

THE MAIN CAUSES OF MOTIVATION LACK FOR INVENTIONS CREATION IN STATES WITH TRANSITIONAL ECONOMY AND PRIMARY MEASURES RESULTING FROM THE SITUATION

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Abstract

Research universities have recently added the commercialization component of research results as a supplement to their educational objectives. The situation in nations with transitional

economies in this regard is worrying. Lack of drive to develop and use inventions is one of the primary causes of the Republic of Armenia's inadequate commercialization of scientific findings. The situation in nations with transitional economy in this regard is worrying. Lack of drive to develop and use inventions is one of the primary causes of the Republic of Armenia's inadequate commercialization of scientific findings. The main barriers to the implementation of scientific research results in the Armenia were identified, and remedies were suggested to overcome them, based on an analysis of the international experience of commercializing scientific results.

The basis of the proposed solutions is the primacy of valuing and supporting human value as capital.

Key words: university, patent, research, strategy, technology, law, innovation policy.

Intriduction

Industrialists gave universities strong support when they added research to their missions at the close of the 19th century [1]. But following the WWII, there emerged a belief in a number of industrialized nations that businessmen's active involvement in university-based research could be detrimental to the advancement of fundamental science. As a result, there was a decrease in the amount of money the industry invested in university research. From 1970 to 1980, the situation changed. An Act To Amend the Patent and Trademark Laws was signed by President Jimmy Carter on December 12, 1980, as a result of the development of intricate measures meant to avert the economic recession in the United States (Bayh-Dole Act-1980). The state's ownership of inventions and discoveries was transferred to universities under that law. Universities were also given the choice of exclusively keeping the rights to state-funded inventions and discoveries or giving them, in whole or in part, to researchers [3]. Universities are regarded as the first link in the chain from research to the commercialization of scientific findings, according to the "Linear Model" of innovation policy. According to some, the state should be viewed as the major funder of university research projects, which serve as the foundation for creative development. The analysis demonstrates that the US government's strategy has significantly increased the scientific potential of universities, transforming many of them into major centers of science on a global scale. However, there has been little advancement in the commercialization of scientific findings [4].

After the Bayh-Dole Act was passed in 1980, the US government acquired ownership rights to inventions and discoveries made as a result of government-funded research. Therefore, less than 5 per cent of the total 28,000 discoveries and inventions were turned into profit. The Bayh-Dole Act of 1980 laid a crucial cornerstone for creating a "transfer bridge" between academic institutions and the business world [4, 5].

The noticeable increase in the commercialization of inventions and discoveries in the USA in the final years of the 20th century is largely attributed to the passage of the Bayh-Dole Act in 1980. However, the results of the complex analysis support the conclusion that it is just one of a small number of significant drivers of development [6].

Following the passing of the Bayh-Dole Act in 1980, many nations are creating ground-breaking policies to bolster the research component of universities as a driver of economic development. In this context, intellectual property rights (IPR), particularly patents, have taken on a crucial role in the process of comparing universities and evaluating their suitability for accreditation [5, 7].

In order to increase financial flows and promote technological business in the high-tech sector, it is imperative [8, 9].

High efficiency of university-industry relations cannot be documented in universities and scientific centers with low levels of encouragement for researchers (lecturers).

This is especially apparent in nations with limited financial resources. These nations typically continue to be vulnerable to a variety of problems because they save while making innovative investments. When talking about targeting issues, it's important to think about the support that research activities will receive and whether that support is enough to help researchers reach their goals and cooperate to some extent with the business world and the commercialization of science [10, 11]. Anti-intellectualism is prevalent across the social spectrum in developed nations, and it can take on destructive proportions in small nations. Before the Bayh-Dole Act of 1980 was passed, the majority of the US public, in particular, believed that funding science from the federal budget amounted to "useless burning of coins in the furnace of the scientific research complex." This happened as a result of inadequate technology transfer efficiency. The challenge, from a strategic perspective, was to make sure that each year "the funds of the federal budget, which burn senselessly in the furnace of the scientific research complex," are used to advance the economy and raise the standard of living for the populace [4].

