

# THE UNIVERSITY AS AN AGENT OF KNOWLEDGE TRANSFER: THE CASE OF THE LATVIA UNIVERSITY OF AGRICULTURE

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## **Abstract**

*There is a discussion within social science literature on theoretical models looking at the relationships between universities and stakeholders in the process of knowledge transfer particularly explaining whether universities are involved in the triple helix relationships (politicians, businesses representatives and university officials) or a quadruple helix system where public constitutes the fourth party. Universities have a number of functions which among the other include both creation and obtaining of knowledge and transferring it within wider community, thus promoting socioeconomic development. By studying the case of the Latvia University of Agriculture (hereinafter – LUA), the authors of the paper focus on cooperation networks that are involved in the process of knowledge transfer from the university to regional stakeholders and vice versa. The research methodology is based on the qualitative approach. For identification of cooperation agents, nineteen individual and six group semi-structured interviews were held involving 35 informants. For a deeper analysis of relationships between the LUA and regional stakeholders, policy documents concerning socioeconomic development of Zemgale planning region were analysed.*

*The research results show that the LUA operates as a unique agent of knowledge transfer in many fields (agriculture, veterinary science, forestry, wood processing, food technology, etc.) at both regional and national levels thus diversity of structural elements in cooperation networks depends on demand and supply of knowledge as well as on involvement of institutions responsible for facilitation of successful knowledge transfer. The authors discuss which of the theoretical cooperation models is more evident in the case of the LUA and conclude that currently the triple helix relationships dominate; however, in some cases particular relationship patterns and activities indicate transformation towards the quadruple helix system.*

**Key words:** cooperation models, knowledge transfer, the Latvia University of Agriculture (LUA).

## **Introduction**

Currently in Latvia there are many discussions about the role of higher education institutions in the regional development, which stress the importance to develop closer cooperation with regional stakeholders. Through cooperation with producers, business representatives, education and culture entities, government institutions and policy makers the higher education institutions including universities potentially are becoming the key leaders in development

processes at the local, regional and national levels. Only through a close cooperation with other social agents, universities have possibilities to influence various social and economic processes and to promote innovations. Motivation and interest of the regional social agents is one of the primary and most important preconditions in the knowledge transfer processes.

University has its intellectual, scientific, cultural and administrative potential. The role of university as a cooperation agent and its tasks in knowledge and technology transfer is increasing, as the society requires not only the knowledge development, management and transfer, but also a closer cooperation and goal oriented performance of regional agents.

The factors described above are analysed in the context of cooperation of the LUA and other social agents. Thinking of a sustainable and polycentric development of regions, it is important to study how the university potential is used in existing forms of cooperation, as well as to outline new possibilities for cooperation in the future. The paper characterises university functions and explores various theoretical cooperation models. The authors analyse the documents of Zemgale planning region (hereinafter – ZPR) in order to identify what is the role of the university and cooperation possibilities in Zemgale regional development from the viewpoint of the region development planners and policy makers. On the basis of the theoretical cooperation models explaining relationships between university and social agents (triple helix relationships and quadruple helix system), the authors describe the main forms of cooperation and identify which cooperation model is the most suitable to characterize relationship between LUA and the regional stakeholders in the knowledge and technology transfer process.

### **A University as a Knowledge Transfer Agent – the Role and Functions to Ensure Cooperation**

Universities play an important role in regional development. The literature describes several types of universities which differ in certain characteristics that in some cases may overlap or combine. Due to administrative factors, unique knowledge, intellectual and resource potential the most important universities are ones located in capitals or the national universities. Further, regional universities, which are located in regional centers, may be distinguished, since they, undoubtedly, plays an important role in regional development. Such universities typically have developed infrastructure for scientific research, unique libraries and specialist training centers. Regional universities of the classical type can be classified into the third group; these usually are small education institutions which were created in the second half of the 20<sup>th</sup> century and which cannot be proud of unique libraries or teaching staff composition. Regional universities must intensively monitor the development trends and the demand for specialists in the region (Шафранов-Кудев, 2005).

