Quality Festival 2019
ISSN 2620-2832

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ACADEMIC ENTREPRENEURSHIP AND THE EU FUNDS IN POLAND 2014-2020

Abstract: *The objective of this paper is to present how the requirements of the EU funds in Poland 2014-2020 force or foster academics to establish and run their own businesses, and/or cooperate with industry. Poland is one of the major beneficiaries of the EU funds in Europe, receiving over EUR 80 billion distributed through operational programmes. Entrepreneurs and researchers receive money mainly through Operational Program Smart Growth (EUR 8,6 billion). Its aim is to stimulate research and development (R&D) and transferring the innovative results to the industry. In this article, we present the results of interviews with academics who established and run their own companies with support of the EU funded R&D projects. The following aspects have been explored: 1) profile of companies established by academics; 2) EU-funded projects submitted and realised by the company; 3) difficulties with running the company; 4) motivation of academics behind establishing their businesses (and benefits thereof).*

Keywords: *EU funds, academic entrepreneurship, academic business, Operational Program Smart Growth, EU projects*

1. Introduction

By 'academic entrepreneurship' the authors understand activities undertaken by university researchers specifically, although it may also refer to the researchers working in other organisations. Universities belong to the group of entities defined by the EC Regulation No 651/2014 [Art. 2, p. 83] as 'research and knowledge-dissemination organisations', involving 'universities or research institutes, technology transfer agencies, innovation intermediaries, research-oriented physical or virtual collaborative entities), irrespective of their legal status (public or private) or way of financing, whose primary goal is to independently conduct fundamental research, industrial research or experimental development or to widely disseminate the results of such activities by way of teaching, publication or knowledge transfer'.

Although academic entrepreneurship is not a tradition for many universities, most of them seek additional revenues through transferring knowledge to industry. There are various definitions of "entrepreneurship" in academic context. The term "entrepreneurial university" was used for the first time by Etzkovitz [1983] to describe relations between academia and business organization [Lewandowski 2013].

Academic entrepreneurship is now commonly understood as university researchers commercializing university research through new business companies [Cantu-Ortiz et al. 2017]. However, it is often narrowed to spin-off companies,

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typically associated with universities [Shane 2004].

There are many forms of relations (cooperation) between researchers and industry, for example [Sundbo 2003, p. 60-62]:

- researchers having individual contacts with entrepreneurs,
- government financing research projects realized by researchers having individual contacts with entrepreneurs,
- applied research conducted by research teams, financed or co-financed by business, government or foundations,
- grants funded by the government, managed by universities at institutional level and by professors,
- individual researchers being hired by enterprises to conduct industrial research,
- scientists starting up their own scientific enterprises to commercialize research results outside of the university.

Academic entrepreneurship is often associated with the last of the above listed types of university-industry cooperations. It usually takes form of spin-off or spin-out technology company. According to the National Centre for Research and Development, a spin-off company is a new entrepreneur, usually operating in the form of a capital company (limited or joint stock), set up by at least one employee of a university (or: research organization) or student or university graduate, for the purpose of commercializing research or development work. This entity is usually not related personally or financially to the university, however cooperation between them is usually based on commercial rules. A spin-out company is created by at least one employee of a university (or: research organization) or student or university graduate, and of the university itself (or: research organization) or their organizational unit established for commercialization of knowledge. Thus, such company is personally or capitalally linked with the university or research organization, which constitutes a parent unit for it. A spin-out form is recommended when a parent organization intends to take an active part in the functioning of the created company [The Naional Centre for Research and Development Portal: www.ncbr.gov.pl].

The objective of this paper is to present how the requirements of the EU funds in Poland 2014-2020 motivate university researchers to establish and run their own businesses, and/or cooperate with industry. Factors influencing such activities undertaken by scientists have been already explored in the literature. For example, D'Este et al. [2010] studied the attributes of academic researchers that influence the capacity to identify and exploit entrepreneurial opportunities. These features included prior knowledge, entrepreneurial experience and scientific excellence. Another study [Miranda et al. 2017] aimed at examing determinants of entrepreneurial intentions of academics. They identified attitude towards entrepreneurship being the main determinant of entrepreneurial intentions. It was in turn influenced by the creativity, perceived utility and entrepreneurial experience. The current article focuses on the influence of the EU requirements (or, more precisely, formal rules of the Operational Program Smart Growth 2014-2020) on the academic entrepreneurship in Poland.

