

Commercialization of innovations and leadership in agricultural industry

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Abstract In today's highly competitive, globalized and dynamic world, the agro-industrial industry can only become a leader thanks to the commercialization of its innovations. This paper focuses on the growth of commercialization and inventions in the agro-industrial industry that enables good management and smooth access to the world market of agro-industrial goods. The paper provides in-depth evaluations the current state-of-the art and analyses the main tasks that are required for the successful commercialization of inventions.

This paper shows that the successful commercialization of innovations relies upon eight important factors: i) degree of resource assistance; ii) anticipated efficiency of executing the inventions; iii) good management and responsibility within the venture; iv) accessibility of an expert outsourcing firm in the market which satisfies the demands of the producer of advanced products; v) accessibility of the middle of obligation; pooling of assets; vi) expanding the market share; vii) consulting services; and viii) creation and marketing the trademark. This paper also provides some requirement that are essential for the improvement of the infrastructure and the commercialization of innovations in the agro-industrial policy of the state. The results of this paper might be of some interest for the experts and policy-makers in the fields of rural development, agricultural policy, and economic growth.

1 Introduction

Agricultural (or agro-industrial) industry needs innovations same as any other industry in today's competitive world. The falling prices for agricultural production, severe competition, lack of support from the government, lack of capital, on one side, and factors such as global warming and climate change, on the other side, all make the latest development of this sector a very volatile business.

New modern agrarian policies, strategies and perspectives, the development of global agribusiness and the rise of rural development and rural economy concepts that are shifting the priorities from growing crops to using the agricultural lands in other possible ways, are changing the rule of the game (Smutka et al. 2015; Akberdina et al. 2018). This is becoming the new agenda for both policy-makers and rural entrepreneurs (Abrham et al. 2015a; Abrham et al. 2015b). This is where the new leaders, in the true sense of this word, in business and economics emerge (Strielkowski and Chigisheva 2018).

Moreover, innovations and commercialization of the agricultural sector would also be useful for changing the concept of its management (McCoy 2008). New and more efficient approaches to production, sales and conquering new markets would increase the success of agro-industrial enterprises (Svatoš and Smutka 2010; Špička and Smutka 2014; or Moskalenko and Yevsieieva 2015). Thence, these approaches should be handled by

the agricultural enterprises in order to achieve favourable results and increase their profits (Teece et al. 1997). This should be done transparently and not in the shadow sector of the economy (Mostenska 2015).

This paper focuses on assessing the determinants of growth and success of agro-industrial enterprises that operate on the local and world markets of agro-industrial goods. The paper scrutinizes the current state-of-the art and discusses the main determinants that are required for the successful commercialization of inventions in the agricultural industry using the examples of several countries.

2 Measuring innovations and success in agriculture

An important question is how to measure innovations in enterprises and what constitutes innovations. In general, some authors show that such things as certificates, patents as well as trademarks and licences constitute a good measure of innovations (Ehrenberger et al. 2015).

It is assessed based on the application of the agricultural enterprise that various forms of certification of production might review the foresight, risk and innovation of the company's research and then report the opinion to the national tax offices for the reduction of expenditure on business research as an investment. Moreover, the existence of certificates and patents might ease the access not only to domestic but also to the international markets (see e.g. Mansfield 1986; Husted et al. 2016). However, it is also stated that stakeholder support and targeted policies for helping rural small and medium enterprises (SMEs) are necessary (Coccia 2017).

A good example is Taiwan where stakeholders are initiating the environment and investing infrastructure for agricultural development in the country, including the creation of incubation centres for agriculture and such innovative projects as, for example, the cluster for agricultural biotechnology (Lai and Nepal 2006).

Information on transferable agricultural technologies, various industrial-scientific collaborations, popular agricultural inventions, licensing announcements and licensing activities on agriculture technologies seem to be an appropriate path to follow. In addition, collaborations with academia, research institutes and private sector members to develop innovative technology for commercial production also represent a good way of fostering commercialization and helping to induce innovations (Markman et al. 2008).

Through the implementation of agro-industrial support projects, technology marketing, facilitating investments, industrialisation of science and technology and international marketing are the main tasks of the governments worldwide, in particular using their strategies for rural and industrial development. All these initiatives are very beneficial, since Taiwan's agriculture is also faced with limited land use, a shortage and ageing of farmers, a lack of economic scale on the small agricultural scale and a shortage of agricultural incentives (Huang 1993).