The Bayh-Dole Act of 1980 gave US universities the freedom to choose the areas of research that best suited their interests and skills. At the state level, it enabled coverage of the entire field of research directions. Universities and organizations of significant industrial importance are increasingly implementing joint initiatives and programs [12].

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Many times, additional financial investment is needed for university inventions to be commercialized. This has occasionally been linked to the rise in recent years in the number of low-tech jobs [18].

Pharmaceutics, biotechnologies, and cosmetology make up the majority of university inventions, and commercialization of inventions in other industries is still not widely spread. In particular, references to patents with a biomedical focus accounted for 68.5% of all citations in the last ten years, with 46.4% referring to works with a biological focus. Physics is referenced at 8.5%, engineering at 7.0%, and chemical sciences at 12.2% [19].

Concern should be expressed over the fact that, concurrently with this, funding for research projects in the fields of engineering and natural science has decreased [20, 21].

According to research, increasing the quantity of scholarly publications, conferences, and unofficial gatherings held for the purpose of information exchange are all necessary to improve the effectiveness of commercializing scientific findings [22].

The standard of the university's research program—which should be measurable—is the main determinant of the prestige of the institution. The opportunity to consistently overcome challenges on the path to success will arise from the government and university administration realizing the significance of this component.

The barriers to conducting research have been documented by the Conference of Leading Research Universities [21]:

- 1) The complexity of organizational processes and the intense competition.
- 2) Indirect methods for paying back research expenses.
- 3) Poor research quality, insufficient process support,
- 4) Making plans and decisions
- 5) Research universities with low rankings,
- 6) The management administration is unprofessional.

One of the key prerequisites for ensuring the research component in universities is the university administration's commitment to high scientific professionalism. By demonstrating a strong commitment to science, university administration can guide the professors who follow them and ensure the growth of the organization. Success also requires easing the workload for research professors in terms of paperwork. Research professors spend at least 40 per cent of their time on administrative tasks, according to surveys. This holds true for the amount of pointless writing necessary to be awarded a grant. This is, first and foremost, a result of an administration where those in charge of managing the sector and universities have insufficient scientific training [23].

American and Chinese universities place a lot of emphasis on the issues of setting up specialized courses for students and training professors in this field as they move toward commercializing scientific findings. Students and professors are heavily involved in these processes because they stand to gain additional funding [24]. However, a small percentage of university graduates who performed well upon graduation continue to express a desire to work in the academic sector. As a result, the governments of developed nations are looking for ways to boost research motivation [23].

Conflict Setting

The task is to examine the global experience of commercializing scientific results and suggest solutions arising from the created situation in order to pinpoint the primary causes of the lack of motivation to develop inventions in states with a transition economy, such as Armenia and Artsakh.

Research Results

Anti-intellectualism, which is present in all developed countries at all levels of the social pyramid, is one of the main factors impeding the growth of the state in emerging economies.

This article uses the universities of Armenia and Artsakh as an example to analyze the process of invention creation.

Added value created by universities of Armenia and Artsakh from 2016 to 01.08.2022 quantitative data of invention patents registered according to the national procedure are given in Fig.1 (The analysis was carried out in 2016, as Shushi University of Technology was established on 28.12.2015).

Shushi University of Technology received 62 invention patents between 2016 and 2022 August 1; Yerevan State University received 29, the National Polytechnic University of Armenia received 26, the National Agrarian University of Armenia received 23, and the National University of Architecture and Construction of Armenia received 7. It should be noted that Shushi University of Technology's scientific potential and laboratory capabilities do not exceed one per cent of each of the aforementioned campuses.

If we also consider the 44-day Artsakh War, which cost Shushi University of Technology its territories (including laboratories), 2021-2022 won't be the only year that this will be true but also in 2022, was able to restore the majority of it. It has received more patents as of August 1 than the Yerevan State Polytechnic University, Agrarian University, and National University

of Architecture and Construction put together, proving that the motivation to create inventions tends to zero in there is little incentive for invention in Armenia.