2. Research-industry cooperation in Operational Program (OP) Smart Growth 2014-2020

In the current EU Multiannual Financial Framework (2014-2020), Poland spends money through the following Operational

Programs [European Funds Portal: www.funduszeeuropejskie.gov.pl], managed at central level:

- Infrastructure and Environment (EUR 27,4 billion),
- Smart Growth (EUR 8,6 billion),
- Knowledge Education Development (EUR 4,7 billion),
- Digital Poland (EUR 2,2 billion),
- Eastern Poland (EUR 2 billion),
- Technical Assistance (EUR 0,7 billion),
- or at regional level:
- 16 Regional Operational Programs (EUR 31,15 billion).

At central level, OP Smart Growth is the largest source of support for enterprises competing for the EU money within different 'calls'. It is funded from the European Regional Development Fund, and it is divided into five areas [Operational Program Smart Growth Portal, www.poir.gov.pl]:

1. Support for R&D (research and development) activity of enterprises.
2. Support for the environment and capacity of enterprise for R&D&I (research and development and innovation) activity.
3. Support for innovation in enterprises.
4. Increasing the research potential.
5. Technical assistance.

Activities that can be financed within this Program include: R&D activities to create innovative technologies and products, implementing new solutions on the market, investment in R&D infrastructure, pro-innovation services, entering foreign markets and creating new companies.

Although the terms "research" or "science" are typically associated with research and knowledge disseminating organisations, a vast majority of 'calls' in the Smart Growth program is addressed to enterprises as leaders of R&D projects. In other words, business is encouraged to cooperate with universities or research organizations, but entrepreneurs should be the ones responsible for R&D process and market implementation of the project result. Thus, they should take all decisions in the project and control the whole R&D process, while the university should only support entrepreneur by providing advanced academic knowledge and research experience.

3. Forms of industry-academia cooperation in Smart Growth projects

There are usually two ways of project cooperation between enterprises and universities / research institutions under the Smart Growth schema:

1. *Subcontracting*, in which entrepreneur – beneficiary of the EU funds – delegates to a third party (university, research institution or another entrepreneur) substantive works under the project.
2. *Partnership*, in which beneficiary and university / research institution sign the consortium agreement for a collaborative project, but only entrepreneur can be the leader of the consortium.

In subcontracting, selected R&D activities are carried out in the area of the third party (subcontractor), who supervises works and incurs costs of necessary resources [Handbook for eligibility of expenses in OP Smart Growth 2014-2020, Document of the National Centre for Research and Development]. At the end, the parties settle the invoice and subcontractor is not entitled to the benefits resulting from market implementation of the results. Due to the fact that part of the research is conducted without direct supervision of the beneficiary, subcontracting costs are excluded from the basis for calculating indirect costs of the project (which is a lump sum, usually

accounting for 25% of direct costs of the project). In R&D projects, subcontracting is understood as substantive R&D activities commissioned to a third party, and it does not involve auxiliary activities such as legal, accounting or consulting services, which should be paid from indirect costs.

Under the partnership, there is a consortium agreement specifying conditions of collaboration, with entrepreneur as the Consortium Leader, being ultimately responsible for incurring eligible expenses. The consortium agreement has to regulate inter alia the following points [Minimum scope of consortium agreement, Document of the National Centre for Research and Development]:

- data of consortium members and purpose of the consortium,
- the scope of authorizations for the Leader, including authorization for representing consortium members, incurring eligible expenses, and mediate in transferring funds from the Intermediate Body to the members,
- the way the parties interact and manage the project, and the division of work between the consortium members,
- rules for implementing the results of the project, and division of inellectual property (IP) rights to the results,
- rules for transfer of IP rights between the Consortium Leader and other members of the consortium (for remuneration corresponding to the market value of these rights),
- duties of the consortium members,
- rules for submission of the results by the consortium members to the Leader,
- the way parties inform each other about any problems in the project,
- conditions for terminating the project.

