



European
Commission

The European Commission's Science and Knowledge Service Joint Research Centre

Evaluation of its relations with industry

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THE EVALUATION PANEL

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Foreword by the Director-General

Some months ago, I asked a panel of top personalities from the world of industry and business to review the JRC's activities with a view to possible improvement of our interactions with this important group of stakeholders.

An important motivator behind this question was the wish to see an effective interaction between the JRC and industry to get more from our relationship than what we have at this moment. I am very grateful for the panel's direct and inquisitive approach to the challenge of our diffuse set of questions.

The report in front of you presents a comprehensive analysis of our questions and a variety of possibilities for further action. It fully meets the expectations I had set beforehand, and it presents to us a number of very imaginative and useful suggestions.

It is my intention to make good use of the recommendations for strengthening the JRC's relationship with industry and to make its contribution to the competitiveness of European industry more explicit.

Many thanks to Björn Stigson, Jeroen van der Veer, Gianfelice Rocca, Maria Garaña and Ivan Štefunko for making available their huge experience from the world of business and enterprises, in particular in the relations between governments and industry.

I look forward to further developing the JRC's activities along the lines suggested in the report together with my colleagues in the Commission.

Vladimir Šucha

Director General

Preface by the Chairman

In late 2016 our panel accepted the task to evaluate the JRC's relationship with European industry and I had the honour to chair this panel with distinguished colleagues from the world of industry and business.

The evaluation turned out to be a highly interesting assignment. It brought us into contact with a not very well known part of the European Commission that plays a key role in providing the scientific and technical background for the preparation and implementation of many EU policies, regulations and standards. Many of these have a direct influence on industrial performance, competitiveness and the functioning of the internal market.

Having seen the full extent of the activities and the responsibilities of the JRC as the Commission's Science and Knowledge Service, the question whether there is scope for enhancing the JRC's relationships with industry receives a solid 'yes' and I reveal the three messages to the JRC how we see that further success can be achieved, i.e. by:

- Organising specific operational improvement
- Working more consciously with industry
- Taking initiative to enhance the EU innovation ecosystem.

These three headlines should encourage the reader to continue reading the full report, to

discover the underlying ideas and ways to implement them, as this is all elaborated in more detail.

With my panel members I believe that our analyses and suggestions in the report can help in achieving better structured and more visible interactions with business and enterprises, for mutual benefit.

I am grateful to my fellow panel members for their dedication and the substantial time and effort that they have invested in providing this advice to JRC.

Speaking on behalf of them, I would like to thank the Director General of the JRC, Vladimir Šucha, for taking this bold initiative and giving us complete freedom to do our work. The support to us from his colleague Pieter van Nes, his team and other JRC staff has been excellent and crucial for the successful completion of our task.

We believe that our findings can be valuable for the future JRC strategy and increased synergies with European industry.

Last but not least our idea is that this report is not an end-product; it should start a new process with much tighter relations with industry. We believe that this can contribute to strengthening the innovation capability and competitiveness of the EU economy.

Björn Stigson

1

Introduction

This report presents our evaluation of the European Commission's Science and Knowledge Service (Joint Research Centre - JRC), regarding the importance of its activities for European industry and whether it could enhance its relationship with industry. Note that the term 'industry' does not refer exclusively to manufacturing and production companies, but indeed covers the full composition of the industrial fabric including business, services and SMEs.

We accepted this assignment out of our general interest in good relationships between governments and industry, assuming that our experience could help creating a closer relationship between JRC and industry (see Annex 1). While the JRC was largely unknown to most of us at the start of the evaluation, once informed about the expertise and the pan-European role of this highly competent Commission service, we believed that a clearer branding of the organisation would allow industry and consumers to recognise what it does. We made this observation very early in the work and wanted to retain this as a general recommendation for improvement upfront.

Service brand

- Few people associate the brand name Joint Research Centre¹ with the tasks that it fulfils. We strongly felt that it is a misnomer for the Commission department that we were evaluating.
- The JRC leaves its mark in technical parts of a range of policy files that affect business enterprises and industry, as well as standards, tests and measurements. Branding

is a key instrument to stand out and be easily recognised by the people that one hopes to reach. However, business enterprises and industry in our networks do not know the JRC for its name or influence.

- Last year the JRC 2030 Strategy² started to brand the Joint Research Centre as 'The European Commission's Science and Knowledge Service', which we believe is a much clearer service brand; it much better shows the focus of the organisation.
- We fully endorse this service brand and underline our intention by using the alternative name of the JRC in the title of our report and as often as reasonable in text.

Having dealt with this first important observation we could start our actual evaluation task as follows.

Methodology

- We analysed background documents and a series of executive briefings prepared for this evaluation and consulted the [EU Science Hub](#) of the Commission's Science and Knowledge Service - JRC to familiarise ourselves with the capacity, the competence and the role of the subject of the evaluation.
- We had a number of focussed meetings with management representatives of the Commission's Science and Knowledge Service in Brussels, Ispra and Seville and visited a selection of its laboratories and unique research facilities, which are spread across five different countries.
- We revisited our mandate to make a workable interpretation of the many evaluative questions. In fact they were too many to be treated in detail individually in a

¹ The Euratom Treaty of 1957 charged the Commission 'to establish a Joint Nuclear Research Centre'. Nowadays at least 70 % of the work of the organisation is outside the nuclear domain.

² The European Commission's science and knowledge service: [JRC Strategy 2030](#)

compact exercise like this. Our interpretation of the mandate, given in the subsection below, helped focussing the discussions on the areas where we believe the evaluation would benefit most from our experience.

During the assessment, we focussed our attention in particular on:

- JRC activities with an expected or assumed importance for industry;
- Interactions with industry in areas like energy, transport, food safety, health, environment, sustainability and the digital economy and society, and considering whether there is scope for a more efficient collaboration with EU industries;
- Innovation, a broad area where the JRC can contribute in various ways, e.g. regarding the European dimension of test beds and demonstrators, and helping start-ups by giving access to JRC research infrastructure and test laboratories, or addressing aspects of standardisation, ‘regulation and innovation’.

Interpretation of our mandate

The diversity in the questions in our terms of reference (Annex 2) indicates that practically every aspect in the relations between the JRC and

industry is uncharted territory. While most parts of the work and the programme seem to be well underpinned, we could not start from a clear vision about relations of the JRC with industry or any structured view of how this should be. Hence, we agreed to focus on the bigger picture, to help establish a general framework for the JRC to work in; a framework to help the management solve the most of the important issues.

As a general mission for this evaluation we took ‘to help the JRC optimise its interactions with industry’, and we structured our assessment around three key questions:

[What is the current relation between the JRC and industry?](#)

[What role could the JRC pursue?](#)

[Where can /should relations be enhanced?](#)

The following three chapters respectively deal with these questions, and we complete our findings with a chapter of conclusions and recommendations.

Finally, we have identified some issues that merit further attention in a future update of the JRC strategy. They are included in Annex 7 at the very end of the report.



2

Relationships between the JRC and industry today

2.1 The JRC work programme and industry

Like for any other part of the European Institutions, coming to grips with the role and the responsibilities of the Science and Knowledge Service of the European Commission (JRC) is not possible without a fair idea of the background and the functioning of the European Union.

Started in 1957 as the Joint Nuclear Research Centre, this department of the European Commission has a history of 60 years with a laboratory infrastructure where it actually carries out research and related activities. Its work programme today is focussed on science support to EU policies. It translates political priorities into key orientations that direct the work in its six 'knowledge-production directorates', as illustrated in Figure 1. These directorates are physically spread over the JRC establishments in Ispra, Seville, Karlsruhe, Geel, Petten and Brussels.

The JRC's annual income statement shows EUR 372 million funding from EU research programmes³, plus around EUR 70 million from work under contract. Its expenditure concerns mainly people, with infrastructure as the second largest item in the budget. Around thirty per cent of its funding comes from the Euratom programme for nuclear research. Our evaluation is focussed on the 'other' seventy per cent commonly referred to as 'non-nuclear activities'. Faced with such a non-descriptive identifier for its main responsibilities, we wondered what actually the core business of this Commission department is.

An evaluation panel in 2015 already pointed out that 'non-nuclear' is not consistent as a label for the JRC's core business, but what is the

alternative? The JRC 2030 Strategy describes the core business of the JRC as:

'... work across many different policy fields, from regional development to agriculture, environment and energy. It contributes to the Commission's impact assessments prepared for legislative proposals, particularly through its economic analysis and modelling. It carries out pre-normative research and develops standards, harmonised methodologies, reference measurements and materials, which are critical for innovation and the internal market, as well as environmental protection and consumer protection. All of this is essential for the uniform implementation of EU legislation, especially for establishing regulatory limits'.

In our deliberations, we made an attempt with 'science for better policy' and the even simpler label 'science for policy'. We also used 'metascience' or regulatory science⁴, which is characterised by many activities that are also typical for the JRC, like monitoring, evaluation, screening and meta-analysis, developing new tools, standards and approaches to test the safety, efficacy, quality and performance of certain products, dissemination of information and knowledge.

The JRC does so many things and besides this, it also has to attract and educate good people, help create innovative conditions and so on. Overall, we were impressed by the breadth of activities and the quality of the human resources that can do all this nuclear research and 'science for policy' in one work programme and how that thrives.

