UNIVERSITY-BUSINESS-STATE RELATIONS IN POSTINDUSTRIAL ECONOMY: PERSPECTIVES AND PROBLEMS

Hasan Rahimli,
PhD candidate
Lankaran State University
Lankaran, Azerbaijan

Abstract: *In a post-industrial economy, knowledge is the most important economic resource. The socio-economic development of modern society depends on innovations in research and development. In a post-industrial society, research institutions and especially universities are the leading elements in both the development of human capital and the commercialization of science. In today's information society, the relationship between universities and the economy is growing. University-business cooperation makes an important contribution to the process of knowledge commercialization and raises the level of innovation. University-business-government relations benefit all three parties and influence the formation of an innovative economy.*

Keywords: *postindustrial economy, university-business relations, innovative economic growth, model of innovations*

The role of knowledge in the economic life of society has never been more relevant and important at any stage of history. In other words, knowledge has not always been considered an important factor for the economy. Only after the 60s and 70s of the twentieth century (social philosophers J.Galbraith, D.Bell, A.Toffler and other researchers called this period "postindustrial society", "information society", "electronic society", "digital society", "postmodern society" , "knowledge society", "post-capitalist society", "virtual society" etc.) in the qualitatively new stage of economic development, knowledge has become the most important element of the economic system. The most important elements of the new society are science, education and innovation.

In the post-industrial period, universities are becoming the main social and economic institutions of society. Science benefits the economy only when it acts as a source for innovation and when the commercial realization of scientific knowledge is possible. In a post-industrial society, research institutions and especially universities are the leading elements in the process of commercialization of science. In a knowledge-based economy, universities are called "University 3.0" and this number indicates the

number of university missions: 1.0 - education only, 2.0 - education and research, 3.0 - education, research and commercialization of knowledge.

The science-education-business or science-education-production triangle forms the basis of the knowledge economy. The effectiveness of universities in the innovation and knowledge market depends on several factors, the most important of which are the commercialization of knowledge and the close connection of universities with the business world. There are different levels of connection of universities with the business world. There are forms of cooperation for each level of university-industry relations.

Table 1 - A typology of university-industry links, from higher to lower intensity *(source: Jose Guimon, 2013)*

High (Relationships)	*Research partnerships*	Inter-organizational arrangements for pursuing collaborative R&D, including research consortia and joint projects
	Research services	Research-related activities commissioned to universities by industrial clients, including contract research, consulting, quality control, testing, certification, and prototype development
	Shared infrastructure	Use of university labs and equipment by firms, business incubators, and technology parks located within universities
Medium (Mobility)	*Academic entrepreneurship*	Development and commercial exploitation of technologies pursued by academic inventors through a company they (partly) own (spin-off companies)
	Human resource training and transfer	Training of industry employees, internship programs, postgraduate training in industry, secondments to industry of university faculty and research staff, adjunct faculty of industry participants
Low (Transfer)	*Commercialization of intellectual property*	Transfer of university-generated IP (such as patents) to firms (e.g., via licensing)
	Scientific publications	Use of codified scientific knowledge within industry.
	Informal interaction	Formation of social relationships (e.g., conferences, meetings, social networks)

A scientific product is the result of a long process that goes from fundamental research to the commercial stage. University-industry cooperation is an important component of the innovation process. The linear model of innovation demonstrates the process of innovation-based research conducted at universities, government research institutes, or private R&D laboratories and their use for civilian or military purposes.

Fig. 1 - The linear model of innovation

But in the non-linear models of innovation, it is recognised that science emerging in universities and technology emerging in industry are often separate entities. Indeed, there exist lags between science and technology that are more or less wide depending on the technologies. The objective of knowledge transfer is to optimise the innovation process that is systemic, non-linear, and involves diverse quadruple helix innovative actors, among which university-industry actors [9, p.3].

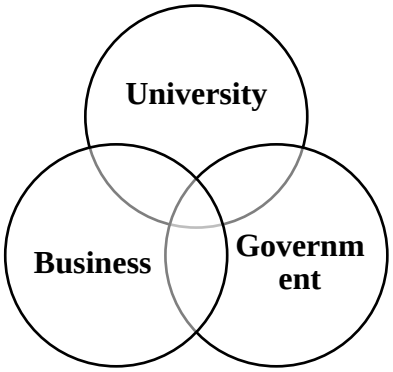

Fig. 2 - The non-linear model of innovation.

The most important subjects of the postmodern innovation system are universities that produce science, firms where the knowledge produced is converted into a product or technology and commercialized, and the state mechanism that regulates this system. The more harmonious and efficient this trio works, the greater their contribution to the economic system will be. University-business cooperation is understood as any sort of interaction between higher education institutions and business for mutual benefit and is considered an essential driver of knowledge-based economies and societies. This means that university-business cooperation not only helps individual organisations to address some of their most pressing challenges, such as the need of funding and innovation, but it can also have a significant impact upon the regional economy in which they operate [8, p.31].

