZATION
- 5- RESULT EXPLOITATION AND END USERS
- 6- TAIPI
- 7- DOCUMENTATION

The survey was launched on 27 April 2015 for a period of 4 weeks. It was sent to 113 FLAG-ERA contact points, corresponding to 38 organizations, 26 countries and European Commission (EC).

The answers to the survey were submitted through the online and open source software Lime Survey. Overall, 19 answers were collected, of which 18 were fully-completed. These 19 answers stem from 18 different organizations, 13 countries and European Commission.

3.2 Section 1 - About the countries and the organizations

The number of responding partners varied across countries (Table 1):

- 2 answers from France (one from a national funding agency ; the other one from the ministry of research)
- 2 answers from Ireland (one from a national funding agency ; the other one from the ministry of research)
- 3 answers from Netherlands (three from two different funding agencies). NWO answered twice (two independant responses), both responses were considered and included in the final analysis.
- 2 answers from Switzerland (one from a national funding agency ; the other one from the ministry of research)

- The majority of responding organizations funds both basic and applied research (13/19).

AUSTRIA	• Austrian Science Fund	Basic research
BELGIUM	• Research Foundation Flanders (FWO)	Basic research
FINLAND	• TEKES	Applied research
FRANCE (2)	• Agence Nationale de la Recherche (ANR)	Both
	• Ministry of Higher Education and Research	Both
IRELAND (2)	• Department of Jobs, Enterprise and Innovation	Both
	• Science Foundation Ireland	Both
LATVIA	• Latvijas Zinatnu Akademija	Both
NETHERLANDS (3)	• Netherlands Organisation for Scientific Research (NWO) (x2)	Basic research
	• Stichting FOM	Both
PORTUGAL	• Foundation for Science and Technology	Both
ROMANIA	• Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI)	Both
SLOVENIA	• Ministry of Education, Science and Sport	Both
SWEDEN	• Swedish Research Council	Basic research
SWITZERLAND (2)	• State Secretariat for Education, Research and Innovation	Both
	• Swiss National Science Foundation	Both
UNITED KINGDOM	• Engineering and Physical Sciences Research Council (EPSRC)	Both
+		
EUROPEAN COMMISSION	• DG CONNECT	Both

Table 1: Description of responding organizations by country and type of research funded

- The majority of respondents are national funding agencies (12/19), one is a regional funding agency (FWO in Belgium) and the remaining (6/19) are ministries or strategic governmental organizations (Figure 1).

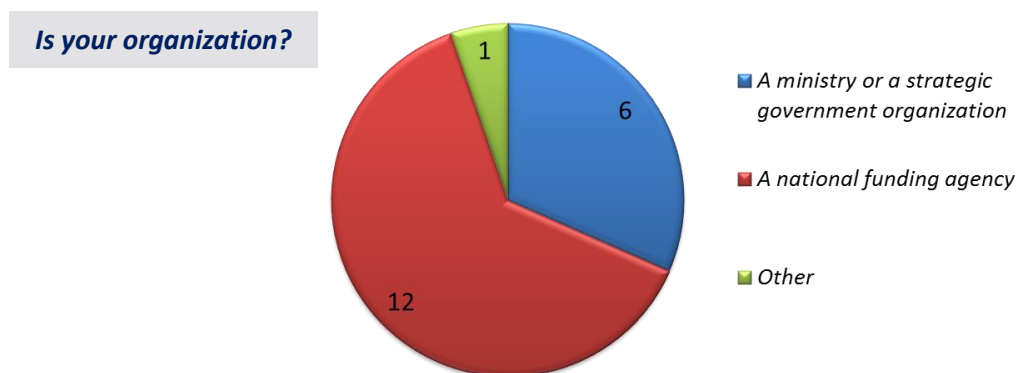


Figure 1: Typology of the responding organizations

3.3 Section 2 - Current status of impact studies

In this section, the organizations were asked about the status of their impact studies.

Throughout the survey, the term « impact study » is used to represent any activities related to quantifying and interpreting consequences of scientific policy actions. In the case of a funding agency, impact studies can focus on, for example:

- the direct outputs of the funded projects and programs (publications, patents, startup companies, ...),
- the outcomes and overall impacts of the agency (socio-economic impact, political impact, impact on scientific communities, impact on the organization of research, etc.).

➤ A majority of the respondents (17/19) had already initiated reflection and/or actions around the notion of impact at the time the survey (Table 2):

How would you describe the current status of reflection around the notion « impact » within your organization?

Formalized implementation	Progressive discussion without systematic implementation	Some references to the notion, but has not yet been applied
FINLAND IRELAND (2) LATVIA ROMANIA UNITED KINGDOM EUROPEAN COMMISSION	AUSTRIA BELGIUM France (ANR*) NETHERLANDS (3) PORTUGAL SWEDEN SWITZERLAND (2)	France (Ministry of Research) SLOVENIA
TOTAL = 7	TOTAL = 10	TOTAL = 2

*ANR: Agence Nationale de la Recherche

Table 2: State of advancement of impact assessment activities, by country

➤ The majority of the respondents (14/19) already conduct impact studies (Figure 2):

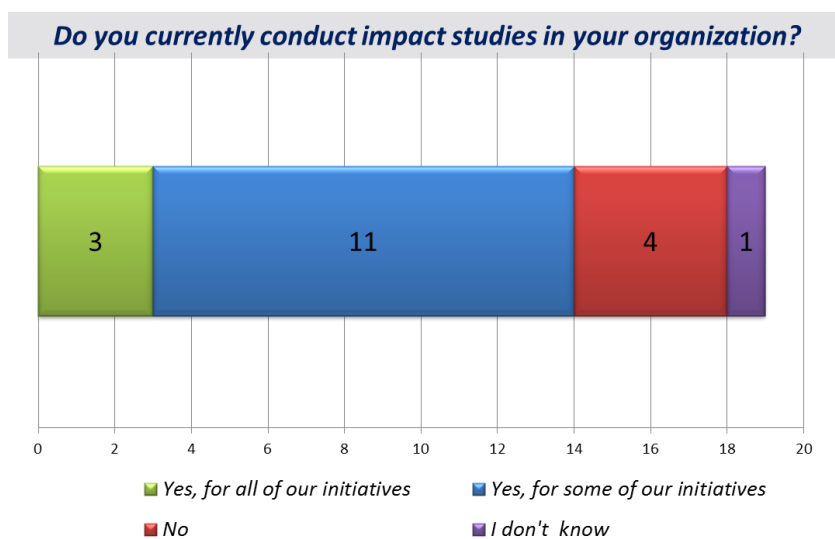


Figure 2: Extent of impact studies

3.4 Section 3 - Implementation of impact studies

From this section, all the questions of the survey were optional and focused on organizations which already conduct impact studies. The organizations not involved in impact studies were invited to go directly to the section 6 to fulfill the questions relative to the FLAGSHIPS.

