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THE ROLE OF AGRICULTURAL E-MARKETPLACE IN PUBLIC ORGANIZATIONS

Summary

The main inputs used in agriculture include biological products, chemical substances, technological systems as well as human and material factors. In general, pressure on the input side exerted by traders' accounts for an extra profit of about 15-20% at the expense of the producers' potential profit of a similar size. On the other hand, the annual agricultural support schemes are mostly utilized by the purchasers of produced goods due to depressed purchase prices. The establishment of an electronic marketplace and innovation space on the input side may bring about a major breakthrough in this situation improving purchase conditions in agriculture offering an opportunity to expend production through improving profitability. The objective of this research is to develop a concept for an innovative online marketplace which establish competition situation among input providers, enlarge supply side and discontinue inflexible trade structures. The present study intends to demonstrate the role that this type of new electronic marketplace may play in the life and operation of public organizations.

Key words: database, cooperation, inputs, support

1. Introduction

Globalization has been reshaping national economies by extending market competition to the whole world and triggering a profound transformation in the nature and conditions of competition in the market. As a result of deregulations and international agreements, national governments cannot directly interfere in global competition, hence they are forced to resort to indirect tools including efforts to improve surrounding conditions and develop an appropriate business environment. Furthermore, the situation of agricultural companies is influenced by a number of economic factors; they are exposed to and have to remain competitive against the rigours of global market forces.

Inputs act as a starting point for both production and business. The input field is characterized by an extremely dynamic development and renewal activities that have led to the dominance of supply. The relationship of traders and input suppliers is considerably

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determined by space, i.e. input users are controlled by the agent network of manufacturers and traders with their relationship being defined by traders aiming to maximize profits. Within this relationship producers have limited possibilities to compare the full supply portfolio and to realize the most favourable offer from among all available options (e.g. minimal purchase price, best quality, etc.). On the other hand, it should be understood that European Union support and funding are particularly important for agriculture. Part of the necessary sources is provided either by the European Union or the Member States, thus it is imperative to investigate the roles and functions of agriculture and the principle of ensuring the optimal use of resources. It is evident that EU funds have much greater significance for agricultural companies than for businesses in other sectors since standard EU subsidies have become a major contribution to agricultural income. EU Member States (including Hungary as well) also benefit from the rural development programmes that enable them to tackle social, economic and environmental problems of certain rural regions which would not be possible relying only on internal resources. The research carried out by Bakos et al. [2011] and Bakucs-Fertő [2013] aimed at the assessment of the rural development programmes and tenders realized by two neighbouring countries during the 2007-2013 period. Based on their findings, we can conclude that neither Hungary nor Romania has fully utilized the rural development resources offered by the European Union. Nevertheless, agriculture receives special attention not only in Hungary but at the Union level too. In line with that, Common Agricultural Policy (CAP) is given priority again within the 2014-2020 budgetary cycle.

The foreign policy of new EU Member States is confined to a forced path. In order to effect a substantial favourable change in the bilateral trade balance of Hungary, we need to improve communication between stakeholders, explore and exploit niche markets and strengthen product paths [Váráry, 2013; Vásáry et al., 2013]. The strengthening of the bargaining power of producers both on the input and the output side will bring about long-term benefits for each stakeholder of the sector. There is little sense in having strong machine-, seed- and chemical distributors if producers are unable to sustain farming activities at a level that leads to sufficient economic outcome. The same is true for the sales market, since if there is no sufficient commodity fund with regard to the volume, quality, packaging and presentation of goods, stakeholders of the sales market are not able to survive in the long run.

Consequently, the improvement of the positions of farmers in input trade and the exploitation of the possibilities in the field of output sales are of high importance. States and their intervention through economic policy tools also play a role in this process, for example by implementing various financial support schemes.

The aim of the so-called “market-conscious technology development” system developed by Fenyvesi and Erdeiné Késmárki-Gally [2012] is to facilitate competitive production by focusing on increasing the success of an “agricultural” product. The essence of our method is to underline the product or service instead of concentrating on specialized activities in the course of research and development.

