CROSS-CULTURAL ANALYSIS OF INNOVATIVE DEVELOPMENT OF ETHNIC REGIONS OF RUSSIA

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Abstract

Different ethnic groups are characterized by their own formal and informal economic structures which largely define the lifestyle of their representatives. The aim of the research is to evaluate interdependency between ethnic – social processes and formation of innovative development in the region using the example of national subjects of the Russian Federation.

The main task of the conducted analysis was to identify the interconnection between random variables by means of dot and interval evaluation of double correlation coefficients, calculating and checking the importance of multiple correlation and determination coefficients.

The results of conducted analysis provided empirical data to supported several hypotheses: the hypothesis on the level of title influence influencing innovation development; natural barriers of informal institutions' influence on smaller ethnos' activities lead to "slower" innovation development; the "share of country title population" indicator is positively correlated with all innovation development indicators. As a result of conducted research authors got the quantitative evaluation of ethnic-social processes influence degree on the level of regional innovation development. Obtained results can be used for prognosticating innovation activities development and consequently for managing knowledge formation process in ethnic regions.

Keywords: ethno – social processes, innovation development, influence of ethnos on innovations

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Introduction

At present Russian economic literature, has very few researchers devoted to the influence of social and ethnic factors on the innovative development of the region. For our multi – national country this topic is particularly important. Russia is inhabited by a variety peoples with their own formal and informal institutions which largely define lifestyles of their representatives. As a rule, they are based on customs, the traditional way of life and traditional knowledge. This largely counterpoises these institutions and innovation development.

Innovation development requires other institutions based on modern academically based knowledge. As a rule, traditional knowledge does not require significant material and immaterial

resources. Innovation development, on the other hand, suggests significant costs for modern academically based hi-tech research and development. Therefore when planning innovation policy in the Russian Federation regions one must consider concrete social and ethnic peculiarities of the regional development.

The aim of this research is to define dependencies between ethnic – social processes and formation of innovation development in the Russian Federation regions.

There is a considerable research proving the existence of the relation between basic cultural values and social – economic development.

On the one hand, economic development of the region is defined by innovation processes inside these territories. As the research by T. Broekel states, cooperation between regional organizations plays an important role in forming innovation climate. Regions with weak inter- and intra-regional cooperation between organizations can have low innovation development dynamics (Broekel, 2012).

Economic changes are influenced by cultural foundations of the society. Trust between economic agents is defined by the cultural landscape (Capello&Lenzi,2016). In that case migration routes considerably influence research activities in the regions and therefore innovation processes (Niebuhr, 2010).

When describing innovation processes one must consider the evolutionary character of changes as the style of cultural life influences the dynamics of social transformation change. This causes economic evolution determined by innovation implementation and academic research development (Crescenzi&Iammarino, 2018).

The research by D. Irawati and R. Rutten says that innovation – scenario innovation development is most fruitful in forming teaching processes in the region. Mutual cooperation in generating and mastering knowledge facilitates innovation development (Irawati&Rutten, 2011). Yet company development is hindered social and cultural norms and values, human capital and institutional infrastructure (Crescenzi&Jaax, 2016).

The study of China regions innovation opportunities shows that the resources of private companies, cultural peculiarities, and cooperation between companies strongly influence the differentiation of the regions according to new technologies implementation (Zhao, et al, 2015). In this case, cultural differences between companies and universities stimulate development and research (Bjerregaard, 2010).

On the other hand, regional economic development is strongly influenced by cultural and ethnic peculiarities. J. Raymond-Yakoubian and his co – authors prove that introduction of

traditional knowledge and culture define the development of fishing industry in Alaska (Raymond-Yakoubian et al, 2017).

Development of innovations inside the company is related to labor diversification. Innovation processes are influenced by cultural background, education and demographic characteristics of employees (Parrotta et al, 2014). In that case, culture and national peculiarities of immigrants have a strong influence on the development of business in manufacturing companies (Halkias, 2013).

At the same time despite the existence of research on evaluating innovation development and ethnic – social processes individually, there is not enough research in the economic literature on the interrelation of these processes. Hence, we get the problem of evaluating their mutual influence.

1 Methodology

In order to define correlation dependence between ethnos and innovation development the authors used development indicators for ethnic – social processes most fully describing the economic state of the region and its national composition as well as peculiarities of population's lifestyles. Such indicators include the following data:

- the share of Russian population, %;
- life expectancy, years;
- population density, thousand people/square km;
- periphery (distance from the capital), km;
- gross regional product – GRP, mln. rubles;
- the share of rural population, %.

To evaluate innovation potential of the region the authors used indicators reflecting entrepreneurial activities level and development of intellectual activities, as well as a set of general indexes:

- the amount of innovation goods, service, mln Rubles;
- number of small enterprises per 1000 people, units;
- costs for technological innovation per 1 person, rubles;
- number of issued patents for inventions and useful models;
- academic and technical potential index (includes a set of indicators evaluating academic research and development financing, as well as evaluation of attracted academic staff general performance);

- index of social and economic environment for innovation activities (calculated using basic macroeconomic indicators, indicators of population educational potential, as well as indicators reflecting the level of life in information society);
- Russian regional innovation index (overall index calculated on the basis of socio – economic environment for innovation activities, innovation activities index, index of quality and innovation activities) (Abdrakhmanova, 2015).

