

START UP
INDUSTRIAL
RESEARCH



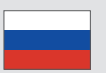
Policy Brief

Bringing industry and science closer together to solve industrial and societal challenges

A guide on how to empower
specialised Scientific Service Companies



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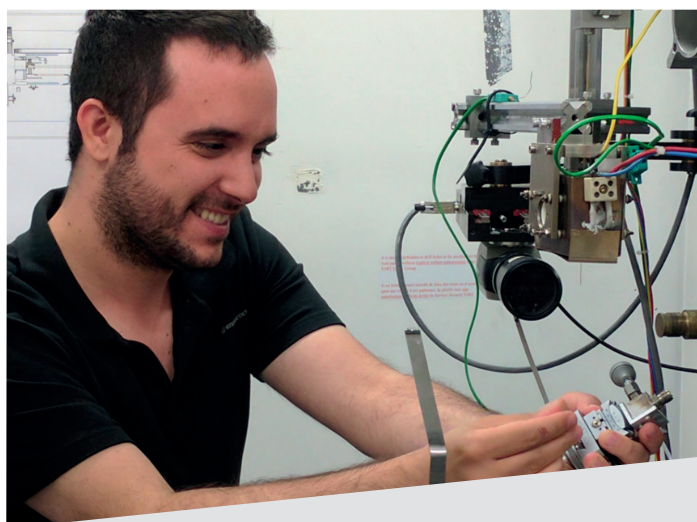
The role and potential of specialised Scientific Service Companies

Solving societal challenges, like the current Covid-19 pandemic or climate change, requires a **fast translation of scientific insights and advances into innovative remedies, products and processes**. To be agile and fast to market a quick connection between the creators of scientific insights – academia – and those serving the demand of the market – business – is needed.

We believe that this “quick connection” can be built by empowering more **specialised Scientific Service Companies**¹. These act as a **hinge between science and businesses** and complement the existing research and innovation landscape. As outlined by the EU commission, Europe suffers from a major shortcoming: “While benefitting from world-class research and strong industries Europe can do better at transforming this into leadership in innovation and entrepreneurship.”² This needed transformation can be spurred and facilitated by specialised Scientific Service Companies that carry out **research and measurement services at (public) research infrastructures on behalf of industrial clients and provide targeted expertise in many technological and scientific fields on a contractual basis**.

In other words: these companies have an excellent know-how on certain research methods and on how to apply and interpret gathered data and research insights, while also understanding the commercial context of their client. Through their services and knowledge they can bridge several gaps in our partly fragmented innovation landscape.

Finden research scientist Antony Vamvakeros, PhD, working at ID15, ESRF to develop the next generation X-ray imaging (photo courtesy of Finden Ltd, UK)



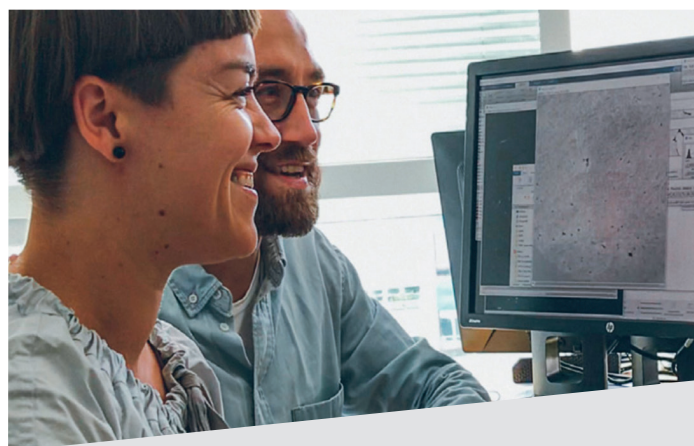
The roles and tasks they take on and are performing are manifold:

- Specialised Scientific Service Companies act as innovative **problem solvers and facilitate applicable tailor-made solutions to industrial and societal challenges involving industry and academia**. Lowering the burden for businesses (particularly SMEs) to get in touch with research infrastructures and being knowledgeable about research instruments and methods are key features of their competence. They easily meet industry’s interests in **confidentiality** and in concluding straightforward contracts on industry terms while **advancing applied science** through method development as well as **real knowledge and technology transfer**.
- They act as **executors of scientific expertise and “ambassadors” for research potential and facilities** by e.g. carrying out measurements and experiments with their own staff at research facilities. Thus they **unburden the classic science sector** with regard to staff capacity and academic key activities (often connected to qualification stages) like ▶

¹ These service companies have also been known as intermediaries, mediators, service providers or contract research organisation (CRO) or Commercial Analytical Research Organisation (CARO); please refer to this document for more insights: https://www.carots.eu/sites/sites_custom/site_carots/content/e114136/e114157/CAROMarketanalysis.pdf

² Please refer to: https://ec.europa.eu/info/sites/info/files/research_and_innovation/strategy_on_research_and_innovation/presentations/horizon_europe_en_investing_to_shape_our_future.pdf

Dr. Emely Bortel and Dr. Christian Seim conducting data analysis and visualisation of synchrotron-based measurements (photo courtesy of Xploraytion GmbH, Germany)



publishing (through taking over acquisition, supervision and hands on support of industrial customers by carrying out time-intensive services and applied research activities) as well as **storage, curation, modeling, analysis and interpretation of (big) data**.

- They act as **translators and educators of methods, results and data by interpreting scientific insights** for their industrial customers. This way they enable businesses (particularly SMEs) to even tap into the world of research and broadening their knowledge to be turned into new products or processes and thus are drivers of productivity. Furthermore

through trainings and seminars for customers and employees they broaden the knowledge base and help to reduce skills shortage.