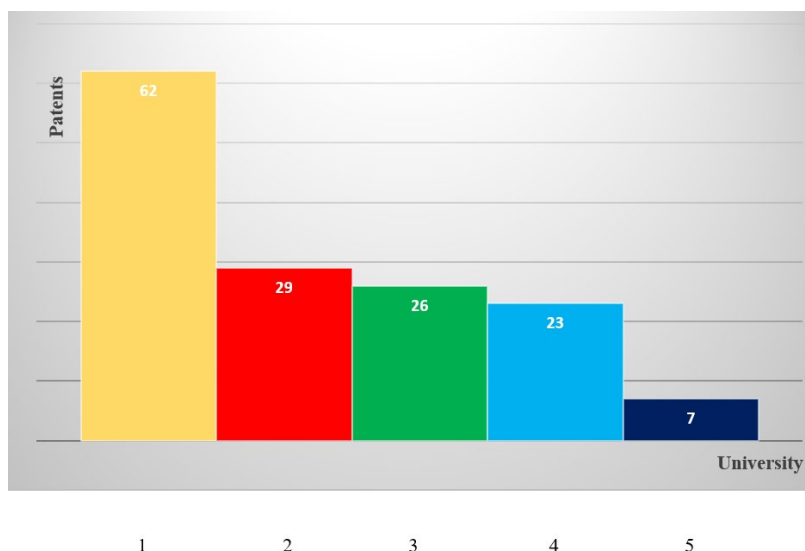


Fig. 1 Added value created by universities of the Republic of Armenia and the Republic of Artsakh within 2016-2022.

Quantitative data of patents for inventions registered under the national procedure

- 1 - Shushi University of Technology, 2 - Yerevan State University,
- 3 - National Polytechnic University of Armenia, 4 - National Agrarian University of Armenia,
- 5 - National University of Architecture and Construction of Armenia

The quantitative information of invention patents registered by Armenia's and Artsakh's value-added universities between 2016 and 1.08.2022 according to national procedure is shown in Fig.2.

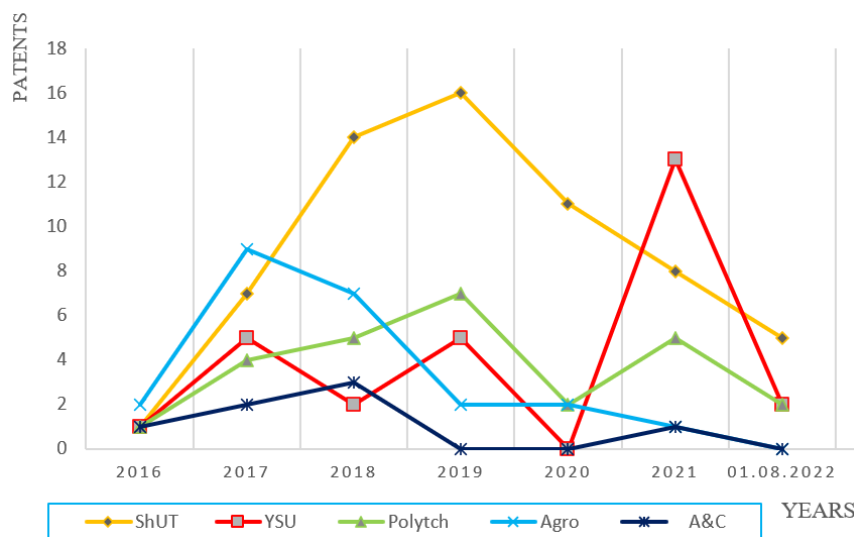


Fig. 2 Data on quantitative patents for inventions registered through the national procedures for years between 2016 and 2022 of added value creating Universities in Armenia and Artsakh

What were the quantitative findings for the same seven-year period for the aforementioned universities' invention creation? Yerevan State University got 11 invention patents from 2009 to 2015, compared to 38 from the National Polytechnic University of

Armenia, 39 from the National Agrarian University of Armenia, and 39 from the National University of Architecture and Construction of Armenia.

Fig.3 shows quantitative data on patents of inventions registered according to the national procedure by value-added Armenian universities for years from 2009 to 2015

Fig.4 shows comparison of the annual average number of invention patents filed through the national procedure by Armenian universities creating added value between 2009 and 2015 and 2016-2022.