Drucker and Goldstein (2007) find that the technology transfer programs, university-industry partnerships, and educational curricula tailored to match the skill demands of local knowledge-based industries provide just a few examples of such economic development programs. Studying university impact and typology, authors evolve eight functions for modern research universities that may potentially lead to economic development impacts - creation of knowledge, human-capital creation, transfer of existing know-how, technological innovation, capital investment, regional leadership, knowledge infrastructure production, influence on regional milieu (Drucker & Goldstein, 2007). Universities pass their investments in research to the external agents (industry sector or businesses). Formal and informal interactions between these agents are important, especially with businesses located around universities, as it allows such businesses to implement innovations faster than rival firms located elsewhere (Hedge, 2005). Huggins, Johnston and Steffenson, researching universities and knowledge networks, found if universities as knowledge agents are to continue to play a regional economic development role, it is vital that knowledge transfer and networks' initiatives are fully supported to en-

sure sustainability. The authors emphasize that the impact on regional development of university knowledge transfer is generally positive. Universities have a varying ability to effectively transfer their knowledge, but regional businesses have the same ability to effectively absorb such knowledge. Policy makers must ensure they suitably balance support for both networked and market-oriented transfers of knowledge (Huggins, Johnston, & Steffenson, 2008).

In the literature, the authors propose different cooperation models that explain relationships between universities and other social agents. One the models - triple-helix system – characterizes relationships as an interaction between representatives of three broad institutional spheres which are politicians, businesses representatives and university officials (Etzkowitz & Leydesdorff, 2000).

The triple helix relationships are developed through the establishment of intermediaries, innovation and incubation centres and science parks, allowing each sphere to undertake activities from which they were previously excluded. Such overlapping triple helix forms are manifested by industrial policies, which seek to develop an industrial structure based on firm engagement in inter-organizational alliances and networks with universities (Etzkowitz & Leydesdorff, 2000). In reality, triple helix development models have focused more on building hardware, rather than software such as the networks, value and supply chains underlying successful growth.

Representatives of local community or citizens in other words, also become increasingly aware of the importance of the knowledge economy in general, and the role of the universities in particular, to ensure current and future wealth creation. Thus the public constitutes a fourth party in cooperation model whose concerns and ideas have to be taken as seriously as those of the others. In a result, knowledge regions are not built on triple helix interactions but constitute a quadruple helix system. Mehta (2002) proposed the idea of the importance of the public as a fourth party and as a Fourth Helix in the system. As Reichert (2006:17) states, ‘this approach was criticized by Leydesdorff and Etzkovitz who find that the free public should be seen more as a fundament for a functioning triple helix system than a party in the system. While an interested supportive public can be seen as a necessary foundation for a functioning knowledge the public should also be treated as a communication party in the system’ (Reichert, 2006:17).

The authors draw a conclusion that knowledge and technology transfer is ensured when different and multiform structural elements are introduced into a united network of social agents. This is determined by the knowledge demand and supply as well as by intermediary institutions which are responsible for successful processes of knowledge transfer. A university acts as a knowledge transfer agent developing also interdisciplinary relationships with other science and research institutions within the framework of the university as well as with social agents from private, public, and nongovernmental sectors.

## **Methodology of Research**

The paper presents the results of the action research carried out in the framework of the research project “Promoting the Utilization of the Research Potential of regional Universities for Regional Development in Latvia” (25.02.2009.-30.04.2011.), funded by the Norwegian financial instrument.

The action research methodology is used in the study, which required active participation of both the researchers to explore cooperation models and the regional stakeholders and the university officials to discuss and reflect on individual and common cooperation experience. The objective of the research was to promote a better understanding about cooperation possibilities among agents through identifying existing conceptual models of cooperation in knowledge and technology transfer. This was reached through joint discussions, interviews, and reflections. It was important to identify what social agents are involved and what cooperation forms reflect

the knowledge and technology transfer in the region. The research also sought to investigate how collaborative relationships were developed between researchers and practitioners and what were the promoting and hindering factors. Within the context of this paper, the authors focus on research issues which provide answers on the diversity of networking agents, and identification of a dominating cooperation model (triple helix system or quadruple helix system) in the case of the LUA. The research focused on the following research questions:

- 1) What social agents cooperate with the LUA in the knowledge transfer process at the level of LUA structural units and the university level?
- 2) What cooperation forms and models can be identified?