Building on the fundamental elements of the market-conscious technology development system, the objective is to develop a concept for an innovative online

marketplace which unites agricultural producers and suppliers within a single system that works as an innovative organisational solution offering a shorter route for actors to find each other thus ultimately reducing the costs of the exchange of goods. The Institute of Agricultural Engineering of the National Agricultural Research and Innovation Centre has developed a model that takes into consideration the complex nature of agricultural production including the differences in the use value of inputs depending on the field of their application, the specific characteristics of biological processes, the necessity of cooperation between several – sometimes quite different – specialized fields and the dynamism of the food market.

2. New dimensions of innovation

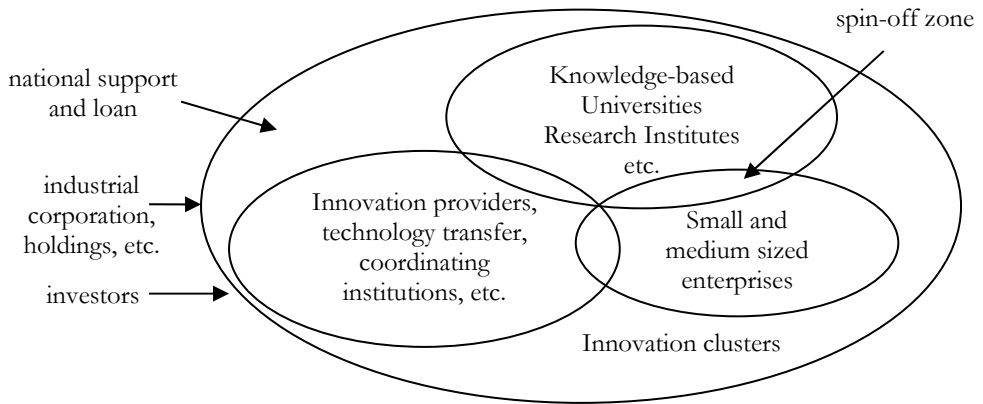
The rapidly changing social and economic world has opened up new dimensions for the innovation process. Innovation demands extensive interaction between actors like businesses, academics, university research institutes and consumers. The feedback between science, technological development, product development, manufacturing and marketing is also demanded. These new types of innovation processes have revealed a transformation process mainly typical of developed countries, where the previously separated R&D institutions, the corporate sector and the government have started to develop a closer cooperation also by partly undertaking each other's roles.

In recent years growth-oriented companies have been started to understand the advantages of the network economy. The idea of applying methods that support the economic benefits arising from networks has been adopted in the regional sciences while the scope of innovation chains, cooperation and networks have been completed [Nábrádi 2010; Maciejczak 2012; Bigliardi – Galati 2013]. The sectorial collaboration has been successful in developing their network management methodology and has been shaped a relevant management structure [Csizmadia 2009]. Industry-specific feature differences are also visible. The terms of the spread of agricultural innovation have their own special characteristics with a greater emphasis on awareness and knowledge that are strongly influenced by the cooperation between integrators, actors and counsellors [Daberkow, McBride, 2003; Baranyai, Takács, 2007; Takács, Baranyai, 2010; Lencsés, Béres, 2010; Kutter et al. 2011]. The clusters represent a special form of network cooperation within the European Union.

The clusters need to catalyse collaboration between small and medium-sized enterprises, multinational companies and research institutes to realize market-oriented innovation. The benefits of innovation clusters may be particularly useful for SMEs by accumulating their resources, reducing risks of R&D projects and transmitting technologies (Chart 1). The primary actors of the innovation clusters are knowledge-bases, innovation providers and SMEs. The establishment of clusters requires a minimum amount of entrepreneurship and practice which might involve an external impact that induces the organizational process. This process is similar in both developed and developing countries [Tóth, Strén, 2012].