Our results show that:

- Most of the studies (13/19) are conducted locally and punctually by different teams (program officers...) according to their needs
- In fewer cases (8), there is a dedicated office in charge of the impact studies
- Nevertheless, most of the organizations (15) do not have a standardized framework or do not answer precisely this question
- Most of them (13) delegate a part of their studies to a third party which can be public or private (Table 3)

Are these impact studies or evaluations conducted internally or delegated to a third party?

Conducted internally	Mostly conducted internally with some external intervention	Mostly delegated to a third party	Completely delegated to a third party	NA
NETHERLANDS SLOVENIA SWEDEN	FRANCE (2) LATVIA NETHERLANDS (2) ROMANIA SWITZERLAND	IRELAND (2) UNITED KINGDOM EUROPEAN COMMISSION	AUSTRIA FINLAND	BELGIUM PORTUGAL SWITZERLAND
TOTAL = 3	TOTAL = 7	TOTAL = 4	TOTAL = 2	TOTAL = 3

Table 3: Internalized/externalized implementation of impact studies, by country

- Generally, the third parties involved in the impact studies come from the public sector: academic laboratories, public administration... (Figure 3).

Who are the individuals or agencies involved in carrying out the impact studies?

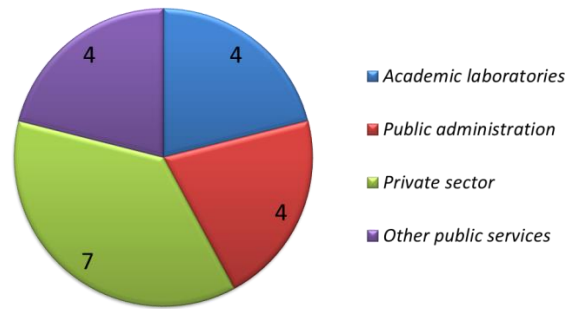


Figure 3: Typology of third parties in charge of impact studies

- Some organizations (5/19) mention to be part of a specialized network or think tank dedicated to the reflection on impact.
 - Examples of national networks:
 - *Irish Public Service Evaluation Network*
 - *Finnish Evaluation Society*
 - *Austrian Platform for Research and Technology Policy Evaluation (FTEVAL)*
 - *German Society for evaluation (DEGEVAL)*
 - Examples of European networks:
 - *Working Group on Monitoring the ERA Roadmap*
 - *European Evaluation Society*
 - *EU RTD Evaluation Network*
 - *The European Network of innovation Agencies (TAFTIE)*
 - *Science Europe Working Group on Impact and Evaluation Indicators*

3.5 Section 4 - Tools and methodologies

Our results show that:

- The ranked list of impacts assessed consists in (Figure 4):
 - The scientific impacts (average: 12.7 quotes):
 - Scientific and technological outputs (14),
 - Impacts on organization of research (12),
 - Impacts on scientific communities (12)
 - The economic impacts (average: 8.7 quotes):
 - Impacts on employment, jobs, careers (8),
 - Impacts on public/private partnerships (9),
 - Economic impacts (start-ups...) (9)
 - The societal impacts (average: 2 quotes):
 - Territorial Impact (2),
 - Socio-cultural Impact (3),
 - Political Impact (2),
 - Media Impact (1)

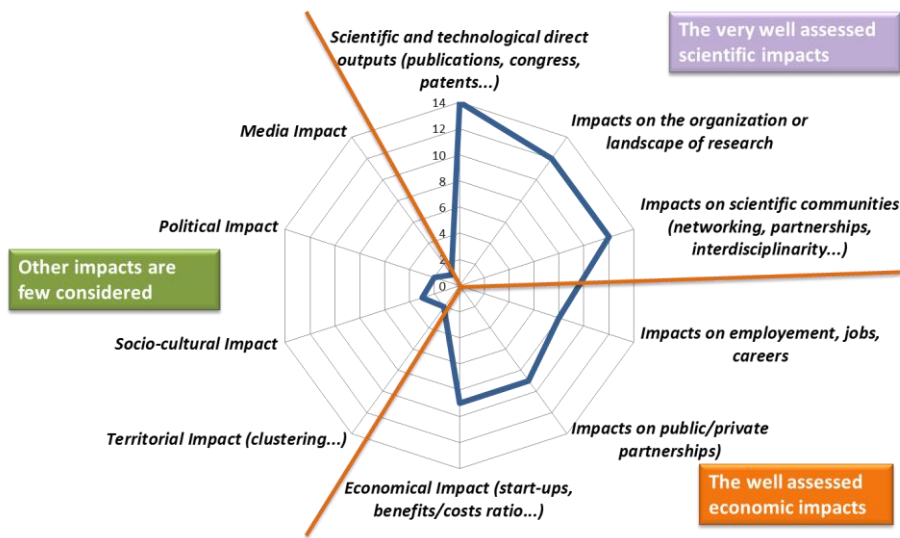


Figure 4: Visualization of the type of impact assessed

In general, what types of impact does your organization study?

Scientific and technological direct outputs (publications, congress, patents...)	Impacts on the organization or landscape of research	Impacts on scientific communities (networking, partnerships, interdisciplinarity...)	Impacts on employment, public/private jobs, careers	Impacts on public/private partnerships	Economic Impact (start-ups, benefits/costs ratio...)	Territorial Impact (clustering...)	Socio-cultural Impact	Political Impact	Media Impact
AUSTRIA	AUSTRIA	AUSTRIA	AUSTRIA	FINLAND	FINLAND	IRELAND	IRELAND (2)	SLOVENIA	AUSTRIA
FINLAND	FINLAND	FINLAND	FRANCE	FRANCE	FRANCE		NETHERLANDS	NETHERLANDS	
FRANCE	IRELAND (2)	FRANCE	IRELAND (2)	IRELAND (2)	IRELAND (2)				
IRELAND (2)	LATVIA	IRELAND	ROMANIA	NETHERLANDS	NETHERLANDS				
LATVIA	NETHERLANDS (2)	NETHERLANDS (2)	SWEDEN	ROMANIA	ROMANIA				
NETHERLANDS (3)	ROMANIA	ROMANIA	SWITZERLAND	SLOVENIA	SWITZERLAND				
ROMANIA	SLOVENIA	SLOVENIA		SWITZERLAND	UNITED KINGDOM				
SWEDEN	SWITZERLAND	SWEDEN							
SWITZERLAND	UNITED KINGDOM	SWITZERLAND	EUROPEAN COMMISSION	EUROPEAN COMMISSION	EUROPEAN COMMISSION	EUROPEAN COMMISSION			
UNITED KINGDOM		UNITED KINGDOM							
EUROPEAN COMMISSION	EUROPEAN COMMISSION	EUROPEAN COMMISSION							
TOTAL = 14	TOTAL = 12	TOTAL = 12	TOTAL = 8	TOTAL = 9	TOTAL = 9	TOTAL = 2	TOTAL = 3	TOTAL = 2	TOTAL = 1
Scientific impacts			Economic impacts			Other impacts			

Table 4: Type of impact assessed, by country

In the graph below (Figure 5), the number of responses by country, according to the different types of impact, show that Ireland and Netherlands consider a large range of impacts in their analyses: from scientific and technological direct outputs to economical and socio-cultural impacts. Switzerland and European Commission have also a diversified range of analysis. Portugal and Belgium, who don't conduct impact studies, do not consider these different types of impacts.

