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ORIGINAL ARTICLE

State Aid in Academia-Industry Cooperation: An Overview of the Existing Conditions and Challenges Through the ExSACT Project

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ABSTRACT

The ATTRACT European Research Infrastructures' Innovation Ecosystem (ERI-IE) is vital to academia-industry cooperation but faces challenges under state aid rules designed to protect market competition. Employing quantitative and qualitative methodologies, including surveys and semi-structured interviews, the ExSACT project (Enable State Administration to be an Active Contributor in the Process of Risk Absorption and Risk Reduction Through IPR and State Aid) investigated how state aid regulations impact the financing of research, research and technology infrastructure (RI/TI) usage, and intellectual property rights (IPR) transfer in the EU (European Union). Findings indicate that limited awareness of state aid rules can hinder public investment and complicate RI/TI usage and IPR management. While the organisations recognise IPR's importance, they need more support with licensing and inventor incentives. IP (Intellectual Property) registration processes are most refined for inventions and trade secrets, with less emphasis on industrial design and trademarks. Additionally, researchers expressed frustration with the complexity of state aid regulations. This research highlights the need to simplify state aid rules and improve understanding within state administrations, enabling smoother cooperation and technology transfer between the ERI, industry stakeholders, and society.

Keywords: ExSACT; IPR; state aid; academia-industry cooperation; public administration; technology transfer; technology/research infrastructure; ATTRACT.

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INTRODUCTION

The ATTRACT European Research Infrastructures (ERIs) have established an ERI Innovation Ecosystem (ERI-IE), which is crucial for enhancing cooperation between academia and industry. The government supports this cooperation through financial incentives but faces challenges due to regulations designed to protect competition in the free market under state aid rules. These regulations allow aid under certain exceptions (such as significant development projects), specific conditions (like advance notification and consent from the European Commission), or in a simplified form within a certain limit (de minimis rule).

Three major problems have been identified in this respect: inadequate management of intellectual property; poor knowledge and understanding of state aid rules; unclear/inexistent rules for the valuation of intellectual property and for leasing/using research/technology infrastructure (RI/TI). Due to limited awareness of state aid rules, managing the allocation of funding and intellectual property rights (IPR) is essential given these restrictions. Confusion can lead to limited and complex use of RI/TI, resulting in inefficient state investments from national budgets or EU-level funds into academia-industry cooperation. This inefficiency prevents the full benefits of public investments from reaching researchers, industries, and society.

The provision or lack of knowledge about state aid can either facilitate or hinder investments and the smooth transition of technology through different readiness levels, involving the ERI-IE. A better understanding of state aid rules for funding research, using RI/TI, and transferring IPR within the ERI-industry collaborative projects would enhance the effectiveness of incentives for transferring research to industry.

The purpose of this article is to analyse and shed light on the current state of affairs in state aid to academia-industry cooperation and to provide recommendations for researchers, TTO managers, contract research managers, and policymakers.

ExSACT project – *Enable State Administration to be an Active Contributor in the Process of Risk Absorption and Risk Reduction Through IPR and State Aid* (ATTRACT Phase 2, 2024) – was focused on

simplifying and optimising public investments into research and technology infrastructures as well as background and foreground IPR. At the same time, we tried to answer how state aid regulations should be considered when discussing cooperation between academia and industry.

The research focuses on how state administration impacts the funding of research, RI/TI, and IPR transfer procedures, all while complying with state aid regulations. By addressing this key objective, we can create a seamlessly integrated ERI that supports research and industry, from knowledge creation and IP definition to commercialisation, with appropriate funding within state aid constraints. This could significantly boost investments, reduce risks, and help stakeholders bring more scientific advancements into everyday use.

Improving the understanding of RI/TI use and IPR contractual challenges in relation to state aid rules can help state administrations of the ERI-IEs implement these rules more effectively. Additionally, the research clarifies the concept and rules of state aid for the beneficiaries of funded projects.