The action research was carried out from November 2009 to April 2010, using qualitative approach of sociological research. Document analysis and semi-structured interviews (individual and group interviews) were implemented for information gathering purposes. The document analysis was used to analyse the LUA performance strategy, the ZPR strategies and other planning documents related to the regional development. Various documents which regulate activities of the LUA and determine development of Zemgale planning region were analysed at the beginning of the research. The research instrument for interviews was developed afterwards.

The semi-structured interviews were conducted to identify cooperation forms and cooperation conceptual models (institutional forms and informal networks) and to identify factors that promote and hinder cooperation. 19 individual and 6 group interviews (25 interviews in total) including 35 informants were conducted. The research sample was made of the representatives of cooperation agents (interviews with heads of different structural units at all faculties of LUA). The average length of the interview was one hour. Interviews were recorded or written down. Some informants showed great interest and initiative, and asked colleagues to present information and share experience. Interview transcripts were set up after each interview.

The interview questions conditionally were divided into several blocks focusing on the following issues:

- cooperation partners in ensuring the study process, in science and research activities, in making the industrial policy, and in relations with the society,
- cooperation forms and time periods, (joint projects, informal networking, participation in professional organizations and/or branch associations, etc.),
- initiators of cooperation,
- factors that promote and hinder cooperation,
- multidisciplinary cooperation (how researchers understand multidisciplinary cooperation, what are those sectors and branches where cooperation exist, what multidisciplinary cooperation could be developed in the future, does knowledge exchange and transfer among specialists (theoreticians and practitioners within LUA, as well as business representatives and other cooperation agents from the region) from different sectors present),
- transfer of the LUA expertise to regions of Latvia.

Empirical data were analysed by using interview transcripts according to the interview guidelines described above.

## Results of Research

### *Cooperation Initiatives in Strategies of the LUA and Zemgale Planning Region*

The document analysis gives an insight in needs and priorities of Zemgale region and envisages whether the LUA responds to them and to which extent. Knowledge transfer from academic environment to national economy is emphasized in both strategies of the LUA and

policy documents that envisage directions of development of ZPR and define the main activities for meeting the aims stated in the documents.

In the LUA Acting Strategy for Planning Period 2010-2016, a strong orientation towards closer linkage between science and practice is emphasised, which means integration of higher education and researches in particular sectors what in its turn would provide implementation of innovative and knowledge intensive technologies in Latvia's economy. Particular cooperation forms with regional stakeholders, the meaning of cooperation and possibilities of collaboration for development of Zemgale region are envisaged in the documents elaborated by ZPR. Below the authors provide a brief insight in the most important documents.

The Development Programme of Forestry in Zemgale planning region (elaborated in 2005) is interwoven by the idea of closer collaboration of stakeholders, quality of education, unity of science and practice in development of new products and technologies in Latvia, and involvement of local municipalities. A great emphasis is put on science, thereof renovated laboratories of the LUA as well as the enterprise 'Forest and Wood Products Research and Development Institute' (abbreviated as MeKA) established in 2004 by the LUA, JSC 'Latvijas valsts meži' and the Latvian Forest Industry Federation are mentioned as a great success. (2005:4-23) In the programme, the LUA appears as a cooperation partner alongside responsible ministries, municipalities and local governments, associations and federations of the industry (2005:28).

The second redaction of the Programme for Development of Entrepreneurship in Zemgale for 2006 – 2011 also was analysed. The programme was adopted in 2005 and currently is being improved. In this programme, a presence of the institutions of higher education is mentioned as a factor diminishing the flow of work force from regions, which is achieved by adequate opportunities of both education and work in a local labour market. It is stated that in a result of active operation of institutions of higher education, the winner is the whole region thus the presence of the LUA in Zemgale has been evaluated as a great advantage, as it is the only technical institution of higher education in Latvia's regions (2005:43). The programme seeks to envisage the main economic sectors that should be developed in Zemgale, proposing some prior such as agriculture, food technology, textile industry, metal-fabricating industry, engineering industry and chemistry (2005:66-69). In the programme, the LUA is mentioned in relation to real support and contribution to entrepreneurs by carrying out researches in construction and wood-processing sectors.

