

University-business collaboration for regional clusters' innovation development: the cases of ASEAN and Russia



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The goal of the paper is to identify up-to-date types of university-business partnership realized in petrochemical and energy sectors. The cases analyzed show high potential of collaboration as a source of innovation.

Keywords: university-business collaboration, ASEAN, petrochemical clusters, energy efficiency, network interaction.

External sources of innovations contributing to the formation of competitive advantages are created in the process of interaction with universities, scientific laboratories and research centers, representatives of small and medium businesses, technical start-ups. The perspectives of the university as a center of innovative activity depend on various factors, including the industry specifics, university ranking, its staff resources, economic and infrastructure environment of the region/country, etc. However, it is clear that the role of universities in the innovation system has been increasing as its traditional functions – education, research, professional sphere – are supplemented by new functions – integration and transfer of knowledge and technology, entrepreneurship, creation of innovational infrastructure, international technology transfer [1]. Also models of collaboration, mechanisms of business and science interaction providing different results and benefits for their members become more and more diverse. Schartinger et al [4] specify sixteen types of university-industry knowledge interactions, grouped in four categories: joint research, contract research, personnel mobility and training. Perkmann and Walsh [2] differentiate between ‘research partnerships’ (collaborative (or sponsored) research, university-industry research centers) and ‘research service’ (contract research, consulting). More than

that, one outlines federal programs supporting collaborative research, university-based consortia, technology transfer through licensing, and other forms.

Due to the globalization such interaction is especially important within industrial clusters where national companies often cooperate with TNCs and global companies. In this case, innovation development requires appropriate staff development to overcome the possible gaps in the level of training and qualifications among representatives of different countries. Involvement of universities may provide among others additional opportunities for employees training. And the universities are interested in research work with the leading global companies.

One can take interest in the experience of implementation of university-business collaboration in the knowledge-intensive industry with its high value of innovation benefits and industrial enterprises arranged mainly as a cluster. Petrochemical industry as a part of the chemical industry including a set of oil and gas refining processes is one of the most promising industries, and this can be confirmed by the growing number of petrochemical clusters, including the Asia-Pacific region. Development of industrial complexes attracting leading international and national energy companies is followed by an increase in

the number of successful practices of interaction between universities and business.

Organization of research activity in Asia-Pacific oil and gas sector has a variety of formats. Most universities are actively engaged in research activities in their laboratories and research centers. E. g. China University Of Petroleum, one of the leading universities in the petroleum and petrochemical industry, now has 62 laboratories and research centers.

Funding of many projects is supported by large companies or regional/national authorities. E.g. Seoul National University carries out its researches with the support of Korea National Oil Corporation (KNOC) and the Ministry of Knowledge Economy (MKE).

Research structures are created not only using the resources of the universities, but also with the participation of businesses. E.g. Chulalongkorn University has founded several laboratories in partnership with ThaiOil. And in 2015, one introduced KAIST-Hanwha Chemical Future Technology Research Center, the first research center in Korean petrochemical industry. Its tasks include the development of petrochemical next-generation materials and innovative technologies, patents to which will be owned in equal shares by Hanwha Chemical and KAIST.

The universities can become the base for creation of interaction-oriented special units and organizations, apart from laboratories. They implement the sale of licenses, patents, provide consulting services, host the conferences, seminars, etc. Indian Institute of Technology Delhi has established a special organization to interact with the industry, i.e. Foundation for Innovation and Technology Transfer (FITT). It conducts training in modern technologies under special programs, carries out innovative consulting projects aimed at solving problems and conducting research. Thus it spreads out the intellectual developments of the Institute and at the same time receives a relevant feedback for training and research from the industry.

Sectoral i. e. academic and research institutions in the petrochemical industry can be created by national corporations (SINOPEC, Petronas) on their own or in cooperation with the regional authorities (CNPC). These institutions have a great influence on industry development (technology, standards, platforms for interaction, etc.), and there is an especially distinctive example of China. SINOPEC has several research institutes, including Beijing Research Institute of Chemical Industry (BRICI), Shanghai Research Institute of Petrochemical Technology (SRIPT), Fushun Research Institute of Petroleum and Petrochemicals and others. Then, they have significant sectoral importance at the national level. BRICI is a leader in the field of organic synthesis, polymerization, plastics production and is the base for several national centers such as National Engineering Research Center for polyolefins. SRIPT is a platform for Petrochemical Branch of the National Standardization Committee and other organizations related to the government ministries and agencies.

Cooperation of business and science involves not only the top national universities as the close distance to petrochemical clusters has its impact

on involvement in research projects. E.g. RIMTEC Corporation manufacturing plastics, with its plant and research laboratory located in the Mizushima Industrial Complex, cooperates with the local Okayama University (13th in the ranking of Japanese universities).