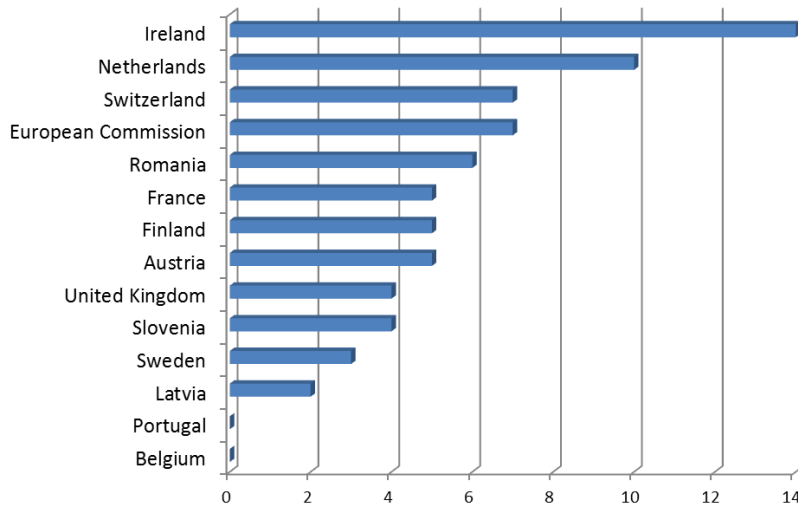


Figure 5: Number of positive responses about the type of impact assessed, by country

- The studies are mostly conducted at the project/program (12) and instrument level (10) (Figure 6):

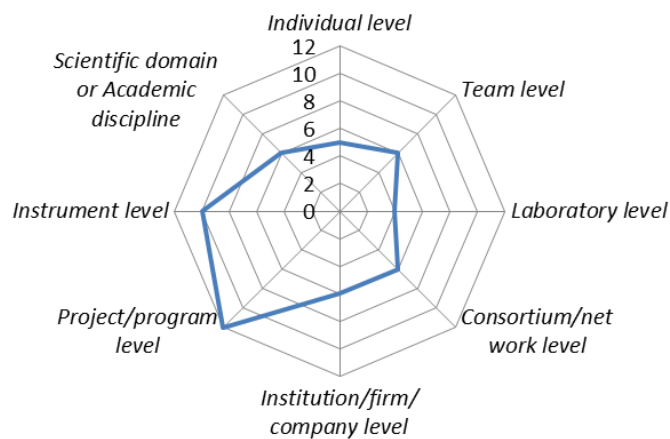


Figure 6: Visualization of the level of analysis in impact studies

- The main methods used are: bibliometrics (12), surveys (9), interviews (8), case studies (7) etc (Figure 7):

What are the main methods used by your organization to evaluate impact?

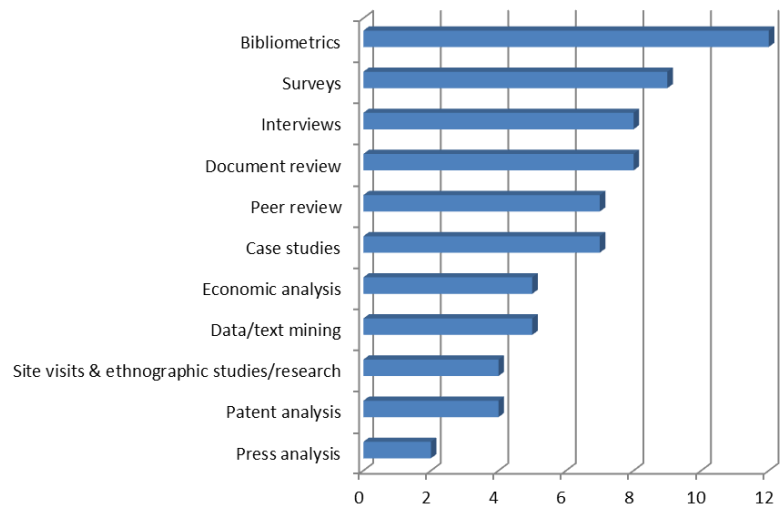


Figure 7: Visualization of the main methods used for impact studies

What are the main methods used by your organization to evaluate impact?

Bibliometrics	Patent analysis	Case studies	Data/text mining	Press analysis	Document review	Economic analysis	Interviews	Peer review	Site visits & ethnographic studies/research	Surveys
AUSTRIA FRANCE IRELAND LATVIA NETHERLANDS (2) ROMANIA SLOVENIA SWEDEN SWITZERLAND UNITED KINGDOM	FRANCE IRELAND ROMANIA	AUSTRIA FINLAND IRELAND NETHERLANDS ROMANIA UNITED KINGDOM	FINLAND IRELAND ROMANIA SLOVENIA SWEDEN	AUSTRIA ROMANIA	AUSTRIA FINLAND FRANCE NETHERLANDS (2) ROMANIA UNITED KINGDOM	FRANCE IRELAND SWITZERLAND UNITED KINGDOM	IRELAND NETHERLANDS ROMANIA UNITED KINGDOM	AUSTRIA FRANCE IRELAND NETHERLANDS ROMANIA SWEDEN UNITED KINGDOM	FINLAND FRANCE NETHERLANDS SWEDEN	AUSTRIA FINLAND FRANCE IRELAND (2) LATVIA ROMANIA UNITED KINGDOM
EUROPEAN COMMISSION	EUROPEAN COMMISSION	EUROPEAN COMMISSION			EUROPEAN COMMISSION	EUROPEAN COMMISSION	EUROPEAN COMMISSION			EUROPEAN COMMISSION
TOTAL = 12	TOTAL = 4	TOTAL = 7	TOTAL = 5	TOTAL = 2	TOTAL = 8	TOTAL = 5	TOTAL = 8	TOTAL = 7	TOTAL = 4	TOTAL = 9

Table 5: Main methods used for impact studies, by country

In the graph below (Figure 8), the number of responses by country according to the main methods used show that Romania and Ireland consider a very large range of methods to evaluate impacts: bibliometrics, patent analysis, case studies, data mining, interviews, peer reviews, surveys, press analysis (for Romania), economic analysis (for Ireland). Netherlands, France, United Kingdom, European Commission, Austria and Finland claim to use at least 6 different methods.