The Programme for Development of Tourism in Zemgale Planning Region 2008 – 2013 was elaborated in order to be useful for a wide range of stakeholders: administration of Zemgale planning region, local municipalities, tourism specialists, tourism entrepreneurs, NGOs, and other social groups to whom it may be concerned including students, thus indirectly pointing at undergraduate, graduate or post-graduate students of the LUA (2008:59; 75-77). In the programme, promotion of collaboration of all the parties involved in tourism in Zemgale planning region is defined as one of the priorities (2008:65). In order to realize this priority, following activities have been forwarded: provision of information exchange between tourism enterprises and institutions of professional as well as higher education on practice opportunities for students and promotion of students to elaborate their scientific papers on topics related to tourism development in Zemgale region. (2008:65)

The strategic target of the Programme for Development of Zemgale Planning Region 2008 – 2014 is to ensure the quality of life in Zemgale. The LUA alongside affiliates of other institutions of higher education (ten in total) is mentioned here as a unique regional value which contributes greatly to development of regional human resources. The development of science technological parks, technological centres, logistics, industrial parks, business incubators and the Technology Transfer Contact Point of the LUA are also treated as a regional value (2008:11).

For meeting the strategic target, three priorities were determined and two of them are closely related with cooperation between regional partners and the LUA. One of the priorities concerns development of human resources, formation of information and civil society. Development of knowledge economy is the second priority, which determines activities for development of entrepreneurial environment, for example, promotion of information and knowledge transfer by creation and maintenance of the support system of coordinated information and knowledge transfer as well as promotion of linkages between education, research, and entrepreneurship. In order to realize it, it is necessary to facilitate cooperation between academic environment and practitioners, and to increase commercialization of research results developed by LUA students. (2008:58) The next and very important task is to promote understanding in wider society on the role of innovations in raising the level of welfare. This task requires informing society on innovation issues by involvement of local activists, NGOs, and representatives of mass media as well as by popularization of particular scientific achievements (2008: 58).

According to the programme, regional stakeholders such as the administration of ZPR, municipalities, the LUA, affiliates of other institutions of higher education, science centres, entrepreneurs, and mass media are responsible for accomplishment of the previously mentioned tasks. This indicates vertical and horizontal cooperation on a large scale between agents representing Zemgale region. The authors believe that ZPR could take up an initiative and coordinate activities of the stakeholders, thus ensuring cooperation agents with an opportunity to exchange information and resources within initiatives of a different level. It is important that scientists themselves are active and interested in popularization of their results, thus promoting understanding within wider community on activities of universities and science centres, their possibilities and results. A good example of cooperation between agents is the Scientists' Night organized by the LUA for several years already. During the night, science becomes closer to public, researchers introduce visitors with their laboratories and technologies, and during public lectures in an attractive manner they tell and show what universities do.

#### *LUA in Cooperation Models in the Process of Knowledge Transfer*

Identification of diversity of cooperation agents (representatives of business, policy makers, university, and public) was important aspect of the research in order to answer the question, which theoretical model – triple helix system or quadruple relationships – dominate in the case of the LUA. Thus the analysis of the transcripts of the interviews focused on identification of various cooperation agents, which were involved in the organization of studies and learning processes, in scientific work and research, in making industrial policies, and in communication with a wider community.