THEORETICAL BACKGROUND

Research infrastructures (RIs) are the scientific community's facilities, resources, and services to conduct top-level research. RIs include major scientific equipment or sets of instruments, collections, archives or scientific data, computing systems and communication networks, and any other research and innovation infrastructure of a unique nature that is open to external users. RIs are organised and financed at the regional, national, and European levels (European Commission, 2019a). The primary objective of an RI is to establish and operate on a non-economic basis. However, they can carry out limited economic activities if closely related to their principal tasks and not jeopardise their achievements (Fric et al., 2023).

Technology infrastructures (TIs) are similar to RIs. Still, they are primarily intended for industrial users, including small and medium enterprises (SMEs), which seek support to develop and integrate innovative technologies to commercialise new products, processes, and services. TIs are also called testing and experimentation infrastructures (European Union, 2022). Like RIs, TIs can have public, semi-public, or private status. Like RIs, TIs are organised and funded on different levels (European Commission, 2019b). The primary goal of a TI is to support SMEs and industry in developing technologies with its help. In the case of TIs, economic activities are encouraged. However, these are sometimes partially financially supported by public means (Fric et al., 2023).

The EC recommends that public research organisations have technology transfer strategic missions and policies. IP should be suitably managed by promoting its identification, exploitation, and, where appropriate, protection in line with the organisation's strategy and mission and maximising socioeconomic benefits (European Union, 2022a; European Union, 2022b; European Union, 2023). In practice, there are many problems with IP management, such as a lack of proper IP culture, unused IP, valuation problems, poor IP service quality, etc. (Tonisson et. al. 2016).

To this end, different strategies may be adopted – possibly differentiated in the respective scientific/technical fields – for instance, the 'public domain' approach or the 'open innovation' approach (Fric et al., 2023).

RIs, TIs, and suitably protected IP rights are crucial elements that support successful technology transfer from research organisations to industry. To comply with state aid rules, IP as well as leasing/using RIs/Tis should be suitably valuated to achieve its market value or maximal economic benefit for the research organisation.

The new Industrial Strategy for Europe sets out that Europe needs 'research and technologies and a strong single market which brings down barriers and cuts red tape'. It acknowledges that 'investing in research, innovation, deployment, and up-to-date infrastructure will help develop new production processes and create jobs' (European Union, 2022). In light of the new Industrial Strategy for Europe, the EC has also set out a *Framework for State aid for research and development and innovation (2022/C 414/01)*. The Framework has addressed rules on state aid regarding cooperation between academia and industry, specifically in collaborative research, contract research/research service, licensing, and consultancy (European Union, 2022).

Various guidelines and examples have been presented to facilitate an understanding of these rules and their application in practice (Nicolaides, 2013; von Wendland, 2015; Kaiser et al., 2021; Kebapci, 2020). However, there is still insufficient knowledge of these rules. There is an opportunity for public administrations to play a more active role by providing educational material and organising information days and similar events to raise the level of understanding of these rules in practice. However, education should involve the widest possible range of interested stakeholders, especially technology transfer offices, finance offices, and decision-makers in research organisations and enterprises.

METHODS AND DATA

To achieve the crucial objective and for a better understanding of RI/TI use and IPR contractual challenges concerning state aid rules and more straightforward implementation by the state administrations of the ERI-IEs, quantitative and qualitative research has been carried out, namely:

- analysis of the critical challenges of RI/TI and IPR management;
- a review of systems for valuing transferring IPR in collaborative projects in ERI-IE;
- a review of the regulation of the state aid system in RI/TI and IPR management;
- prepare a proposal for a sustainable system and implement changes for more effective financial support of the innovation system, following and properly manifesting the EU state aid rules in the ERI-IE of ATTRACT.

Based on secondary and primary data, a quantitative and qualitative analysis of critical challenges for the transfer of IPR and the development of guidelines for the management of IPR in joint research and development (R&D) projects has been carried out. Secondary data was extracted from legal acts available on EUR-Lex to provide an overview of the legislative framework and theoretical background of the relevant field of EU law. Primary quantitative data was obtained using a survey research technique, and primary qualitative data was obtained using a semi-structured interview research technique.

As part of the ExSACT project within the *ATTRACT Phase 2* initiative, a survey was administered to 18 participating research, development, and innovation (R&D&I) project partners. Responses from 29 individuals representing 16 European projects were collected between April and June 2023. Five *ATTRACT Phase 2* project partners from different R&D&I projects participated in semi-structured interviews, collectively providing insights into various topics related to IP and the application of state aid regulations. The semi-structured interviews were conducted between April and June 2023.

