University-Industry Collaboration in Armenia

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Abstract. Collaboration between University and Industry is increasingly significant to make a contribution to the economy and society. University-Industry Collaboration (UIC) facilitates the transfer of knowledge and stimulates new knowledge and technology development. In Armenia, the poor linkages between education and industry are notably critical as well as the existence of innovative intermediaries and support institutions. The government is not a full-fledged facilitator and has an interventionist function in business. The present paper aims to establish successful UIC model. The proposed model emphasizes the role of university, industry, government, trade associations, and non-government organizations (NGOs) to work mutually to achieve successful collaboration. The analysis of Armenia case showed that there is no common practice encouraging UIC. The government policies are insufficient to motivate UIC. Findings identified the university’s role and the factors of UIC. If public policy is employed to bridge this gap the efficiency of both academic and industrial sectors will increase.

Introduction

The evidence of developed countries shows by generating knowledge and using this knowledge in production to achieve efficiency in economy and innovation, in this way they gain a significant competitive advantage in world markets. UICs are one of the ways to obtain a competitive advantage [1]. Collaboration is significant to improve the training efficiency of higher education students. Synopsis Armenia the IT industry's leading enterprise engaged in cooperation with the Polytechnic University of Armenia. The partnership aims to provide Armenia's labor market with highly skilled IT professionals. [10].

Besides, to train students and generate conceptual knowledge, academia should also transfer this knowledge to relevant industries to make its use effective in the economy. Learning from developed countries methods to produce and disseminate knowledge we can apply this method to create collaboration model for Armenia. The use of knowledge by companies and the efficiency of higher education training can be improved using this model. However such collaboration raises an important issue of what will drive firms and universities to collaborate [8].

Although the problem is a challenge for companies, the first move expected from academia. However, in practice, the problem is related to universities, industries, and the government. The effective method of interaction between university and industry is to generate knowledge in academia and transfer it to industries [4]. It is, therefore, significant to try to improve interaction between university and industry. The proposed model of collaboration aims to contribute to bringing together relevant actors and collaborative problem-solving.

Armenian Government Policies Supporting University-Industry Partnership

Armenia made considerable progress in the creation of the National Innovation System (NIS), which became a strategic objective by the Armenian authorities. Critical ingredients of this process are in place: strategic vision, political will, and support at a high level of Government. Understanding that the R&D projects handled in academia have an important function in stimulating firm-level
innovations, the Armenian Government adopted the Action Plan 2017 in October 2016 to promote education-research-industry cooperation. The Action Plan 2017 states the need for initiation during 2017 of a 5-year program directed towards fostering university-research cooperation via the creation of networking universities and scientific-educational clusters [9].

However, several building blocks and linkages that are vital for a well-functioning NIS remain non-existent. The poor linkages between education and industry are notably critical as well as the existence of innovative intermediaries and support institutions in the country. There are also issues related to early stage financing which is practically non-existent [9]. In Armenia, the government is not a sufficient facilitator and has an interventionist function in business matters.

Armenian R&D expenditure on GDP approaches 0.25%. Specifically, the limited public funding available for R&D is mainly allocated to the National Academy of Sciences while universities have less government support for research [9].

Regarding policy tools, one of the first pillars establishing a legal framework for R&D in Armenia was the Law on Scientific and Technological Activity, adopted by the Armenian Parliament in December 2000. This law regulates the activities of scientific and technical subjects, state agencies, and their relationships and use of scientific results. It was directed to formulate a set of policy objectives, including, closer integration of science, education and the manufacturing sector.

The government created the State Committee of Science (SCS) in October 2007 to improve the policy-implementation and better coordination in S&T sector, which is authorized to implement integrated S&T policy in Armenia. This structure is subordinated to the Ministry of Education and Science, but with an extended power of autonomous activity. SCS is responsible for establishment and realization of research and innovation programs. Among recent initiatives to promote research-industry cooperation, the funding program for research projects, launched by the SCS in 2011, requires for research institutes to build a partnership with an industrial enterprise in a project proposal with 15% co-funding by the industry partner. The industrial partner co-funding was increased up to 25% in 2013 call for proposals, and up to 35% in 2015. Recently launched, New Young Researchers Support and Infrastructure Programs reflect the positive tendencies in S&T and Innovation system. The Government employed the Strategy for the Development of Science in Armenia 2011-2020 compiled by the SCS. This strategy outlines the state policy for scientific development over 2011-2020 and formulates the vision for Armenia to build a knowledge-based economy by 2020 [9].