In actuality, from 2016 to 2022, value-added colleges in Armenia, with the exception of Yerevan State University, registered a significant number of invention patents through the national system. have significantly decreased when compared to 2009-2015. For the nation's first university, Yerevan State University's quantitative rise in the number of licenses it has earned is so negligible that it can hardly be considered «progress».

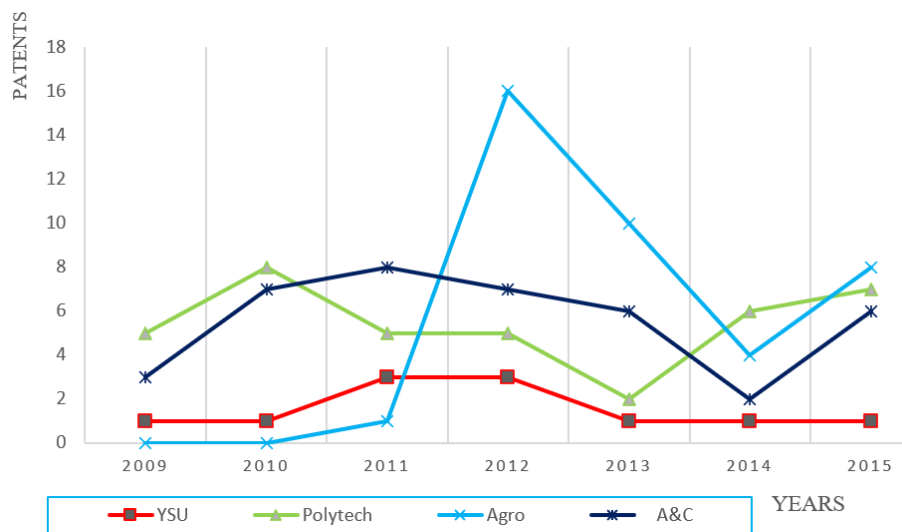


Fig. 3 RA universities creating added value for years between 2016-2022 patents for inventions registered under the national procedure

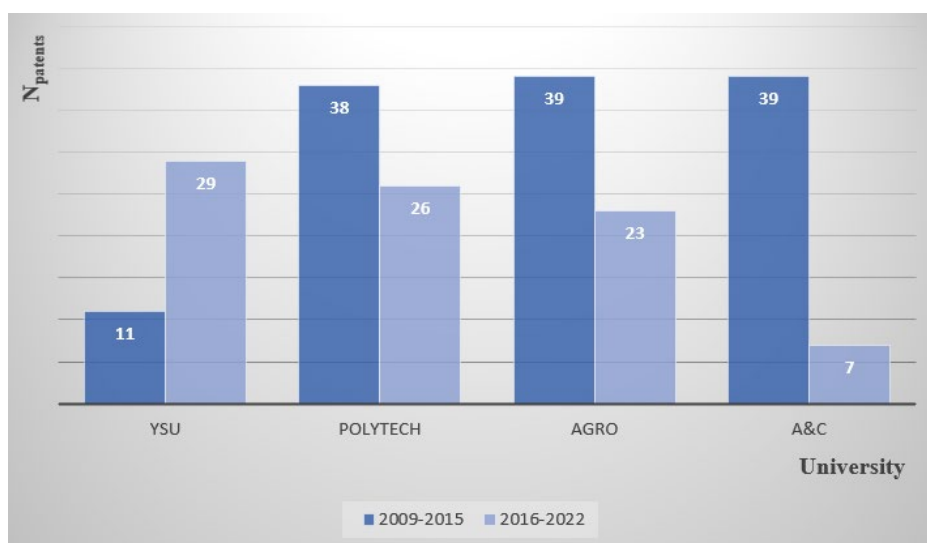


Fig. 4 Comparison of quantitative data of patents of inventions registered by the national procedure of RA universities creating added value for the years 2009-2015 and 2016-2022

Fig. 5 presents comparison of the three top value-creating universities in Armenia (polytechnic, agrarian, and architectural) from 2009 to 2015 and 2016-2022 in terms of the annual average number of patents for inventions filed through the national procedures.