Even if the actual size of quantitative and qualitative research is small and does not present a generalisation to the field under consideration, it is an important indicator in preliminary research, where the research carried out is classified.

RESULTS

Quantitative Analysis of the IPR Transfer

Respondents (29) were affiliated with start-ups (10), followed by universities (8), research institutes (5), small enterprises (5), micro-enterprises (3), large enterprises (3), and spin-off companies (2). Notably, seven individuals were employed at two separate institutions.

More than 90% of the R&D&I projects use our respondents' own IP. However, less than 25% successfully licensed it to other organisations. This implies that organisations are aware of the importance of IP. However, they need substantially more encouragement and assistance in licensing, for example, through better cooperation with their technology transfer offices.

Almost 80% of respondents reported that individuals or offices handling IP are well-known in the involved organisations. Over half of the organisations highlight IP as part of their marketing strategies.

However, only half of them consistently reward the inventors for the successful commercialisation of inventions. This, coupled with the fact that only 45% of individuals had a positive experience in managing IP rights in collaborative projects involving research organisations and companies, and even less (34%) of them had a positive experience in valuation and determination of the price value of said IP, might discourage employees from seeking appropriate IP registration and commercialisation.

As seen in Figure 1, internal IP registration procedures in the involved organisations are most transparently regulated for inventions (69%) and trade secrets (41%), such as software and secret know-how.

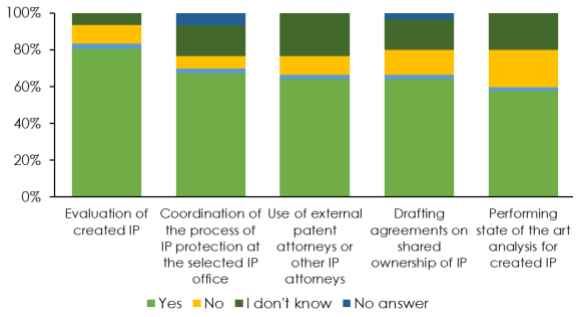

Fig. 1. Transparency of procedures for the internal registration of IP.

It is also apparent from the results that certain forms of IP, such as industrial design and trademark, are poorly represented and constitute a potential source of previously unprotected IP. In the involved organisations, the largest share (55%) of marketing is devoted to products and services, followed by marketing of IP (41%). Additionally, more than half of the involved organisations search for market connections through market and potential partner monitoring. Based on our survey results, organisations do not sufficiently encourage joint national or EU project applications (34%) or the joining of consortia (28%).

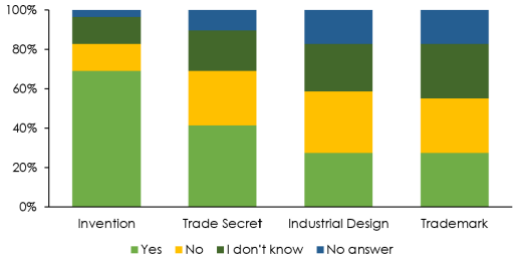

Fig. 2. The most well-known offered IPR-related services.

The most common (83%) and well-known offered IP-related process in the involved organisations is the evaluation of created IP.

The least common (21%) use is internal IP attorneys, as seen in Figures 2 and 3. Given the frequent occurrence of IP in these projects and organisations, multilevel IP analysis, which could improve its quality, appears to have great potential.

The uncertainty about whether a particular IP-related service is offered at included organisations was, except for evaluation of created IP, coordination of IP protection processes and drafting agreements on shared ownership of IP, such as inventions, more than 20%.

Notably, 31% of survey participants were uncertain whether their technology transfer office handles IP registration as intangible assets. This could be resolved by better promoting IP-related processes by the designated technology transfer offices.

