ENHANCING COMPETITIVENESS AND SUSTAINABILITY OF AGRI-FOOD SECTOR THROUGH MARKET-ORIENTED TECHNOLOGY DEVELOPMENT IN AGRICULTURAL KNOWLEDGE AND INNOVATION SYSTEM IN BULGARIA

D. Sc. Terziev V.1, Assist. Prof. Arabska E.2
Vasil Levski National Military University – Veliko Tarnovo1, University of agribusiness and rural development – Plovdiv2, Bulgaria
E-mail: terziev@skmat.com, katya.arabska@gmail.com

Abstract: The paper considers priority goals of future sustainable development and assurance of food quality and safety in agricultural and food sector and underlines the necessity of establishment of Agricultural Knowledge and Innovation System (AKIS) in Bulgaria based on a production model with market-focused technology development system. Knowledge-based economy, and particularly the searched increase in competitiveness in agriculture and food industry, could be reached by creation and distribution of knowledge and innovations among stakeholders and networking. The establishment of such a technology development system would incorporate three main elements: measurement of inputs, market-focused technology development and information systems. It would foster rural development through knowledge exchange between stakeholders in support of production, marketing and processing of agricultural and food products, as well as natural resources management. AKIS is a framework embracing all the actors and their interactions in creation and transfer of knowledge in new and effective ways.

KEY WORDS: KNOWLEDGE-BASED ECONOMY, SMART SPECIALIZATION, INNOVATION TRANSFER

1. Introduction

Challenges before humanity in XXI century connected to climatic changes, insufficiency of resources, pollution of environment, dynamics in international business and uncertainty in economic and political sphere lead to a number of questions regarding sustainable development not only in the sense of “protecting nature for future generations” but also of development of steady in economic, ecological and social relation productions and first of all in internationally oriented knowledge-based economies – a difficult task which in fact includes different elements as: institutional environment for entrepreneurship encouragement, human resources, material and information structure, uniting link in which is the establishment of innovation systems on regional and national levels (Terziev & Arabska, 2014a). In contemporary globalizing world one of the most prominent and mutually connected goals, governments and international institutions have, are those of sustainable development, knowledge-based economy and transfer of innovation. The main characteristics of the changing world in XXIth century is the knowledge and knowledge-based economy – favorable economic and institutional environment, entrepreneurship development and management, information infrastructure, human resources and innovation systems.

The economic development of a country or a region is strictly linked to the innovation process Organisation for economic cooperation and development OECD (1995) considers four types of innovation (Rebelo & Muhr, 2012): product innovation (which involves a good or service that is new and significantly improved); process innovation (which involves a new or improved production or delivery method); marketing innovation (which involves a new marketing method, including significant changes in product design or packaging, product placement, product promotion or pricing); and organizational innovation (introducing a new method in the firm’s business practices, workplace organisation or external relations).

Social innovation is a complex and multidimensional concept that is used to indicate the social mechanisms, social objectives and/or societal scope of innovation. The social mechanisms of innovation refer to the fact that the development, diffusion and use of innovations always occur within the context of society and in interaction with social relations, practices and norms and values. Social innovation is often appointed as an essential part of agricultural and rural innovation (Bock, 2012).

The project of the Innovation strategy for intelligent (smart) specialization in the Republic of Bulgaria 2014-2020 from 09.09.2014, published on the web-site of the Ministry of economy and energy, in the adopted definition of innovation gives the accent on the fact that innovations create market advantages and raise competitiveness of organizations (enterprises). The strategic goal of that document is till 2020 the country to pass from the group of “modest innovators” to the group of “moderate innovators”. Being in accordance to the Strategy of smart, sustainable and inclusive growth Europe 2020, the approval and the execution of the national innovation strategy of smart specialization would put in the agenda the solution of the problems of sectoral specialization and sustainable economic development. The underline in its vision “managing social challenges in the fields of demography, sustainable development, intellectual capital and health of the nation” turns into expression through two operational goals embracing innovations in priority thematic fields and innovations for effectiveness of resources and information and communication technology (ICT). In that sense, in their essence as main economic sectors, agriculture and food industry will continue being in the focus of a great number of strategic and program documents in the new period 2014-2020 which is based on the traditional national competitive advantages and image.