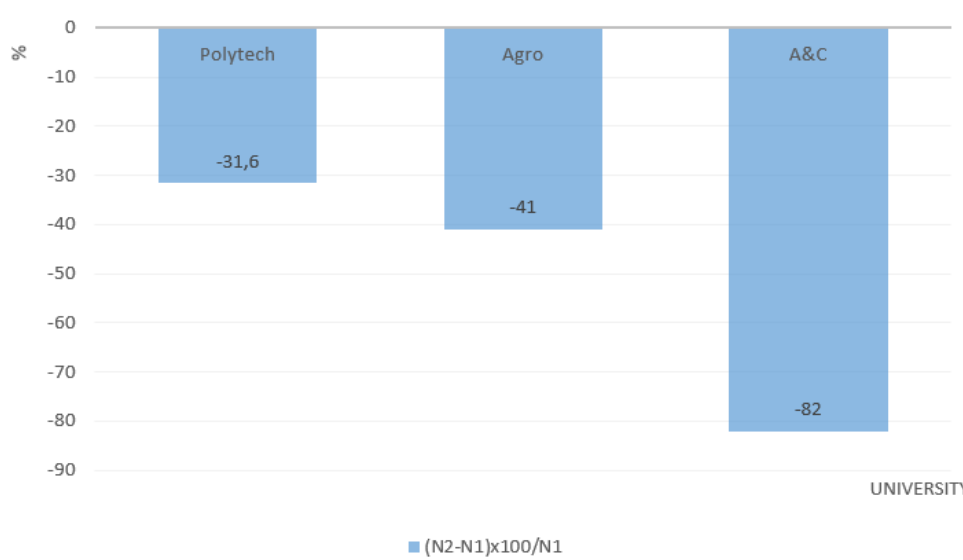


Fig. 5 Comparisons between the 2009–2015 and 2016–2022 periods for the number of invention patents numbers registered under the national procedure at the value-added universities of RA
 N2 and N1 are the number of patents registered by the given university for the periods 2016-2022 and 2009-2015, respectively.

The National University of Architecture and Construction of Armenia experienced the biggest decline, 82 percent. Universities with a focus on agriculture and polytechnics had declines of 41 percent and 31.6 percent, respectively.

The decrease in the number of registered inventions filed by added value creating Armenian universities can be attributed to a variety of factors. Here are a few examples:

First, the patent holders receive nearly nothing from the registration of inventions under the national procedures. Inventions are not on the list of scientific journals that Higher Qualification Commission accepts, not even in the training of scientific professionals. Meanwhile, they clearly represent a scientific novelty, unlike many other papers.

The rights of patent owners are not practically guaranteed from the perspective of legal protection when inventions are registered via national procedure [25]. Basically, there are not mechanisms or they are ineffective for stopping third parties to arbitrarily and gratuitously usage of inventions that belong to patent owners. The owners of the patents have the majority of the control over these operations.

The public consciousness has not yet fully developed the belief that violating intellectual property rights is unacceptable and will result in punishment.

Second, there are no efficient government support systems for the development and commercialization of inventions.

Third, mechanisms designed for foundation and operation of university management boards are ineffective, as well as there is a decline in the level of professional censure for those in charge of organizations.

Fourth, lack of effective mechanisms for ensuring the continuity of education.

Fifth, a shortage of qualified professors in value-added professions.

Sixth, while doing study, the expression of state support discrimination at the legislative level varies depending on the kind of ownership of the organization.

Seventh, there is no strict academic code. The existing legal system governing education is made up of a "patchwork" of laws that have been passed by several parliaments and governments. If passed, the law of the Republic of Armenia on "Higher Education and Science," which is currently being discussed, will not only fail to address the issues at hand but will also exacerbate the inconsistencies already present in the law.

The above-mentioned problems are the subject of separate studies in subsequent publications.

Conclusion

The lack of motivation to create and introduce new inventions and ideas is one of the primary causes of the undercommercialization of scientific findings in nations with transition economies.

