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The Scope and Conditions of the European Union's Innovation Policy

Abstract. This article aims to present the nature and the many directions of support for innovation processes in the EU on the one hand and to indicate the orientations of this support that could be used by Poland, including by agribusiness, on the other. The article covers the following: the nature, objectives and tools of innovation policy implementation, evolution of the European Union's innovation policy, characteristics of EU innovation policy measures after 2010, and characteristics of EU innovation policy measures in agribusiness after 2010. It is clear from the discussion herein that innovative actions and their support in the EU encompass not only technological but also social and environmental issues, with innovation and its support being the cornerstones of various policies, hence it is important to address them systemically. In particular, tools for implementing innovation policy and innovation partnerships at various levels play a role in this respect. The article is based on the related literature as well as documents and materials concerning the EU's innovation policy.

Key words: innovation, innovation policy, innovation policy tools

JEL Classification: M1, O1, O3.

Introduction

The European Union pursues a policy of structural change and reduction of the differences between countries and regions. One of the structural policy instruments is innovation oriented towards restructuring and development as well as enhancement of competitiveness of the economies of EU countries and regions. This is done by means of various legal, economic and institutional instruments that have given rise to innovation policy (Czerniak, 2013; Weresa, 2014). The scope of this policy and its tools evolve over consecutive years as changes occur in innovation needs and expectations that should be satisfied through innovation implementation.

Given the current interest in innovation and the role that it is meant to play in society and the economy, this article attempts to present the scope and determinants of the EU's innovation policy. It aims to present the nature and the many directions of support for innovation processes in the EU on the one hand and to indicate the orientations of this support that could be used by Poland, including by agribusiness, on the other.

The article is based on the related literature as well as documents and materials concerning the EU's innovation policy. The foundation for considerations was provided by data processing methods, i.e. analysis and synthesis. The considerations are mainly made at the macroeconomic level.

The article covers the following: the nature, objectives and tools of innovation policy implementation, phases of the European Union's innovation policy, characteristics of EU

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innovation policy measures after 2010, and characteristics of EU innovation policy measures in agribusiness after 2010.

The nature, objectives and tools of innovation policy implementation

Innovation issues have been present in economic policy for years, but their significance has been changing. Initially, innovation was associated primarily with science or science and technology, hence it derived from scientific policy or scientific and technological policy. Since innovation was mostly material and implemented in industry, that policy was also referred to as industrial or innovation and industrial (cf. Ciborowski, 2014; Czerniak, 2013; Okoń-Horodyńska, 2014; Staśkiewicz, 2013; Stryjek, 2015). Since the 1970s, the approach to innovation has changed, chiefly driven by the European Union, the USA and Japan. Innovation began to be seen as a leading development trigger contributing to structural change and the competitiveness of companies and economies, thereby extending the scope of innovation impact. The reason was that the objective of scientific and technological policy was principally to broaden the knowledge base and educate the scientific staff, whereas innovation policy aims to support development through the use of these resources (Czerniak, 2013). Moreover, attention was paid to the intangible aspect and a comprehensive view of innovation through knowledge management (Baruk, 2006), which is reflected in the definitions of innovation policy:

1. "Innovation policy comprises all these intentional actions of authorities that are intended to influence the creation and diffusion of innovation" (Czerniak, 2013);
2. "Innovation policy is defined as all actions aimed at stimulating the innovative development of economic entities by creating appropriate, broadly understood, systemic conditions for them" (Stryjek, 2015);
3. "Innovation policy can be best defined as the area of state intervention focused on faster innovation. Its overriding goal is to intensify the processes of creating, diffusing and applying knowledge in the economy, thereby generating new or significantly improved products, services, technological processes and organisation and management techniques" (Nazarko, 2015);
4. "Innovation policy is the conscious and deliberate activity of public authorities aiming directly or indirectly to support innovation and thus the competitiveness of the economy" (Ciok, Dobrowolska-Kaniewska, 2009);
5. "Innovation policy is a set of elements of scientific policy and technological policy. Its purpose is to support the economy's innovative performance, namely to assist in the introduction of new products, services, technological processes and management techniques. Its impact is mainly focused on enterprises, notably small ones, that bear the risk of failed innovation. This is done by creating a climate conducive to innovation, supporting the innovation culture of enterprises and developing services for innovation" (Stawasz, 2011).