Agricultural technology, which has been commercialized from the public sector to agriculture, is not only a technological transfer, but a whole system, according to government policies, defining strategies, creating business opportunities and infrastructure through a systematic process that will help develop agriculture and increase the likelihood of success. In addition, the government also organises campaigns such as the great Innovation Awards in Scientific and Technological agriculture (GAISTA) to encourage agricultural companies to develop and share their successful experiences with other companies. In addition, in 1998, the co-operative Agricultural Science and Technology Program and the "Agricultural Technology Development Program" for agriculture in 2007 was promoted.

All in all, the diversification of agro-industrial systems to improve agrobial activity is likely to be crucial for the development of environmental, economic and social sustainability in agriculture. The integration of such crops can improve the sustainability of such agro-industrial systems, with minimal interference in current agricultural production.

However, diversification through the integration of new crops is hampered by barriers, including the lack of profitability for commercial use and the challenges of integrating new crops into agroecological systems. Therefore, the demand for new raw materials could stimulate the adoption of new crops, diversification of agroecosystems and a significant improvement in the sustainability of agroecological systems. In particular, it is not possible to see penncress farming as an unallocated benefit for sustainability-oriented stakeholders, such as environmental NGOs, which are now very interested in agricultural practices.

Thanks to agricultural innovation centers, agricultural projects connect emerging agro-entrepreneurs and facilitates investment in the agricultural sector. Despite the economic and political instability that led to strikes, closures in transport and frequent changes in leadership within the executive agency, the project has managed to overcome the chances and has shown one of the most promising models of agricultural marketing. The purchase of the new equipment as well as the implementation of a training programme for agricultural food and product analysis can also improve the ability to monitor and test standards. In addition, an ability to identify institutional, state and federal changes in policies that could accelerate the adoption of innovations that may be beneficial to rural enterprises, municipalities and universities in a given region. In general, empirical evidence of the effectiveness of state and university policy will help formulate recommendations to accelerate the transfer of technology to rural development.

Moreover, coaching and social media vehicles might also become a good and reliable method to gain confidence and involvement in the decision-makers and rural companies in research on preferences for technological transmission. Ideally, the region's large-scale production of cress would increase the multi-functionalities of regional agro-systems and landscape architecture by producing significant amounts of significant ecosystem services, which are of great importance to farmers and other stakeholders, while at the same time imposing a relatively small "bad" ecosystem.

Participants must at least cover agricultural production and supply chains, civil society organisations dealing with the environmental and social impact of agriculture, research institutions and governments. The efforts are to be coordinated by a number of offices and industrial technology, research and applications centres.

Universities, as well as state and federal agencies, should also be considering and expanding their relationship with the private sector, exploring ways to improve scientific communication and technological progress.

The ability to establish links between primary and applied research programmes and financial incentives, including consultations, patents and industry subsidies, have a positive impact on the transfer of technology and might help the commercialization and spreading innovations in the agricultural sector worldwide.

3 Leadership position of the agricultural sector

Many examples worldwide show that any country can accelerate the integration of agricultural change when the government provides a clear vision of the agro-industrial sector's development and aligns funds from public and development partners around a number of priorities (see e.g. Timmer 1997).

In addition to the important role of the government - as many countries (including post-Soviet states) continues to transform - a well-functioning and vibrant private sector will be crucial to help the country improve its production by investing in new products, services and agro-processing to ensure that farmers are encouraged to adapt new practices.

Agriculture should still be regarded as one of the priorities for the governments worldwide, so that activities should be considerably expended to strengthen and implement an integrated agricultural strategy through integration and additional capacity building and technical support. Nowadays, rural experts, politicians, policy-makers and activists should be focusing more on system change by working with government institutions and non-governmental partners to strengthen and implement the development plan of the agricultural sector.

The dynamics of agro-industry worldwide is quite obvious and clear (see Figure 1). While the share of agricultural land is rising globally, the share of rural population is shrinking due to the urban-rural migration and the rise of the large cities that would constitute the hubs for the innovations and productivity of the figure (Glaeser 2011).