It is now commonly accepted that raising competitiveness could be reached not only through huge investments but also through creation and distribution of knowledge among stakeholders and networking. Those questions are of extreme importance for agricultural sector reflecting historical and cultural characteristics of a region and influencing the production structure, and especially of organic production combining traditions and innovations and ‘engulfing’ high production expenditures. In the process of its development agriculture has been forced to provide produce in enough quantities and at affordable prices which has imposed many unsustainable methods and many debates about ecological and social impacts of agricultural systems. The whole development leads to enormous growth in yields and decrease in production costs. On the other hand, agriculture uses resources that are accepted as enough – water and energy. World population growth and the processes of urbanization presume that the demands towards agriculture will increase. The need of establishment of a new connection between urban and rural areas is implemented in the concept of sustainable development. Further, the opportunities of organic production are considered in a number of strategic and program documents reflecting its potential contribution to achievement of sustainability.

Development of organic farming would lead to provision of ecological food for the whole society, employment and sustainable incomes for population in rural regions in the following ways: combining traditions and innovation, entering new markets, environmental protection and wise use of resources. Along with the benefits for nature and organisms, the improved landscape in organic areas has a broader social and economic effect. It is an opportunity for making rural regions a more attractive place for
living, tourism or recreation. Thus, it is one of the approaches specifically addressed in the above mentioned project of Innovation strategy for smart specialization in the country.

The positive trends in the growth of organic production are noticed in Bulgaria too as it is shown in the information provided by the Ministry of agriculture and food for the development of the organic agriculture in Bulgaria. In Bulgaria in recent years organic agriculture is one of the sectors developing fast in conditions of crisis and permanently increasing the areas and number of operators in the organic control system. Although the revealed positive data and the availability of the corresponding legislation and the institutional support, the question of the marketing of organic produce stays as one of the most topical: the trends that more than 90% of certified organic produce in the country to be exported are offered which (along with the low level of information, the lack of clear identification of organic products and easy confusion with so-called ecological products) inevitably leads to unaffordable prices and low market shares of organic produce as a whole.

Studies on organic sector development are provoked by the progressive development of the sector worldwide and increasing demand of organic products on one hand, and on the other – by the favorable prerequisites which exist in the country, as well as the opportunities that this sector provides to small and medium business, rising its competitiveness and fostering rural development. Organic production is economically effective, ecologically compatible and socially responsible and it occurs to be an innovative solution for creating entrepreneurial initiatives in rural regions (Nikolova, 2012) aiming at increase in competitiveness by applying an ecological technology using a new approach – planning, management and control over the production and management processes. Further, it is concluded that for organic production development in the country first of all “market innovations” are needed, not only expressed in changes in design and packaging of products, their positioning, promotion and price-making, but also assuming new market approaches and connections to consumers (Terziev & Arabska, 2014a). The introduction of Community-supported agriculture (CSA) as a variety of Alternative food networks (AFNs) and as an innovation which would provide the necessary financing for organic farms / enterprises, as well as giving opportunities for diversification of activities are examined. That investigation takes into account the economic and social impact of alternative food networks and community supported agriculture in particular as a way of reaching a positive economic growth, increasing employability and reviving of rural regions, establishing places for social activities and rising society consciousness in addition to other outcomes - providing of fresh, tasty and healthy food, protection of environment and positive impact for the local businesses. However, these opportunities are not used by the operators in the country again because of the lack of information and knowledge, motivation and support.

The organic agricultural activities in the country are mostly implemented by small and medium enterprises and farmers. That way they could not reach the levels needed for gaining market advantages. The market opportunities are big but the risks are even bigger. The profit in agricultural sector is low as a principle and this impedes the production increase. It is necessary an agricultural system to be established which to support the close connections to producers and to improve the innovation activities (Arabska, 2014a).