And the clusters in their turn provide a unique environment for the implementation of joint projects. The Institute of Chemical and Engineering Sciences, a research institute of the Agency for Science, Technology and Research (A*STAR) has established laboratories on Jurong island (Jurong, Singapore) to enhance research activity and its relations with the industry. The Jurong island is one of the largest Asian petrochemical clusters with more than 100 residents and actually works as laboratory for testing innovative solutions.

Another area of universities involvement in the business is the creation of incubators, labs to support start-ups based on the latest research and development and with the participation of well-trained and motivated students. POSTECH (South Korea) has organized a special association i.e. Association of POSTECH Grown Companies (APGC), uniting 50 venture capital firms founded by university staff and graduates, and provides them with active support through training, mentoring programs, financing, management consulting.

Universities can commercialize their research not only through the sale of patents and licenses at the open market. Their basis can be used to create enterprises that are active players in the industry. Shandong Shida Shenghua Chemical Group Co., Ltd., a company owned by China University of Petroleum, is a key national manufacturer of organic and biochemistry, and its products are exported to more than 20 countries.

In such case sustainable and diversified cooperation of businesses and universities promotes the development of Asia Pacific petrochemical industry, supports innovative technology development and their transfer between representatives of global and national business operating in local clusters.

At the recent time, one can see that Asia-Pacific universities strengthen their positions in the world rankings: in particular, 50 best universities in the world in chemical engineering list 16 universities from Asia. In addition, according to the 2016 State of Innovation report by Thomson Reuters, the global leaders in oil and gas industry (due to the number of inventions) include not only Asian corporations (Sinopec, Petrochina), but also the universities such as University of China Petroleum, University of Southwest Petroleum.

These trends show that the universities are not only able to provide the industry with competent graduates competitive at the global program level, but also to participate actively in the development, transfer and commercialization of modern technologies supported by their research competence. And the more open the universities are to cooperate with business, government, forming a powerful synergy at the national and international level, the greater potential they have to innovate and to produce technological leadership.

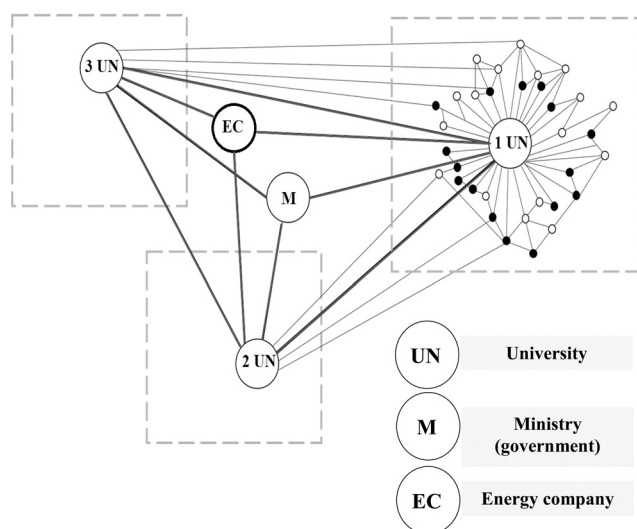
An example of the Russian practice of successful cooperation of universities and business refers to the related industry i.e. power industry. In this case, a demand

to universities to support innovative development of the industry was pointed and financed by the government through the Ministry of Energy.

Three Russian Universities: NRTU Moscow Institute of Steel and Alloys, FSBEI HPE Saint-Petersburg State University of Economics and NRU Tomsk State University were involved under the 'Energy Efficiency and Energy Development' State program (on the basis of open contest) in the implementation of an educational project 'Energy Saving and Energy Efficiency Improvement' subprogram, approved by the resolution of the Government of the Russian Federation dated April 3, 2013 under No. 512-R. The aim of the project was to train the representatives of regional ministries, as well as the heads and specialists of state-financed institution in the power sector. Assignments carried out through the partnership of these universities, included the methodological subprogram support, examination of the competence level of those engaged to train the target groups, formation of expert community in the Russian regions and organization of a general system of educational process monitoring.

All universities have formed their own pattern of network partnerships with major regional universities ensuring the educational platform, attracting faculty and expert community to the training and instructing practice, implementing continuous interaction with the heads and specialists of the state-financed sphere during the implementation of the energy saving and energy efficiency increasing tasks in the region (see figure).

Partnership interaction within this project was interpreted as the interaction of independent entities based on network technologies. The features of network interactions in such case are the following: autonomous status of each entity under the guidance of the Ministry of Energy of the Russian Federation; voluntary nature of participation in the solution of an entire task; constant availability of the materials of joint activities for all entities in the network; availability of the proper technical support i. e. ability to use telecommunication networks in an interactive mode.



Interaction pattern for the participants of educational project
Source: compiled by the authors

Training at the educational platforms has been continuous. All platforms were provided with the work of a permanent consultative-methodological center where students could receive advice on the development of educational material.