Particular cooperation agents are active partners in one or another sphere where the LUA operates. In the organization of studies and learning processes, institutional cooperation forms dominate, which involve labour contracts, regulations and contracts on student practices, membership in professional organizations, etc.; however, informal contacts between university departments and their graduates or colleagues from other institutions outside the LUA are also important. Very often informal contacts are an initial basis for institutional cooperation forms, for example, in the case of guest lecturers, learning excursions, student practices. Most frequently, the cooperation is developed between academic personnel and researchers in realization of study programmes, mutually discussing a content of study courses, consecutiveness of the courses, linkage between theory and practice, etc. Cooperation was observed within a framework of disciplines as well as between them, for example, in a form of consultations how to give a course so that it better meets the requirements of the particular study programme. It is important to note that the learning process is not conceivable without mutual cooperation between students and academic staff where both sides are gainers. Of course, to a great extent

knowledge is transferred from a lecturer to a student; however, this process is reflexive. Cooperation forms here are different and depend on study methods. When students are involved in research activities, opportunities of knowledge and experience transfer extend.

Since representatives of municipalities, NGOs, graduates, educational establishments, and industries are involved in study process, theory and practice is interlinked in the following ways:

- scientists and academic staff in cooperation with practitioners observe how technologies are used practically and how theoretical knowledge is approbated, how innovations are introduced, etc.;
- the same observations make students during the excursions or practice in enterprises, public or private institutions;
- entrepreneurs offer grants or bursaries for better students (they organize thematic competitions);
- producers offer topics for student researches.

There are various configurations of cooperation forms in research and scientific studies; their multiformity depends on research focus and depth of a study. Both specific cooperation within disciplines and interdisciplinary team building practices were identified where cooperation among researchers is widely apparent within the departments and between the faculties, with other universities, science centres, institutes, etc. In the cooperation process, the experience, position, identification at national and international levels of particular people is important, as it reflects on the common capacity of a team and on networking. The case study in the LUA indicated that interdisciplinary teams operate quite successfully; teams are built between engineering disciplines, engineering and natural sciences, also engineering and social sciences. Cooperation is developed also with producers, which is quite successful in cases when producers themselves are interested in collaboration with a scientist and are able explicitly define their needs and expectations regarding expected results. The initiators of cooperation are both sides. Sometimes in these relationships intermediate institutions are involved, the most active are: the Science and Technology Transfer Centre of the LUA, the administration of ZPR (it organizes seminars and other activities for producers and entrepreneurs), sectorial associations, and business incubators. The respondents expressed different attitude towards the necessity and efficiency of these intermediate institutions, as sometimes they are related to bureaucratic and formal constraints or burden that make the cooperation process more complex. Producers often prefer informal consultations.

At the level of sectorial policy, the current cooperation was identified in disciplines where the LUA provides unique expertise – forestry, food technology, agriculture, veterinary science, alternative energy, etc. Experts contribute also to elaboration of education standards. Cooperation is initiated from both sides – policy makers and academic experts. Cooperation with policy makers at sectorial, local and national levels becomes urgent when politicians elaborate a particular programme or strategy which requires an analysis of current situation. Very often cooperation is organized in projects funded by the EU structural funds where individual interests might dominate, which later can transform in long term collaboration.

Cooperation with a public or wider community more likely exists at an informal, individual level, which could be analysed in the social network context for particular individuals. However, the activities of the Scientists' Night can be mentioned as a good example; interesting lectures and discussions about topical issues in science and society are organised in these activities as well as the population gets introduced with an environment in which scientific experiments are conducted.

## Discussion

The research results correspond with theoretical concepts that some universities are trying to stabilize their position through participation in new science niches, which are multidisciplinary and oriented towards cooperation. These multidisciplinary research programmes have become new study programmes providing graduates with skills necessary for particular economic activities in knowledge economy (cooperation among students from science, engineering science, entrepreneurship and law sectors) (Huggins, Johnston, & Steffenson, 2008).

Development of regional economy is more based on the key research universities. At the same time policy and innovation system for the regional development has to be adapted more specifically not only for available intellectual and material resources but also for the regional culture, social structure and history, as well as the so called *weltanschauung* (Drucker & Goldstein, 2007).