³ EUR 260 million from the Horizon 2020 and EUR 112 million from the Euratom research programme in 2017

⁴ Regulatory science concerns the application of science to support 'policy' in making science-based decisions, notably for regulatory objectives.

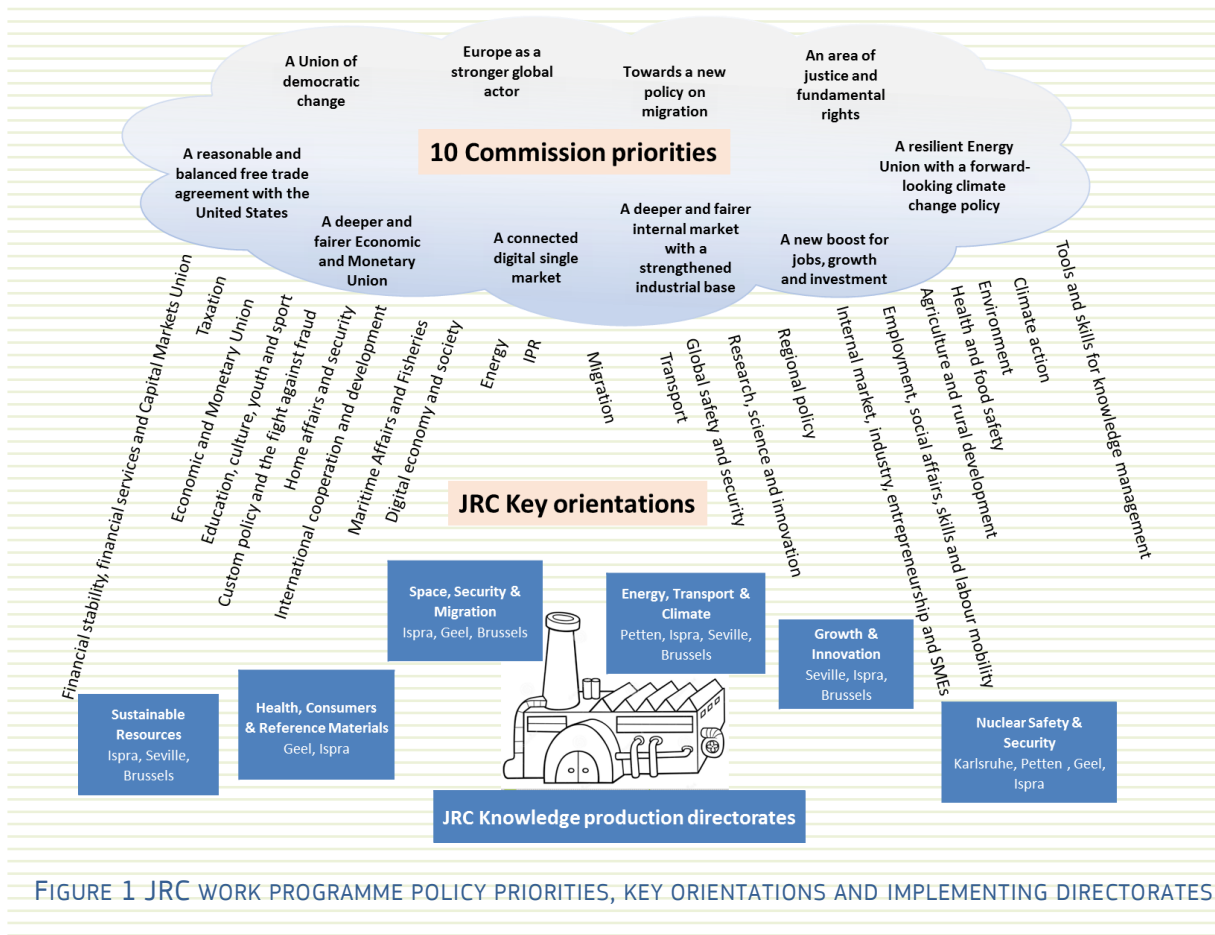


FIGURE 1 JRC WORK PROGRAMME POLICY PRIORITIES, KEY ORIENTATIONS AND IMPLEMENTING DIRECTORATES

Figure 1 shows how Commission priorities trickle down via key orientations of the JRC’s work programme to become work for the knowledge production ‘plants’ of the JRC. However, the mechanisms through which this all comes together in one programme, executed at the different sites of the JRC, are more complex than the figure suggests. And we noticed that the JRC takes on so many tasks, that we were glad to see a 2030 Strategy, which should help to distinguish between what the service *can* do and what it *should* do.

One important question to answer in this evaluation is, whether industry is appropriately involved in JRC activities, and to what extent. In this respect, we all agreed that we needed to look further into the possibility of involving industry in the establishment of the JRC work programme and elaborate the issue in Chapter 3, about enhancing relations with industry.

Furthermore, we noticed that the monitoring routines for the work programme produce hardly any information that can help in answering questions like the one about industry involvement. There was for instance no quantitative data on

the involvement of industry in JRC projects and we asked the JRC to establish this through an ad-hoc survey, as described in Annex 3 to this report. The result indicates that industry is involved in at least 53 % of the projects. For half of these projects, this is a formal, structured involvement.

Industry involvement is rather concentrated in four out of the twenty-three key orientations of the work programme, namely:

- Internal market, industry, entrepreneurship
- Health and food safety
- Energy
- Environment

This leader group takes two thirds of the projects. A group of ‘followers’- i.e. Digital Economy and Society, Transport, and Climate Action - shows 3 or 4 projects each. This was much-needed statistical background information, besides the many circumstantial and qualitative examples of industry involvement that we received during the discussions.

Annex 4 summarises some of this anecdotal evidence of significant contributions and support given to: capping road transport emissions for the

Horizon 2020: JRC activities shall amongst others focus on industrial leadership

- *Contribute to European competitiveness through support to the standardisation process and standards with pre-normative research, development of reference materials and measurements, and harmonisation of methodologies in five focal areas (energy; transport; the flagship initiative 'Digital Agenda for Europe'; security and safety; consumer protection).*
- *Carry out safety assessments of new technologies in areas such as energy and transport and health & consumer protection.*
- *Contribute to facilitating the use, standardisation and validation of space technologies and data, in particular to tackle the societal challenges⁵.*

new on-road tests for cars; analysing the competitiveness of the EU's oil-refining sector: fitness check; running the European Integrated Pollution Prevention and Control Bureau; the revision of nanomaterial definition; a new information system on raw materials and online services for the Digital Single Market.

Finally, bibliometric analyses of the scientific literature show that JRC scientists have a good deal of contact with scientists from industry. They publish 3½ % of their peer-reviewed scientific articles together with private-sector partners (business enterprises and industry). While this share is lower than that of comparator organisations like Fraunhofer (DE), TNO (NL) and VTT (SF), it is on par with NIST in the United States or the CEA in France, and significantly higher than for most of the universities and other academic science organisations.

2.2 Industrial leadership: the invisible task

In our discussions with the JRC we tried to understand how it deals with industry, in particular since we noticed that the Horizon 2020 programme drives the JRC into the direction of industrial leadership (see the text box above), which is one of the three priorities of the programme⁵.

However, the new 2030 Strategy says little about the contribution of the Commission's Science and Knowledge Service to European competitiveness. The detailed work programme is not more specific; it serves the industrial-leadership target

in lacklustre language, like '*support to standardisation and reference measurements*'. Furthermore, we missed monitoring and reporting information from the project cycle about how and what the organisation is delivering on the Horizon 2020 industrial leadership priority.

The analysis of the actual work in Annex 3 shows that at least half of the JRC projects involve industry appropriately in sufficient degrees and we have seen enough examples of this during the evaluation. Hence, the concern is not whether the JRC contributes to European competitiveness or not, but that there should be much more documented information on why and how industry is involved in the JRC's work and in which way this work contributes to the competitiveness of European industry.

In the presentations of the JRC and in the discussions, we were encouraged by the pragmatic approach to the involvement of industry through its mandates for standardisation, harmonisation, measurement and testing, including a specific mandate from Horizon 2020 to undertake innovation activities on behalf of the Commission.

Serving European competitiveness is part of the genetic makeup of the JRC, but it is not visible in its strategy or its work programme. Note that the JRC has one hundred per cent match with the core mission that the European Association of Research and Technology Organisations (EARTO) has for its members⁶.

⁵ The Horizon 2020 research programme focuses on three priorities: generating excellent science, fostering industrial leadership, and tackling societal challenges.

⁶ This core mission of an RTO is: '*to harness science and technology in the service of innovation, improve quality of life and build economic competitiveness*'. Many European countries have set up RTOs at

Thus, we began to see a JRC that is also fulfilling the role of a Research and Technology Organisation (RTO) with a pan-European dimension; a unique role clearly embedded in today's mandate of the JRC under Horizon 2020.

KPI missing

The JRC judges the relevance of its work merely on science and policy support. Two of its current key performance indicators (KPIs) measure precisely these two aspects, and the others measure performance on international relations, contract income and compliance with internal rules. It has no KPI or any other metric on its stated objective to contribute to industrial leadership (in Horizon 2020), or its success in relations with industry.

