EARTO
IMPACT
DELIVERED

European Association
of Research and Technology Organisations

Jobs & Growth

Economic Footprint Study

Impact of 9 European RTOs in 2014

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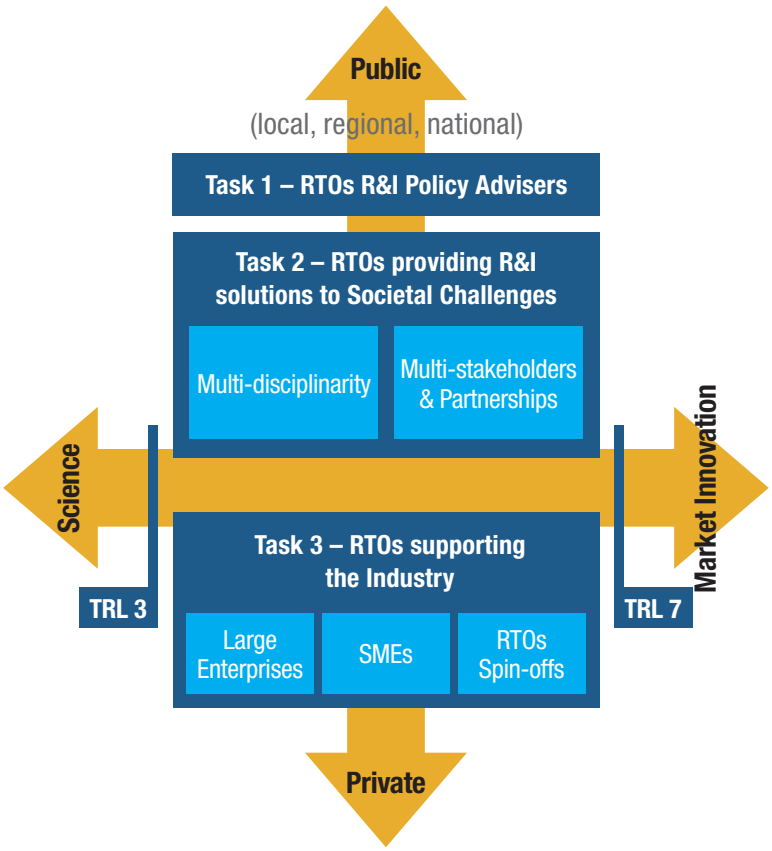
EARTO's work aims at demonstrating and exemplifying the impact of RTOs. In an EU R&I policy environment where data on RTOs from official EU sources is unfortunately lagging, EARTO felt the need to further support the development of RTOs impact data.

Understanding RTOs Activities



The quantification of these largely unknown economic effects is an important value added in the demonstration of RTOs' value for Europe's economy and society.

RTOs, key players in the innovation chain

The focus of this study is to specifically highlight the economic footprint of Research and Technology Organisations (RTOs) based on information collected from 9 RTOs, representing 1/3 of EARTO members in terms of employees and turnover. Those 9 RTOs, active members of EARTO, are: CEA (FR), DTI (DK), Fraunhofer (DE), imec (BE), Sintef (NO), SP (SE), Tecnalia (ES), TNO (NL) and VTT (FI).

RTOs produce, integrate and transfer science and technology to help resolve the grand challenges of society and support Europe's industrial competitiveness. RTOs are key players in the innovation chain, bridging the gap between basic research and practical application.

Demonstrating one's impact is a key issue in today's economical context. Among others, EARTO's work aims at demonstrating and exemplifying the impact of RTOs. In an EU R&I policy environment where data on RTOs from official EU sources is unfortunately lagging, EARTO felt the need to further support the development of RTOs impact data. To this extend, EARTO, strongly supported by 9 of its active members, commissioned an economic footprint study to IDEA Consult in summer 2014. Accordingly, this document is a synthesis of the complete study's report which is publicly available on EARTO website and which includes full methodology explanations.

As any economic footprint study, our analysis focuses on two types of activities that are expected to generate a strong economic impact:

- **the economic leverage of the RTOs' core activities through spending and employment;**
- **the economic leverage of the knowledge transfer through bilateral contract research and spin-offs.**

Although the total economic footprint of RTOs goes beyond the above mentioned effects, EARTO very consciously made the choice of conservative estimation of RTOs economic footprint to avoid double-counting and overestimations. This resulted in objective and robust observations on the economic effect of RTOs onto the European economy. As such, the results presented here can be quoted as a lower boundary.