CHART 1.

Primary actors in innovation clusters



Source: [Tóth, 2007].

The researches of higher education are the foundation stones of spin-off companies. The public research institutes are the key representatives of the economic utilization of knowledge. The most important factor in economic competition is the innovation. In the past few decades the role of universities and research institutes has been transformed all over the world. In addition to their traditional function (e.g. providing education, or performing research activities), the governments and the wider society expect them to put their researches to efficient use. Recognizing the importance of spin-off companies started as early as the 1960s in the United States. Today, the spin-off companies are also priority for the European Union.

Spin-off companies in the United States utilizing research findings normally to boost the innovation system of their own region through innovation clusters thus contributing to local economic development.

In contrast, researches carried out in the European Union regularly reveal that spin-off companies tend to remain small businesses. The reasons of this difference have been attributed to differences in the financial systems, entrepreneurial culture and approaches in addition to the distinct economic and innovation environment.

As a result of a long thinking and empirical research process the conceptual framework of the national innovation system, a major concept of evolutionary economics was born. Christopher Freeman was one of the pioneers of this line of thinking [Godin, 2010]. Based on the most frequently used definitions that partly overlap each other "An innovation system includes those institutions which produce, distribute and use knowledge and which separately and jointly contribute to the development and spread of new technologies. The innovative productivity of a nation and that of the companies of a region is determined by the capacities of individual institutions and the relationship between them. These institutions provide the framework within which governments

develop and implement policies aiming at driving the innovation process. The system of mutual cooperation between the institutions enhances the production, preservation and transmission of new knowledge, new abilities and new products that define new technologies” [Inzelt, Balmóczy, 2013].

Researchers in various fields of social sciences have been contributed to the development of distinct innovation systems along different dimensions in the categories of global, national, regional, sectoral and technological innovation systems. These are completed by newer concepts thinking in terms of international regions (EU) or models concentrating e.g. on the triple-helix system [Martin, 2012]. The triple-helix system perceives national innovation systems as being constructed of three spirals, successful innovation may be realized through the harmonious cooperation of public institutions, knowledge-bases and corporations regardless of the specific product being produced or the specific rural development task being solved. In certain fields it is not possible to establish this type of collaboration, the research findings cannot be utilized, and thus support fails to achieve its aim.

Considering extensive historical periods, it should be concluded that the shifts in innovation systems can be underlain by major changes in the knowledge of technology. These in turn stimulate transformation in the mode and functions of learning. Moreover, they are frequently accompanied by bigger changes not only in corporate organizations and their management but also in the social sphere. Since the Millennium, national innovation systems have been forced to face major challenges of knowledge based economies and new technologies.

The state of small and medium-sized enterprises has a considerable influence on the whole European economy. According to the commonly entertained idea, the key to the strengthening of the actors of the SME sector is the constant renewal and the capacity for innovation. Innovation leads to competitive advantage which ensures an appropriate market position in the long term [Neszmélyi 2014a,b]. Only few companies are able to innovate products and services, according to the classical Schumpeterian model, due to high capital requirements as well as the lack of managerial abilities needed to oversee and complete the process.

In his comprehensive study Kolodko [2009] draws attention to the fact that in the past centuries development has been brought about as a result of successful imitation. The success of innovation and imitation has also been studied by Glass [1997] who concentrated on corporate behaviour and the process of invention, innovation and diffusion. According to the research of Nagy [2013, 2015], the companies should pay more attention to business planning. According to Takácsné [2014], companies should pay more attention to the monitoring, adoption and adaptation of best practices of their specific field, i.e. they should focus on imitation. Instead of innovation, imitation might become the key to growth in the case of SMEs. Actors may achieve a more significant result by minimizing their costs and reducing (technological and market) risks by innovation and imitation. The essence of imitation is that first the idea worth being copied shall be found and then production and market distribution shall immediately start. Virtually, this type of corporate behaviour corresponds to those cases where companies enter the diffusion process of an innovation at an early stage. The room

for manoeuvre regarding corporate development and renewal is also influenced by industry-specific features and regional differences related to differing levels of economic development. Entrepreneurs have insufficient knowledge of the innovation process and they also need to accept the need for a change in mind set and approaches.

