THE ROLE OF EU PROGRAMMES FOR BOOSTING INNOVATIONS

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Abstract

The article explores the attempts to answer the research question: Are the odds of engaging with innovation activities higher in companies who implement EU projects? Based on mixed methods of empirical data collection we find out that EU projects increase statistically the likelihood of innovation. The highest differences are observed in process innovations, followed by product and marketing innovations. There is no difference in organizational innovations.

Keywords: EU funds, Innovation, Impact, SMEs, Bulgaria

Literature review

Impact of the innovation support

The positive impact of EU innovation funding on companies' innovation activities has been confirmed by a number of theoretical and empirical studies (Čučković & Vučković, 2018). The authors claim positive effect on incentivizing innovation activities, output, and business performance of SMEs.

Targeted research (see Innovation.bg 2023: Innovation and Sustainable Growth, Applied Research and Communications Fund, 2023) highlights that funding research and innovation „is a measure of the investment in the creation, use and dissemination of new knowledge in the public and business sectors. It is considered an indirect indicator of the innovation capacity of the national economies in future periods". Other key studies highlight that innovations are the basis for sustained competitive economic development nationwide and globally. It finds that bigger companies with more solid financials tend to invest more in innovations (Grossman & Helpman, 1991) while small and medium enterprises (SMEs) remain on the arena facing challenges to attract credit, venture and grant funding (Simeonov, 2015).

Bringing innovations to live (regardless of them being product, process, marketing, organisational) is heavily dependent on the budget and resources allocated for them (on research and development (R&D) mainly).

This thesis is also supported by local research for Bulgaria on factors that hinder companies' innovation, namely that companies find direct innovation costs for too high, with a high price and a scarcity of available financing sources (see ARC Fund, 2020, Innovation.bg Economic resilience through Innovation, Sofia, Bulgaria), with the same interpretation supported by European studies presenting how „access to finance is the largest obstacle to innovation that SMEs face" (see Cuckovic, & Vuckovic, 2021).

This conclusion is highly interesting given the fact that the importance and budget for innovations are increasing. To respond to this challenge companies face, the Bulgarian government has implemented policies aimed at enhancing innovation in the private sector. Key strategies **include the National Innovation Strategy and the Innovation Strategy for Smart Specialization 2014-2020**. National Innovation Strategy emphasizes the development of a knowledge-based economy through investments in R&D and innovation infrastructures while the Innovation Strategy for Smart Specialization focuses on identifying and supporting key sectors with high innovation potential, such as information and communication technologies (ICT), mechatronics, and clean technologies.

However, this national financing is considered insufficient while the existing funding is inefficiently used and prevent Bulgaria from achieving intensive innovation development. EU Programmes, like in previous years, are expected to mobilise significant private resources[1]. Companies and organizations usually complain from over-bureaucratic procedures for the co-financing options to EU R&D project funding.

Policy and EU subsidies framework development

A comprehensive overview of the Innovation policy of the European Union and Bulgaria on the eve of the programming period 2021 - 2027 is presented in the ARC Fund, Innovation.bg 2020: Economic Resilience through Innovation paper.

For the financial period 2007-2013[2], the total amount of **555 million euro** has been allocated to support innovations through EU grant Programmes through *OP Development of the Competitiveness the Bulgarian Economy*[3] (for the promoting innovative start-ups and efficiency of the enterprises), *OP*

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[1] Innovation.bg 2023: Innovation and Sustainable Growth, Applied Research and Communications Fund, 2023

[2] Source: Authors, see Table 1

[3] Official site of the OP Development of the Competitiveness the Bulgarian Economy, available at: https://www.opcompetitiveness.bg/index.php?lid=2

Regional Development[4] (for applying innovation as a horizontal priority with no separate innovation measures), *JEREMIE*[5] (with Bulgaria being one of the few pilot EU countries in 2011, allowing also more risky and innovative projects to be funded by commercial banks). Those programmes worked in a context of lack of companies' own financial resources, little understanding of the characteristics of innovation among Bulgarian enterprises while at the same time the key national innovation stakeholders (National Innovation Fund and the Bulgarian National Science Fund) operate without strategic guidelines[6].