The choice of methods seems to depend on the type of impacts that is under consideration in the different agencies: for example Ireland and Netherlands who claim to study a large range of impacts (see above Table 4 and Figure 5) use also a large range of methods (see Table 5 and Figure 8).

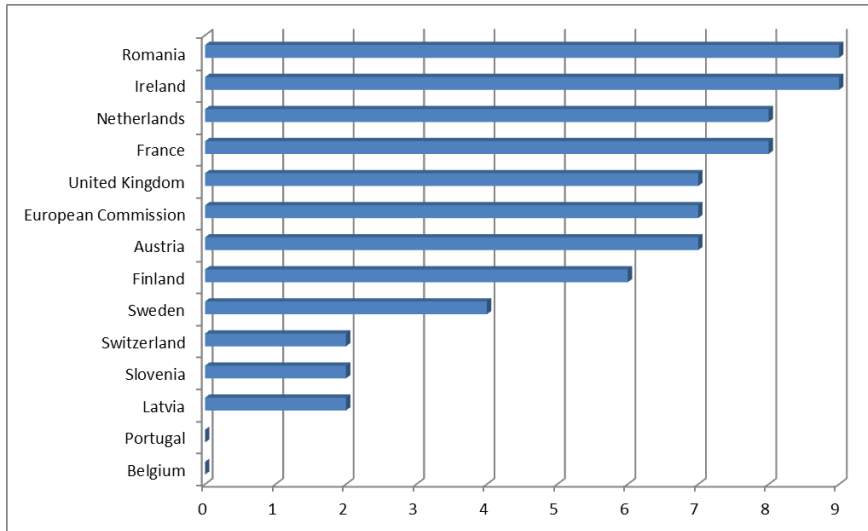


Figure 8: Number of positive responses about the main methods used, by country

- In majority (10), the methods used by the organizations are both quantitative and qualitative methods (Table 6):

<i>The main methods used to analyze impact are mostly</i>			
QUANTITATIVE (statistics, indicators, figures...)	QUALITATIVE (case studies, experience feedback...)	BOTH	NA
ROMANIA SWITZERLAND	NETHERLANDS (2) SWEDEN	AUSTRIA FINLAND FRANCE IRELAND (2) LATVIA NETHERLANDS SLOVENIA UNITED KINGDOM EUROPEAN COMMISSION	BELGIUM PORTUGAL SWITZERLAND
TOTAL = 2	TOTAL = 3	TOTAL = 10	TOTAL = 3

Table 6: Quantitative vs qualitative methods, by country

There is not necessarily a link between the choice of quantitative/qualitative methods and the types of impacts under consideration. Switzerland for example considers a large range of impacts (from scientific to economic ones) and principally uses quantitative methods. While agencies from other countries use in majority both quantitative and qualitative methods.

➤ The methods used depend on the area of research (Figure 9) :

9 organizations (out of 18) respond that assessment methods are specific to the area of research.

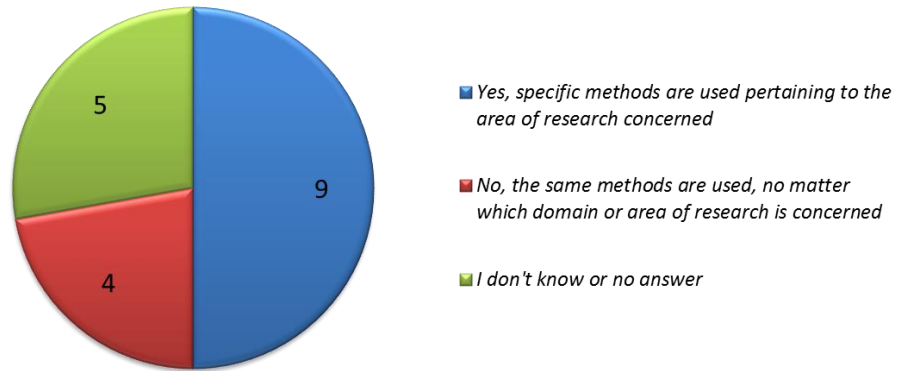


Figure 9: Specificity of the assessment methods

➤ Data collection is performed through different ways: case by case, in a systematic and standardized manner or both (Table 7):

How do you collect the data from the researchers or other individuals or organizations involved?

	Data are collected continuously, in a systematic and standardized manner	Data collection is determined case by case, depending on the study in question	Both	Not answered
Formalized implementation	FINLAND ROMANIA	IRELAND	IRELAND LATVIA UNITED KINGDOM EUROPEAN COMMISSION	
Progressive discussion without systematic implementation		FRANCE NETEHRLANDS (2) SWEDEN	AUSTRIA NETHERLANDS SWITZERLAND	BELGIUM PORTUGAL SWITZERLAND
Some references to the notion, but has not yet been applied	SLOVENIA			
	TOTAL = 3	TOTAL = 5	TOTAL = 7	TOTAL = 3

Table 7: Data collection procedure, by country

- To process the data, centralized platforms exist (9) but are not generalized (6) (Table 8):

	NO	YES	Yes, but it must be modified to correspond with our requirements	Not answered
Formalized implementation	IRELAND	FINLAND IRELAND LATVIA ROMANIA EUROPEAN COMMISSION	UNITED KINGDOM	
Progressive discussion without systematic implementation	NETHERLANDS (3) SWEDEN SWITZERLAND	AUSTRIA	FRANCE	BELGIUM PORTUGAL SWITZERLAND
Some references to the notion, but has not yet been applied		SLOVENIA		
	TOTAL = 6	TOTAL = 7	TOTAL = 2	TOTAL = 3

Table 8: Data analysis procedure, by country

- 5 organizations have developed specific indicators, which are described below (*verbatim*):
 - About scientific impacts:
 - “Publications in peer-reviewed high impact journals”
 - “Number of books”
 - “Number of joint public-private publications”
 - About economic impacts:
 - “Number of patent and request for patents”
 - “Patents applications and patents awarded”
 - “Share of participating firms introducing innovations new to the company or the market”
 - “Share of participating SMEs introducing innovations new to the company or the market”
 - “Growth and job creation in participating SMEs”
 - “Number of prototypes and testing activities”
 - “Licenses”
 - “Methods, methodologies & studies”
 - “New products/technology/services”
 - “Spin-off”
 - About other impacts:
 - “Funding leverage from other sources”
 - “Training metrics (PhD, master graduated)”

3.6 Section 5 - Results exploitation and end-users

- The impact evaluations are used for strategic decisions and management
- The end-users are mainly: government, policy makers, board of trustees, internal management
- These studies can also be used for media communication, most of them being made public, at least partially