3. Advanced IT solution

In the 21st century agricultural producers have to invest more time to perform such tasks that are not directly related to production due to accelerated economic processes, new consumer demands and more rigorous environmental regulations. As a result of the wide range options, it is increasingly difficult to make the best possible decision relating to issues such as which seed, pesticide or fertilizer can be used for production, when and to who products shall be sold, what type of agro-technological interventions are suitable for the input materials applied, etc. In addition, a considerable amount of time is needed to meet certain administrative requirements (e.g. application for subsidies, updating records, submission of statements and tax returns to government authorities, etc.), let alone the novel consumer demand for the full and effective traceability of food [Charvát et al., 2009]. These tasks are too wide-ranging and divergent to be tackled using paper-based records, therefore information technology solutions need to be applied in agriculture as well to enable producers to meet new challenges and successfully face the tight competition.

Today an increasing number of farmers are buying and using computers and other IT tools.

Several studies have outlined the main objectives that inspire producers to obtain such devices, the most common aims being as follows [Nuthall, 2004]:

1. Realizing a higher income through the selection and use of more cost-effective input materials.
2. Saving time by using a faster and simpler method for the provision of data required by public authorities and bodies.
3. Facilitating the performance of managerial tasks through processes that ensure quicker decision-making and more efficient planning, implementation and supervision.
4. Simpler way of maintaining contact with players in the market and representatives of public authorities.
5. More efficient professional development.
6. Staying competitive with other farmers using computers.

The opportunities offered by the Internet are playing an increasingly dominant role in each segment of the economy. More and more companies are offering their trading, customer relation and other services on the World Wide Web. According to the most commonly used definition, e-commerce includes all forms of business transactions whereby parties tend to maintain electronic contact instead of direct physical encounters. According to the definition coined by IBM e-commerce is the support of business processes drawing on Internet-based technologies. The two basic formats of E-commerce

are business-to-business (B2B) and business-to-consumer (B2C) trading. As a result of this trading system, the process of inter-enterprise transactions has undergone a profound change leading to a much more transparent market both for the sellers and the buyers [Fónai, 2006].

However, the opportunities provided by the Internet have not been fully utilized by agriculture. The main obstacles hindering the spread of innovative solutions are the high cost of technologies in comparison with the return on the investment, the extent of capitalization and the specific legal provisions farmers shall comply with.

4. The online system, which supports producers

The relationship between producers and input providers is quite determined in the field. It means that input users are connected tightly by the agency of manufacturers and traders and their relationship is determined by traders' profit maximalization. In this relationship a producer has hardly any possibility to compare complete supply portfolios and validate suppliers' most favourable proposals. The concept, which is going to be made, enables the producers' common tender announcement. This could be resulted in a more favourable position in the tender announcement through quantity increase of claims arisen in one transaction by competition the participants in the supply position. Other aim of this concept is to induce the system of innovation relating to the inputs.

Central element of development is the database, which is the basis of the Internet market field. For users (producers) the market field collects proposals as well as helps to write procurement tenders and sales tenders, hence it fosters competition of suppliers and purchasers. Producers can achieve more favourable positions by this system in terms of procurement price level, quality and other product qualities regarding their input materials (technical systems, chemical materials, biological products).

Despite the fact that participants in the supply market will compete with each other, they will have also advantages since supply market of the input products provided by them will be more transparent also for them and can be planned in an easier way and specification of participants in the market will be simpler. Therefore, efficiency of their trade will increase.

The number of participants in the supply can gradually increase since the system expects new members. As a consequence, competition can increase, number of products in supply can increase and their quality features improve.