The benefits of university-business-government cooperation to universities are as follows:

- obtain additional financial resources and implement joint projects with the industry (government grant for research & Industrial funding for research assistance, lab equipment, etc.);
- create internships for students and staff and take advantage of industry opportunities;
- in-depth study of the labor market and job creation for graduates;
- participate in solving practical economic problems and Contribute to regional or national economy;
- academics' quest for recognition or achieve eminence;
- personal financial gain for academics;
- business opportunity, e.g. exploitation of research capabilities and results or deployment of IPR to obtain patents;
- discover new knowledge/test application of theory;
- obtain better insights into curricula development;
- expose students and faculty to practical problems;
- applied technologies;
- publication of papers;
- shift in knowledge based economy (growth in new knowledge);
- promote innovation (through technology exchange).

The benefits of university-business-government cooperation to the business world are as follows:

- use the scientific potential of the university and carry out research work;
- gain the opportunity to scientifically and systematically analyze the results of practical activities;
- to train and improve the skills of workers in the industry;
- gain a competitive advantage by bringing scientific innovations to the industry;
- national incentives for developing such relations such as tax exemptions and grants;

- increase opportunities for staff selection;
- enhance the technological capacity and economic competitiveness of firms;
- to have the opportunity to improve technology;
- commercialize university-based technologies for financial gain;
- risk reduction or sharing;
- enhancement of corporate image.

The state also has its own interests in university-business cooperation:

- increase employment;
- rapid development of education and acceleration of scientific and technical progress at the national level;
- protection of sustainable development;
- to achieve innovative economic growth;
- accelerate the development of strategic systems that are important for the state, etc.

References:

1. Əliyev, Ş.T. Xüsusi iqtisadi zonaların tətbiqi problemləri [Problems of application of special economic zones]. Bakı: Azərbaycan Respublikasının Prezidenti yanında Elmin İnkişafı Fondu, 2012. - 360 s. [in Azerbaijani].
2. Jose Guimon. Promoting University-Industry Collaboration in Developing Countries. The Innovation Policy Platform. World Bank, 2013.
3. Measuring the Impact of University Business Cooperation. Final Report. Luxembourg: Publications Office of the European Union, 2014.
4. Rahimli.H. Evaluatıon of the role of ıntellectual capıtal ın ınnovatıve economıc growth ın the framework of knowledge economy. "Вісник аграрної науки Причорномор'я" ("Ukrainian Black Sea region agrarian science"), 2021, pp. 110-119.
5. Rəhimli H. (2021), Müasir universitet modelinin formalaşması şəraitində elm, təhsil və istehsalın vəhdəti. [Integration of science, education and production in the formation of a modern university model]. Geostrategiya, №3 (63), səh, 149-154. [in Azerbaijani].
6. Rəhimli H. (2021), Sahibkarlıq universitetlərinin insan kapitalı və sosial kapitalın inkişafında rolu. [The role of entrepreneurship universities in the development of human capital and social capital]. AMEA-nın Xəbərləri. İqtisadiyyat seriyası (may). [in Azerbaijani].
7. Samuel Ankrah, Omar Al-Tabbaa. Universities—industry collaboration: A systematic review. Scandinavian Journal of Management. January 2016.
8. The State of Universıity-Business Cooperation in Europe. Final Report. European Union, 2018.

9. Unıversıty-ındustry collaboratıon. A Policy Brief from the Policy Learning Platform on Research and innovation. European Union, 2020.

10. Wissema, J.G. Advancement in the 3rd Generation University areas: At the same time, balancing the administration of universities. Northampton, MA: Edward Elgar, 2009. 478 p.

11. Wissema, J.G. Threat or Opportunity? From the Humboldt University to a Third Generation University Model. University Prospects. 2014.

Анотація: *У постіндустріальній економіці знання є найважливішим економічним ресурсом. Соціально-економічний розвиток сучасного суспільства залежить від інновацій у дослідженнях і розробках. У постіндустріальному суспільстві науково-дослідні установи і особливо університети є провідними елементами як у розвитку людського капіталу, так і в комерціалізації науки. У сучасному інформаційному суспільстві посилюються відносини між університетами та економікою. Співпраця університету та бізнесу робить важливий внесок у процес комерціалізації знань та підвищує рівень інноваційності. Відносини університет-бізнес-влада вигідні всім трьом сторонам і впливають на формування інноваційної економіки.*

Ключові слова: *постіндустріальна економіка, відносини між університетом і бізнесом, інноваційне економічне зростання, модель інновацій.*