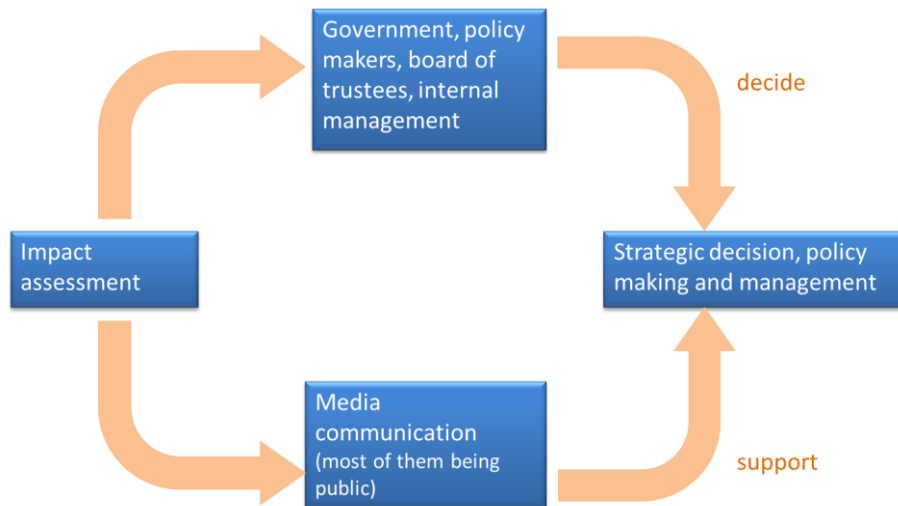


Figure 10: Workflow of impact assessment utility

- The organizations make several comments about examples of political decisions that have been based on impacts studies. It shows that final uses are slightly different depending on whether the organization is a ministry (national decisions, policies and laws, recommendations, culture of evaluation) or a funding agency (program management, communication, transparency) – (Table 9):

Country	Type of organisation	Are you aware of political decisions (organizational, scientific, regulatory...) made based on an impact study?
AUSTRIA	Funding Agency	<ul style="list-style-type: none"> Decisions on the continuation of FWF initiatives Fine tuning in programme management
IRELAND	Funding Agency	Programmes may be altered / discontinued or new programmes developed.
IRELAND	Ministry or government organization	<ul style="list-style-type: none"> The Enterprise Policy and Evaluations Unit in the Department of Jobs, Enterprise & Innovation has completed a comprehensive programme of evaluations of supports provided by the State Enterprise Agencies (Enterprise Ireland, IDA Ireland, and for Science Foundation Ireland programmes that have a touch point with industry) across three thematic areas: Start Up and Entrepreneurship (2012); Research, Development and Innovation (2012-2013); Business Development (2013-2014) The programme inputs were evaluated within the period 2003-2013. In total, these programmes covered €2.5 billion of approved expenditure across 50 different supports provided by IDA Ireland, Enterprise Ireland and the Local Enterprise Offices (formally CEBs when evaluated), in addition to SFI programmes that have a touch point with enterprises. Recommendations for change and improvement were made for each of the individual programmes and at a systematic level to improve data collection and implement a culture of evaluation for enterprise support programmes. These recommendations are now being implemented.
LATVIA	Ministry or government organization	Ministry of Education and Science is running national program on research capacity development, based on evaluation of research institutions .
ROMANIA	Funding Agency	<ul style="list-style-type: none"> Internal and external communication is constantly done. To communicate constant the results of activity is part of UEFISCDI strategy. The Scientific community, industry and universities are brought together in conferences, events and exhibitions to see "where the money is". Decision-makers are always invited. The website and social media are used to increase the visibility of research funding.
SLOVENIA	Ministry or government organization	Preparation of law
SWEDEN	Funding Agency	We are the prime Agency for giving advice to the government on research policy.
SWITZERLAND	Ministry or government organization	The reports produced by SERI play an important role in the parliament and government decisions with respect to education and research policies . This is especially true of reports concerning the involvement of Switzerland in international research programs and infrastructures.

Table 9: Detailed description of organizations awareness on political decisions, by country

3.7 Section 6 – TAIPI

In this section, respondents were asked about the types of impact that are the most relevant to study for the Graphene and HBP Flagships. Their responses are written below (*verbatim*):

- A set of impacts can be studied commonly in both Flagships:
 - “Progress relative to the Flagship initial goals”
 - “Scientific impact (by usual bibliometrics)”
 - “Socio-economic impact”
 - “Patents filing, new patents and licenses”
 - “Potential for new discoveries and new innovations”
 - “Update of national research priorities”
 - “The added value of the Flagship instrument (budget, nature of the consortium, duration)”

It was also raised that an online and easy-to-use system to collect information on outputs and impacts should be implemented for both Flagships.

- More specific impacts were also proposed for each Flagship:
- For HBP:
 - “Ethical impacts”
 - “Societal impacts (medical practices, economic innovations in health...)”
 - “Collaborations with industry, particularly in pharmaceuticals and medical technology sectors, as well as services (behavioral analysis)”
 - “Development of unified databases and algorithm for data processing (how many new computing and robotics technologies?)”
 - “Impacts on neurosciences (does the Flagship succeed in building large user communities for the planned ICT platforms? Are problems/research questions solved thank to these platforms?)”
 - “Number of hospitals using the results of HBP; number of patients cured or whose health improved; How many concrete improvements in the treatment of brain disorders?”
- For Graphene:
 - “Spin off and start-up companies”
 - “Potential for new products and services, additional business revenue associated with new technologies and products”
 - “Key enabling technologies”
 - “Societal impact”
 - “Collaborations with industry”
 - “Develop specific indicators on economic aspects: cost/benefits ratios, economic benefit, market share, energy/environment/health/electronics (...) benefits, private capital attracted”

3.8 Section 7 – Documentation

In this part, the respondents have the possibility to upload any documents that they find interesting for impact assessment studies:

Better Regulation guidelines, European Commission, 2015

http://ec.europa.eu/smart-regulation/guidelines/docs/swd_br_guidelines_en.pdf

Broadening the Scope of Impact: Defining, assessing and measuring impact of major public research programmes, with lessons from 6 small advanced economies, Public Issue Version, Small Advanced Economies Initiative, March 2015

http://www.smalladvancedeconomies.org/wp-content/uploads/SAEI_Impact-Framework_Feb_2015_Issue2.pdf

The impact of Tekes and innovation activities, 2015

https://www.tekes.fi/globalassets/julkaisut/vaikuttavuusraportti_2015_eng.pdf

The Impact of Tekes Activities on Wellbeing and Environment, 2014

https://www.tekes.fi/globalassets/julkaisut/wellbeing_and_environment_308_2014.pdf