By using the Internet market field, it will be the producers on the first place who will have advantages since their agriculture can be planned in an easier way and can be transparent. Besides the faster information flow, they can achieve decrease in their cost. Quality assurance and standardization guarantee utility and marketing of quality products.

By inducing this system concept, cooperation among producers will be fostered. Cooperation solutions foster use of results achieved due to modern solutions and innovative developments. Apart from production devices, access to money assets can be improved. The method how to obtain market information can be developed,

as well. Besides producers and distributors, the system provides advantages also for the government, authorities, experts and other participants of the R&D&I market.

A field informatics system can be accomplished by which we could get an exact picture and data about utility and time-quality-quantity features of inputs. Collection of data can be provided for the supportive market forecast systems (estimation of production on the basis of structure of inputs and products). It can contribute to optimization of the national and the European Union sponsorship. Structure of costs and marketing can be monitored at traders and producers implied in the system.

Considering structure of producers, they can belong to different fields. Plant production and stock raising agriculture can be emphasized (these can be also mixed plant and stock raising agriculture). The energy plant process factories using products of plant production agriculture produces energy out of agricultural renewable materials. By using the system, these factories can enter by their claims regarding input materials for procurement while they are interconnected no matter where they are located or how big or small they are. Cooperation can extend to harmony concerning common utility of technical devices as well as accomplishment of a more effective access to money assets. Coordination of intensity regarding production can be accomplished on a higher, more comprehensive level by participation of more producers.

Moreover, harmony of supportive systems and their optimization in accordance with their different stimulating measures could be more accurate and deeper professionally.

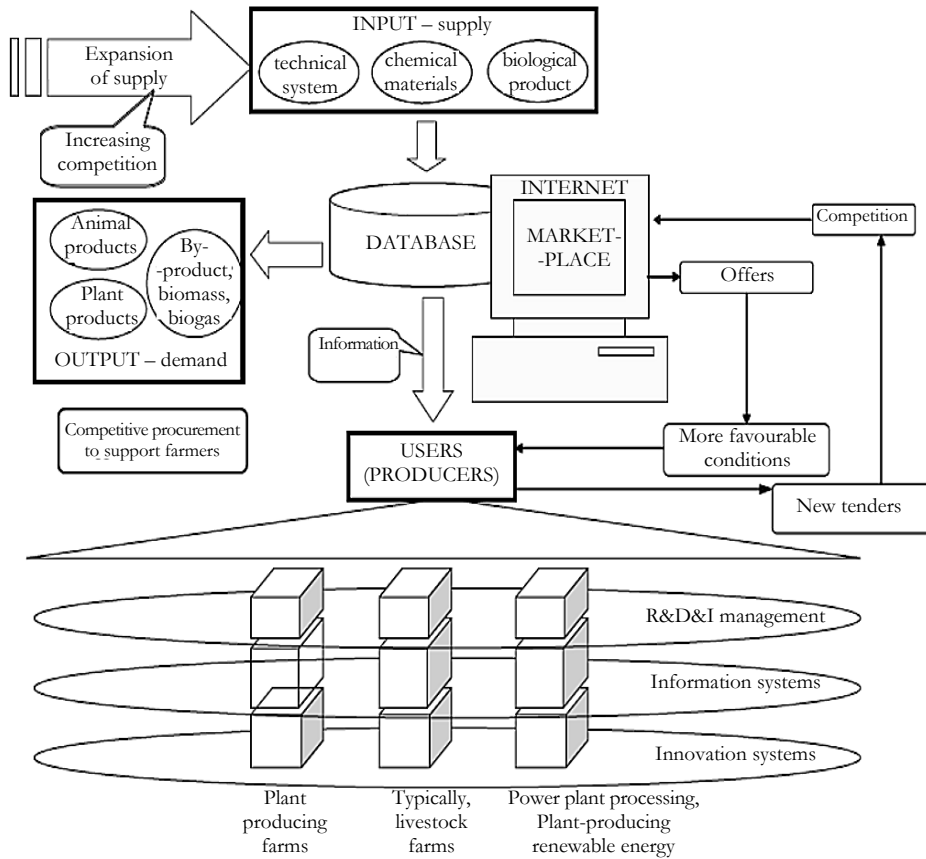
The information system that is going to be established stimulates producers to cooperate with each other. It provides conditions of effective information flow by covering all of the users. It provides a common base for application of innovation systems. Coordination of R&D&I tasks can be accomplished mutually by covering a bigger production structure (Chart 2).