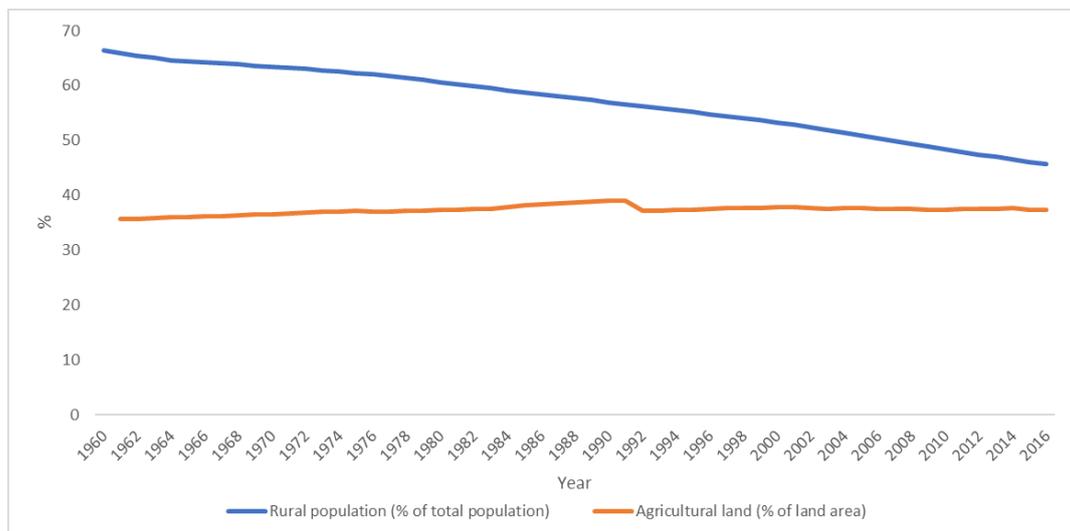


Fig. 1. Dynamics of changes in the share of rural population and agricultural land (1960-2016), in %
Source: World Bank (2019)

Promoting new technologies and reforming agricultural research and expansion is one of the main needs for agricultural development is to reform and strengthen agricultural research and expansion systems. India is a good example of that. Developing markets, agricultural credit and public spending: the legacy of India's extensive government involvement in agricultural marketing has limited domestic and external trade which has led to the

creation of difficult and costly marketing and transport options for agricultural products (Umali-Deininger and Deininger 2001).

In India, the steering of agricultural sector is done on a grand scale. For instance, the research and development of agricultural technology is conducted through two national projects with the implementation of pan-India National Agricultural engineering Project and the National Agricultural Innovation Project that are coordinated by the Indian Agricultural Research Council (ICAR).

When it comes to the role of management, the impact of the financing of large agri-food companies on the agricultural sector has not been spared from the financialisation of the global economy over the last thirty years: most companies have resorted to the stock exchange to finance themselves.

Finally, the negative external effects of the focus on the agri-food industry lead to considerable public health and environmental costs that are not currently integrated into the responsibilities of the company, as the costs are met by the community to varying degrees.

The size of the company in amplifies the development of customized technologies and industrial unit sizes, while the way in which organizational and business management are designed to share resources and expertise between enterprise networks, enabling cost reductions that would benefit from economies of scale in the company.

In fact, over time, food system is emerging in most of these countries: a subsector is aimed at the middle and upper classes of large urban areas, with the emphasis on exporting and reproduction of the agro-industrial model, while another traditional subsector.

Figure 2 that follows show barriers to innovations that are linked with a company type on one single handy diagram. It becomes apparent that some high-tech and potentially interesting projects in agricultural sector might also encounter many difficulties and fail. All in all, the barriers to innovations are multiple and the agro-industry is not an exception.

Company size	High-tech	Novely and technology	Assets and costs
	Low-tech	Exogenous factors	Inefficient business model
		Micro	Medium and large
Company type			

Fig. 2. Company types and barriers to innovation factors in agricultural industry

Source: Own results

In addition to the traditional economic development and poverty reduction targets, governments are also focusing their agricultural transformation plans on sustainability targets (e.g. on climate-intelligent strategies, women's economic empowerment and biodiversity). Some successful plans identify targets in a limited number of chains of crop and livestock values, cross-section agricultural tools (such as lower transport costs or access to irrigation) and specific geographic areas. Successful plans for agricultural transformation are aimed at agri-food systems and geographical areas with tailor-made strategies.