From a business perspective, the appropriate set of KPIs always reflects and measures key drivers of business value. They concern activities that, when executed properly, guarantee future success. Such KPIs monitor the value drivers that move the organisation in the right direction to achieve its stated financial and organisational goals. This applies equally well in the public sector. **You cannot improve what you do not measure.**

Therefore, if the JRC wants to optimise its interactions with industry, it has to measure the intensity and quality of its interactions with industry by introducing KPIs and start monitoring this. An additional advantage of this will be that it will allow the JRC to account for its contribution to European competitiveness and its many activities involving industry. Hence, we retained this as a recommendation for the JRC to enhance relations with industry.

national (e.g. TNO, VTT, Fraunhofer-Gesellschaft) and sometimes at regional level to support local industry around specific industrial technologies or sectors. Their core responsibility is technological upgrading, and they play a key role in regional and national innovation systems. RTOs tend to be public or private non-profit organisations that provide a range of research, development and technology services, principally to business and governments.

2.3 The JRC in the EU innovation ecosystem

The JRC provides economics and socio-economic (regional) analyses (e.g. smart specialisation) for the underpinning of EU innovation policies and helps to assess their effectiveness with some leading specialists in innovation economics. The knowledge produced is also of interest to the private sector, but involvement of industry and businesses in this work is promoted passively. By this we mean that the knowledge is available to those who actively look for it, the necessary key players are involved or aware, but the JRC is very modest in reaching out.

In its role of pan-European Research and Technology Organisation (RTO) from its position close to the policy maker, the JRC can offer a lot more, even help translating emerging requirements into what policies are needed. Over and above this, Europe's innovation landscape is filled with regional, national and European innovation initiatives and we need to get the full picture of what is happening there.

There is a strong political urge to upgrade the whole innovation ecosystem, born out of the need to enhance complementarities and improve policy impact and effectiveness of the various initiatives. We imagine that the Commission's activities through the JRC could be able to help in breaking down silos between the different EU initiatives of which we include in particular two, European Institute of Innovation and Technology (EIT), where several of us have been involved in the governance, and the European Innovation Council (EIC). We did not explore all different possibilities for links with other industry-led stakeholder forums, technology, SME or other platforms, already covered by the research framework programme.

The EIT

The European Institute of Innovation and Technology (EIT) is an independent EU body set up in 2008 to boost innovation while creating growth, jobs, nurturing entrepreneurial talent and supporting new ideas in the EU. Both the JRC and EIT are financed through the Horizon 2020 programme for research and innovation (of the order of EUR 2.5 billion each for the seven years duration of the programme), but

there is a world of difference between the two. The EIT is relatively new, compared to the JRC, it is an independent EU body, and it is mainly a funding instrument for networks of business, universities and research centres.

The EIT's KICs

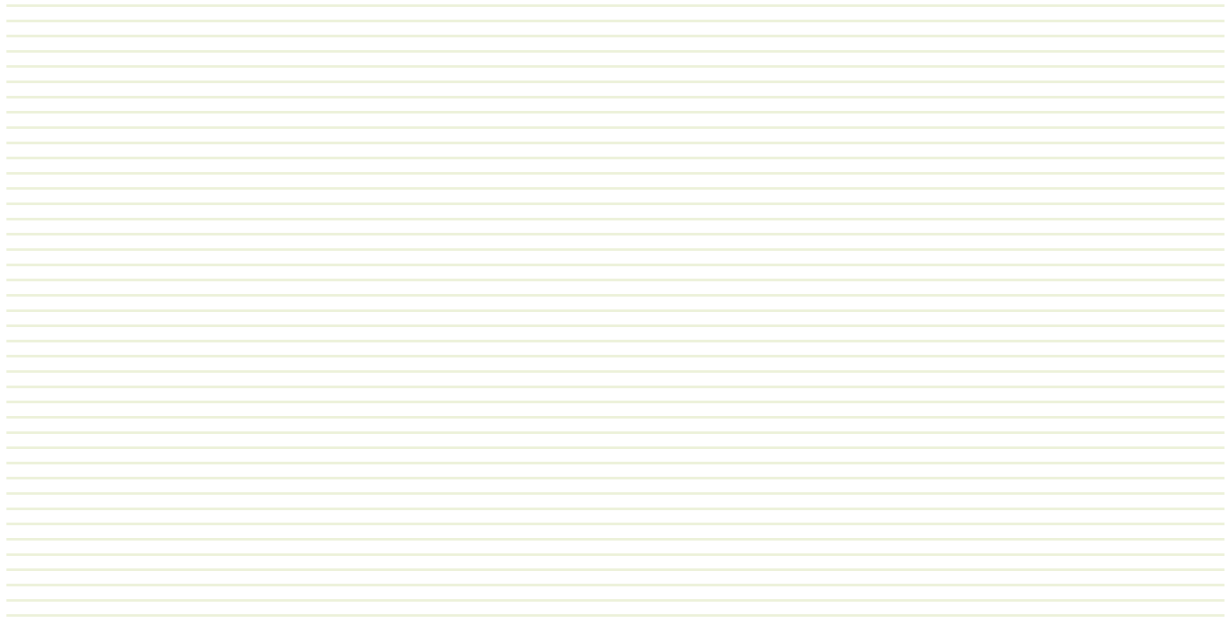
To achieve its mission the EIT created Knowledge and Innovation Communities (KICs), bringing together businesses, research centres and universities. Annex 5 gives more details on the six KICs representing the largest innovation communities of the EU in their respective fields of competence.

It is worth noting and certainly not by coincidence that the subjects of the KICs are practically the same as the key orientations in the JRC work programme where we have seen strong interactions with industry. Therefore, it is obvious that there are questions about synergy, duplication, complementarity and cooperation and it was highly reassuring to see that relations between the JRC and EIT are already formalised in a memorandum of understanding (MoU). It was signed last year with the purpose to come to grips with cross-cutting synergies and to seek collaboration in many areas of common interest⁷.

The EIC

Regarding the European Innovation Council (EIC), this initiative has so far been qualified as a working title for 'the Commission's new approach to supporting innovation'. It recently engaged a new High-Level Group of innovators to assist in the design of measures to strengthen support for breakthrough, market-creating innovation in Horizon 2020 and future research and innovation programmes. The European Parliament gave its consent to an additional top up of the Horizon 2020 on the mid-term review of the EU budget and assigned EUR 50 million to the EIC on the RTD budget line Innovation in SMEs. The EIC is expected to adopt a riskier, venture capital-style approach to awarding grants in a pilot later in 2017.

With the various initiatives, it would be good to see an overarching strategy for enhancing regional, national and European innovation ecosystems and addressing the barriers to investment in innovative business opportunities. While it is not sure in which direction the EIC develops, it adds a new financial tool that should have a leverage effect on European innovation. It should certainly foster closer cooperation between academia, industry and RTOs.



⁷ Smart specialisation - regional outreach, education, training, skills, technology transfer, intellectual property, new financing mechanisms, communications and knowledge management

3

The different roles towards industry

The previous section already referred to the genetic makeup of the JRC in passing; a look at the Commission's Science and Knowledge Service in light of its history is quite enlightening. It shows in a (chrono)logical way how its different functions emerged and evolved over time since 1957:

- The implementer of the research task for the European Atomic Energy Community, and it is well aware of this task from the Euratom Treaty since 1957;
- A pan-European research and technology organisation (RTO) with a task to contribute to the competitiveness of European industry, looking after standardisation, harmonisation, measurement and testing methods for the EU, emerging in the 1970s and 80s when the JRC was eventually encouraged 'to place its installations and expert assistance at the disposal of (public or private) third parties against payment';
- The Science and Knowledge Service of the European Commission strengthening its core business in its new Strategy, in line with the policy support mission established in the Fifth Framework Programme (1998) now enshrined in Horizon 2020.

This reflects our analysis of the nature of the JRC as we found out during the evaluation. It is more complex than the comprehensive image of the JRC that we saw in the 2030 Strategy, i.e. the image of the Commission's Science and Knowledge Service, leaving the other two functions of the organisation in the shadow. There is room to correct this in a future update.

Although one of the three functions, nuclear, is outside the scope of our evaluation, we gathered that there may be dual-use (nuclear/non-nuclear) applications and indeed the JRC has leading expertise in generic technologies in this field⁸ that may well suit the innovation community in the EU.

⁸ For instance, knowledge and characterisation of high-performance structural materials with advanced thermo-mechanical properties, robotics,

This example also convinced us that we should not pursue a look at three different JRCs. The strength of the JRC may very well be in exercising different S&T functions in one Commission department. It entails much needed efficiency in the Institutions for the EU. From what we have seen, we like to support the Science and Knowledge Service to exploit the synergy of having the different skills in one place inside the Commission

Hence, in the following we discuss some roles for the JRC that we see meaningful and mutually interesting for further elaboration with the relevant partners.

3.1 Scientific entry point for industry

The JRC presented several examples of successful dealing with certain industry branches (see Annex 4) and we believe that the organisation is well-placed and some of its staff already has the relevant experience to build the necessary trust and come to fruitful relations regarding regulations in different contexts:

- Because of its technology lead over the public sector, industry is ahead in thinking about the necessary regulatory framework; the JRC is a useful entry point for discussion;
- The regulatory framework in place may be inadequate, may even be flawed; before going to court the JRC could be a useful entry point for discussion (see Annex 7);
- There may be good reasons to allow industry to influence the JRC Work Programme. Moreover, feedback on JRC work programme is likely to be mutually beneficial.