The document analysis shows that the regional development planners consider the LUA as an important force promoting regional development. Since it is seriously taken into consideration, policy makers express concrete expectations in regard to the university. These expectations are study programs based on labour market needs, qualitative studies, research and science activities based on innovations and practical applications. Other expectations are related to scientific activities that provide technologies with a high applicability in the national economy, involvement of the students of all study levels in researching topical problems for business and society, active cooperation with the practitioners and users of knowledge and technologies in the region. Because of these expectations the LUA is mentioned in all the analysed documents, emphasizing the uniqueness of the university in Latvia. This is concluded both in the analysis of current situation and in outlining the future development of the region and economic sectors in Zemgale region.

As it was described above, researchers discuss whether society forms a fourth party in cooperation networks that involve universities and regional stakeholders or not. The authors of the paper are of opinion that the local community or society has to be defined as a separate agent in cooperation networks. The results of the interviews reflect that the knowledge transfer in the LUA is mainly characterized by the triple helix system when the cooperation is implemented among the university structural units, policy makers and business representatives. Activities of these agents are emphasized both in policy planning documents and empirical research. The issue of bringing other parts of society into a knowledge transfer process remains open. By raising a level of understanding within society about the role of higher education and science in the regional development, the attitude of the other agents (politicians and industry representatives) may change. By raising social awareness about functions that university fulfils, the stereotypical concepts about science as something alienated from practice could be weakened. There are new agents, not mentioned before, participating in the knowledge transfer into a broader society (local community). These agents are various groups of interests, mass media and students themselves. More and more discussions are raised in LUA and in the regional planning documents that research results have to be popularized and understanding about innovation processes in the society has to be promoted. These ideas are emphasized in documents and interviews which showed that some structural units of the LUA work on activities which provide the local community and a wider society with information and ensures its participation. Thus there is evidence that in some cases quadruple helix system relationships already exist. The authors suggest that further investigation should be carried out in the partnership development among the cooperation agents.



## Conclusions

The cooperation network involving the LUA and regional stakeholders is sufficiently wide and open on both international and local levels, since cooperation and exchange of resources takes place with agents of different types - non-governmental organizations, scientific organizations, business representatives and cooperation with industry companies.

The LUA in policy documents appears as a crucial factor promoting development of Zemgale, particularly influencing several important economic sectors such as tourism, the engineering industry, forestry and entrepreneurship in general. The planning documents emphasize that it is necessary to promote and encourage a closer cooperation between the LUA and regional partners, e.g., in developing innovative business products and technologies, in developing research on economic sectors, and in improving the study programmes. The sector policy makers or regional development planners are mentioned as initiators of cooperation. This allows the authors to conclude that the relationships between the LUA and regional stakeholders are formed as the triple helix system. At the same time, the research indicated some activities that are directed towards greater involvement and information of local society, and this means a drive to the quadruple helix system. Gradual transformation towards this system is indicated by the increase of awareness of both the university and public (through mass media, NGOs, etc.) in greater information exchange, discussions and mutual expectations. This drive is also implied by the policy documents.

The LUA faculties and departments have a broad network of contacts which is formed by academic personnel, graduates, central and local government employees. In many cases informal contacts are initiators to develop institutional or formal partnerships among agents. The knowledge transfer from the academic environment to practical users in many cases is implemented in an informal manner. In this way, knowledge can be possibly obtained by any user, however, the institutionalisation or formalisation of this knowledge transfer is important, otherwise many potential users are not informed about such possibilities. The involvement of other social groups in the knowledge transfer requires initiatives and preparedness of scientists themselves to share their knowledge and achievements. From the point of view of knowledge transfer, it is a positive fact that the respondents are oriented towards knowledge commercialisation. For this purpose, institutional solutions making it easier to transfer knowledge are considered.

The most typical and successful cooperation emerges among scientists. During the next stage, after a product has been developed and the research results have to be transferred to users, various barriers can be observed, for instance, lack of confidence in the quality of product, distrust. Presently, the weakest linkage can be observed between scientists and a local or regional community. It is hard to identify convincing examples or stable social practises that would indicate a close linkage between a local community and a university.

The research results show that the triple helix relationship system is currently dominating in cooperation between the university and regional stakeholders; nevertheless, the authors stress that some cooperation examples indicates a shift towards quadruple helix system where public constitutes the forth party and this shift should be encouraged by both institutional and informal mechanisms.

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