All data have been taken from official statistics of the Russian Federation from 2005 for 2016, calculation of correlations was carried out by means of a software package of processing of statistical data of STATISTICA

On the basis of preliminary research results, two levels of hypotheses were formulated.

The first level characterizes the influence of Russia Federation title population on the regional innovation development. The share of the Russian population in the region influences innovation development. Natural barriers of informal institutions' influence on the life of smaller ethnic groups lead to "lagging" innovation development. The following suggestions fall under this hypotheses:

H1: The number of small enterprises depends on the share of the Russian population. Russian title population demonstrates wider – spread institutions of entrepreneurship, whereas smaller ethnic groups have informal entrepreneurship structures

H2: The share of Russian population influences overall costs of technological innovations.

H3: The share of Russian population influences Russian regional innovation index.

H4: The share of Russian population influences the index reflecting social – economic conditions for innovation activities.

The second level of research characterizes the influence of economic state of the region (on the basis of gross regional product) on the innovation development of the region of the Russian Federation. Innovation development largely depends on GRP. General innovation development directly depends on the overall state of regional economics. The following aspects were formulated as working hypotheses.

H5: GRP influences overall costs for technological innovations.

H6: GRP influences the academic and technical index.

H7: GRP influences the number of issued patterns for inventions and useful models.

These hypotheses are the most empirically proven and have the strongest correlation dependencies.

The main task of correlation analysis is in identifying interrelations between random variables by means of targeted and interval evaluation of coupled (individual) correlation

coefficients, calculating and checking meanings of multiple correlation and determination coefficients. Besides that correlation analysis helps in solving the following tasks: Selection of factors with the strongest influence on result indicators on the basis of measuring their interrelations level; identifying earlier unknown causal relations.

The data on ethnic-social processes for the research was taken from the official website of the Federal Statistics Agency (http://www.gks.ru). The share of the Russian population was calculated according to the latest census. Innovation indices were taken from statistic collection "Ratings of innovation development of Russian Federation subjects" (Abdrakhmanova, 2015).

The data for 13 regions of Russia with the largest share of the ethnic population were analyzed. These regions include Tyva, Altai, Mary El, Sakha (Yakutia), Kalmykia, Northern Ossetia – Alaniya, Dagestan, Ingushetia, Udmurt Republic, Karachaevo – Cherkesskaya republic, Kabardino – Balkarskaya republic, Chechen Rrepublic, Chukotka autonomous area.

2. Results of the research

As we see from the Table 1, the "Share of Russian population" indicator positively correlates with all innovation development indicators. The strongest dependence is for the indicator "The number of small enterprises per 1000 people" with 0,837. The weakest correlation 0,016 is for "The number of issued patents for inventions and useful models". It allows for speaking about the absence of correlation between these two indicators.

Tab. 1: Correlation interdependence for indicators of ethno-social processes and regional innovation development

	Amount of innovation goods and services	Number of small enterprises per 1000	Technological innovation costs for 1 person	ATP index	Russian regional innovation index	SECIA Index	Number of issued patents for inventions and useful models
Share of Russian population, %	0,383	0,837	0,722	0,18	0,561	0,71	0,016
Life expectancy in years	0,188	-0,480	-0,330	0,048	-0,248	-0,03	0,313
Population density per 2 sq.km.	0,040	-0,462	-0,420	-0,318	-0,354	-0,22	0,170
Income level (rubles per month), rubles per month.	-0,059	0,396	0,380	0,044	0,065	0,06	-0,025
Periphery, km	-0,356	0,337	0,209	-0,237	0,113	-0,21	-0,403

GRP, mln rubles	0,235	0,361	0,675	0,564	0,453	0,10	0,625
Agriculture	-0,235	-0,527	-0,625	-0,427	-0,448	-0,52	-0,351

Source: own elaboration

Strong correlation links are seen for “The share of Russian population” and innovation development criteria “Costs for technological innovation” (0,722); “Social – economic conditions of innovation activities” (0,714); “Russian regional innovation index” (0,561). A bit smaller correlation 0,383 is seen for “The share of Russian population” and “Amount of innovation goods and services”. There is also a small interdependence between “The share of Russian population” and “Academic and technical potential index”.

The situation with another ethnic indicator: “The share of rural population in the region” is quite the reverse. It has a negative correlation with all innovation development indicators. The largest negative correlation of -0,625 is seen for “The Share of rural population” and “Costs for technological innovations”. Another important thing is the correlation dependence index between indicators “Share of rural population” and “Number of small enterprises per 1000 people” (-0,527). Approximately the same figures were found for correlation dependencies between “Share of rural population” and “Russian regional innovation index” (-0,448), “Share of rural population” and “Academic and technical potential index” (-0,427). Less significant correlation dependencies were observed for indicators “Share of rural population” and “The number of issued patents for inventions and useful models” (-0,351), “Share of rural population” and “Amount of innovation goods and services” (-0,235).