These definitions suggest that innovation policy is a deliberate activity of public authorities that supports innovation diffusion and implementation. This activity applies to both tangible products and services and intangible accompanying elements such as consulting, organisation, management, logistics, marketing, etc. Furthermore, innovation policy consists of a variety of interrelated policies. It is based on economic and social policies in combination with scientific policy and technological policy but also with

sectoral (industrial, agricultural, etc.) policies and spatial, especially regional, policy (Ciborowski, 2014; Jasiński, 2013; Nazarko, 2015). Innovation policy is one of the structural policies, and its primary goal is to increase the innovative performance of countries and individual regions (Stanisławski, 2010). It now encompasses material and non-material innovation as well as support for innovation processes in the economy and society. Simultaneously, it is becoming less and less sectoral and more and more cross-sectoral, horizontal, achieving ever more social and environmental goals (Wiatrak, 2017).

Innovation policy is implemented at three levels (see Okon-Horodyńska, 2014):

1. Macroeconomic level – this is innovation policy of a country or supranational structures such as the EU but also international organisations (e.g. OECD or ILO);
2. Meso-economic level – innovation policy implemented at the regional level (e.g. voivodships in Poland);
3. Microeconomic level – innovation policy implemented locally and by organisations.

When analysing the individual levels of innovation policy, it should be noted that at the macroeconomic (and partly mesoeconomic) level, creation of a climate oriented towards supporting innovation processes, innovation culture, research and new technological processes, etc., is a more frequent exercise than other innovation policy directions. On the other hand, at the microeconomic level, the introduction of new technological processes, new products and services, innovative organisational solutions, etc., is more important.

Today's innovation policy (Stawasz, 2011):

- supports innovation processes in the economy and society,
- treats innovation as a network process involving public, civil society and private organisations working in various fields and areas,
- is becoming less and less sectoral and more and more cross-sectoral, horizontal,
- achieves ever more social and environmental goals,
- is oriented towards improving the ability of organisations to adopt and diffuse innovation,
- promotes innovation processes and activities.

The scope of impact of innovation policy evolves over time, yet it is based on changes and implementation of new solutions. Innovation policy comprises actions targeted at stimulating innovation processes and encouraging organisations to take them up. This is done by means of various tools such as strategies and programmes, institutional and financial support, public-private partnerships, etc. All tools (instruments) for innovation implementation can be divided into the following groups (Czerniak, 2013; Jasiński, 2014; Stryjek, 2015):

- *Coercive measures* in the form of *legal instruments*, including norms, standards, limits, prohibitions, orders, rules and regulations on the protection of the environment, consumers, competition and intellectual property, defining boundary conditions for the activities of different actors in respect of innovation;
- *Stimulating or dissuasive measures* (i.e. *economic instruments*) for introducing a specific type of innovation such as differentiated tax burdens, tax reductions and exemptions, utility charges, interest rates on loans, financial incentives, credit guarantees, etc., depending on the degree of preference for a given type of innovation;

- *National, local and regional government programmes and projects* aimed at accomplishing specific objectives and tasks (e.g. smart specialisations), including public procurement, public-private partnerships;
- *Institutional measures* – setting up institutions or changing the scope of their activities to aid in innovation implementation, support the actors involved in innovation processes, provide help in establishing innovative partnerships, etc. (e.g. the Polish Agency for Enterprise Development, technology parks, business incubators, innovation and technology transfer centres);
- *Information measures* – providing information on undertaken innovation activities and ensuring communication among stakeholders, notably those interested in implementing specific innovation (e.g. aid and information on innovation and its implementation provided to the agricultural sector by the Agricultural Advisory Centre);
- *Structural measures* – covering education at various levels as well as national and international research programmes.