- Through all this, they act as **accelerators for innovation** by providing businesses with much quicker yet complete assistance in (analytical) research through targeted and nuanced application of conventional and advanced characterisation of e.g. ingredients or materials and speed up research and development in areas like infection research, life and material science.

To illustrate their day to day business, we asked CEOs of specialised Scientific Service Companies about the challenges they solve for industry³:

"Today, products have many advanced technological features. Instead of just developing mechanical components, smart technologies in the product need to be considered. In our case, the product. We help our clients to visualize and understand how the product will perform before constructing it. For this, we make use of high-power computing."

CEO FEAC Engineering, Greece

"We perform optical resistance tests on various laser parts, measuring the quantity of light they can withstand without breaking. Optical resistance threshold data is needed for traders, manufacturers, and users of these products. After funding a service company we got a lot more attention and clients than being a research team at university: commercial organisations prefer to do business with other commercial organisations rather than public research centres, associated with bureaucracy, lack of speed and sometimes inefficiency."

CEO LIDARIS, Lithuania

"We help our clients with fundamentals for the strategic decisions they have to make. That fundament is based on understanding something, for example, how an ingredient will work or a product should be processed, but also on understanding the true context and your client. To give advice, you must really try to understand not only the science but also the commercial context, to try to be in your clients' shoes. This takes time and effort, time that academic researchers often do not have. We unburden researchers at universities or larger RI like synchrotrons with this task."

CEO CR Competence, Sweden

"A big chemical company asked us to look at their catalytic converter technology. We used x-ray scatter-based imaging methods that we have been working to develop to look at aged devices, to find the deactivation pathways that we were leading to loss of performance. Our insight led to the redesign of the product. It's nice to know that we have played a part in improving air quality in Europe."

CEO Finden, UK

Bringing industry and science closer together ...

Competence in different scientific areas already exists at large Research Technology Organizations (RTOs like Fraunhofer in Germany or DTI in Denmark), in universities, and (large scale) research infrastructures or directly in large companies. However, by supporting small, agile, and dedicated Scientific Service Companies, the competence will be made available to an even wider range of industrial sectors, and the current need to bridge gaps within the research and innovation system can be addressed in a more cost-effective and agile manner.

Specialised Scientific Service Companies are capable of very different research methods and services such as:

- Non-destructive X-ray based analytics at the highest sensitivities and spatial resolutions carried out at large scale research infrastructures like synchrotrons **servicing the health sector**
- Optics characterization services focused on laser-induced damage threshold, improving the quality of high power optics **supporting key enabling technologies and sectors like aerospace** ▶

³ A series of interviews can be accessed online:
https://www.carots.eu/carots_intermediary_company_portraits/

- Or research concerning design and multiphysics simulations, by studying the structural, thermal, electromagnetic and vibration properties of superconducting accelerator magnets with a view to ultimately **improving goods in areas like mobility and logistics**; just to name a few examples.



Anna Stenstam, PhD,
an expert on physical chemistry checking a sample
(photo courtesy of CR Competence, Sweden)

Those few and very small companies cooperate with large research infrastructures like CERN, DESY or ESRF as well as smaller laboratories at universities. In order to tackle current challenges in e.g. health and seriously pursuing the goal of making Europe climate neutral by 2050 (Green Deal) we need to foster small and agile agents like these service companies, in addition to prioritizing research and innovation within traditional structures and through established actors (particularly in **Life and Material Sciences**). Particularly in Europe we need more of these players in the field to find concrete answers to pressing societal problems and be “faster to market” than so far.

Therefore, dedicating a **support scheme** to those specialised Scientific Service Companies in **HORIZON EUROPE** (Innovative Europe) and foster their potential to bridge the gap between science and business seems promising.

Dedicated start-up and growth funding⁴ could be beneficial, since they are not easily scalable and do not hold attractive assets from an investors perspective; furthermore schemes targeting specific technology and knowledge transfer routines might be another⁵ promising path to pursue. Support⁶ should aim at establishing new players as well as fostering existing ones, mainly in the field of Life and Material Sciences, to kick start **knowledge partnerships of these companies** that are capable of carrying out a multitude of different research methods, serve different branches and address a multitude of societal challenges.

... by empowering specialised Scientific Service Companies for the common good

- they can foster **value and job creation** within several areas of **regional economic development** (e.g. tax flow, providing highly skilled jobs and avoiding brain drain) as well as **knowledge transfer**
- support the **development and competitiveness of (local) companies** that access their services
- offer **unlimited career opportunities for scientists** in their home region and be particularly attractive for those who want flexibility for working hours and gather experience as a scientist
- and, since those companies often use research equipment of third parties they remain flexible and bind less capital, thus taking the paradigm of the “**sharing economy**” to an advanced level. This way existing (mostly publicly financed) resources are used more intensively and can even be co-financed by paying industrial customers that rely on confidentiality

All in all: by speeding up and professionalising the interaction of science and industry, specialised Scientific Service Companies might just be the change agent Europe needs right now to enhance its innovation capacity, successfully accomplish its missions and seal the Green Deal.

⁴ Different financial support quotas for young and established scientific service companies and de minimis rules need to be applied.

⁵ After studying the national landscape of policies in selected EU countries, Russia and EU funding schemes like the Open Innovation Test Bed https://ec.europa.eu/research/participants/data/ref/h2020/other/guides_for_applicants/h2020-im-ac-innotestbeds-18-20_en.pdf, we realized that an EU support program to foster Scientific Service Companies would be beneficial and might be worth considering. Please find our report here: https://www.carots.eu/sites/sites_custom/site_carots/content/e114136/e114476/PublicsupportprogramsforCAROs.pdf

⁶ In terms of the potential set up, budget and outreach of such a scheme fostered by the European Commission and administered by a Research Infrastructure please see the ATTRACT initiative as an illustrative example: <https://attract-eu.com/the-project/>

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