It is positive to observe how European Union funding for innovation in Bulgarian enterprises increase over the programming periods since 2007, and the understanding and priorities for innovation evolve.

For the planning period 2014-2020[7], the total amount of **1 352.3 MEUR** (some projects for 2021-2022 are also included) was foreseen for measures addressing innovation support. This financial support was backed up by further strengthening of the policy framework, strategies[8] including the approval of important strategic documents such as *Innovation Strategy for Smart Specialization 2014-2020;* prepared *National Strategy for SMEs in Bulgaria (2021-2027); Industry 4.0 2017-2030* – the use of the latest and digital technologies that enable new and more efficient processes by including a group of rapid digital transformations of production systems and products; *National Strategy for the Development of Scientific Research 2017-2030* aiming a modern and a sustainably maintained research infrastructure, *National Road Map for Scientific Infrastructure* – the development of significant scientific complexes, aims to improve the efficiency of the system of scientific infrastructures in the country and reduce fragmentation in scientific research.

Next to the EU grants the support for innovations through financial instruments has been further extended incl. the launch *InnovFin (2016); COSME DIGI (2020).* Bulgaria has become one of the frontrunners in EU for the effective usage of financial instruments (FI) to support the SMEs growth. The Bulgarian enterprises and the financial sector as well as the FI providers have built experience for the effective Fis usage next to the EU grants what is of high importance for the future innovations growth.

In the period 2021-2027 the strategic framework has been further strengthened incl. the *National strategic document „Digital transformation of Bulgaria for the*

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[4] Official site of the Ministry of Regional Development and Public Works in Bulgaria, available at: https://www.mrrb.bg/en/infrastructure-and-programmes/the-period-2007-2013/operational-programme-regional-development/

[5] European Investment Bank, Fi-Campus. (2016). JEREMIE Acceleration and Seed instrument in Bulgaria Case Study https://www.fi-compass.eu/sites/default/files/publications/case-study_esif03d-bulgaria.pdf

[6] ARC Fund, Innovation.bg 2020: Economic Resilience through Innovation paper

[7] Source: Authors, see Table 1

[8] Shikova, I. (2015). European Funds, Programmes, Projects 2014-2020, Minerva, Sofia (updated)

period 2020-2030" sets the framework for the country's policy in the field of digital transition. The high propitiation of innovation development is visible also from the significant EU budget increase for **(3,5148 BEUR)**[9] supporting the innovations.

The Innovation Strategy for Smart Specialization has been approved and includes priorities such as informatics and ICT; mechatronics and micro-electronics; healthy living industries, bioeconomy and biotechnologies; new technologies in creative and recreational industries; clean technologies, circular and low carbon economy. The National Risk and Resilience Plan 2021-2026 includes innovation-oriented measures such as Component 2.A.3 Smart industry.

The variety and number of EU Financial instruments has further grown incl. the launch of EIF InvestEU Innovations (12.2023); EIF RRF Innovations (2024); EBRD InvestEU Innovations (Q3-4 2024, expected); BDB InvestEU Innovations (Q3 2024). The Fund Manager of Financial Instruments in Bulgaria presented its intention to launch a new generation of products – Financial instruments and EU grant in a single operation in Q3 2024.

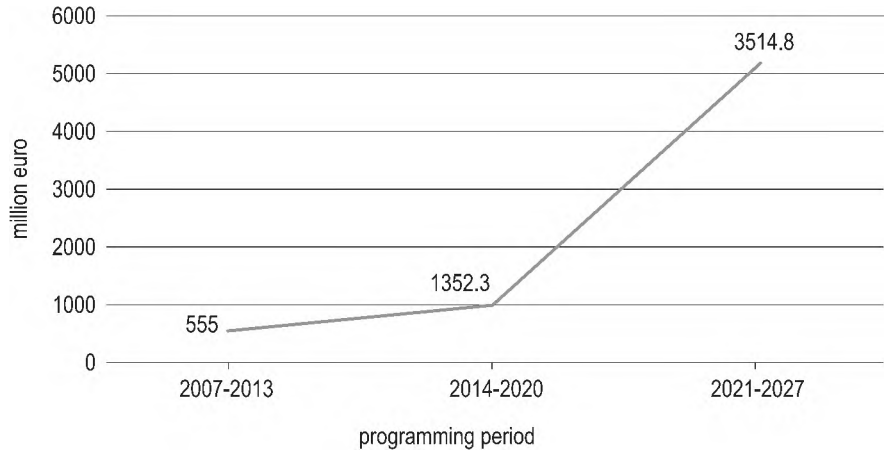

Figure 1: Authors' research on EU investment programmes in innovation
(source: Table 1, in MEUR)