In order to function efficiently, these instruments need to be connected within a system that ensures their complementarity. In the absence of a systemic connection, they are illegible, do not provide synergies and may even impede innovation implementation. It should be noted that these measures may vary in nature that defines the scope of innovation policy and the objectives of supporting it. Such measures may be (Ciok, Dobrowolska-Kaniewska, 2009):

- *regulatory*, when the public sector affects the course of innovation processes through legal instruments,
- *supportive*, through provision of innovation-related institutional and information assistance to actors (primarily research institutions and enterprises), which assistance fosters actions for innovation and innovation implementation, cooperation between stakeholders, support for innovative projects, etc.,
- *participatory*, when the public sector is totally or partly involved through financing research and implementation costs or through public procurement.

The scope of innovation policy is defined by the tools for its implementation, yet what needs to be first and foremost taken into account is the basis for pursuing this policy that lies in legal, institutional, information, structural, etc., measures as a preparation for innovation implementation. For example, exerting the impact on the improvement of labour qualifications and skills promotes the interest in innovation and its better use, consequently fostering the launch of innovation processes. As a result, economic instruments for innovation implementation can be used to a greater degree and more efficiently. Qualifications also contribute to the search and development of so-called smart specialisations.

Evolution of the European Union's innovation policy

Innovation policy changes in consecutive years as a result of the need to tackle emerging development problems formulated by economic, social and environmental policies but also to take into account scientific and technological achievements. Innovation policy is influenced primarily by the objectives that it intends to achieve, followed by its implementation to date and the effects of its application. The evolutionary nature of

innovation policy can be exemplified by the European Union, where three phases of this policy may be distinguished (Okoń-Horodyńska, 2014; Romanowska, 2014):

1. The sectoral policy phase (1952–1973), which established innovation policy foundations supporting research on selected sectors: coal, steel and nuclear energy. The core objectives of that policy were to shape cooperation among research centres of the member states and to finance that cooperation by national governments and enterprises.
2. The scientific and technological policy phase (1973–1992), which established a common policy covering research cooperation, scientific and technological research programmes (including research framework programmes), technology transfer, development of industry standards, etc., and the rules for coordinating these issues and their funding. Innovation policy in this phase is defined, in particular, by:
 - The action programme for research, science and education – so-called R. Dahrendorf's 1973 report;
 - The Community Research and Development Programme of 1982;
 - Single European Act of 1986 – establishing a legal and institutional framework for a comprehensive research and development policy.
3. The cross-sectoral policy phase (since 1992) – characterised by a comprehensive and systemic approach to innovation towards a horizontal view of innovation. The foundation was provided by the Treaty on European Union of 1992, which extended the objectives of innovation policy to include environmental issues, transport, the development of SMEs and the competitiveness of the economy. In particular, these changes are confirmed by the following documents and programmes:
 - White Paper on Growth, Competitiveness and Employment of 1993 stipulating the need for innovative entrepreneurship;
 - Green Paper on Innovation of 1995 containing the fundamentals of innovation policy, regional innovation strategies and technology transfer;
 - Lisbon Strategy of 2000, with its subsequent modifications, based on three pillars: social, environmental and economic, with the following priorities: innovation, entrepreneurship, social cohesion, sustainable development and liberalisation. The strategy provides that the EU objective is to promote and strengthen its research and technological base through integrated projects and the creation of a European Research Area;
 - EUROPE 2020 – A strategy for smart, sustainable and inclusive growth underlining the need for further development of the knowledge- and innovation-based EU economy that is environmentally-friendly and efficiently uses existing natural resources. The strategy promotes cooperation among organisations for building an entrepreneurial, cohesive and competitive Innovation Union.

The brief description of EU innovation policy shows that it is being further developed. Innovation is not only a technological issue but also a social, environmental and economic one.

Characteristics of EU innovation policy measures after 2010

In 2010, the Lisbon Strategy was replaced by the Europe 2020 agenda. The agenda specified the following priority areas (EU, 2010a):

1. Smart growth – developing an economy based on knowledge and innovation;
2. Sustainable growth – covering environmental protection, promoting green growth through innovation, mitigating and adapting to climate change, etc.;
3. Inclusive growth – supporting employment and retraining of employees and preserving social structures that will ensure economic, social and territorial cohesion.