“GRP” indicator demonstrates positive correlation dependence to regional innovation development index. The strongest positive correlation is seen for “GRP” and the following indicators: “Costs for technological innovations” (0,675); “Number of issued patents for inventions and useful models” (0,625); “Academic and technical potential index” (0,564). There is less significant correlation between “GRP” and the following indexes: “Russian regional innovation index” (0,453), “Number of small enterprises per 1000 people” (0,361), “Amount of innovation goods and services” (0,235), “Index of social and economic conditions for innovation activities” (0,101).

Indicator “Life expectancy” demonstrates different meanings for correlation matrix in relation to innovation development indicators. There are positive correlation meanings between “Life expectancy” and: “Number of issued patents for inventions and useful models” (0,313), “Amount of innovation goods and services” (0,188), “Academic and technical potential index” (0,048). Negative correlation meanings were found between “Life expectancy” and: “Number of

small enterprises per 1000 people" (-0,480), "Costs for technological innovations" (-0,330), "Russian regional innovation index" (-0,248), "Index of social and economic conditions for innovation activities" (-0,028).

Indicator "Population density" demonstrates different correlation matrix meanings as compared to innovation development indicators. Positive correlation figures are found for "Population density" and: "Number of issued patents for inventions and useful models" (0,170), "Amount of innovation goods and services" (-0,462). Negative correlation meaning were found for "Population density" and: "Number of small enterprises per 1000 people" (-0,462), "Costs for technological innovations" (-0,420), "Russian regional innovation index" (-0,354), "Academic and technical potential index" (0,318), "Index of social and economic conditions for innovation activities" (-0,216).

Indicator "Population income level" demonstrates various correlation matrix meanings depending on innovation development indicators. Positive correlation meanings were found for "Population income level" and the following indices: "Number of small enterprises per 1000 people" (0,396), "Costs for technological innovations" (0,380), "Russian regional innovation index" (0,065), "Academic and technical potential index" (0,044), "Index of social and economic conditions for innovation activities" (0,062). Negative correlation meanings were found for "Population income level" and: "Number of issued patents for inventions and useful models" (-0,025), "Amount of innovation goods and services" (-0,059).

"Periphery" indicator demonstrates various meanings of correlation matrix to innovation development indicators. Positive correlation meanings were found for "Periphery"; indicator and "Number of small enterprises per 1000 people"» (0,337), "Costs for technological innovations" (0,209), "Russian regional innovation index" (0,113). Negative correlations were found for "Periphery" and "Number of issued patents for inventions and useful models" (-0,403), "Academic and technical potential index" (-0,237), "Index of social and economic conditions for innovation activities" (-0,205), "Amount of innovation goods and services" (-0,356).

As a result of conducted analysis, the hypotheses made earlier were proven by empirical data. The hypotheses H1-H4 on "The share of the Russian population in the region influences innovation development" was proven. Natural barriers hindering the influence of informal institutions on the lifestyle of smaller ethnic groups slow down innovation development. It has been empirically proven that the indicator "The share of the Russian population" has a positive correlation with all the innovation development indicators. One can suggest that the formal institution "The share of the Russian population" has a strong influence on regional innovation development. Indicator "Share of rural population" demonstrates negative correlation with all

innovation development indicators. Rural population favors formal and informal institutions which are completely different from innovation development institutions.

The hypotheses H5-H7 were also proven: "economic position of the region (according to GRP indicator) influences innovation development of the Russian Federation subject".
GRP has a positive correlation with all innovation development indicators. Therefore, innovation activities of the region directly depend on the general economic position of the Russian Federation subject.

Conclusion

The conducted research identified several interdependencies. The share of the Russian population in the region influences innovation development. Traditional lifestyle, habits, tribal relations form an integral part of smaller ethnic groups' life. However, the lack of readiness and desire to accept changes required by scientific and technical progress and globalization make ethnic regions "outsiders" in terms of economic and innovation development. During the research, the hypothesis: "influence of natural informal institutional barriers on the life of smaller ethnic groups leads to slower innovation development" was proven. The indicator "Share of the Russian population" has a significant influence over 4 indicators of innovation development.

Title population of the Russian Federation is more prone to official economic activities. Smaller ethnic groups with the traditional style of life tend to limit themselves to their household and natural exchange. Therefore the research supports the hypothesis: "The number of smaller enterprises depends on the Russian population". Title population of Russia is characterized by more wide – spread formal institutions of entrepreneurship, whereas for smaller ethnic groups informal entrepreneurial institutions have a dominant position.

The authors also justified the hypotheses: "The share of Russian population influences Russian regional innovation index", "Share of Russian population influences overall costs for technological innovations", "Share of Russian population influences the index of social and economic conditions for innovation activities".

The stable economic condition of the region attracts incoming investments which also influence innovation development. The research proved the following hypothesis: "Innovation development largely depends on GRP". The following hypotheses were also supported: "GRP influences overall costs for technical innovations", "GRP influences academic and technical

potential index", "GRP influences the number of issued patents for inventions and useful models".

Therefore economic and ethnic – social processes significantly influence the formation of innovation development of the Russian Federation regions.

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