Evaluating Impact of Public Agricultural Research (ASIRPA), INRA, 2014

<http://www6.inra.fr/asirpa>

FenRiam Full Guide: Proposal for a Foresight-enriched Research Infrastructure Impact Assessment Methodology, Research Infrastructures: Foresight and Impact (RIFI)

<http://uefiscdi.gov.ro/Upload/12fa1792-0d22-4d82-98e2-9269410ef10d.pdf>

Council Decision of 3 December 2013 establishing the specific programme implementing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)

http://erc.europa.eu/sites/default/files/document/file/Specific%20Programme%20Horizon%202020_council_decision_establishing_the_specific_programme_implementing_Horizon_2020.pdf

Digital Economy: Report of the 2012 RCUK Digital Economy Impact Review Panel, 2012

<http://www.rcuk.ac.uk/RCUK-prod/assets/documents/documents/RCUKDEconReport.pdf>

FP6 IST Impact Analysis Study, Final Report, December 2009

<http://cordis.europa.eu/fp7/ict/impact/documents/wing-pilot-fp6-final-report-18-12-09.pdf>

IST Impact Study, Methodology, 2004

<http://cordis.europa.eu/fp7/ict/impact/documents/methodology.pdf>

IST Impact Study, Mobile Domain, 2004

<http://cordis.europa.eu/fp7/ict/impact/documents/mobile.pdf>

IST Impact Study, Health Domain, 2004

<http://cordis.europa.eu/fp7/ict/impact/documents/health.pdf>

RTD Evaluation Toolbox: Assessing the Socio-Economic Impact of RTD-Policies, IPTS Technical Report Series, 2002

https://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/assessing_the_socio_economic_impact_of_rtd_policies_2002.pdf

3.9 Synthetic view by country

	FINLAND	IRELAND	LATVIA	ROMANIA	UNITED KINGDOM	EUROPEAN COMMISSION	AUSTRIA	BELGIUM	FRANCE	NETHERLANDS	SWEDEN	SWITZERLAND
Current status of reflection around the notion of « impact »:												
Formalized implementation												
Progressive discussion												
Studied impacts:												
Scientific												
Economic												
Other												
Main methods used:												
Both												
Qualitative												
Quantitative												
Main methods used (bis):												
Bibliometrics												
Surveys												
Interviews												
Document review												
Peer review												
Case studies												
Economic analysis												
Data/Text Mining												
Data collection:												
Both												
Case by case												
In a systematic and standardized manner												
Data process and exploitation:												
In a centralized platform												
In a centralized platform punctually modified according to requirements												
No platform												

Table 10: Synthetic view of the main answers given by the most advanced organizations in terms of impact assessment. A coloured box indicates a positive answer.

This representation is based on a part of the results presented above (§3.3 and 3.5).

Table 10 represents a synthetic view of the answers given by the most advanced organizations in terms of impact assessment.

Differences are observed between organizations who declare to have a formalized implementation and those who are having on-going discussions without systematic implementation:

- The most advanced organizations generally use both types of methods: qualitative and quantitative ones
- The range of methods used by the most experienced organizations is very diversified
- To conduct their studies, these organizations collect data from outside both in a systematic and standardized manner, and also case by case depending on the study in question
- The most experienced organizations systematically process and analyse the data through a centralized platform.

4. OVERVIEW OF THE SURVEY'S RESULTS BASED ON ADDITIONAL INTERVIEWS

The results from the online survey provide an overview of the status impact evaluation in Europe, which allows to identify both the trends and the organizations' specificities. Nevertheless, it has limited value to explore more deeply the organizational and historical set-up of impact assessment activity and to understand why specific choices have been made and what is the view of the actors on this work.

To complete the quantitative analysis of the survey, interviews have been conducted with actors involved directly in impact evaluation within these organizations. Interviewees' selection has been conducted to account for the vast diversity of expertise and experience in the field across organizations.

Five interviews have been conducted and included both agencies declaring advanced activity on impact evaluation and agencies which didn't.

The list of questions (see Annex 2) explored how impact evaluation is perceived within the organizations and what constraints those actors deal with. In addition to the results of the online survey, interviews provided an overview of the different impact assessment practices that are implemented in some European organizations involved in funding policies:

- A first interview was organized with Sue Smart, Head of Performance & Evaluation at EPSRC – United Kingdom (19th July 2015)
- A second one was organized with Pekka Pesonen, Chief Advisor at TEKES - Finland (23th July 2015)
- A third one was organized with Lucia Russo, Policy Analyst at DG CONNECT at European Commission (18th September 2015)
- A fourth interview was organized with Bérangère Virlon, Head of Studies and Impact Assessment at ANR – France (30th September 2015)
- A fifth interview was conducted in 2013 (during a first step of the study) with Raphael Beck and Jean-Claude Kita, in charge of the Strategic Foresight Division at FNRS - Belgium, Wallonia

The main results of these interviews are presented below:

4.1 How is impact defined and what are the main methods used?

Overall, the results of these interviews show that there is no unified methodology for impact assessment. This is mainly explained by the polysemous meaning of impact which strongly depends on the nature of the funding initiatives, and more broadly on the scope and context in which these initiatives are undertaken. The impact can cover any output related to the effect on the outside of the agency. Then, the division of task inside the organization and the local needs have a strong implication in defining what impact means.

The notion of impact can be interpreted from different manners:

- For the **European Commission**, “impact assessment” covers *ex ante* evaluation that is performed for policy design. The notion of “impact assessment” as it is defined in the present survey is referenced as *ex post* evaluation in the European

guidelines. Impact assessment is performed through a strong division of work inside the Division: conception of guidelines, monitoring activities, qualitative studies.

- In the **UK research councils**, impact is defined as the demonstrable contribution that excellence research makes to society and economy. It has been partially formalized at the national level but is interpreted within each research council to match their specificities.
- At **TEKES**, the notion of impact is related to innovation and business. Impact assessment is routinely performed to ensure that there is a good return on investment of the funding activities.
- At **ANR**, impact assessment is not yet implemented, but the questions under investigation will include the effects of ANR on the national scientific production, on the scientific/economic ecosystems and on the research offering.
- At **FNRS**, impact can be both outputs statistics and specific investigation ordered by the direction.

The surveyed agencies generally consider impact assessment as an integral part of evaluation activities. Nevertheless, units dedicated to impact assessment usually don't have a unique standardized procedure, but instead operate on a case by case basis according to the fields, the requests, the needs and the resources. Some agencies have produced guidelines and methodological frameworks (UK, European Commission, TEKES) that give indications of what is expected by the different funding programs and lists the information needed to be collected to ultimately measure and report performance indicators.

The impact activity usually includes a significant amount of monitoring and reporting activities on publications, patents, business creation, awards and prizes, successes to other calls for proposals etc. Bibliometrics is one of the most frequently used methods. These analyses can be easily and routinely implemented: they rely on indicators that are known, understood and comparative. Statistical and datamining analyses can also be performed from the data collected by the agencies at the project/program levels. However, it is not always sufficient to gather information about the full range of existing impacts.