2014 Aggregated effects of 9 European RTOs

Aggregating the effects from 9 RTOs' core activities and generated through bilateral contracts and spin-offs, results in a total of 225.900 jobs created in the European economy that can be linked to the activities of the 9 RTOs included in this footprint. This is a lower boundary to the total effect that would take into account all other types of impact (technological, social, tourism, human capital development, etc.). In the same manner, the total turnover generated from the 9 RTOs' core activities and bilateral contracts and spin-offs amounted to €29,3 billion in the European Economy in 2014, and the total value-added amounted to €14 billion. The aggregated economic effects from the 9 RTOs' core activities and generated through bilateral contracts and spin-offs also led to €5,2 billion fiscal and parafiscal flow-back towards governments in 2014.

For each job in these 9 RTOs, another 3 jobs are created elsewhere in the European economy (on top of the 1 direct job in the RTO): either at the suppliers of the RTOs or in the broader economy. Those additionnal 3 jobs are created thanks to the additional consumption of the employees of both the RTOs and their suppliers as well as thanks to the effects of knowledge transfer through bilateral contract research and spin-offs.

The operational grants received by the 9 RTOs in this study, are earned back by governments through fiscal return mechanisms. For each euro invested in the form of operational grants, almost 4 euro flow back to the governments.

In other words, about 380% of the amount spent on operational grants for RTOs returns to governments through fiscal revenues.

Study methodology

Our study methodology is based on an input-output approach, combined with micro-data input collected by and from the 9 participating RTOs. The advantage of such approach is that direct economic effects quoted here are then exact. In addition, the quantification of the indirect effects is then based on the RTO-specific data and not on sector averages. Those two elements ensure the accuracy of the results presented, avoiding overestimations.

In addition to the direct and indirect economic effects, also the induced impact (the effect of additional direct and indirect employment leading to extra consumption in the local economy) and the fiscal return (the return for the governments via fiscal flows originating from direct, indirect and induced impacts) are calculated.

The aggregated economic effect of those 9 RTOs from their core activities and generated through contract research and spin-offs resulted in 2014 in:

225.860
jobs

€29,3
billion turnover

€14
billion
value added

€5,2
billion fiscal and parafiscal return to governments

1 job in these RTOs, 3 jobs were created elsewhere

€1 invested in these RTOs', €3,8 returns flew back to governments

Particularly interesting are the leverage effects arising from our economic footprint study:

- **What is the additional employment in the European economy that can be related to one person employed at a European RTO?**
- **If operational grants are received by an RTO, how many euros flow back to the governments for each euro they invest in the RTO?**

This economic footprint assessment is further complemented with a number of indicators on the scientific and technological activities of the 9 RTOs studied. Here the focus is on two forms of knowledge transfer and knowledge conversion that are typical of all RTOs and have strong economic impact: public or bilateral research projects and spin-off creation.

9 RTOs' CORE ACTIVITIES
Impact in the European Economy

2014 **DIRECT ECONOMIC IMPACT**

9 RTOs employed
55.773 people (HC)

64% are
researchers

€8 billion
turnover
(incl. operational grants)

€4 billion
value added

The direct economic effect of an RTO is defined by its in-house activities: the staff it employs as well as the turnover and added value it creates as an organisation. An RTO has a particular profile in this respect: the majority of the staff is highly-educated and/or works as researcher.

The 9 RTOs employed almost 55.800 knowledge workers in 2014, corresponding to around 48.100 full time equivalents (FTE), 64% of which work as researcher for these RTOs. Each year, the 9 RTOs generate a total turnover of around €8 billion. This includes the operational grants that the RTOs receive (around €3,5 billion per year). Together, the 9 RTOs are estimated to have generated a total direct value added of around €4 billion in 2014. Each employee in the RTOs (FTE) created on average €84.000 value added (including grants) in 2014.

2014 **INDIRECT ECONOMIC IMPACT**

The 9 RTOs purchase goods and services from suppliers, who then in their turn buy goods and services from their own suppliers, and so on. This way, in consecutive rounds of spending, the suppliers (and their suppliers) generated in turn:

53.157 jobs mainly in

business service sector **33%**

manufacturing sector **24%**

construction sector **13%**

€6,3 billion
turnover

€2,8 billion
value added

In order to generate turnover, RTOs buy (high-tech) goods and services from EU companies in a series of other industries. This in turn leads to additional employment and additional demand of these EU companies upstream. This expanding impact of an RTO on the economy is what is called its indirect economic effect.

In 2014, purchases from the 9 RTOs with European companies amounted to nearly €3,2 billion. This in turn leads to additional indirect employment created in the European economy through the purchases of the 9 RTOs, amounting to around 53.200 jobs. As the 9 RTOs rely on a broad range of suppliers of goods and services, their activities result in the creation of employment across many different sectors. Due to such purchase of goods and services, the 9 RTOs' suppliers (and their suppliers) generated a total indirect turnover of more than €6 billion and a value added of €2,8 billion in the European economy in 2014.