During our system concept we are going to establish such a market field, which can be considered a trade and production system in agriculture and its aims take the following stipulations into consideration:

- Producers autonomous and equal people/organizations, which could have the best situations to make decisions.
- Market relations are a key element and activities as well as production have to meet the requirements set by the market.
- The system has to meet the market and all of the stipulations arisen during its operation, such as environmental regulations and support. These stipulations determine conditions of operation instead of the system of operation.
- The system should foster the producers, should foster more successful production and must not restrain them. Hence it should provide market advantages at all of the elements of the production (regardless the size of property and production system).

CHART 2.

Systems encompassing marketplace actors



Source: Erdeiné [2014]

We must achieve fast, practical induction of results of the described system, which is based on the production models, generates R&D and optimizes vertical and horizontal research, by competition of participants in R&D, and information have to be provided for producer in question by taking specifications, such as size of property, location, conditions into account. It means that the producer in question receives the production information referring to the producer if the system works appropriately.

In the case of a production guidance system, the method establishes horizontal development directions “spontaneously” since more than one partial elements of the product path can be the same during development of the activity of which management can be the same as well.

Tasks of the organization dealing with external information flow have to be specified since such an electronic system should be constructed, which is as good and useful as

possible, user-friendly and could be based on the GIS structure that operates in the country (e.g. systems for land registration, systems for animal registration). This system could maintain the conventional forms for information flow, such as presentation and training. The production guidance system providing information can be well connected to other integrated guidance structures, such as logistics, marketing organizations.

5. Conclusions

The basic concept of our work focuses on establishing an innovative online marketplace that unites agricultural producers and suppliers in a single system. This solution offers a number of important innovations as well mainly in the form of information that has previously been difficult or expensive to access or has been accessible only by mobilizing huge research resources.

Through stimulating competition, the marketplace may contribute to the continuous expansion of the supply of production means available for producers (buyers); it may allow much more efficient representation of producer interest enabling farmers to keep up with their competition in other countries and finally, as a result of a higher concentration of demand, producers shall acquire the products they need at a favourable price which greatly improves and rationalizes their economic efficiency.

Suppliers may also derive numerous benefits using the system due to the concentrated presence of demand, the permanently updated profiles of groups their marketing activities target at and the fact that their operation becomes predictable. At the moment, the concept is developed only theoretically, its implementation in practice requires state support.

The system is a knowledge-base which is jointly being built by each participant through their comments on specific products, various online activities and most importantly through their purchases. As a result, the system is able to reveal permanent monitoring relationships mapping and tracking regional differences always indicating the current situation.

The employment of the electronic marketplace primarily offers benefits for the users (producers) since their production activities become more transparent and predictable. As a result of a fast exchange of information they are able to reduce costs while the use and sale of quality products are ensured through quality assurance and standardization.

Producers are stimulated to cooperate through the introduction of the system. Cooperative solutions in turn facilitate the application of state of the art solutions and the results of innovative developments. In addition to the better access to the means of production, the availability of cash and the techniques to access market information may also improve. This also means the potential establishment of a territorial information system which offers precise data on the use of inputs and their features related to time, quality and quantity. The system also offers benefits for state and government authorities, experts and other actors of the R&D&I market through providing datasets

for support and market forecasting systems thus contributing to the optimization of European Union and national subsidies.

The resulting agricultural marketplace with its planned content and services forms a basically new approach (which does not have any international precedence).

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