This will require innovative consultation mechanisms with industry.

prize-winning automated 3-D laser scanning localisation devices, high-temperature coolants.

Can the JRC have relations with industry without compromising its independence?

Appearing amongst the evaluative questions, this question is apparently a concern in the JRC. However, the foundation for an effective relationship between two parties becomes very narrow if one is concerned that its neutrality is at stake, while the other is constantly afraid that it can be damaged by every piece of information that it shares.

As described in the JRC's own integrity guidelines⁹, there are different roles in the policy decision-making processes of the EU: the decision maker, the policy maker, the scientific expert and the stakeholder. The baseline is that each one plays its proper role and acts responsibly, respecting ethical norms and standards, relevant codes of conduct and scientific integrity.

JRC scientists who worked on some of the very successful examples of cooperation with industry were unanimous in their analysis: building mutual trust was the first thing to be addressed. As soon as both parties were convinced of that, collaborations had been exceptionally effective. Therefore mutual trust is more important than the affirmative answer to the above question.

3.2 Partner in pre-normative research

The JRC does pre-normative research and has numerous standards, measurements and testing activities. There is a broad range of issues to be addressed. Considering that 3½ % of the peer-reviewed scientific articles is published together with co-authors from the private sector (business enterprises and industry), it is likely that the ongoing contacts take care of many of these issues.

Since we have seen the breadth of the programme in the traditional tasks of the JRC in this field, we may add a few pre-normative subjects for consideration that would benefit from cooperation with industry:

- Work on a framework for the use of biomass;
- Besides trends in IT - like the Internet of Things, Data Analytics, or Artificial Intelligence - there are also issues, challenges and opportunities with as secondary intention: appropriate legislation (e.g. storage space, energy for data centres, IT literacy, productive model transition);
- Machine learning, Internet of Things, Artificial Intelligence, away from the focus on the sensors, towards deeper understanding and insights.

3.3 Bridge between EU innovation initiatives

The European Union disposes of several similar – not identical – instruments to facilitate innovation. Although it may appear interesting that there are many schemes, dispersion of effort is also not in the interest of industry and it is crucial to align existing support instruments for innovation in different EU funds (e.g. Horizon 2020, EFSI, ESIF, EIT, JTI, SME Fund). We clearly see added value when the JRC assumes its role of pan-European RTO. The JRC can actually sit down with national and regional RTOs, play an active role in coordinating the EU's innovation ecosystem at the operational level, using Horizon 2020 funding combined with their national support as well as their own investment. Eventually we believe that society gets more value out of these initiatives when the JRC plays a coordinating role, using its convening power to get the people around the table.

The direct interest of closer interaction with the EIC may be small at this early stage. However, it could be useful to establish working contact with the initiative. The experience of the JRC can be useful in making links between this new and promising initiative, with existing initiatives and the work and expertise of the JRC itself.

⁹ JRC guidelines for integrity and veracity in scientific support and advice (JRC, Board of Governors document CA(06)55)

4

Where relations with industry can be enhanced

From what we have seen of the JRC, both in its capacity as the European Commission's Science and Knowledge Service and in its role of pan-European RTO, it is an important contact point and partner for industry beyond any doubt. We also have the impression that it could do better and mean even more for industry and create a higher impact on competitiveness.

To start working on this - we alluded to this in the previous chapter - the JRC has to **adopt a set of key performance indicators (KPI) to measure and monitor its significance for industry**. This could include metrics for:

- JRC participation in industry networks and vice versa, industry participation in JRC networks;
- Co-authored scientific publications with private-sector partners (business enterprises and industry);
- Percentage share of work on: standardisation, harmonisation, reference methods, reference measurement, and its importance for industry;
- Accepted third-party work under contract;
- Outsourced work under contract.

Besides this general improvement action in the programming, execution, monitoring and evaluation of the JRC, this chapter will discuss the following potential items where stronger interaction with industry will be beneficial:

- The JRC work programme, which has so many relevant elements for industry that it should have a possibility to influence it (section 4.1);
- Research and innovation with standards, measurements and testing, including opportunities for enhancing relations with industry and SMEs notably regarding innovation (section 4.2);
- There are opportunities for industry in the operations of the JRC (section 4.3);

- The unmissable opportunity to create synergy between two EU actors in the field of industry and innovation, the JRC and the EIT (section 4.4).

4.1 The JRC work programme

The Commission's Science and Knowledge Service has a very broad work programme and a well-equipped research infrastructure. It is not our mission to assess its work, but to us it seems well done, although the reason why it is done is not always so clear. Then, reasons may be hidden in the past and it is not easy to trace them at all.

Nowadays, the Commission takes the final decision on the JRC work programme, which gives it a formal status, well-documented and the assurance that JRC programmes are fully supported by every part of the Commission. The programme follows Commission priorities, translated in certain tasks in internal discussion and a certain part of the tasks is anchored in EU legislation. It could be useful to introduce metrics for the approximate fraction of tasks anchored in EU legislation and for the diversity of tasks.

Hence, the JRC work programme is an internal affair of the Commission, whereby the JRC has some flexibility since the Director General can propose. In view of the relevance for industry and the European competitiveness, it cannot come as a surprise that we believe that the voice of industry is completely missing and we float the idea that the JRC should seek ways to consult industry on the JRC's work programme.

Such an external consultation will provide an opportunity to discuss specific cases for which the private sector may be able to provide alternative solutions. The (isolated) internal process may accept arguments against involving the private sector in certain tasks, while a transparent process would bring different solutions to light, possibly with efficiency gains.

The interaction with industry should not only go through the R&D departments; there should be enough interaction with the people managing companies. Take the interaction beyond the laboratories, not only to R&D or EU-affairs departments. It is important to be in touch not only with the CTOs but also with the CXOs¹⁰ and those who own the strategy, the biz model or the key operative decisions.

Furthermore, consultation with industry on the work programme could create an entry point for industry to draw attention to potential scientific or technical problems with new draft or existing EU legislation.

Therefore, we recommend to organise an industry/business-stakeholder analysis of the JRC work programme on a regular (annual, bi-annual...) basis.

4.2 Research and innovation

The JRC does pre-normative research and has numerous standards, measurements and testing activities. We have seen a number of examples and we are confident that the appropriate first-order industry partners are involved. However, since these are programmatically unrelated activities it is not possible to enhance the impact or the synergy between them in broader consultation with policy makers and industry representatives on a higher level.

The European Commission takes an interest in being in touch with the innovation pipeline, to know whether and which regulation is needed. With its collaborations, networks and contacts the JRC is well-placed to enhance relations with industry and SMEs, notably regarding innovation, to lead this pipeline to the interested parts of the Commission.

Within the EU there is a growing number of FabLabs, workshops, test beds and demonstrator facilities which are supposedly vital resources for companies and universities to develop innovative products services and processes and for getting them to the market. Member States and industry are interested in test beds. In Sweden RISE has set up something along those lines providing

¹⁰ The chief experience officer (CXO) of a company is the executive responsible for the overall user experience of the company's products and services.

'excellent' support for the development of SMEs in Sweden (cf. Annex 6). There is a need for a common agenda with open access to test beds. Cooperation for innovation is the name of the game, and not in the least also for the benefit of the EIT KICs as well.

The JRC is well-placed to start federating the needs and the initiatives in the Member States, at the same time making its own relevant facilities available as it does. In the continuation of its RTO role, the JRC already set up the 'TTO CIRCLE', a network of Technology Transfer Offices of leading European RTOs, which seeks a collective role in driving changes and boosting innovation in Europe. The JRC has important convening power which makes it particularly good to facilitate the sharing of best practices, knowledge and expertise; establishing informal channels of communication with policymakers; organising training programmes. The TTO CIRCLE may add its experience in this innovation effort.

4.3 Industrial opportunities in the operations

Outsourcing activities

In the JRC, 'outsourcing' usually means outsourcing to other parts of the Commission or to Member States; the idea of outsourcing to industry is not well developed and there are not many examples.

An unknown but large part of the work of the JRC is a continuation of activities started many years ago. As long as there are no firm criteria for stopping or outsourcing activities, this work will continue. Therefore, we suggest an industrial approach to this and decide on the principle to outsource every paying material production¹¹ for which the added value of the European Commission doing this is not clear (follow the subsidiarity principle). Subsequently, set realistic target dates for the accomplishment of the outsourcing. Enhanced, structured but flexible relationships with the private sector will help creating ideas how to achieve this goal.

While in our industries many tasks are being outsourced for efficiency reasons, it is not JRC culture to ask someone else to do a job that you can do yourself. There are certainly tasks to spin-off to

¹¹ This does not apply to obligations under the Euratom Treaty

the private sector, but few people will endeavour to outsource their work and it will not happen by itself. It is undoubtedly more complicated for a European administration than in a national setting, but **we encourage the JRC to actively seek one or more concrete outsource/spin-off exercises in an open call to industry**, using public procurement as driver for innovation (see Annex 7).

An example: A recent evaluation report by a group of leading world experts in reference materials reviewed the JRC's activities in this field. The report makes a detailed analysis of how this development and production activity ended up in the JRC more than 20 years ago. Today it would be more appropriate to have it outsourced in an arm's length organisation. It could be discussed and elaborated with industry how this organisation, and in particular the production of many samples, could be run externally.