The above ways of cooperation refer to institutional level, in which a contract is signed between two organizations: enterprise and university or other research entity. However, a company carrying out the R&D project may employ (on full-time or part-time basis) individual researchers who become members of the project team. In this case, there is no interaction between the entreprise and the researcher's home university. This is a common practice due to the fact that one of the project evaluation criteria is the research potential of R&D personnel. Therefore, staff with scientific achievements increases the chances of financing the project. As most enterprises (especially SMEs) do not have employees with academic achievements, they willingly reach for university employees.

Academics are allowed to maintain their full-time jobs at universities while having at the same time the contract of employment in the company's project. Nevertheless, the number of working hours per one employee should not exceed 276 hours monthly, constituting a sum of working hours from all his/her contracts. There is also possibility to hire a scientist who performs a specific task based on a contract work at a specific rate of pay. Such contract employee is not considered the part of the project personnel and the EU documents define such relation as subcontracting [Handbook for eligibility of expenses in OP Smart Growth 2014-2020, Document of the National Centre for Research and Development].

4. Industrial research, experimental development and innovation

There are three types of research work as specified by the EC Regulation No 651/2014 [Art. 2, p. 84, 85, 86]: fundamental research, industrial research and experimental development.

'Fundamental research' is defined as 'experimental or theoretical work undertaken

primarily to acquire new knowledge of the underlying foundations of phenomena, without direct commercial application or use in view' [p. 84].

'Industrial research' (also called: 'research') aims at acquiring 'new knowledge and skills for developing new products, processes or services or for bringing about a significant improvement in existing products, processes or services' [p.85].

'Experimental development' (also called: 'development') is based on 'acquiring, combining, shaping and using existing scientific, technological, business and other relevant knowledge and skills with the aim of developing new or improved products, processes or services' [p.86].

Such classification is linked to the so-called Technology Readiness Level (TRL). According to guidelines provided by the National Centre for Research and Development, TRL 1 corresponds to fundamental research, TRL 2-6 – industrial research, while TRL 7-9 – experimental development [Technology Readiness Levels, Document of the National Center for Research and Development].

Entreprises are rarely interested in carrying out fundamental research, which according to the above definition is not focused on commercial applications. Even commercial projects involving industrial research and experimental development – as all investments in innovations – are associated with a high (above-average) risk of failure and financial losses. Thus, very few entreprises (especially SME) could afford such investment without external support. However, to stay ahead of the competition and get a high rate of return on investment, innovations are necessary. Thus, the EU recognized the need for special support for R&D&I activities through the following statement: "Aid for research and development and innovation aid can contribute to sustainable economic growth, strengthen competitiveness and boost employment" [EC Regulation No 651/2014, Art. 2., p. 45].

As it was mentioned above, all Smart Growth 'calls' for proposals oblige entrepreneurs applying for the EU money to conduct industrial research and experimental development, or just experimental development. These activities should lead to the creation of an innovative result, which should be implemented on the market.

Within Smart Growth, the EU funds may cover various activities at different stages of product implementation. For example, measure 1.1.1 (*Industrial research and experimental development conducted by enterprises*) cover costs of research and development activities, but not the implementation of innovative product resulting from these activities. Whereas, measure 3.2.1 (*Research for the market*) covers the costs of implementation but not R&D activities; however, entrepreneurs applying for projects under the 3.2.1 measure, has to present evidence that the result to be implemented is innovative and was the effect of R&D acivities undertaken prior to the application. Thus, R&D&I activities are key for entreprises to successfully apply for the EU money in the years 2014-2020.

According to documentation of Operational Program Smart Growth, only product and process innovations are eligible for funding (contrary to organizational and marketing innovations). The term 'innovation' has been defined in multiple sources, eg. Oslo Manual and the EC Regulation No 651/2014. The latter defined innovation as 'products, services or processes which are new or substantially improved compared to the state of the art in its industry, and which carry a risk of technological or industrial failure' [Art. 2., p. 80]. Nevertheless, having product or process innovation is not enough to get funding under this program. An applicant should justify that the innovation fits in at least one of the 20 National Smart Specializations, defined in the

documentation [National Smart Specialisation, Document of the Ministry of Digitization].