2. Prerequisites and means for solving the problem

The agricultural and food sectors face a huge challenge to boost production without exceeding the world’s ecological boundaries. Research and innovation are hereby of crucial importance as sustainable intensification will largely depend upon the increase of productivity (instead of farming more land) (Vuylsteke & Gijshegem, 2012). Farmers must continuously adapt production and management systems in order to maintain and enhance the competitiveness and sustainability of their businesses. The development and implementation of innovations require both information and the farmers’ willingness to change daily work routines. Learning and knowledge transfer among farmers, technology developers, experts and university teams ensure the development and application of innovative ideas which are crucial for a sustainable growth in food (and non-food) production (Munchhausen & Haring, 2012). Recently, the transition from traditional scientific approaches of creation and transfer of innovations by linear approaches (scientists create innovations, consultants transfer innovations to farmers) towards systematic approaches lead to the understanding that “innovation emerges from networks of actors as a social (and institutional) as well as a technical, nonlinear and interactive learning process (Koutsouris, 2012). The use of group processes to encourage innovation and to transfer best practice is relatively novel in the agricultural sector. The establishment of small, close knit groups with a dedicated experienced facilitator and utilising Action Learning methodology can result in extremely effective and sustainable innovation and knowledge transfer (Owen & Williams, 2012).

Successful entrepreneurial strategies in agriculture, applying innovative approaches, add value in new activities and contribute to sustainable development. They include new connections of agriculture with other sectors and mutual use of “waste” products. The need of sharing responsibilities between the stakeholders imposes the establishment of new innovation systems. ‘Non-financial’ goals have started to be put in the strategies on the level of organizations. The eco-marketing includes all activities involved in obtaining social acceptance of environmental ideas, the public and private conduct appropriate environmental requirements (Gheorghiu, Vidrașcu, & Niculescu, 2013).

The main problem in development of the agricultural sector is the competition of imported products which leads to negative trends and demotivation of producers. The ways of overcoming could be summarized as: search of the best ways of coordination between the European and national policies and strategies, action plans, etc. consistent with local conditions and peculiarities; entrepreneurship and innovation activity encouragement. The access to training and advisory services in rural regions should be made easier.

In that relation the importance of information and training (for both stakeholders and consumers) is considered along with the necessity of establishment of a special Agricultural Knowledge and Innovation System (AKIS) in which organic answers the concepts of market-orientation and takes its particular position.

3. Solution of the examined problem

Entrepreneurship is one of the main drivers of economic growth, productiveness and innovations. Entrepreneurship and innovation networks are the main elements of innovations systems. Networking in educational projects for innovations in organic farming and entrepreneurship encouragement - experience in training, motivation, knowledge transfer, entrepreneurship and networking, is a subject of many projects working on experiences and knowledge in the field of ecologic farm production, specifically in the relation and interaction with and between farmers in the training process using innovative methods and practices. A practical presentation in that relation is discussed by Arabska (2012) concerning innovations through networking in educational projects by a specific example of a project implemented in the field of capacity building in ecological food production and management.

In addition, the connection science-business is a subject of many discussions and financing schemes in international and national programs, and especially the building of innovation infrastructure. In all these processes the user-centered approach in innovation research is the leading one but the organization and
implementation of activities is a tricky task. In modern time the shift from a product-based economy to a user-centered one brought to many challenges before companies concerning innovativeness and flexibility issues in market positioning. The importance of technological factors and users’ feedback in innovation processes leads to the development of the living labs concept in recent years as open innovation intermediaries which among the number of the approaches and types of proinnovation structures the living lab concept gathering momentum in last years is one of the most promising in the processes of developing goods and services fulfilling consumer demands (Arabska, Shopova & Dimitrova, 2014). The shift from product-based to user-centered economy poses many questions about innovations and their connections to various sectors’ interactions in assuring knowledge management, competitiveness and flexibility.

The aspirations of every one organization to answers customers’ needs and fulfill their requirements are expressed in a number of approaches in which the feedback processes assure information for development of products and services and decreasing risks in their future realization take significant part. Traditional closed innovations models step back and proinnovation structures oriented towards real life and society gain momentum recently showing active involvement of end-users in research and innovation aiming at raise in competitiveness. The striving after smart specialization is namely substantiated by inclusive participation and relies on capacity building activities and entrepreneurship encouragement (Terziev & Arbas, 2014).