The EU Strategic agenda 2024-2029 was adopted by the European Council on 27 June 2024 and is based on three pillars: a free and democratic Europe (incl. „making a success of digital and green transitions"); a strong and secure Europe; a prosperous and competitive Europe (incl. „Promote innovation

[9] Source: Authors, see Table 1

and research")[10]. Innovation remains among the key policy priorities for EU so could be expected to be further backed up by EU funds.

Innovation indexes has been introduced by the Applied Research and Communications Fund, which has been conducting regular research on the innovation activity of enterprises in Bulgaria since 2004, adopting as a basis the methodology of the European Innovation Survey. The index considers three separate groups of innovations, from the point of view of innovation positioning - product innovations (new products to the firm, to the national market and to the world), process (new to the firm and new to the sector) and organisational (how it is produced) and marketing (for whom it is produced and how it is sold)"[11].

As shown in the literature review, analysis and review on policies, funds, hinders and fosters of innovation is the most frequently used methodological approach in recent studies and reports. Based on the valuable insights into this context, the next best step in providing added value to research is to inquire directly with beneficiaries of EU Programmes funding on the effects of the grants to their developed and/or applied innovations.

Empirical analysis

We used the data from ARC Fund's survey in the Summer of 2020, which captured the innovation situation after the first Covid-19 wave. Then we merged that data with information on around 35,000 EU projects from the ISMM (Information System for Management and Monitoring) in the period 2014-2023 with the sample of 998 companies. Quite often this approach is better as it provides more accurate data as interviewed and companies themselves might not have good institutional memory over previous years.

Around 31% of the sample have participated in at least one EU project. Out of them 64% had only one EU project. 20% have implemented two projects and 10% had three projects. The maximum projects in our sample of companies were seven.

The distribution of EU projects is uneven in different planning regions with the two Eastern regions significantly higher than average. 37% of the companies in the Northeastern region and 36% of those in the Southeastern region implemented EU projects. Somewhat surprising is the fact that the lowest rate is observed in the Southwestern region - 28%, but it could be rationalized through existing of significantly more inter-connected companies in the region, which are not allowed to apply together in each call.

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[10] Council of the European Union, Strategic Agenda 2024 - 2029, June 2024

[11] Georgieva, T., Yalamov, T. (2020) ARC Fund, 2020, Innovation.bg Economic resilience through Innovation, Sofia, Bulgaria, ISSN: 1313-1060

Table 1: EU investment programmes in innovation

2007-2013

	2007	2008	2009	2010	2011	2012	2013	Indicative budget (million euro)
555								555
							TOTAL	555

2014-2020 (2022)

Operational objectives	Sub-objectives	Planned source of funding	2016	2017	2018	2019	2020	2021	2022	Indicative budget (million euro)
№ 1: Focus on innovation potential in the identified thematic areas (for the creation and development of new technologies leading to competitive advantages and increasing the added value of national products and services)	Effective collaborations science-business	OPIC, OPNOIR, NIF, FNI (Horizon 2020)	143	143	143	143	143	143	134	1 237.34
	Quality human resource	OPNOIR, HRDP, National Programme for Youth (European Programmes)	16	16	16	16	16	16	18,44	
	Adequate environment and infrastructure for innovation, incl. digital growth and governance	OPIC, OPDU, PRSR	19	19	19	19	19	18	17,9	
№ 2: Support for accelerated uptake of technologies, methods, etc. improving resource efficiency and the application of ICT in enterprises across industry	Innovations for resource efficiency	OPIC, OPOS (Norwegian Programme, Horizon 2020)	20	20	25	/	/	/	/	115
	Innovations for implementation on ICT applications	OPIC (Horizon 2020)	25	/	25	/		/	/	
									TOTAL	1352,3