Access to JRC research infrastructure

While we have visited only a fraction of the JRC research infrastructure, a recently produced inventory shows that it is impressive and has a replacement value of around EUR 190 million. With annual running costs of around EUR 21 million and EUR 45 million associated staff costs, it is clear that maintaining and operating this infrastructure is the second largest item in the JRC budget.

It is good practice to maintain such an inventory with an internal assessment of the financial and human resources associated with the various components. Simply because of its size it needs attention in times of economic reduction and we encourage some rationalisation in the near future. Hence, we strongly recommend taking the next step, which is to submit this inventory to an expert inquiry on subsidiarity, which should address and assess:

- the utility of open access;
- opportunities for sharing or outsourcing;
- redundancies and/or a necessity to phase out.

It would be useful to associate relevant industry to such an inquiry. In principle, all stakeholders will be interested in an open and public assessment.

On this subject, we also like to draw the attention to the reverse model, i.e. that the JRC uses industry resources for its research. We have seen

only a very few examples of this, while we have the impression that we did see examples in which time and resources are invested in modelling, infrastructure or platforms that are commercially available in industry or on the market. Where needed the JRC could access these resources in many cases for free.

Spin-off market potential

From time to time the JRC develops products with a market potential. Without being exhaustive, examples that were transferred to the private sector are: certain pieces of software, certain devices, certain reference materials... That is not mainstream, but it can be useful to keep an eye on this part of the activities. For certain industry sectors, the JRC plays a promotor of applications ('government' industries like nuclear, aerospace defence). For the space sector, the JRC developed satellite observation applications and support the application of Galileo navigation signals. We have not assessed this area of activities, but believe in the usefulness of involving the relevant industrial players in the various discussions on the work programme, outsourcing, and using infrastructures. In the current context, the organisation still seems reluctant to even discuss these things with industrial representatives.

4.4 The JRC and the EIT

From our own experience and from many contacts lately we notice that the EIT-JRC tandem is getting a lot of traction with stakeholders in the Commission and the European Parliament encouraging collaboration between the two organisations for mutual benefits.

The European industry takes an interest in successful JRC - EIT collaboration; it would create a symbol of enhanced efficiency in the currently diverging landscape of innovation initiatives in Europe.

Building a bridge with the EIT

The complementarity between the organisations is great, which creates a large scope for synergy.

- The key orientations of the JRC have 100 % coverage of the subjects of the KICs;
- The methodological knowledge and tools of the JRC are highly complementary to the focused and comprehensive business approach in the EIT's innovation community KICs;

5

Conclusions and recommendations

In the comprehensive and detailed introduction to the JRC we have made acquaintance with an intriguing and interesting asset of the European Union, a Service of the European Commission that fulfils different roles and functions, which are not easy to catch under a common denominator. It is 'science for policy', it is running a nuclear research programme and it is emulating the role of a unique pan-European public research and technology organisation (RTO).

This report is not an end product; it should start a new process with much tighter relations with industry. The issues raised in this report, addressed in an appropriate way, will facilitate a more effective relationship with industry, and we conclude our findings with three key recommendations and their sub elements in terms of how we see that success can be achieved.

Organise specific operational improvements

- **KPI:** Adopt a set of key performance indicators (KPI) to measure significance for industrial stakeholders.
- **Branding:** 'Science for policy' is the core business and the JRC should continue to brand itself as 'The Science and Knowledge Service of the European Commission' and each activity should clearly mention which EU policy (at least one) it serves.
- **Focus:** Focus is the result of consistently implemented prioritisation. Bringing more focus in the work will improve the quality; taking on too diverse tasks goes at the expense of the quality.
- **Outsourcing:** Invite an external opinion on which production process and services of the JRC can be outsourced.

Work more consciously with industry

The JRC has shown some exemplary cases of industry involvement in the implementation and in the evaluation of EU regulations (the science-for-policy activities), and it should develop stronger relationships along the following lines:

- **Work programme consultation:** Annual consultation with industry to solicit the views of industry while drafting the JRC's work-programme proposal. The work programme will benefit from a stakeholder analysis broader than the current one which is internal to the Commission.
- **S&T entry point:** Become the entry point to discuss, act and mediate concerning scientific aspects or technical issues related to developing policies or new and existing EU legislation, when industry flags policy measures (legislation) that are inconsistent, or based on arguments that can be proven not to be rooted in sound science.
- **Platform:** Convene a platform of CTOs or CXOs as a sounding-board meeting once a year with 'Sherpa meetings' to prepare. This platform provides the basis for arranging the two aforementioned actions. Possible modality: convene sector by sector.

Take initiative to enhance the EU innovation ecosystem

- **EIT:** Tandem with the EIT and build a bridge to the KICs.
- **KICs:** Create a regular meeting between the JRC top management and an assembly of the Chairs/CEOs of the KICs to establish a powerful exchange mechanism between industry and the Commission's Science and Knowledge Service.
- **Test beds:** Enhance the possibilities for innovation support by developing partnerships with RTOs to promote pan-European application of innovation test bed activities, including support of SMEs.
- **Lead by coordination:** Enhance leading coordination of RTOs in pre-normative research, standards, measurements and testing, or innovation, including the oversight of test beds coordination.

Finally, in Annex 7 we raise a number of issues that the JRC should consider when it updates its work programme and strategy.

Annexes

Annex 1 The Evaluation Panel



Chair: Björn STIGSON

Chairman Stigson & Partners AB consulting
Chairman Mistra Centre for Sustainable Markets,
Stockholm School of Economics
Senior Advisor to the Royal Academy of Engineering
Science, Sweden,
Former President of the World Business Council for
Sustainable Development (WBCSD), Sweden



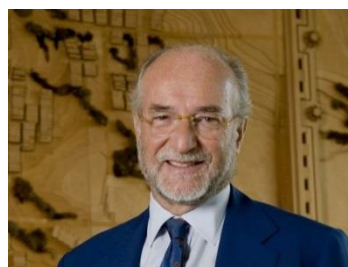
Jeroen VAN DER VEER

Chairman of the Supervisory Board of Royal Philips
Chairman of the Supervisory Board of the ING Group
Member of the Board of Statoil
Member of the Board of Royal Boskalis Westminster
Former CEO of Shell Plc



María GARAÑA

Vice President of the Business Solution Division of
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Member of the Supervisory Board of Euler Hermes
(Allianz Group)
Member of the Board of DIA Supermarkets Group
Member of the Board of Alantra Asset Management
& Investment Bank
Member of the Advisory Board of Harvard Business
School in Spain



Gianfelice ROCCA

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President of Assolombarda, the largest territorial
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Italy



Ivan ŠTEFUNKO

Managing Partner, Neulogy Ventures, Slovakia
Co-Founder and Board Member, Diagnose.me B.V.
Entrepreneur and angel investor

Annex 2

Terms of Reference

1. Background

The Joint Research Centre (JRC) is the science and knowledge service of the European Commission whose mission is to support EU policies with independent evidence throughout the policy cycle. Its vision, enshrined in the new JRC 2030 strategy, is to play a central role in creating, managing and making sense of collective scientific knowledge for better EU-policy making.

The JRC has a unique position as the key facilitator of European pre-normative research¹² and regulatory science¹³ and it works closely together with policymakers, research organisations and academia worldwide. These partnerships assure that the JRC has access to the latest and best data, methods and information. They also ensure that the work of the JRC remains relevant to European society and correctly addresses societal challenges.

The JRC also has a unique role in using (i) applied research for scientific support to EU policies that concern industrial sectors, as well as (ii) scientific infrastructure and cross-cutting knowledge that could be shared for the benefit of EU industries.

This document provides the Terms of Reference for an Industry Experts Panel whose prime objective is to assess the relevance of the JRC's activities for the European industry with a view to its possible enrichment.

2. Purpose of the Assessment

The general purpose of the Industry Experts Panel is to deliver advice under the form of a single report, which will assess the potential of the JRC to bridge the gap between innovators and regulators.

The Panel should also analyse whether and how the JRC could develop a more efficient collaboration with EU industries, while ensuring that the JRC maintains its independence and neutrality when providing support to EU-policy makers.

The report shall also provide a comprehensive analysis of the possible orientation of the JRC approach towards industry and examine the need to maintain, expand or reorient already existing JRC industry-relevant activities.

Since the European Commissioner for Education, Culture Youth and Sport is responsible for both the Commission's Joint Research Centre and the European Institute of Innovation and Technology (EIT), the report should also address potential synergies between the activities of those two organisations.

The experts should also refer to available industry-led stakeholder forums such as the European Technology Platforms (ETPs) and consider other areas, already covered by FP7 or Horizon 2020.

In this context, the objectives of the Panel are to advise the JRC on:

- Current activities and research facilities of the JRC that are of potential relevance for European industry, including Small and Medium Enterprises (SME)¹⁴;
- Possible gaps in JRC activities and research that would meet common needs of European industry;
- Mechanisms to optimise the preparation and the implementation of the JRC work programme in view of specific needs of European industry.

¹² Pre-normative research supports the development of regulations, standards, and technical codes.

¹³ Regulatory science supports the development of tools, standards and approaches for the implementation of policies and regulation and facilitates a sound and transparent regulatory decision making.

¹⁴ The analysis should cover the full spectrum of JRC's industry-relevant activities, e.g. ranging from agri-industry to decommissioning of nuclear reactors.