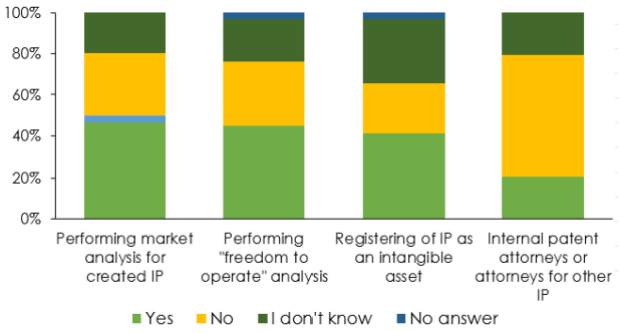

Fig. 3. The least known offered IP-related services.

Qualitative Analysis of IP and State Aid Rules

Interviewees (5) were mostly researchers, group leaders from research organisations and companies, and coordinators of ATTRACT Phase 2 R&D&I projects. Most of the interviews are published (ATTRACT Phase 2, 2024).

Patents are anticipated to emerge as the prevailing IP form from these projects, followed by secret know-how and trade secrets. While all interviewees exhibited familiarity with the EC's regulations about state aid for R&D, a notable point of consensus among them was their shared frustration regarding these rules. One noted that their management forces them to set an excessively high market price for their products, making them less appealing to potential investors and hindering their progress.

Technology transfer offices are common within academic institutions, whereas start-ups, spin-offs, and SMEs rely on external IP attorneys. One interviewee noted an issue within university technology transfer offices: understaffing. As a result, the researchers often need to perform specific time-consuming tasks, such as conducting state-of-the-art analyses.

Interviewees with academic ties expressed frustration over the extended duration of the patent application process. In some cases, they deemed it more advantageous to prioritise publishing research articles to earn recognition for career advancement over safeguarding their IP, particularly when dealing with patents of limited or negligible exploitable potential. Furthermore, laboratories or SMEs occasionally preferred maintaining their developed IP as a trade secret rather than pursuing patent protection, ensuring their knowledge remained concealed.

DISCUSSION AND CONCLUSIONS

The article outlines quantitative and qualitative research highlighting the need to understand and suitably apply state aid rules by technology transfer officers, researchers, public administrations and other stakeholders. This may allow for smooth cooperation and technology transfer between research organisations and companies.

The EC recommends that public ROs have technology transfer strategic missions and policies. IP should be suitably managed by promoting its identification, exploitation and, where appropriate, protection in line with the strategy and mission of the public ROs and to maximise socioeconomic benefits.

IP management is important to maximise the value of IP. Decisions need to be made at different milestones. The newly created IP needs to be detected and evaluated. Evaluation involves categorisation, state-of-the-art analysis, analysis of commercial potential etc. Due to open science policies, some valuable information can be published before being protected by a patent. In some cases, the most suitable protection is a trade secret, where additional confidential measures need to be taken. An IP owner needs to have an IP protection strategy, often a patent strategy, which includes geographical coverage, content of patent claims as well as cost management. Relations with co-owners and licensees need to be agreed upon, which is often advisable to do in advance. Appropriate incentives should be provided to ensure that all relevant staff actively participate in implementing the IP policy.

State aid rules are set to prevent market distortion, but also to help research organisations in negotiating their maximum economic benefit. This is useful when a research organisation and a company enter a contract research agreement, collaborative research agreement or license agreement. Awareness and understanding of state aid rules are important at different levels – researchers, technology transfer officers, contract research managers, legal officers, and entrepreneurs.

Services and goods including intellectual property rights need to be provided by research organisations to companies at a market price or with maximal economic benefit. Valuation of services, RI/TI rental and intellectual property need to be done professionally and updated regularly.

As seen from the results of the ExSACT project, they are already an essential source of feedback on state aid for R&D for public administrations, technology transfer offices and other stakeholders. The current recognition of familiarity with the EC's regulations about state aid for R&D is particularly crucial. Most interviewees are familiar with these rules, but their detailed familiarity can be questionable. As observed by interviewees, it is important that supportive units such as technology transfer and financial offices, which (should) understand state aid rules, support academia-industry cooperation. The staff of such offices are often under-trained and understaffed.

An internationally comparative view on the regulation of the state aid system in infrastructure use and IPR transfer in cooperative R&D projects in the ERI-IE, based on good practices of the general procedure for using the state aid system, will be prepared to guide the users and the state administrations of the ERI-IE countries for maximum impact delivery with the least friction among the stakeholders.

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