In years of intensive discussions on and searching ways of improving business environment, building knowledge-based societies and raising competitiveness, the concept of living labs as open innovation intermediaries applying demand-driven and user-centric approaches is one of the most promising in the innovation lifecycle. The last one embracing various processes in creating ideas, design, development, validation and transfer into practice of new products, services or technology is implicated in living labs by user-driven innovation processes decreasing investments risks and assuring better effectiveness and sustainability (Terziev & Arbas, 2015). The active involvement of end-users in research and innovation life-cycle is a prerequisite for raising competitiveness and improving business environment. It is a way of entrepreneurship encouragement and meeting challenges of assuring safety, quality and sustainability in all the spheres of economic life.

4. Results and discussion

There is a need of establishing a technology development system that incorporates three elements (measurement of inputs in space and time, market-focused technology development and a self-teaching information system for farmers) and that could be used in rural development, primarily in the area of agricultural production (Fenyvesi & Szilvia, 2012). Knowledge and innovation are keywords in a context of resource scarcity and sustainable intensification of agriculture. But in order to fully use the knowledge potential and to transform research results into innovative practices, there is a need for an adequate configuration of the agricultural knowledge and innovation system (AKIS). This configuration should be considered in relation to its own specific context and history (Vuylsteke & Gijseghem, 2012). Agricultural knowledge and information system (AKIS) aims at knowledge exchange between producers, researchers and scientists, institutions and organizations, which create and distribute knowledge and information in support of production, marketing and processing of agricultural products, as well as natural resources management. AKIS is the framework embracing all the actors and their interactions in creation and transfer of knowledge in new and effective ways (Fig. 1).

![Fig. 1. A model of production with the market-focused technology development system (Adapted by Fenyvesi & Szilvia, 2012)](image)

The need to recognize individual peculiarities in agricultural production, previous knowledge and experience, social and economic development, etc., along with the notion that training is a social process, effective interactive communications, combination of new technological decisions with management activities, lead to the integrated approach – interdisciplinary forms of training and scientific research and creation of knowledge for practice. As already pointed out, systems of innovations approaches build on...
networks as social processes encouraging the sharing of knowledge and, notably, as preconditions for innovation. Such approaches, therefore, focus on processes (instead of the emphasis on structures) with knowledge conceived as being constructed through social interaction – i.e. not unproblematically transferred but instead continuously created and recreated. Thus particular attention is given to (social) coordination and networking (Koutsouris, 2012). Crucial factors for the application of innovations could be different: interactions on the macrolevel; entrepreneurship; innovation capacity; management, etc.

5. Conclusion

Agrarian sector in world scope is standing before a number of challenges connected to globalization processes and competitive environment on international markets grounded by new consumers’ demands and behavior regarding healthy living and added value. Agriculture is a main activity ensuring food and non-food products characterized by its long historical development marked by inertia and conservatism as a whole, especially in regard to management of agricultural holdings and resources. The strategic goals of sustainable economic, social and ecological development interlinked to entrepreneurship encouragement in rural regions in agricultural activities and other connected to them focus on the preservation of components of environment (soil, water, biodiversity, landscape) are targeted to sustainable agriculture and organic farming in particular because it is a realistic way of achieving sustainable development and it has great opportunities to integrate with a number of other economical and non-economic activities. The aims of managing demographic problems, rural regions’ depopulation, social and economic development of the country could be achieved by smart specialization and transfer of innovations. Agricultural sector and food industry, today more often considered jointly, as well as their integration with tourism, training, etc., have the advantages of both traditions and innovations.

In consideration of priority goals of future sustainable development and assurance of food quality and safety in agricultural and food sector the paper underlines the necessity of establishment of Agricultural Knowledge and Innovation System (AKIS) in Bulgaria based on a production model with market-focused technology development system incorporating three main elements: measurement of inputs, market-focused technology development and information systems. The system is discussed from the point of view of its opportunities to foster rural development through knowledge exchange between stakeholders in support of production, marketing and processing of agricultural and food products, as well as natural resources management. AKIS is presented as a framework embracing all the actors and their interactions in creation and transfer of knowledge in new and effective ways. The need of creating knowledge for practice by recognizing individual characteristics and background of specific objects, social and economic development, imposes the notion that development and transfer of innovation is a social process of interlinking technological decisions, communications and management through integrated user-centered approaches in innovation lifecycle and interdisciplinary forms of scientific research and training.

6. References