For the implementation of the priority areas, 5 objectives, 10 integrated guidelines and 7 flagship initiatives are foreseen, aimed at, among others (EU, 2010a):

- improving the conditions for scientific and research activities,
- strengthening the knowledge triangle and unleashing the potential of the digital economy,
- working towards new skills and jobs, while developing a skilled workforce,
- improving resource efficiency and reducing greenhouse gases emissions,
- reducing poverty in order to lift people out of poverty and social exclusion and promoting actions in this respect.

A broad action programme was adopted, containing a reference to the functioning and development of organisations in various areas of activity, from science, through the economic sphere (industry, agriculture, construction, etc.), to social and environmental areas invoking health and quality of life. With a view to implementation, individual organisations may get involved by cooperating with other organisations and by taking action on their own. One of the flagship initiatives defining such action is the Innovation Union supporting, in particular (EU, 2010b):

- cooperation between the world of science and the world of business,
- investment in education, research and development,
- creation and implementation of innovation, including social and eco-innovation,
- the understanding of the concept of innovation in the public sector along with its impact on the private sector and civil society organisations,
- the search and promotion of successful innovation initiatives and the measurement of progress in their implementation.

These actions should be aided by European Innovation Partnerships launched “...to accelerate research, development and market deployment of innovations to tackle major societal challenges, pool expertise and resources and boost the competitiveness of EU industry” (EU, 2010b). These Partnerships are a tool to promote development and innovation through cooperation of various public, social and private actors undertaken to counteract the negative effects of the so-called global societal challenges such as climate change, the scarcity of raw materials, demographic changes, etc. Priority areas to be supported include (EU, 2010b):

- active and healthy ageing through the improvement of social protection and health care systems, the development of new drugs and methods of treatment, research cooperation in this field, etc.,
- sustainable supply and availability of raw materials for a modern society by developing innovative methods of sourcing raw materials, securing the supply of raw materials other than energy, finding substitutes and recycling,
- efficient water management by promoting innovative actions in the water sector, reducing water consumption and ensuring water security,

- efficient and sustainable agriculture through the use and development of technologies that will promote the efficient use of raw materials, soil and water to preserve the natural environment while producing safe food,
- smart cities, a partnership to support large cities that are committed to reducing carbon emissions by more than 20%, increasing renewable energy shares in electricity generation, heating and cooling by 20%, increasing energy efficiency by 20%, etc.,
- smart mobility for European citizens and organisations that will ensure that Europeans can travel smoothly, with effective logistics through the development and deployment of intelligent transport and travel services.

These priority areas of action specify the range of innovative activities that are associated with the whole social and economic life, hence with the impact of many policies. For example, smart mobility for European citizens and organisations can be seen from the perspective of innovation policy combined with social, tourism and transport policies, but also with economic, regional and environmental policies. The smart city programme, on the other hand, combines innovation policy with environmental, social and urban policies, but also with construction, energy, industrial and economic policies. In turn, efficient and sustainable agriculture directly integrates innovation policy with economic, social, rural, agricultural and environmental policies, but also indirectly with spatial, regional, tourist, etc., policies. In the implementation of innovation policy objectives in the different priority areas, the EU is expected to play a particular role as regards smart specialisations developed as a result of collaboration of the public sector, science and business and supporting innovation through focus on the most promising areas of comparative advantage (Foray, 2009). The public sector plays the key role in cooperation and innovation partnership (Sørensen, Torfing, 2012).

Characteristics of EU innovation policy measures in agribusiness after 2010

One of the priority areas where innovation is to be supported is agribusiness, which should consume less water, fossil fuels, mineral fertilizers and plant protection products in order to ensure food supply, while making better use of the complementarity between crops and livestock rearing, organic waste management, renewable energy generation, etc. It is assumed that "... a shift required from the agricultural sector, needed because of increasing urgency for resource efficiency, will result in primarily producing more food in a more sustainable way, but also in supplying a variety of different societal services and bio-based products, related to health, leisure, land management, waste management, feed, fibres and renewable energy" (EU, 2013). To this end, the European Innovation Partnership "Agricultural Productivity and Sustainability" programme was developed with activities focused predominantly on (EU, 2012):

1. increased agricultural productivity, output, and resource efficiency to save resources and the environment (especially natural resources), reduce the losses in agricultural production and make use of biological progress;
2. innovation in support of the bio-based economy in the whole food production and supply chain through the promotion of environmentally sound technologies, e.g.