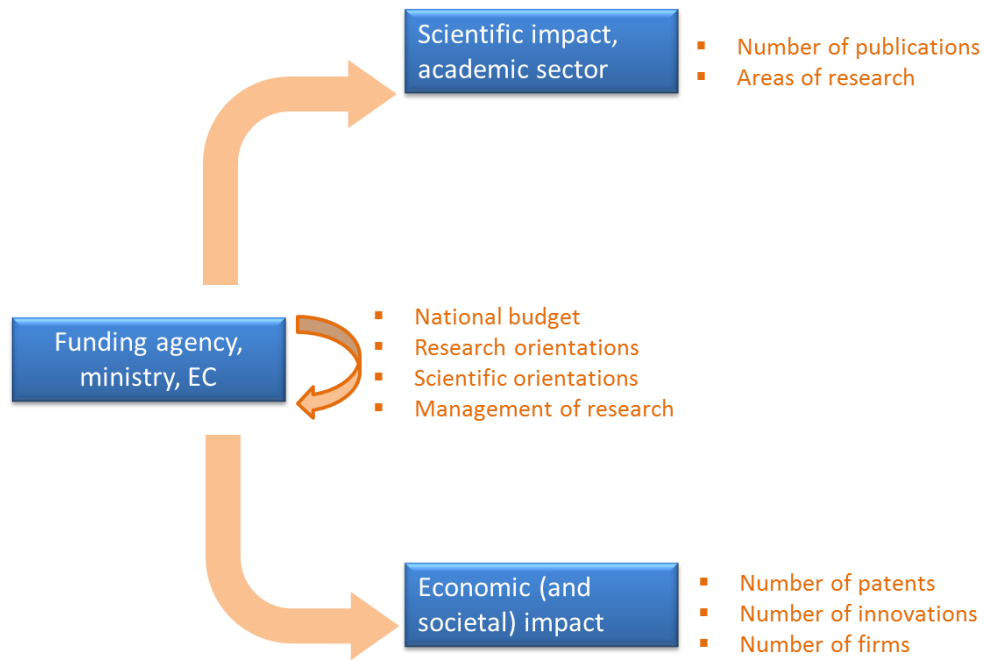


Figure 11: Diversity of impact assessment

In order to refine their analyses, some funding agencies try to trace back the so-called “impact pathway”, to highlight how the research outputs were disseminated outside the academic world to be finally used by socioeconomic actors. Agencies such as EPSRC, TEKES or European Commission perform sophisticated qualitative and *ad hoc* studies as: case studies, success stories, cost/benefits studies, econometric studies or counterfactual analyses. These approaches may be useful to demonstrate that research and socio-economic effects are related but they require time, know-how and expertise. They are more related to R&D activity and often call upon the contribution of external and specialized consultants.

4.2 How is the activity of impact assessment organized?

For all interviewed organizations, impact is a matter of concern, even if no substantial activities are currently done. This takes two forms:

- the actors involved in performing such evaluation, are interested to increase their skills, both through internal prospective and exchange with other actors,
- the tasks of impact evaluation tend to be identified as a specific function inside the agency with a dedicated budget even if it seems generally limited with respect to the complexity of the aims.

From an organizational standpoint, the teams dedicated to evaluation and impact assessment are composed of about 3 FTE persons. The annual budgets can vary from 100 k€ to 500 k€. The main activities consist in:

- Monitoring and reporting activities,
- Statistical analyses,
- Qualitative and *ad hoc* studies,
- Methodological support and advice,
- Curating data and maintaining databases.

Most often, the analyses are performed at the corporate, the program or the instrument level.

The final reports are generally published online and working closely with the communication teams is often mentioned as to be important to ensure that the information arising from evaluation activities is effectively communicated to the key audiences.

There are some variations and specificities according to the agencies:

The EPSRC (UK) for instance has a relatively independent unit of 10 people that includes a set of functions:

- Publications and reports addressed to the council and national levels,
- Support and advice to the other internal teams who can ask for data analysis services,
- Foresight about the metrics that can be used and developed for impact assessment.

The role of the team is to provide information and evidence of what EPSRC has achieved in relation to its objectives. The team also manages the development of policies on Open Access publications and research data management. The skills and profiles of the analysts are multidisciplinary, with a strong emphasis on data analysis and data science.

4.3 What are the technical considerations to take into account when conducting impact studies?

Impact studies are based on the use of quantitative and qualitative data. Thus, all technical considerations, the choice of tools and methods are largely based on a “data-driven” management. It is pointed out by the interviewed actors that strong efforts have to be made i) to ease access to these data, ii) to improve their quality, and iii) to facilitate their processing.

Much of the data is provided by the researchers in a self-declarative way through final reports or dedicated surveys. In several agencies, the process to collect and gather this *ex post* information has been automatized. A database was created at European Commission since the two last years of the FP7 and was adapted for H2020 needs. In UK, since 2014, all 7 research councils have moved to a harmonized system (Research Fish) which enables to collect and share information on the outcomes of the projects. Once collected, the data are cleaned, processed and tailored to the specific questions being asked, they tend to form an input to expert discussions rather than an output in itself.

Other sources of data can be used to complete these self-declarative data, for example data on innovation, on countries and regions (Eurostat), on publications (Pubmed, Scopus, WoS) and patents (Patstat) etc. For example, the Web of Science (WoS) database, and more recently the Scopus database also, enables to grasp information about the funders who supported the project from which a given publication emerges. A growing number of agencies strongly encourage the supported teams to mention the name of the funder in a standardized way in the acknowledgement section of their articles.

4.4 What are the main difficulties and the envisaged solutions?

All actors interviewed consider impact assessment as a challenging activity. The main difficulties mentioned are:

- It may be difficult to cope with both the exploratory character of this evaluation activity (which needs time to be relevant) and the constraints of the politic demand (which needs rapid and reliable answers for strategic decisions)
- It is needed to be very clear on the purpose and the audience of the impact study (even if the final results and uses are not known in advance), as this should inform the approach used
- Another issue that is raised is about timing and lags needed to perform the analyses. The necessary time to observe the impacts of science is generally estimated to 20 years. It is not always possible to work retrospectively on such long periods of time
- There is another issue about the attribution of impact. It is not trivial to identify and isolate the proper impact of a given policy. A funding policy for example is rarely disconnected from other strategic initiatives or other contributive actions. The results of impact studies need to be addressed within the context and the main purpose of the study. Impacts need to be considered as resulting from a global synergic action led by a great variety of stakeholders (other funders, researchers, private sector, and all sorts of other intermediaries...)
- Most of the impact cannot be easily quantified or aggregated, so it is challenging to define appropriate, sensitive and robust metrics and indicators
- It is necessary to get harmonized, centralized and reliable data as soon as possible when the funding policy or the program action is launched. In any cases, a high quality of the data has to be ensured
- Significant resources and budgets are needed, as well as a skilled staff in data and policy analysis

