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CHALLENGES OF FORMING A REGIONAL INNOVATION SYSTEM IN THE RA

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Abstract: The development of innovation systems is important not only in cities, but also in regions. This issue is especially important in the Republic of Armenia, where about two-thirds of the population lives in regions. It is noteworthy that the vast majority of scientific and technical potential is concentrated in the capital city of the country, where innovative ideas are generated and brought to life. The article reveals the key factors that hinder the formation and development of territorial innovation systems in the Republic of Armenia.

Keywords: territorial innovation system, generation of innovative ideas, obstacles to innovative investments, innovation, digitalization.

JEL code: O18

Research aims: the aim of the research is to identify the factors that currently hinder the development of territorial innovation systems in the Republic of Armenia.

Research novelty: using econometric models, the factors that have a significant impact on the formation and development of

regional innovation systems in the Republic of Armenia were analyzed.

Introduction

Taking into account modern trends such as digitalization, green technologies and the use of artificial intelligence, Armenia can form rerritorial innovation systems (RIS), which will not only ensure economic growth, but also position the country as a regional innovation center (Parsyan S. et al. 2024).. To achieve this goal, further research is needed, focused on the development of specific tools and pilot projects, that will test the applicability of the proposed approaches in the economic and social context of Armenia.

It should be noted, that the above-mentioned factors have an impact on the country's competitiveness and economic growth, which in turn contribute to the balanced development of territories, creating a favorable basis for RIS. However, various analyses and studies have shown, that factors contribute to economic development in different ways, which is due to a number of circumstances that need to be clarified (Dallakyan, S., Makaryan, A., Isanians V., Mkrtchyan. H., Sargsyan, H., Tovmasyan, G., Bilan, S. 2005).

Research results

In order to carry out a correct and substantiated assessment of the impact of innovation factors on the RA economy, as well as to identify the main directions that significantly affect the RA innovation economy, we have carried out econometric modeling, the purpose of which is to measure the impact of scientific and

technological and innovative development on the competitiveness and economic growth of countries. The following indicators were considered as outcome characteristics:

Y1 – economic growth (%),

Y2 – Global Sustainable Competitiveness Index,

and the following indicators were selected as factors:

X1 – Institutional environment,

X2 – Share of gross expenditures for research and development in GDP, %,

X3 – Knowledge-intensive employment, %,

X4–University-industry innovative cooperation,

X5 – Growth in labor productivity, %,

X6 – Complexity of production and export.

The study included 97 countries, which were grouped according to the value of the Global Innovation Index, distinguishing the following groups:

1. up to 25 - low level of innovation development (26 countries),
2. 25-40 - medium level of innovation development (42 countries),
3. 40 and above - high level of innovation development (29 countries).

Then, for each of the groups, multivariate modeling was carried out, presenting the relationship between the characteristics of economic growth, competitiveness and innovative development of countries using the following econometric models:

$$Y_1 = a_0 + \sum_{i=1}^{k} a_i X_i + \varepsilon_1,$$

$$Y_2 = b_0 + \sum_{i=1}^{k} b_i X_i + \varepsilon_2,$$

a-$_0$ and b-$_0$ are the free members of the econometric models,

Xi is the i-th factor characterizing innovative development,

ai and bi are the regression coefficients of the i-th factor in each of the models,

ε-1 and ε-2 are the random error of each of the models.

The regression models were evaluated using the stepwise regression analysis toolkit. That is, the factors were included in each of the models sequentially, checking the adequacy of the model using the p-value at each step. If the p-value was less than the selected significance level α, then the null hypothesis of the inadequacy of the relationships in the regression equation was rejected and the factor was included in the regression model. This process continued until the p-value when including the factor in the model was greater than the significance level α, which indicates that the model is no longer adequate and it is not advisable to include the given factor in the model.