integrated biological plant protection, the reduction of greenhouse gas emissions, the use of biomass, bio-fermentation, bio-refinery, recycling, etc.;

3. biodiversity, ecosystem services, and soil functionality through improved land management, integrated agro-ecological systems, natural methods of ecosystem protection, etc.;
4. development and deployment of innovative products, devices and services, alongside with establishing a sustainable and efficiently managed food supply chain;
5. food quality, food safety and healthy lifestyles – through actions mentioned in the previous paragraphs on the one hand and through information and education in this respect on the other hand.

The actions taken are diverse, but they share an innovative approach that promotes sustainable management in agribusiness combined with the use of biological and ecological drivers of development. At the same time attention is paid to the improved use of organisational drivers of development through production management and distribution systems and an efficient information and monitoring system that enables integration of the various links of the food chain. Organisational drivers of development and innovation implementation in agribusiness also include cooperation and collaboration, among others, at the local and regional levels, where the potential for economic and social dynamics is the biggest (Wiatrak, 2017). Consideration should be given to the fact that food- and nutrition-related issues are fundamental, which makes the consensus on development directions so important. The tools for these actions and implementation comprise national smart specialisations and regional smart specialisations (RIS3) that target a particular area and its resources, including specific and marginal resources, to name a few (Foray, 2009). Simultaneously, smart specialisation strategies, as the preferred mode of action, can both stimulate private investment and foster more efficient and effective use of public funds, together with aid funds in individual countries and regions. “They can help regions to concentrate resources on few key priorities rather than spreading investment thinly across areas and business sector. They can also be a key element in developing multi-level governance for integrated innovation policies. In addition, they must be closely linked to other policies and need to understand the strengths of the region as compared to others and the possible benefits of interregional and international cooperation” (EU, 2010c).

Poland's accession to the European Union necessitated many changes in agribusiness and these changes continue to date. They have their source in programmes implemented under consecutive financial perspectives, including the current one, which addresses innovation issues in the most comprehensive way. As regards agribusiness in Poland, they are included in the Rural Development Programme for 2014–2020, which points to a poor innovative performance in agriculture, the food industry and other agribusiness links as well as to small interest in acquiring new knowledge and marketing new products. It is therefore proposed to (Program, 2013):

- increase R&D investment, including environmentally-friendly and climate-friendly solutions;
- improve the qualifications of employees, notably in agriculture, and their awareness of new production methods, also those conserving the environment;
- improve the competences of advisers who should play a greater role in innovation diffusion;
- establish operational groups for innovation (EIPs);

- strengthen the mechanisms for transfer of information, knowledge and innovation;
- support investment in agribusiness and agribusiness infrastructure to implement specific innovative processes, e.g. modern processing technologies.

These directions of innovative actions confirm that agricultural and rural policies are oriented towards creating conditions for innovation development and implementation. These actions rely on knowledge and preparation for change. Simultaneously, the focus is on cooperation between agribusiness and research institutions so that innovation that will be most suitable for implementation can be jointly developed.

Conclusion

It is clear from the discussion herein that:

1. Innovative actions and their support in the EU encompass not only technological but also social and environmental issues, with innovation and its support being the cornerstones of various policies, hence it is important to address them systemically;
2. The diverse and growing range of innovative actions included in EU policies requires innovative actions to be pursued by innovation partnerships at various levels, comprising the public sector, science and business on the one hand and individual actors across and within different sectors on the other;
3. Particular attention should be paid to tools for implementing innovation policy that are diversified (legal, economic, institutional, etc.) but combined into a complementary system supporting the policy objectives;
4. All tools for implementing innovation policy are important, yet what should be used first is structural measures that create conditions for innovation and their practical application through education at various levels and research programmes;
5. The implementation of the various orientations of EU support for innovation can significantly contribute to the reconstruction of Poland's socio-economic structure, including in agribusiness, where the needs for production modernisation and organisational changes are the greatest;
6. The partnership of individual agribusiness links with research institutions aims not only to support the implementation of innovation but primarily to develop new innovation.

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