For this purpose, the Panel shall include the following tasks:

- Review key areas¹⁵ of the JRC's work programme and provide guidance as to how to best evolve that work to benefit from and support industry;
- Analyse the gaps where JRC can support industry (this includes the JRC's crosscutting work on e.g. technology transfer, IPR, standardisation, anticipation and foresight, indicators and scoreboards, modelling, knowledge management);
- Identify possible overlaps, redundancies or activities that could be better performed elsewhere.
- Recommend how the JRC can work more closely with industry in future, whilst maintaining its independence (e.g. by providing access to the JRC's research facilities, potential development of incubators /science parks close to the JRC's sites and the development of different form of partnership).

3. Composition, Deliverables and Timeframe

Composition

The Industry Experts Panel shall be composed of five members including a Chairperson selected and appointed by the Director-General of the JRC.

Each member of the Panel shall have extensive international industrial experience and be a recognised expert in one of the industrial sectors identified as most important and relevant to the JRC work.

The members of the Industry Experts Panel will participate in their own personal capacity and will not represent the positions of the individual organisations for which they work.

The Panel will be supported by a secretariat provided by the JRC which will prepare meetings, reports and visits, and will assist the Panel in establishing the final report.

¹⁵ These are grouped in 10 'priority nexus', namely: Economy, finance and markets; Energy and transport; Education, skills and employment; Food, nutrition and health; Resource scarcity, climate change and sustainability; People, governance in multicultural and networked societies; Civil security; Migration and territorial development; Data and digital transformations; Innovation systems and processes.

Deliverables

The ultimate deliverable is the final report of maximum 30 pages excluding annexes, with an executive summary, an analysis of findings and a set of conclusions and recommendations related to issues within the purview of the JRC.

Timeframe

The Chairman will convene a kick-off meeting of the Panel as soon as the Director General has appointed all experts. At this meeting, the main objectives and expected deliverables shall be explained and the Chairman ensures that there is a full understanding among the experts about their role in the Panel. The reimbursement schemes and procedures will be explained and different options will be offered to the experts (e.g. with or without registration to the Commission transparency register). The experts will suggest their methodology, planning for visits, interviews or any additional requests and agree on a definite schedule in consultation with the JRC.

The Panel may meet as often as necessary to produce the final report and address it to the JRC in agreed time, not later than 6 months after the kick-off meeting. The JRC will facilitate meetings, video or audio conferences between the experts and JRC scientific or managerial staff, visits to JRC facilities, etc.

4. Available Sources

The JRC will distribute to the Panel a set of (web links to) documents including:

- JRC Strategy 2030
- The description of the JRC, mission, organisation, structure, facilities and main activities
- Relevant official EU documents
- JRC Key Orientations document
- JRC detailed Work Programme

5. Terms and Conditions

The industry experts will be invited by the JRC as very high-level experts and will be reimbursed according to the European Commission "Rules on the reimbursement of expenses incurred by people from outside the Commission invited to attend meetings in an expert capacity".

Annex 3

A statistical analysis of industry involvement in the JRC projects

To establish some information on the JRC's relations with industry, the panel asked for an estimate about industry relevance/ participation/ involvement in the JRC work programme. Following this, the JRC made a qualitative analysis of industry involvement in the 120 projects, based on their detailed descriptions in JRC's projects databases. Every project was scored on a scale of one to four, according to the level of involvement of industry:

1. No involvement of industry and not really relevant for industry,
2. No involvement of industry and some possible relevance for industry,
3. Certain incidental to recurrent industry involvement,
4. Clear involvement, structured by EU law, or formal JRC approach on an ad-hoc basis.

The pie chart in Figure 2 shows the result. Industry is involved in at least 53 % of the projects and for

half of them this is a formal, structured involvement. Hence, according to this statistical analysis, industry is involved in more than half of the JRC projects.

Further classification of projects in the last group with clear industry involvement gave more insight in the key orientations in which industry involvement is the highest. This distribution with a leader group of four key orientations taking two thirds of the projects:

- Internal market, industry, entrepreneurship
- Health and food safety
- Energy
- Environment

The next three key orientations - with at least three projects - being:

- Digital Economy and Society
- Transport
- Climate

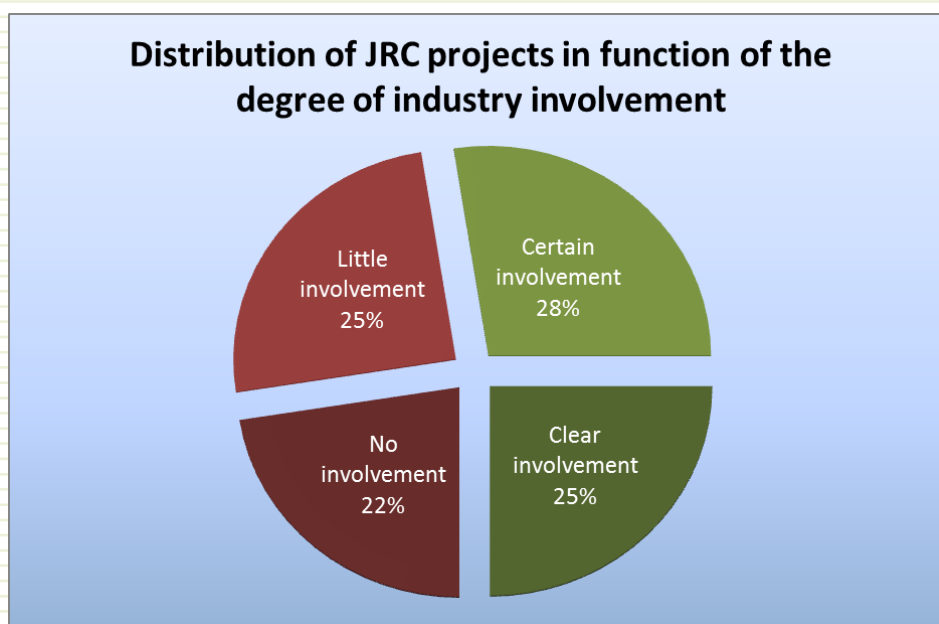


FIGURE 2. THE 120 JRC PROJECTS DISTRIBUTED IN A PIE-CHART ACCORDING TO DIFFERENT DEGREES OF INDUSTRY INVOLVEMENT IN THE PROJECT (JRC WORK PROGRAMME 2017)

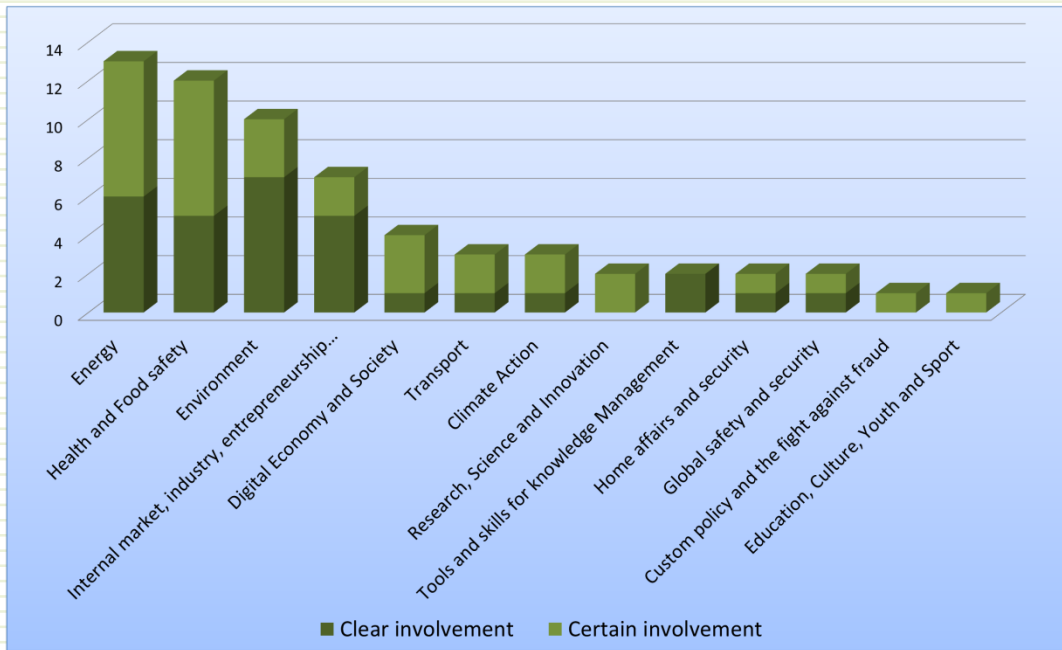


FIGURE 3. DISTRIBUTION OF 62 INDUSTRY-RELEVANT PROJECTS OVER THE RESPECTIVE (13 OUT OF 23) KEY ORIENTATIONS

Annex 4

Examples of projects where industry is involved

Based on or extracted from existing JRC reports

The EU petroleum-refining sector: fitness check

The JRC conducted a thorough analysis of the EU's oil-refining sector as part of the Commission's 'fitness check', which aims at keeping legislative measures fit for purpose. The checked pieces of legislation relevant to the refining sector concerned renewable energy, energy taxation, the EU Emissions Trading System, fuel quality, clean and energy-efficient vehicles, industrial emissions, strategic oil stocks, marine fuels, energy efficiency, and air quality. The analysis shows that the legislation has delivered its objectives at sectoral level. The estimated total costs to the sector are 47 eurocents per barrel of processed input during the study period. These costs are in proportion to the benefits. The more efficient refineries have been able to absorb these costs and remain profitable, but this has not been the case for some others. According to the various analyses in the report, also a number of other factors had an influence on the economic performance of the EU refining sector, some of which are plant-specific, while others are external, including the relatively high level of input costs of refineries and, in particular, energy costs. In retrospect, it took a lot of work to produce all the analytical results for the fitness check, whereas in the end they were not different from what can be deduced with common sense. Nevertheless, the net effect of the common understanding established during the whole process created trust between the Commission services as representatives of a European Institution and industry, which is an extremely positive outcome with real but intangible impact.