Many types of changes, from emerging technologies to the shortage of natural resources to political changes, have pushed traditional agricultural business models have created new opportunities for companies to innovate, develop new strategies and scale their activities. One can gain valuable insight into the trends, challenges and opportunities of agricultural activity, and you'll find new ways to build competitive advantage and stimulate business growth. Moreover, one can explore new business models to navigate through rapid technological changes, consumer trends, geopolitics and natural resources. Various case studies, group discussions and guest speakers from industry, might also help to understand agricultural trends and best practices that cover a wide range of business, economic, environmental and social issues. The potential for value addition, especially in the food industry, the food sector has become a highly growing and profitable sector.

Clean management, strong leadership, growing infrastructure and political efforts might help to catapult agricultural industries in many countries on the road to faster growth. Such factors as the availability of specialists with the necessary language skills, cultural affinity, and strong customer support for the employees might become drivers of success and foreign direct investment as well as become a powerful domestic driving force behind high incomes and jobs.

4 Leadership in Russian agricultural sector

In the recent decades, the focus on regulation and support of Russian agricultural sector by the government has improved significantly (Maitah et al. 2016). The requirement of getting a support for agriculture, including substantial financial aid, aimed at fostering its development and stimulating its growth, is dependent on the qualities of the agrarian sector. One of these traits that should be mentioned are the following ones: the effects of climate change that determine the development and evolution of the insurance program with the direct involvement of this state; cost volatility which depends upon market terms and is characterized by reduced elasticity of demand for agricultural goods; very low amount of monopolization of agricultural production in comparison with other industries of the market; as well as the absence of funds inflows into intensive agriculture which could not yield a plausible return on investment that would be higher than in other locations.

The main milestones in Russian agricultural policy throughout the recent years were the federal project "The Development of Agricultural Complex" (2006-2007), the Food Security Doctrine of the Russian Federation (2010), and Russia's accession to the World Trade Organization in 2012. A new framework was created by the adoption of those documents for agricultural industry and created favourable conditions for modifying Russian agricultural industry.

Lately, Russian authorities accommodated the plan of economic growth that's based on reducing the nation's heavy reliance on gas and oil. This, together with the Western sanctions imposed in Russian and Russian counter-sanctions that were envisaged as the reaction to them, helped to regain the momentum of sectors of Russian economy other than related to the extraction of gas and oil. In addition, counter-sanctions helped Russian farmers and agrarian producers to regain their belief in their own capabilities and started an enormous wave of regaining domestic markets and flooding them with good quality agricultural products.

To sum this all up and put it concisely, one can say that economic sanctions helped Russian agricultural production enterprises to regain its potentials and occupy the new niches on the markets. Various innovative and novel projects emerged as a result of this process.

5 Conclusions and implications

All in all, one can see that the agricultural industry represents a specific case. This is especially true in the case of the post-Soviet economies market by the socialist models of agricultural production which is slowly transforming into the market economy approach to agricultural sector. It becomes apparent that in many post-Soviet countries, including Russian Federation, agricultural sector still heavily relies upon the government subsidies and generous financial support.

Nevertheless, everyone would probably agree that agricultural sector needs innovations and commercialization which might increase its competitiveness and resilience. These initiatives should embrace new technologies, supporting initiatives induced both by the governments and policy-makers and by the representatives of NGOs and public activists.

Our results demonstrated that successful innovations and commercialization of the agricultural sector should go hand in hand with a number of key factors, such as the degree of resource assistance, anticipated efficiency of executing the inventions, responsible management and responsibility within the venture, accessibility of an expert outsourcing firm in the market which satisfies the demands of the producer of advanced products, accessibility of the middle of obligation; pooling of assets; expanding the market share; proper consulting services; and working on establishing and promoting trademarks and patents. These factors seem to be crucial for the improvement of the infrastructure and the commercialization of innovations in the agricultural industry. Policy-makers as well as rural entrepreneurs might consider these implications if they want to foster and preserve the leadership potential in the agricultural industry.

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