5. Factors motivating researchers to establish business or cooperate with industry in Poland

5.1. Method

The research was based on in-depth inteviews with four academics, employed at universities in Poland on a full-time basis, who also run their own businesses. They were asked the following questions:

1. What is the profile of your company? (spin-off/spin-out or other form, how many employees, what is the main activity generating revenues, who are the customers)
2. What did motivate you tu establish the company?
3. Before you established your own company, had you had any experience in cooperation with industry? Do you use your university experience in the company, and vice-versa?
4. How do you think you are perceived by other, non-academic business players? Is being 'academic entrepreneur' an advantage on the market? What benefits and problems do you see?
5. How do you think you are perceived by your university colleagues, superiors or students? Is being 'academic entrepreneur' an advantage at your home university? What benefits and problems do you see?
6. Have you applied for EU projects? If so, have you been successful? (number of the proposals submitted, number of EU projects funded, perceived benefits and problems of such projects)

The responses were recorded, transcribed and analysed by the content. The results of the content analysis are presented below.

5.2. Results

The respondents were owners of spin-off limited companies established mainly to commercialize the R&D work and provide R&D services or products. Home universities of the respondents have no shares in their companies, yet two companies rent rooms from the university on a commercial basis ("for convenience, having full-time academic position and travelling to other premises would be time-consuming").

In one company, the university had some percent of shares two years ago, but the owners negotiated to buy these shares, so the university has no control over the firm's activity. When asked for a reason, the respondent complained about the university's beaurocratic procedures stopping the company's market activities. However, he admitted that having university as co-owner was in some cases as having an umbrella, especially during cooperation with large businesses, and increased credibility on the market. Yet, as it was stated that "costs of having university on board exceeded the benefits", they were forced to break up.

All respondents were owners of young entreprises (start-ups), existing no more than 5 years at the market. All of them are microfirms with up to 10 employees. An example of their R&D services is designing a robot based on specifications provided by the customer. Customers who order the R&D services are only business clients not the consumers, so the explored entities operate merely in B2B sector. However, the academics admitted that they are ready to offer other services, too. For example, one of them declared he is ready to do "anything to stay on the market", such as car rental, as he

selected several codes in Polish Classification of Economic Activity ('PKD code') when he set up the business[1]. One company provides also consulting services, which ammounts for more than 50% of its revenues. The owner is also thinking of providing training services for other companies, mainly in the area of R&D project management.

As regards the respondents' motivation to run own business, they indicated the following factors: finances, willingness to prove oneself on the market, verify the suitability of academic competencies in business, getting business experience that is beneficial in academic work, willingness to do "something useful for the society" and "research freedom". As regards the latter, one respondent admitted that "in my company, I'm free to do whatever research I want and in the way I want, I don't need any agreements from administration, and I have much more time for science; when doing research projects at the university, a vast majority of my time was devoted to administrative work not to scientific activities; and I'm also happy that the result of my work will be useful for someone else". He also said that there are very few 'calls' in Polish Operational Programs dedicated for R&D projects managed at universities, most of the measures are dedicated for private entrepreneurs who may or may not invite the universities to cooperation in R&D projects as partner or subcontractor. However, very few companies decide to do so ("due to beaurocracy and high indirect costs"), they prefer to employ individual scientists who become personnel in their projects.

All the respondents had prior experience in cooperation with business and industry. They had worked in private sector and NGOs, one of them had had a scientific workplacement in a consulting company, and the experience and successes gained in that company motivated her to establish her own business. Besides, all subjects had had experience in working in R&D university projects in the previous Multiannual Framework (2007-2013). All these projects were based on university-industry cooperation, which was much more advantageous for the university than in the present framework 2014-2020. As it was mentioned above, in the previous Framework 2007-2013 there were many programs in which university could have led the R&D projects, while currently most projects should be managed by industry players[2].

When asked about how academic entrepreneurs are perceived by other marketplayers, the responses were different. One of them stated: "Being a scientist and increases my credibility in the eyes of the customers". Such perception might be explained by the fact that academic teachers and scientists are professions of public trust, such as doctors and lawyers. On the other hand, this status might be a disadvantage: "They think I'm more a scientist than an entrepreneur, so they sometimes try to negotiate prices below the market value, thinking I'd be happy to get anything out of it".