The European Integrated Pollution Prevention and Control Bureau (EIPPCB)

Emissions from industrial and agricultural activities in the EU are subject to one overarching Industrial Emissions Directive (IED). This concerns about 50 000 installations, such as large combustion plants, waste incinerators, refineries or installations for instance for the mineral industry, the production and processing of metals, or intensive rearing of poultry and pigs.

The Commission set up the European IPPC Bureau to implement the directive. The JRC runs this bureau from its establishment in Seville and defines the technical standards for each sector covered by the Directive through extensive exchange of information between the stakeholders. The resulting 'best available techniques', or so-called BATs, are formalised in the BAT reference documents (BREFs). In practice, the JRC drafts, reviews and updates the BREFs in consultation with Member States, industry representatives, environmental NGOs and other Commission services.

These predesigned converging discussions between the stakeholders are known as the "Sevilla process". Over the years they involved thousands of experts in the technical working groups coming from the public sector, the private sector and environmental NGOs.

The panel acknowledges the excellence and the effectiveness of the JRC-industry cooperation in this process. It is well enshrined in EU legislation and exemplary for other areas.

Laboratory for the interoperability of electric vehicles and smart grids

Interoperability within and between electric vehicles and the smart grid is a key issue for the deployment and full exploitation of transport electrification and modernisation of the electricity system. Under the auspices of the Transatlantic Economic Council, the JRC is working with the US Department of Energy (DoE) to find harmonised solutions on both sides of the Atlantic.

A new European Interoperability Centre was inaugurated in 2015. Located at the JRC's site in Ispra (Italy), it will cooperate with a twin facility at the Argonne National Laboratory in the US. The European centre combines four state-of-the-art laboratories focusing on the energy efficiency of electric and hybrid vehicles, their interoperability with smart grids, electromagnetic compatibility, and battery testing (the latter is located in Petten, the Netherlands). It will enable the testing of system architectures, technologies and communication protocols. The resulting harmonised standards and test procedures should minimise trade and technical barriers both for the EU and the US, while promoting innovation.

Capping road transport emissions - new on-road tests for cars

JRC studies found that laboratory tests do not accurately capture vehicle emissions, including nitrogen oxides (NO_x), under real driving conditions. The European Commission took action and focused its efforts on developing complementary on-road tests, with the intention to introduce Real-Driving Emissions (RDE) tests in the future which have to be passed by new car models before they are allowed to be placed on the EU market.

The JRC has been essential in this development, by demonstrating the feasibility of on-road tests for cars with portable equipment and by leading the drafting of the technical specifications for the new RTD test procedure, based on the JRC's technical expertise and measurements. In 2015 important milestones were achieved with the approval of two regulatory packages by the Member States at the Technical Committee on Motor Vehicles. In both cases, the JRC was heavily involved and provided scientific support. The first package describes the test procedure and the requirements for measurement instruments. The second defines binding emission limits, their

application dates and additional boundary conditions. The JRC is leading the technical development and drafting of two additional RDE packages focused on the measurement of particle number emissions with portable equipment and the surveillance of vehicles already in use.

The JRC's vehicle emissions laboratory (VELA) allows emission tests to be carried out on a wide variety of engines and vehicles (from motorbikes to trucks or electric cars). It looks at new technological options to reduce vehicle emissions, increase energy efficiency and, in particular, the environmental aspects of advanced technologies and fuels. The findings provide scientific support for the development or revision of EU Directives/Regulations and for the assessment of new measurement techniques and procedures.

Portable Emissions Measurement Systems (PEMS) offer a modern and innovative counterpart to check the impact of emissions from combustion engines upon the environment.

Defining nanomaterials

The exact definition of a nanomaterial represents the gateway to their wider production, use and safety assessment for human health and the environment. The Commission is currently reviewing its regulatory definition and the outcome is expected in 2016. The JRC has looked into science-based options to improve the clarity and practical application of the Commission's recommendation. The JRC advised to change the scope of the definition concerning the origin of nanomaterials, which addresses natural, incidental and manufactured nanomaterials. It also advised to maintain the use of size as the sole defining property of a nanoparticle, as well as the range of 1 nm to 100 nm to define a nanoscale.

As identified by the JRC, further options to consider include a possible variation in the current 50 % threshold for the particle number fraction (i.e. if more than half of the particles have one or more external dimensions between 1 and 100 nm then the material is a nanomaterial). Variable thresholds may allow regulators to address specific concerns, but could also confuse customers and lead to an inconsistent classification of the same material based on the field of application.

New information system on raw materials

The Raw Materials Information System (RMIS), set up by the JRC, is a comprehensive online repository of information on policies, activities, indicators and data related to the European non-energy-related raw materials sector. It supports the EU Raw Materials Initiative and the activities of the Commission's Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, notably for the European Innovation Partnership (EIP) and the European Raw Materials Knowledge Base (EURMKB), and aims at tackling the pressure on valuable resources and their efficient use to benefit EU economies.

Online services and trade: building blocks for the Digital Single Market policy

In the context of the Commission's Communication on the Digital Single Market (May 2015) the JRC provides scientific policy support with desktop research on a wide range of related topics, such as cross-border e-commerce, online trade and services, copyright and intellectual property rights, eHealth, digital competence and data protection.

This research shows that the online-services market is geographically fragmented. Europeans surf mostly on US-based websites, which account for about 54 % of online activity, while activity on EU-based websites accounts for 42 %. Only 4 % of the EU's online services activity goes via websites from other parts of the world. A large number of highly diversified local online-services websites attract relatively little traffic, while a small number of truly global giant service providers account for the bulk of all activity. Moreover, less than 1 % of online suppliers actually deliver their services to all EU Member States. In fact, two-thirds of the suppliers, who are active in the EU, cover no more than four countries.

The Commission's proposal for online-consumer protection was also informed by JRC research into the economic impact of technology – the shift from offline to online shopping, and the effects of reducing barriers to online trade. EU surveys combined with econometric modelling made it possible to estimate the impact of removing the main perceived barriers on both consumers and producers. The research evaluated the impacts of cross-border e-commerce on trade costs, price

competition, retail price margins and household consumption. It showed that shifting from offline to online retail induces considerable welfare redistribution from the retail to the manufacturing sectors, and especially to households. The results of the policy simulations revealed that additional measures to facilitate cross-border e-commerce between Member States could give a 0.3 % boost to household consumption. EU production as measured by GDP would increase by 0.04 %.

Supporting a circular economy

The aim of circular economy strategies is to extend the value of products and resources, whilst minimising waste generation. In December 2015, the Commission published an ambitious programme in this area.

The JRC follows these efforts throughout the product value chain, from production to consumption, repair, remanufacturing, waste management and the use of secondary raw materials. It has, for instance, developed Life Cycle Assessment (LCA) based methods like the Product Environmental Footprint and the Resource Efficiency Assessment of Products to evaluate the environmental performance of products, goods and services. The JRC runs a European Platform on Life Cycle Assessment (EPLCA) that provides information on the use of energy, of raw materials and the generation of emissions in production and consumption processes. In addition, the JRC has developed guidelines for a more sustainable waste management system, created indicators to monitor the environmental impact of waste management in cities, and analysed chemicals in products to develop toxicity-impact categories in view of facilitating recycling and the use of secondary materials. It also supports the implementation of the Ecodesign and Ecolabel initiatives.

The JRC's work on food waste, raw materials and bio-based products is linked to the priority areas identified in the circular-economy package as issues that require targeted action. Furthermore, the JRC provides monitoring tools, such as the Raw Materials Information System and the Bioeconomy Observatory. These aim to provide information on resources and consumption patterns to identify opportunities for recovering and saving materials and to find solutions to reduce the excessive waste of resources.

Annex 5 - The EIT Knowledge and Innovation Communities (KICs)

The EIT is bringing leading universities, research centres and businesses together to form dynamic partnerships in its so-called 'KICs' (Knowledge and Innovation Communities).

Each KIC has been set up as a legal entity, allowing the partners to test and develop innovations in products and services, start new companies, and train a new generation of entrepreneurs. Each KIC has appointed a CEO to run its operations with innovations hubs ('co-location centres') spread across the EU. These hubs work with regional centres to increase the impact of the KIC's activities.

Table 1 shows the KICs started by the EIT

following calls for proposal since 2009.

Between 2014 and 2020 the EIT will receive more than EUR 2.4 billion funding under the Horizon 2020 Programme for Research and Innovation. In 2015, the ratio of project funding was 25 % from the EIT (public sector) and 75 % from KICs partnerships (private sector), in fulfilment of one of the aims of Horizon 2020, i.e. to attract private investment. With its KICs the EIT represent Europe's largest innovation community, currently bringing together more than 800 excellent partners from business, higher education and research, working in 30 innovation hubs across Europe. To date it has supported the creation of more than 200 innovative start-ups.