$$Y_2= 34.08+0.16X_1+0.18X_6:$$

It is noteworthy that in countries with a low level of innovation development, which occupy 82nd and lower positions in the Global Innovation Index ranking table (World Intellectual Property Organization WIPO 2024), it was not possible to build a significant regression model between economic growth and the selected factors. This means that in countries such as Honduras, Cambodia, Nigeria, Kazakhstan, Azerbaijan, etc., the role of innovations in ensuring economic growth is not significant. The 57% of the variation in the competitiveness of countries in this group is due to factors X1 and X6. Therefore, in countries with a low level of innovation development, both technological changes and the

formation of a favorable institutional environment necessary for them are important for increasing competitiveness.

$$Y_1 = 98.36 + 0.09X_5,$$
$$Y_2 = 38.27 + 0.23X_2 + 0.13X_3$$

In countries with an average level of innovation development, including Armenia, which occupies 36-80th positions in the GII ranking table, labor productivity is a prerequisite for economic growth, and competitiveness is mainly influenced by key characteristics of innovation output, including the share of gross expenditures for research and development in GDP, and the level of science-intensive employment. Moreover, by placing the corresponding indicators of Armenia within the framework of the obtained regression model, we will obtain a competitiveness indicator value of 44.99, while the actual value of the Global Sustainable Competitiveness Index for Armenia is 43.77, which indicates a high level of mastery of existing opportunities. This means that in Armenia, through investment in the field of innovations, development and implementation of scientific potential, a qualitatively new level of economic competitiveness can be ensured.

$$Y_1 = 97.70 + 0.03X_1 + 0.11X_5,$$
$$Y_2 = 54.61 + 0.41X_4:$$

In countries with a high level of innovation development, which are in the top 35 places in the GII ranking, the key to economic growth and competitiveness is the institutional environment, labor productivity, and university-industry innovative cooperation. That is, in developed countries such as Switzerland, Sweden, the USA, the United Kingdom, etc., economic policy aimed at long-term

quality growth is anchored on innovation ties, the impact of knowledge, as well as a favorable institutional environment that ensures them.

Thus, the constructed regression models make it possible to identify the degree of use of innovation potential in individual countries, to identify quantitative characteristics of homogeneous groups of countries, to specify priorities, as well as to substantiate the need for deepening policy in individual directions.

It should be noted that in the absence of statistical data, the above-mentioned problems, questions and analyses do not yet fully reveal and present the current state of the RA local government, which may to some extent hinder the further development and implementation of the local government formation and development strategy. Within the framework of this dissertation, we have set a task to study and analyze the local government as deeply and comprehensively as possible, as a result of which it will be possible to offer more precise and applicable solutions to the problems posed.

Information related to the territorial innovation systems being formed and even operating in the RA is quite scarce and is probably not included in the official statistical system. For this reason, we have obtained such information on our own initiative through surveys in order to find out.

- ✓ the level of awareness of stakeholders about the importance of regional socio-economic development,
- ✓ assessments of the effectiveness of key functions of regional innovation systems from the perspective of specific stakeholders,

- ✓ existing obstacles and challenges to strategic development in the Republic of Armenia,
- ✓ the availability of financial and non-financial potential for the formation of regional innovation systems,
- ✓ strategic management issues from the perspective of internal and external stakeholders.

In this regard, surveys were conducted among the beneficiaries of the activities of territorial innovation networks in the Republic of Armenia. The number of respondents was 158 people, the scope of which was justified in the general population by the requirement of a 95% confidence limit, a 6% permissible error and at least 18% of respondents in the general population. Under such conditions, the necessary level of sample representation and the justification for the dissemination of survey results to the entire population under analysis are statistically substantiated.

The responses to the conducted surveys allow us to compare the results of the theoretical research conducted by us with the quantitative and qualitative empirical analytical results, thereby providing additional justification for solutions related to the problems of development of territorial innovation systems.

The results obtained from the surveys conducted by us are considered as arguments for the justification of the results.

a/ the sufficient representativeness of the sample of the survey framework in the entire system, since the surveys were conducted in 11 regional units of the Republic of Armenia, have insignificant deviations, are evenly distributed and included about 158 respondents

b/ the survey directions also ensured the structural multi-layering of the ecosystem: private and community sectors, university and research circles, public organizations (see Appendix 4, Figure 1),

c/ the distribution of respondents by professions was mostly targeted at management employees (see Appendix 4, Figure 3), due to which the interpretations of strategic development management issues as a result of the survey become more reliable.