For the purpose to introduce the best practices in the energy saving and energy efficiency improvement sphere to the attendees, they established cooperation with regional organizations and institutions, representatives of Russian and international business, engaged in the promotion and introduction of advanced energy efficient technologies. Moreover, some energy companies due to their representative presence in Russia and industry leadership collaborated with key universities and participated in the project in many regions of the Russian Federation (in particular, Schneider Electric, Siemens and other companies).

In all regions the students participated in various events aimed at promoting the ideas of energy conservation and energy efficiency i.e. industry and innovation forums, conferences. Moreover, the universities worked in close cooperation with the experts of the regional Energy Efficiency Centers, as well as representatives of the sectoral ministries, involving them to lecture within the program and to organize workshops. As the number of events required joint participation of representatives of various regions, this allowed them to update existing or create new contacts with organizations and universities in other regions of Russia (also reflected in figure).

The entire project involved 65 Russian universities, training of 18600 attendees (two thousand were regional ministers and deputy heads of regional ministries and agencies). As this training program resulted in the development of individual graduation projects, which were applicable for the organizations represented by the students, and relevant to the region, one can see the obvious practical value of the program as distributing current practices, technologies that increase the efficiency of energy use, their application in practice in all regions of the Russian Federation.

Other results of the project include the strengthening of interaction between regional universities, ministries and agencies, state-financed and commercial organizations. Creation of individual and organizational relationships facilitates further joint activities – educational, manufacturing, innovative, etc.

Network form introducing the partnership of universities and organizations allowed to conform with the qualitative and quantitative (based on the scale of the country and the number of participants) requirements of the project at a high level. This is especially important for development of organizations, businesses, clusters in far regions.

Nowadays the leading universities implementing the programs of additional professional education cannot continue their activities following the already known and mastered ways. The level of complexity of the task in improving the skills of those involved in implementation of priority state programs and regional projects requires network forms and ways of integration and interaction of state, educational environment of the universities and business community where the universities community

plays the key role. Universities have previously acted (but only as a link) in the cooperative system of state, industrial complexes and business structures. Today the center for integration and interaction often moves to the educational environment of the universities requiring to combine the competencies of the leading universities which are able not only to diagnose, but also to ensure the implementation of the resource demands of the regional representatives, major industries, as well as private national and international companies operating in the country.

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Сотрудничество между университетами и бизнесом для инновационного развития региональных кластеров: на примере АТР и России

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Цель статьи состоит в описании современных типов партнерства между университетами и бизнесом, реализуемых в нефтехимической и энергетической отрасли. Анализируемые примеры демонстрируют высокий потенциал подобного сотрудничества как источника мотивации.

Ключевые слова: университетско-промышленное сотрудничество, АТР, нефтехимические кластеры, энергосбережение, сетевое взаимодействие.

«ИННОСИБ-2017» в Омске расскажет об инновационной экономике в развитии человеческого капитала

Международный форум социальных предпринимателей и инвесторов «ИННОСИБ-2017» традиционно пройдет в Омске 18-20 октября, уже в 7 раз. Ключевой темой в этом году станет инновационная экономика в развитии человеческого капитала. В ходе форума планируется подписать соглашение между Омским центром инноваций социальной сферы и зарубежными партнерами о создании Международной школы социального предпринимательства.

Ирина Сербина, председатель ОРОО «Центр инноваций социальной сферы»: «Ежегодно в ходе форума мы обсуждаем самые актуальные вопросы в сфере развития социального предпринимательства. В ходе «ИННОСИБ-2017» мы представим уже действующую модель кластера социальных инноваций в Омске, первые полученные результаты в этом направлении. Здесь есть что обсуждать, так как кластер стал реальным инструментом стимулирования социальных инноваций на региональном уровне, позволил сделать ряд услуг комплексными и более доступными для жителей Омской области. Это именно те услуги, которые не предоставляются государственными учреждениями, но очень нужны людям».

В работе форума примут участие более 1000 человек из 21 российского региона, эксперты из Германии, Индии, Казахстана, Марокко, Непала, Кореи, ЮАР, Республик Беларусь и Узбекистана. Среди гостей и участников форума «ИННОСИБ-2017» — представители федеральной власти, крупного бизнеса, социальные предприниматели и инвесторы, а также российские и международные эксперты и социальные инвесторы. На площадках форума 18 октября пройдут мастер-классы российских и зарубежных экспертов, а 19 октября в Конгресс-холле состоится пленарное заседание, будут организованы дискуссионное ток-шоу, круглые столы, панельные дискуссии и экспертные сессии. В рамках «ИННОСИБ-2017» также пройдет международная выставка социально-предпринимательских проектов и биржа контактов резидентов кластера.

Справка

Омская область на сегодняшний день один из ведущих регионов в России по уровню развития социального предпринимательства. Омский центр инноваций социальной сферы – первая российская инфраструктурная организация такого типа. Свыше 800 выпускников Омской Школы социального предпринимательства создали и успешно работают в 21 субъекте Российской Федерации. Регион первым в РФ внедряет кластер социальных инноваций.

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