2014 **INDUCED ECONOMIC IMPACT**

RTOs activities generate income for their employees and for the additional employees of their suppliers (and their suppliers). The spending of this additional income in turn induced:

10.100 jobs

€1,2 billion turnover

€0,5 billion value added

The induced economic impact is created through the directly and indirectly created employment. These employees receive a wage higher than the social benefits at unemployment. This additional income is partly spent in the European economy through consumption of goods and services. This spending generates additional turnover and value added in the European economy. Here our study took into account for an unemployment benefit in the counterfactual situation, to avoid any overestimation of the additional induced effects (which is unfortunately often done in other studies).

The employment generated at the 9 RTOs directly and indirectly at their suppliers results in additional household expenditures in the European economy, which in turn creates new employment and value added. In 2014, an additional 10.100 jobs were created in Europe as a result of these 9 RTOs' consumption. The turnover generated at companies who benefit from this extra household expenditures amounted to €1,2 billion in 2014, and the corresponding value added is more than €0,5 billion.

2014 **FISCAL & PARAFISCAL IMPACT**

The economic activities of RTOs generate major fiscal and parafiscal returns for governments, amounting in total to €2.5 billion in 2014, including:

€1,7 billion return
of **SOCIAL SECURITY** and **INCOME TAXES**

€0,5 billion return
of **VAT** revenues

€0,2 billion return
of **CORPORATE TAX** revenues

Based on the direct, indirect and induced effect, the fiscal and parafiscal return to the national governments in Europe can be estimated. This fiscal and parafiscal return is mainly generated through the following channels: the additional employment (direct, indirect and induced) leads to additional social security contributions in different EU countries; the additional production and turnover leads to additional corporate taxes; the additional value added leads to additional VAT.

The direct, indirect and induced economic activities generated by the 9 RTOs generate major fiscal and parafiscal revenues to European governments, amounting to €2,5 billion in 2014:

- Taxes levied on the income of employees whose job is directly or indirectly linked to the 9 RTOs (social security contributions and income taxes) amounted to €1,7 billion in 2014.
- Corporate income tax revenues collected from companies that supply the 9 RTOs (indirect effect) or its employees (induced effect) with goods and services, amounted to €0,2 billion in 2014, assuming that the 9 RTOs themselves do not directly pay any corporate income tax.
- The value added tax (VAT) that stems from the purchase of goods and services by companies and households amounted to €0,5 billion in 2014.

TOTAL IMPACT
of 9 RTOs' core activities

The aggregated economic effect of RTOs from their core activities in 2014 resulted in:

119.030 jobs

€15,4 billion turnover

€7,4 billion value added

€2,5 billion fiscal and parafiscal return to governments

For each 1 job in these RTOs, another additional 1,1 jobs were created elsewhere in the European economy due to RTOs' core economic activities in 2014.

For each €1 invested by governments in the form of operational grants of those RTOs in 2014, **€1,50 flew back to those governments** due to RTOs' core economic activities in 2014.

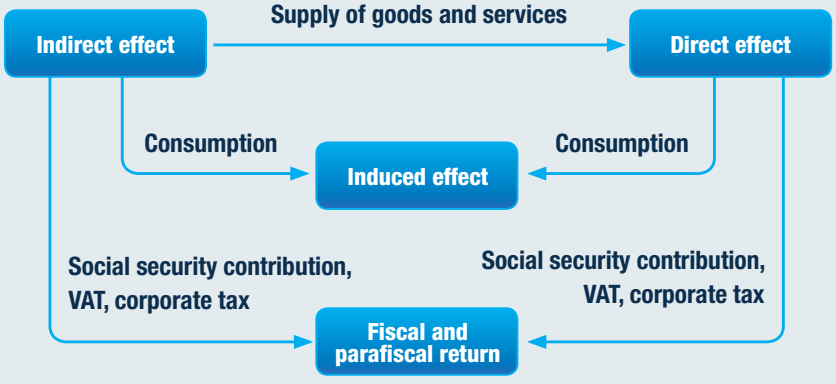
Aggregating the individual economic effects created by the 9 RTOs (direct, indirect and induced), results in an estimate of the total effect of the 9 RTOs' core-activities in the economy.

Taking together the employment that is generated directly at the 9 RTOs, indirectly at the suppliers of the 9 RTOs as well as the employment induced by the consumption purchases of these first two categories, the total employment generated amounted to nearly 120 thousand jobs in 2014. Similarly, direct, indirect and induced effects added up to a total turnover effect of more than €15 billion in Europe in 2014 and the total (direct, indirect and induced) effect of the 9 European RTOs translated into €7,4 billion of value added creation (including the operational grants).