To tempt to overcome these issues, some solutions and developments are proposed by different agencies:

- Production of frameworks, guidelines, definitions and standardized processes is encouraged. In UK and at European Commission, for example, several reference documents are produced to help the different UK councils and European units to work on a common basis
- Discussion with stakeholders is necessary to define common and relevant metrics
- Steering groups of experts are mobilized to monitor field-specific analyses and to help to contextualize the results

- The data have to be centralized in a dedicated online portal, and well-suited information systems have to be implemented to be able to treat and exploit massive data
- To clean and complete the data, external actors can be subcontracted. To check the data validity, comparisons with other data sources such as publications or patent databases (Scopus, WoS, Patstat...) can be done
- Counterfactual analyses can help to attribute more precisely the genesis of impacts

4.5 Are there particular needs about the Flagships evaluation?

A general remark is that no specific evaluation study is planned for the Flagships in any of the surveyed agencies. They probably will be evaluated at a very global level (program or instrument level), but no specific indicators have been designed at present. The agencies' suggestions to TAIPI team are to develop a common set of indicators, as well as specific indicators depending on the area of research:

- For Graphene Flagship: it is suggested to focus on the technology development and exploitation/commercialization activities. Another suggestion is to follow if and how the TRLs have evolved between the beginning and the end of the Flagship
- For Human Brain Project: it is suggested to focus on the knowledge and research outputs, including impacts across other research disciplines.

It is interesting to see that the surveyed persons (originating from the evaluation teams of the funding agencies) seem not to be very well informed on the Flagships and their expected impacts.

5. CONCLUSION: LESSONS LEARNED FOR TAIPI

Impact assessment is an important activity requiring a lot of reflections, initiatives and actions. Both academics in science policy and funding organizations are directly interested by the questions raised by impact evaluation which needs new concepts, new methodologies, and new ways of working¹. The actors have to deal with both the complexity and the pressing demand of policy makers who need reliable information about the return on investment of their funding policies. This topic is common to all organizations worldwide, but for the moment there is no real consensus on the definition, nor on the methodological aspects of impact assessment. This lack of reference contributes to heterogeneity in the impact assessment practices among the European countries, despite the recent emergence of guidelines and reflection networks.

Impact can be considered and used in multiple ways. According to the needs that are expressed in the different organizations, definitions and approaches can considerably vary. For example, the final users and audiences of these analyses are slightly different depending on whether the organization is a ministry or a funding agency. Each organization has its own point of view, greatly depending also on the national context. There are also different needs and uses according to the areas of research under consideration.

Another characteristic of impact assessment is that both quantitative and qualitative approaches are often necessary to explore all possible impacts. If some quantitative methods are relatively well-established and easy to manage (production of simple indicators for instance), some other approaches in particular qualitative approaches (as cases studies or counterfactual analyses) are more complex to generalize because they require time, know-how and expertise. These analyses are often externalized, but this implies the availability of substantial resources and the involvement of qualified contractors.

To initiate their impact studies, it is apparent that organizations first investigate the scientific outputs of research, for which standard methods already exist (counting methods on publications, or bibliometric tools as those developed from the Web of Science). Economic impacts are also studied through reporting and counting methods (number of patents, licences, creation of start-ups for example), but to evaluate more indirect effects (on jobs, careers, productivity and so on) more sophisticated approaches are necessary. To address this issue, funding organizations build upon methodological models that are regularly developed in reports and research articles as those developed by OECD. Concerning the long-term impacts on society, environment, and health, no common definitions nor analysis criteria are available. Point studies are conducted to decipher these questions. This should progressively contribute to enrich the reflection, but time is necessary to obtain a convergence between the stakeholders and to produce methodological standards well-adapted to these impacts.

Impact assessment is still an exploratory activity. Translating the demand of policy makers in generic tools to characterizing and measuring the great diversity of impacts is not trivial. One

¹ Some recent initiatives have tried to answer those questions through new frameworks, as Matt, M., Colinet, L., Gaunand, A., & Joly, P. (2015). *A typology of impact pathways generated by a public agricultural research organization*.
or Nedeva, M., Braun, D., Edler, J., Glaser, J., Laredo, P., Laudel, G., Whitley, R. (2012). *Understanding and Assessing the Impact and Outcomes of the ERC and its Funding Schemes Final Synthesis Report*.

challenge of this activity is to develop robust methods and skilled-staff to do this with relevance, reliability and reproducibility.

From an operational point of view, it is often tricky to move from theoretical approaches to concrete practices. The teams dedicated to impact assessment try to implement the actions as well as they can but are often limited by difficulties related to data, resources and skills. For example, the teams have great difficulties to get, to curate and to process the data from inside or outside the agencies. Those who perform better have been able to create a stabilized database with a clear nomenclature and a procedure to add information (for instance, Research Fish for the UK Research Councils). This issue is commonly observed and a growing number of initiatives are undertaken at the European level (*cf.* Science Europe) to try and harmonize nomenclatures and data management.

It appears from this survey that some form of convergence and common methodological frameworks are needed and expected. Even if local specifics have to be accounted for, comparative studies, common metrics and standardized methods are needed across countries and agencies to create a shared language. First, because some questions are common whatever the organizations (impacts on scientific production, impacts on jobs and careers, impacts on economy, on society etc) and it would be useful to rely on common methods and tools to measure these dimensions. Second, it is crucial to have common approaches in order to ensure cross-organizations or cross-countries comparisons. Third, because more and more funding policies and funding instruments are collectively managed by different countries around the world which implies to develop shared tools and pools of data to study the impacts of these joint actions.

In this context, TAIPI is proposing a common framework and a pool of metrics to tend to measure the impacts of both Flagships “Human Brain Project” and “Graphene”. The expected impacts of each Flagship are well identified by the interviewed actors, even if the specificities of these funding instruments are not necessarily clearly spotted. Specific indicators have been suggested, in addition to the core indicators set suiting both Flagships.

Multiple benefits will ensue from this initiative, both for the Flagships, the involved funding organizations, the European Commission and the OECD. TAIPI is an interface between different actors, their needs and expectations, and through that becoming a meeting point to innovate by promoting a better knowledge on the Flagships and their expected impacts, by providing frameworks and tools easy to appropriate by several users to study these impacts by their own means, and finally by contributing to enrich the reflection on common practices for impact assessment.

6. ANNEXES

6.1 Annex 1: Questionnaire used for the online survey



TAIPI_Survey_FinalVersion.pdf

6.2 Annex 2: Questionnaire used for the interviews



TAIPISurvey_Grid-Interview_Vf.pdf