It should be noted. that 39.2% of respondents consider the activity of regional innovation systems in the Republic of Armenia to be visible, which in turn emphasizes the need for organizing strategic management of development. Moreover, 37.3% believe that there are nevertheless links in the "university-business-local government" cooperation, the revaluation of which from the point of view of generating innovations can have a significant impact on development.

It is noteworthy that 80 out of 158 respondents believe that there is nevertheless a strategic direction of development in the Republic of Armenia and indirectly justify them by the cooperation of IT sectors and industrial organizations with science and education in the regions (44.9% of respondents).

Moreover, the 61.4% of respondents believe that the "business-science-state" interrelationship is visible in the regions.

When asked what the obstacles to development were, the main ones mentioned were the lack of investment and insufficient cooperation between stakeholders. Moreover, the main reasons for these were the lack of a development strategy developed by the government, the lack of the necessary logistical base, as well as

insufficient financing. It is also noteworthy that the respondents' answers were almost equally distributed in terms of the responsibility of the development beneficiaries (government, local self-government bodies, scientific and educational institutions, business sector).

Conclusion

Based on the conducted surveys and their analysis, we can state that local self-government is in the development stage, but there are still no clearly directed factors contributing to this. It becomes clear from the surveys that the lack of a clear strategy is singled out among the obstacles to development. Among other problems, the main obstacles that affect the formation and development of local self-government are singled out:

- ✓ low level of cooperation,
- ✓ lack of strategic orientation,
- ✓ lack of links between science and industry,
- ✓ limited human and financial resources.

The survey results prove, that local government should be considered as a territorial development strategy, develop a clear strategy, outline the introduction and development of necessary factors, and have a clear strategy for local government management.

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ՏԱՐԱԾՔԱՅԻՆ ԻՆՈՎԱՑԻՈՆ ՀԱՄԱԿԱՐԳԻ ՁԵՎԱՎՈՐՄԱՆ ՄԱՐՏԱՀՐԱՎԵՐՆԵՐԸ ՀՀ-ում

Նարեկ Սարատիկյան
Մ. Քոթանյանի անվ. տնտեսագիտական ինստիտուտ
ասպիրանտ

Բանալի բառեր - տարածքային ինովացիոն համակարգ, ինովացիոն գաղափարների գեներացում, նորարարական (ինովացիոն) ներդրումների խոչընդոտներ, նորարարություն, թվայնացում:

Ինովացիոն համակարգերի զարգացումը ոչ միայն կարևորվում է քաղաքներում, այլև մարզերում: Այդ հիմնախնդիրը առավելապես կարևորվում է Հայաստանի Հանրապետությունում, որտեղ ազգաբնակչության շուրջ երկու երրորդը կենտրոնացած է մարզերում: Միաժամանակ, գիտատեխնիկական ներուժի գերակշիռ մասը կենտրոնացած է երկրի մայրաքաղաքում, որտեղ և գեներացվում և կյանքի են կոչվում ինովացիոն գաղափարներ: Հոդվածում բացահայտվել են առանցքային այն գործոնները, որոնք ՀՀ-ում խոչընդոտում են տարածքային ինովացիոն համակարգերի ձևավորմանն ու զարգացմանը:

Հաշվի առնելով ժամանակակից միտումները, ինչպիսիք են թվայնացումը, կանաչ տեխնոլոգիաները և արհեստական բանականության կիրառումը, ՀՀ-ն կարող է ձևավորել ՏԻՀ-եր, որոնք ոչ միայն կապահովեն տնտեսական աճ, այլև կդիրքավորեն երկրին որպես տարածաշրջանային ինովացիոն կենտրոն: Ելնելով իրականցված հարցումներից և դրանց

վերլուծությունից կարող ենք փաստել, որ հանրապետությունում ՏԻՀ-երը գտնվում է սաղմնային փուլում, ու դեռևս չկան դրան նպաստող հստակ ուղղորդված գործոններ:

Հարցումներց պարզ է դառնում, որ զարգացման խոչընդոտների մեջ հստակ առանձնացվում է այդ ոլորտի ռազմավարության բացակայությունը:

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