Through indirect and induced effects, the total impact of the 9 RTOs' core-activities in terms of employment more than doubles. For each employee working in an RTO, an additional 1,1 jobs were created elsewhere in the economy (on top of the one direct job in the RTO itself) due to RTOs' core economic activities in 2014.

The grants that the 9 RTOs receive from national governments trigger economic activity directly at the 9 RTOs as well as indirectly at their suppliers. As a result, a financial flow-back is generated thanks to RTOs' core activities, which exceeds the initial grants. For every euro invested in the RTOs, there was a return of €1,5 for governments due to RTOs' core economic activities in 2014. In other words, 150% of the amount spent on operational grants for RTOs returns to governments through fiscal revenues.

Analytical framework for the economic impact assessment



TECHNOLOGICAL SPILLOVER EFFECTS

Impact in the European Economy

The technological spillover effects of the RTOs also create an economic leverage effect with its knowledge receivers through the valorisation of the technological knowledge into commercially viable activities. Two specific forms of knowledge transfer that typically have a substantial economic effect were analysed: bilateral contract research and the creation of spin-offs.

2014 KNOWLEDGE TRANSFORMATION & TRANSFER THROUGH CONTRACT RESEARCH

€1.9 billion worth of contract in 2014 resulted in:

- **93.044 jobs**
- **€12 billion turnover**
- **€5,8 billion value added**
- **€2,4 billion fiscal and parafiscal return to governments**

Bilateral contract research between the RTO and an individual organisation reflects the value that knowledge or technology have for the organisation (willingness to pay) and this value further translates into economic effects.

In 2014, the 9 RTOs participated in bilateral contracts with a total amount of €1,9 billion, corresponding to a direct knowledge transfer to their contract partners. Their willingness to pay, approximated by the amount of the bilateral contract, can be considered a concrete estimate of the scientific/technological value for the receiving partners. The total value added that is created by means of knowledge transfer through contract research was estimated at around €5,8 billion (€3,2 billion direct, and €2,6 billion indirect & induced) in 2014, the total turnover at around €12,0 billion and the total employment at more than 93.000 jobs (direct, indirect and induced). The economic effects of the 9 RTOs' contract research also led to fiscal and parafiscal flow-back towards governments, amounting to €2,4 billion in 2014.

2014 KNOWLEDGE CONVERSION THROUGH SPIN-OFFS

257 spin-offs active in 2013-2014, resulted in:

- **13.786 jobs**
- **€1,8 billion turnover**
- **€0,9 billion value added**
- **€0,35 billion fiscal and parafiscal return to governments**

The creation of spin-offs is an important way for RTOs to translate their scientific research into commercial or industrial applications and leverage the economic added value of this knowledge. In addition, the human capital moving from the founding RTO to the spin-off contributes to the availability and dispersion of highly qualified knowledge and skills to the local economy and related industries. Several RTOs have an implicit or explicit spin-off strategy.

The scientific activities of RTOs have led to the creation of many valuable spin-off activities over the years. 257 of their spin-off companies were still active in 2014. Almost 14.000 jobs were created thanks to those spin-off activities in 2014. Under the assumption that the spin-offs have a similar turnover per capita as the RTOs, the spin-offs' activities led to an annual additional turnover of over €1,8 billion and an additional value added of €0,9 billion in Europe in 2014. The economic effects of the spin-off activities of the RTOs also led to €0,35 billion fiscal and parafiscal flow-back towards governments in 2014.

EARTO Highlights

EU Institutions

European Commission
European Parliament
Council of Ministers

350 RTOs

23 countries

Network of 150 000
Researchers, Engineers & Technicians

Support 100 000 companies
per year

EU Associations

Industry
Universities
Technology Oriented Assoc.

National Governments

Permanent Representations
National R&D Liaison Offices

EARTO Members

RTOs Headquarters
WGs Experts
RTOs Brussels Offices

EARTO represents the interests of some 350 RTOs from across the European Union and associated countries. With a staff of over 150 000 applied researchers and an annual turnover of €23 billion in addition to specialised research and technology infrastructures and facilities, EARTO represents a significant resource in support of innovation, including for SMEs.

- 23 Countries
- 350 RTOs
- Network of 150 000 Researchers, Engineers & Technicians
- Supports 100 000 companies per year

EARTO's mission is:

- to promote and defend the interests of RTOs in Europe by reinforcing their profile and position as a key player in the minds of EU decision-makers and by seeking to ensure that European RD&I programmes are best attuned to their interests;
- to provide added-value services to EARTO members to help them improve their operational practices and business performance;
- as well as to provide them with information and advice to help them make the best use of European RD&I programme funding opportunities.

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