Collaboration Drivers for Universities

University-industry collaboration provides the following benefits regarding learning effectiveness: supporting instructors to update their knowledge; to provide a basis for their scientific research; carry out research to develop fundamental sciences; promoting scientific research by publications and students training.

Literature review determines the methods necessary for the efficiency of university-industry cooperation as follows:
- Improving interaction between academia and industry,
- Carrying out conferences and technical visits,
- Internships and increasing internships durations,
- Creating more active role in collaboration to trade associations,
- Universities assigning students industry related projects.

The academic structure is one of the reasons of insufficient improvement of UIC in Armenia. Research in academia remains at a theoretical level and is carried out without considering the requirements of the relevant business sector. In reality, most of the Armenian universities have a theoretical structure rather than industry-oriented education traditions. Institutions of higher education should apply necessary measures to promote sectoral initiatives. As mentioned in our
collaboration model the actors are: academia, industry, trade organizations and NGOs can be motivated to collaborate through government incentives.

The main reasons for the university to cooperate with firms are as follows [8]:
- Qualified students adequate training: graduates wishing to work in companies should have necessary expertise and knowledge to satisfy the requirements of the industry.
- Knowledge transfer to industry: companies should be able to take advantage of the practice and theoretical knowledge of the educational sector.
- University has a chance to make use of industrial opportunities: to provide internships or exchange courses to students before beginning their careers.
- Creating synergistic effects: the potential of the collaborators should be brought together systematically, thus facilitating interaction between corresponding actors.

Significance of Collaboration for Firms

The concept of university-industry collaboration refers to conducting educational training, R&D activities, and other purposes, within a system that allows all actors and society to benefit from available opportunities of academia [8].

In this concept, technology-based companies and innovative entrepreneurs without any capital play significant role [2]. Current government support programs in Armenia lack financial support mechanisms to protect industrialists who seek cooperation with academia. Therefore, financial support mechanisms are required to provide initial capital for such start-ups. Though, funding alone is not enough to build and maintain a business. Operating an established business within scientific principals is a challenge. At this stage, it is mandatory to benefit from the academic knowledge. Since the generation and diffusion of scientific knowledge are primarily the responsibility of universities, collaboration with a university is inevitable. When researchers find an opportunity to transfer information and theoretical knowledge to practice, it will favor entrepreneurs at the micro level, and favor the industry and the government at the macro level. It is significant to establish collaboration and interaction between university—where knowledge is generated, and industry—where technology-based production is performed according to scientific principles. Nowadays, developed countries such as the USA, Japan, Netherlands, and Germany directly support programs that create U-I collaboration [3]. For instance, the Knowledge Transfer Partnership (KTP), established in the UK between university and industry, focuses on benefits brought to both actors through the knowledge transfer between these actors [5].

Proposed Collaboration Model

Dooley and Kirk developed a triple-helix model of university-industry collaboration (Figure 1). This model anticipates collaboration between university, industry, and government [2].

In triple-helix model, the government has a facilitator role, through the regulations and policy framework which facilitates collaboration between university and industry.

When examining the Armenia case, it is currently difficult to identify policies that provide sufficient motivation for academia to collaborate with firms. Similarly, there is no traditional practice encouraging UIC. If government policy is employed to bridge this gap, the efficiency of both academic and industrial sectors will increase.

Our proposed model extends Dooley and Kirk model by involving NGOs and trade organizations in the structure because decisions taken solely by a central administration cannot reflect regional and industrial requirements in practice. Therefore, the actors of the proposed model are University, Industry, Government, Trade Organizations, and NGOs.
The roles of the actors are as follows:

**Academia:** Ensuring collaboration with firms according to their knowledge and technology by utilizing the support of NOGs and trade organizations.

**Industry:** With the assistance of government and trade organizations ensuring the academic knowledge transfer to the production processes by providing the basis for using scientific knowledge acquired in university.

**Government:** Ensuring the participation of relevant actors by providing incentives to the development of the partnership.

**Trade Organizations:** Chamber of auditors and financial consultants and committee of electrical engineers can play a facilitator function in the cooperation, as they operate within the industry and employ academic knowledge.

**NGOs:** Non-governmental organizations are well placed to know the priorities of their region; they can play an effective role in determining the fields of collaboration, and can also take a facilitating role in collaborative activities.

**Conclusions**

The research contributes to the literature by establishing the model of four actors which are university, industry, government and civil society organizations towards the successful collaboration between academia and industry. Findings have identified the university’s role and the factors to collaborate with industry. The function of government is to facilitate a successful partnership between these two actors. Firms can help universities through student training, knowledge transfer, and commercialization. The establishment of UIC may optimize the use of human resources, capital, technology, natural resources and will ensure sustainable development.

**References**