[1] Every entrepreneur running a business is required to determine the PKD code. This code accompanies the entrepreneur at every stage of running the company. Any change in the subject of the company's activity is tantamount to the obligation to change the PKD code. The code should be chosen when setting up a business. The selected code plays an important role in the case of application for subsidies or during participation in various types of tenders. In the case of changes in the company's profile, the PKD codes should be updated. Any entrepreneur who performs activities outside the scope set by the selected codes may be fined.

[2] As regards R&D projects, there is only one measure in OP Smart Growth 2014-2020 dedicated to the scientific sector (4.2 *Development of modern research infrastructure of the scientific sector*). Universities may apply for money mostly for fundamental research, not being focused on commercialization (small projects financed from the National Science Centre). They can also apply for R&D projects within Horizon 2020, but it requires international cooperation and is competitive in the European scale.

Regarding the question on how their businesses are perceived by superiors, colleagues and students at the university, all the researchers were rather positive. One of them admitted that his colleagues and superiors also cooperate (or cooperated in the past) with the industry. They also stressed mutual benefits for both the company and the university ("I use my academic skills in doing research for my company's projects, but I also use my business experience in the university projects"). Moreover, "cooperation with the industry" is an important element of employee evaluation and of the promotion proceedings e.g. for habilitation. The academics also noted the benefits of practical experience in teaching students ("how credible I would be teaching about industry if I didn't work for the industry myself?").

Another important issue is the role of the EU funds in financing R&D activities. The academics said they were "used to apply for research grants" and so they did working in the companies. Each of them submitted at least one project proposal, mostly to the OP Smart Growth measure 1.1.1 (*Industrial research and experimental development conducted by enterprises*)[3]. They were usually successful for the second time, and now all of them are conducting the EU projects. The major benefit they see in financial support for costs of remuneration, materials and equipment. They recognized that it would be very difficult for them to operate on the market without the EU support. One respondent admitted to have three Smart Growth projects in his company, and that he set up the company having in mind that he would apply for the external money. However, EU grants are based on cofinancing, covering up to 80% of costs in industrial research and up to 60% in experimental development, so the entreprise has to contribute 20% and 40% of the costs, respectively. It requires additional work to earn this money, so they cannot focus solely on the project. Another problem appears with management of EU grants, which require extensive financial reporting and knowledge of accounting rules.

[3] This is the most popular and frequently announced call for proposals, suitable for any enterprise and covering any R&D activity, regardless the industry or sector.

6. Conclusions

In this article, we have demonstrated how the requirements of the EU funds in Poland 2014-2020 influence academics to establish and run their own businesses and/or cooperate with industry. As it was explained, the present Multiannual Famework 2014-2020 promotes innovatios created through industrial research and experimental development (R&D). This is addressed especially to entrepreneurs, who are encouraged to apply for money to finance their R&D projects. Thus, EU funds constitute an incentive for university scientists to start their own businesses.

Academic entrepreneurship brings benefits to both the company and the university. The company benefits from the research experience and scientific knowledge, while benefits for the university include as follows: improved research skills; knowledge on the real needs of business and industry; increased quality of teaching. In addition, cooperation with industry is an element of employee evaluation and promotion proceedings.

The results of the study demonstrated a disappointment expressed by the scientists as regards the conditions for conducting research at universities. Complex administrative procedures related to public expenditure slow down the research, especially if it requires buying equipment or materials. Besides, the issue of IP rights and related beaurocracy discourages entrepreneurs from cooperating with the university at institutional level. They prefer

to cooperate with individual scientist, and according to the respondents many of their colleagues collaborate with the industry in R&D projects, mostly EU-funded. This is due to the fact that one of the main project evaluation criteria is the research potential of R&D personnel. Most entreprises do not have staff with scientific achievements, so they are forced to reach for the scientists from universities or other research institutions in order to be successful in project application.

There is an important conclusion for universities and public research entities: it is necessary to create more favorable conditions for academic entrepreneurship, such as reduced beaurocracy. Many positive changes have already been made, such as growing number of business incubators and accelerators linked to public and private universities, but there is still much to be done. As regards future studies on academic entrepreneurship, perceptions of academic entrepreneurs by other business players constitutes an interesting research direction.

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