The primary importance of valuing and sustaining human value as capital forms the basis of the suggested solutions.

In general, a university lecturer/researcher makes a poor manager. A university (research organization) - manager - producer chain with clearly defined roles and duties for each link should be established in order to ensure the process of investing academic research effort into the economy.

In the process of training scientific personnel, it is necessary to include the invention in the list of scientific periodicals acceptable by the Higher Qualification Commission.

A significant role in the process of institutional accreditation and comparative evaluation of institutions should be given to invention patents.

The state should offer all-round support to universities and research institutions (independent of the form of ownership) to ensure the internationalization of patents. To involve young personnel in research work, favorable conditions should be created.

In order to increase the efficiency of the commercialization of scientific results, it is necessary to set strict requirements for the quality of publications in scientific journals published in the country, while simultaneously increasing the funds allocated to the work of the editorial board, including the organization of peer review.

To support research activities the state should have adequate resources and volume to support to achieve its purposes and ensure a certain degree of cooperation with the commercialization of science and the business environment.

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ԱՆՑՈՒՄԱՅԻՆ ՏՆՏԵՍՈՒՅՈՒՆ ՈՒՆԵՑՈՂ ՊԵՏՈՒԹՅՈՒՆՆԵՐՈՒՄ ԳՅՈՒՏԵՐԻ ՍՏԵՂԾՄԱՆ ՄՈՏԻՎԱՅԻԱՅԻ ԲԱՅԱԿԱՅՈՒԹՅԱՆ ՀԻՄՆԱԿԱՆ ՊԱՏՃԱՌՆԵՐԸ ԵՎ ՍՏԵՂԾՎԱԾ ԻՐԱՎԻՃԱԿԻՑ ԲԽՈՂ ԱՌԱՋՆԱՀԵՐԹ ՔԱՅԼԵՐԸ

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Վերջին տարիներին հետազոտական համալսարաններն իրենց գիտակրթական նպատակները համալրել են՝ ավելացնելով գտական աշխատանքի արդյունքների առևտրայինացման բաղադրիչը: Այս առումով մտահոգիչ է վիճակն անցումային

տնտեսություն ունեցող պետություններում: Հայաստանի Հանրապետությունում գիտական արդյունքների ոչ բավարար ծավալով առևտրայինացման հիմնական պատճառներից է գյուտի ստեղծման և ներդրման մոտիվացիայի բացակայությունը: Գիտական արդյունքների առևտրայինացման միջազգային փորձի վերլուծության հիման վրա բացահայտվել են հանրապետությունում գիտական հետազոտությունների արդյունքների ներդրման հիմնական խոչնդոտները և առաջարկվել են լուծումներ ստեղծված իրավիճակը հաղթահարելու համար:

Առաջարկվող լուծումների հիմքում դրված է մարդկային արժեքը, որպես կապիտալ գնահատելու և աջակցելու առաջնայինությունը:

Բանալի բաներ. համալսարան, պատենտ, հետազոտություն, ռազմավարություն, օրենք, տեխնոլոգիա, ինովացիոն քաղաքականություն:

ОСНОВНЫЕ ПРИЧИНЫ ОТСУТСТВИЯ МОТИВАЦИИ К СОЗДАНИЮ ИЗОБРЕТЕНИЙ В СТРАНАХ С ПЕРЕХОДНОЙ ЭКОНОМИКОЙ И ПРИОРИТЕТНЫЕ МЕРЫ, ВЫТЕКАЮЩИЕ ИЗ СИТУАЦИИ

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В последние годы исследовательские университеты дополнили свои цели, добавив компонент коммерциализации научных результатов. В связи с этим вызывает тревогу ситуация в странах с переходной экономикой. Одной из основных причин недостаточной коммерциализации научных результатов в Республике Армения является отсутствие мотивации к созданию и внедрению изобретений. На основе анализа зарубежного опыта, выявлены основные препятствия на пути внедрения результатов научных исследований и предложены пути выхода из сложившейся ситуации.

В основе предлагаемых решений основным капиталом принимается человеческий фактор.

Ключевые слова: университет, патент, исследование, технология, стратегия, закон, инновационная политика.

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