2021-2027

Operational objectives		Planned source of funding	2021	2022	2023	2024	2025	2026	2027	Indicative budget (million euro)
№ 1: "Improving the research system and the innovation performance of enterprises"		PNIIDIT, CIP, FNI, NIF, RRF, RRF- Economic Transformation Programme Fund 1 - Innovation Strand, Horizon Europe, National Science Programmes, National Science Infrastructure Roadmap, Education Programme	94,98	297,46	398,41	361,97	452,97	473,55	407,05	2408,1
№ 2: "Increasing the technological capacity of enterprises, increasing the environmental friendliness and internationalization of Bulgarian products and services"		PNIIDIT, CIP, ERDF, Transport Connectivity Programme, Horizon Europe, National Science Programmes, National Science Infrastructure Roadmap	12	43	119,94	110,82	143,92	245,84	142,71	953,1
№ 3: "Improving human resource capacity in new technologies and innovation"		PNIIDIT, Education Programme, HRDP, FNI, Horizon Europe, National Science Programmes, National Roadmap for Science Infrastructure	0	16,8	27,77	29,78	31,77	31,8	31,8	153,69
									TOTAL	3514,89

Sources: *ISSS 2014-2020*
ISSS 2021-2027
National recovery and resilience plan of Bulgaria
Stefanov, R., Mineva, D. (2010) A report to the European Commission Directorate-General Regional Policy: Expert evaluation network delivering policy analysis on the performance of cohesion policy 2007-2013. Task 1: Policy paper on innovation. Bulgaria. Centre for the Study of Democracy (Project One EOOD)

Table 2: Probability of innovation activities subject to existence of EU project

	Probability of making... Innovations 2014-2023				
	Product (what is produced)	**Process** (how it is produced)	**Marketing** (for whom it is produced and how it is sold)	**Organizational** (how the organization is structured)	**Any type of innovation**
No EU project	16,6%	7,6%	23,2%	43,7%	54,5%
EU projects	24,4%	16,8%	31,8%	46,4%	64,1%
Total	19,1%	10,5%	25,9%	44,6%	57,5%
Anova test sig.=	0,000	0,003	0,004	0,440	0,004

The odds of implementing process innovations are 2.2 times higher for companies implementing EU projects compared to those without. This is in line with the focus of EU funds available for technological upgrade and buying new machines and equipment, which often leads to process innovation. Majority of the companies with process innovations used the EU funds for partial automation which led to higher efficiency and despite the growth in markets and revenues they did not exhibit higher employment.

The odds for product innovation are 1.5 times higher and for marketing is 1.37 times higher. More often companies launch new products than processes, also because a new process innovation in year T leads to new products in T+1 and T+2 without the need to engage in process innovation all the time.

The analysis of variance test suggested that all three types of innovation and the composite innovation index (implementing at least one type of innovation) have statistically different probability of innovation.

The only type of innovation where there is no significant difference is the category organizational innovations. One of the explanations is that during the survey (Summer of 2020) a lot of companies engaging in changing how the work is organized – such as implementing home office organization because of Covid-19.

The EU funds had one clear innovative solution as the most benefiting and this is the artificial intelligence. 18% of companies implementing EU projects have also implemented AI solutions, compared to less than 0.6% among companies without EU projects. A striking majority of more than 93% of companies who implement AI did benefit from EU projects. Most of the projects with automation have predictive maintenance based on AI, those with front-office applications like e-commerce would have AI enhanced fraudulent detection and overall cyber-security and so on.

Conclusions

The national policy framework as well the EU funds supporting company innovations have been developed and strengthened in Bulgaria as part of the EU. We confirmed a positive effect of EU funds on innovation in companies, similar to other countries, which is reassuring given the widely spread criticism on the governance of EU funds and high-level corruption. The data suggests plausible fine-tuning in EU funds programming to maximize the potential benefit for the competitiveness of Bulgarian economy.

Acknowledgements: This research have benefited from Sofia University's fund for research projects N 15.80-10-178 European projects and innovations in agriculture.

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