KIC	Mission/goals	Start
Climate-KIC	Bring together, inspire and empower a dynamic community to build a zero-carbon economy and climate-resilient society	2010
EIT Digital	Foster digital technology innovation and entrepreneurial talent for economic growth and quality of life in Europe	2010
KIC InnoEnergy	To build a sustainable long-lasting operational framework amongst the three actors of the knowledge triangle in the energy sector: industry, research and higher education.	2010
EIT Health	Increasing the competitiveness of European industry, improve the quality of life of Europe's citizens and the sustainability of healthcare systems	2014
EIT Raw Materials	Boost the competitiveness, growth and attractiveness of the European raw materials sector via radical innovation and entrepreneurship	2014
EIT Food	Put Europe at the centre of a global revolution in food innovation and production, engage consumers in the change process, improve nutrition and make the food system more resource-efficient, secure, transparent and trusted.	2016
Urban Mobility KIC ¹⁶	Providing sustainable solutions for urban mobility	2018

TABLE 1. THE KNOWLEDGE AND INNOVATION CENTRES OF THE EIT

¹⁶ A call for this planned KIC is expected in early 2018 depending on the outcome of the EIT Evaluation

Annex 6

RISE – The Swedish Research Institute

Sweden's largest industrial research institute RISE with around 2 200 employees is mentioned here as a successful example of the promotion of innovation initiated at national level.

RISE was set up to promote the competitiveness of the Swedish business community on an international level and to contribute to a sustainable society.

Through international collaboration programmes with academia, industry, and the public sector, RISE is able to support and promote all kind of innovative processes, and puts its 100 test beds and demonstration facilities at the disposal notably of SMEs, to develop the future-proofing of products, technologies and services.

Test beds speed up the innovation process by identifying obstacles, meeting challenges and accelerating implementation and they also reduce the risks, which is crucial for SMEs and start-ups

that often lack resources themselves to test their innovations; in addition, they are also important in the context of new policies or regulations to be implemented.

RISE is organised into six divisions as shown in Figure 4, with five business and innovation areas established across the boundaries of the divisions to ensure that RISE is prepared to meet societal challenges on the global scale.

From the EU point of view there will be great added value from a soft coordination of national innovation initiatives, like that of RISE, in an open manner to maximise the return of the total investment made by the various national and EU initiatives.

The convening power of the JRC can help to bring together the various actors, to create synergy by enhancing communication and avoiding unnecessary duplication.

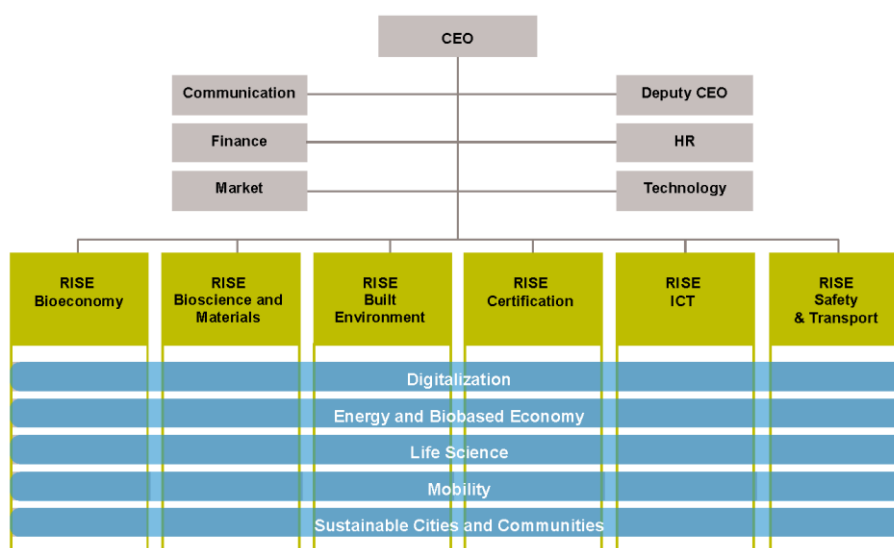


FIGURE 4. THE ORGANISATIONAL STRUCTURE OF RISE

Annex 7

Issues recommended for the JRC to consider

1. Sustainable Development Goals (SDGs)

The Sustainable Development Goals have succeeded to create a common place for government and industry to discuss joint action. They have gained a lot of traction in business circles, because they create opportunities to participate successfully in 'the green race' towards a more sustainable society. The associated market opportunities are estimated at EUR 10 trillion a year or more and 380 million jobs by the year 2030. What can markets do; where do we need public policy? The dialogue between government and industry on SDGs needs to be intensified, also at European level.

The SDGs fit well in JRC's mission and they provide a common theme for a closer connection between the JRC and industry. They can help structuring the contacts and there are certainly areas where the JRC can help (or where it is already helping) industry and business to translate political and policy goals into innovation and (new) technologies.

2. Soft criteria applied in policy making

In many instances, public policy has to act when scientific knowledge is insufficient, inconclusive, or even contradictory. Under these circumstances, taking measures is subject to uncertainty. Such measures may formulate criteria and set limit values or thresholds, which should be evaluated regularly. The applied criteria are soft, not based on sound logic, science and knowledge, e.g. when policy:

- Adopts vehicle-emission norms that several years later are still too tight to be met under real driving conditions;
- Applies sustainability criteria in renewable fuels that focus on energy applications, disregarding the full biomass value chain in the production process;

- Sets the pollution limit for the sector in the Emission Trading Scheme based on the 'best performers', but excludes the cleanest technology process in the calculations

Being familiar with the limitations life-cycle assessments and predictive modelling for legislative purposes, the JRC is an excellent entry point for industry to flag such issues for mediation attempts at first instance.

3. Public procurement as a driver for innovation.

Public-sector procurement makes up a significant part of the EU market, accounting for about 19 % of its gross domestic product (GDP) or almost EUR 2.4 trillion a year. This is a huge potential to pull EU innovations to the market, support lead customers and catalysing effects, and thus provide innovative firms with a head start in the global markets. The Commission is an active player and initiated a number of activities to guide regional and national policy makers how to support public procurement of innovative solutions (PPI) building on experience gained from European Cohesion Funds programmes, FP7 and the Competitiveness and Innovation Programme (CIP).

There are currently funding opportunities under Horizon 2020 and platforms for policy learning, but also in the context of the European Structural and Investment Funds, that will bolster the implementation of smart specialisation strategies, transport plans, policy frameworks for digital growth, priorities in the areas of energy, environment, health etc.

The JRC is somewhat involved in the monitoring of Member States activities, but it could do more in terms of knowledge management support and elaborate PPIs for its own needs (outsourcing).

Glossary

CEA	Commissariat à l'énergie atomique et aux énergies alternatives
CEO	Chief Executive Officer
CIP	Competitiveness and Innovation Programme
CTO	Chief Technology Officer
CXO	Chief Experience Officer
EFSI	European Fund for Strategic Investments
EIC	European Innovation Council
EIP	European Innovation Partnership
EIT	European Institute of Innovation and Technology
EPLCA	European Platform on Life Cycle Assessment
ESIF	European Structural and Investment Funds (i.e. European regional development fund, European social fund, Cohesion fund, European agricultural fund for rural development, European maritime and fisheries fund)
EU	European Union
EURMKB	European Raw Materials Knowledge Base
FabLab	Fabrication Laboratory
GDP	Gross Domestic Product
IPR	Intellectual Property Rights
IT	Information Technology
JRC	Joint Research Centre
JTI	Joint Technology Initiative
KICs	Knowledge and Innovation Communities
KPI	Key Performance Indicator
MoU	Memorandum Of Understanding
NIST	National Institute of Standards and Technology
PEMS	Portable Emissions Measurement Systems
PPI	Public Procurement of Innovative Solutions
R&D	Research and Development
RDE	Real-Driving Emissions
RISE	Research Institutes of Sweden
RMIS	Raw Materials Information System
RTO	Research and Technology Organisation
S&T	Science and Technology
SDG	Sustainable Development Goal
SME	Small and Medium Enterprises
TNO	Netherlands Organisation for Applied Scientific Research
TTO CIRCLE	Technology Transfer Offices' network of leading European RTOs
VELA	Vehicle Emissions Laboratory
VTT	Technical Research Centre of Finland

Title: EUR 28753 - The European Commission's Science and Knowledge Service Joint Research Centre - Evaluation of its relations with industry, July 2017

Abstract

A panel of high-level experts from the world of industry and business evaluated the JRC's relationship with European industry. They see the JRC as the Science and Knowledge Service of the European Commission fulfilling its roles and functions in 'science for policy', running a nuclear research programme and emulating the unique pan-European public research and technology organisation (RTO). Many of the EU policies, regulations and standards supported by the JRC have a direct influence on industrial performance, competitiveness and the functioning of the internal market. Hence, the question whether there is scope for enhancing the JRC's relationships with industry receives a solid 'yes' as an answer.

The panel expresses the wish that the report facilitates a more effective relationship in the future. The report concludes with detailed advice and suggestions to achieve further success, grouped in three headline recommendations:

- Organise specific operational improvement
- Work more consciously with industry
- Take initiative to enhance the EU innovation ecosystem.

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