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MARKETING POSITIONING OF COUNTRIES IN THE FIELD OF INNOVATIONS: QUESTIONS AND ANSWERS*

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Abstract. This article addresses the issues of the marketing positioning of countries in the field of innovations. To date, the level of development and dynamism of the innovation sphere form the basis for the country's sustainable economic growth. The concept of "innovation" is closely related to the concepts of "novation", "invention", and "discovery", which are the products of creativity. The paper examines some of the basic marketing characteristics of such countries as Japan, China, South Korea, India, and Russia. The authors hypothesize and prove that if a country chooses to focus on education and high technologies in its development, it can ensure high development of the national information and communication technologies. They also selected and evaluated the indicators of innovative development for these countries. Based on the correlation-regression analysis, the initial hypothesis was confirmed.

Keywords: marketing positioning of countries; creating an innovative economy; diagnostics of marketing positioning

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1. Introduction

The successful functioning of the national innovation system depends not only on advanced science and education but also on the entire complex of other institutional conditions: a competitive business sector as the major generator of innovation (Hirschhorn, 1988; Carayannis & Grigoroudis, 2014; Salamzadeh et al., 2016; Zemlickiene & Maditinos, 2012); integration into the global innovation sphere as the most important condition for the development of the national high-tech industries; priority of state policy in the development of education, science, and technology, creating a favorable institutional environment for innovation-based growth (Sweet, 2001; Cohen & Zysman, 1987; Zhang & Yang, 2013; Sekerin et al., 2015; Tvaronavičienė 2019; Girdzijauskaite et al. 2019).

According to the well-known Chinese scientist and economist Hu Angang, the constant increase in the technical and technological level of production in the formation of the national innovation system is the most important factor in the state's transition from an extensive to intensive growth. Creation of an innovative economy is a process that involves not only the actual field of economics and science (Onetti et al., 2012). It is much bigger and covers the areas of state-building, education, and culture.

2. Concept

Creation of an innovative economy is a process that involves not only the actual field of economics and science. It is much bigger and covers the areas of state-building, education, and culture. The effective functioning of the national innovation system requires comprehensive government support, including budget allocations, tax regulation, government procurement, etc. The decisive factor is the country's choice of innovative motivation, which will form the basis of the national transformative strategy. A request for implementing an innovative project is primarily a political choice of those countries, which leaders seek effective participation in international competition to designate ambitions for regional or global leadership. It has long been argued that only those countries that adhere to the "right" liberal-democratic course in politics and market priorities in the economy have a monopoly on progress and intensive development (Zhang & Yang, 2013; Zemlickiene & Maditinos, 2012; Kanter, 2001; Zeibote et al. 2019).

Only through the modernization of the economy and the development of innovative industries, it is possible to realize the potential in the field of education and science and transform them from a social sector to a production one. New technologies play a leading role in overcoming the stagnation of global economic instability. The way out of a deep crisis is usually accompanied by a change in technological structure and leading countries. Much has been done in Russia to create the necessary innovative environment. In particular, a system of development institutions, as well as tax incentives for innovative companies and reduced rates of insurance premiums have been introduced. Moreover, an opportunity to create small enterprises at universities has appeared; 30 technology platforms have been approved and innovative clusters and business incubators have been created while state-owned companies have developed innovative development programs.

Despite the significance of all these efforts, there is every reason to believe that Russia is only at the very beginning of its innovative path. Therefore, the practice of other countries with the relevant experience is invaluable.

The experience of such states as China, India, Japan, South Korea is especially important.

3. Methods

Assessing countries in terms of information and communication technologies.

The marketing positioning of countries in the field of information and communication technologies (ICTs) can be defined as the technologies used to access, collect, manipulate, present or report information. ICTs include both hardware (equipment) and software (used by hardware) (Panova & Danko, 2017).

Examples of ICT: satellite navigation systems (GPS); DVDs and CD-ROMs; laptops; personal computers; mobile phones; digital cameras; electronic instruments and recorders; the Internet; satellites; radio, television. In short, ICT is part of everyday life, moreover; the experience in ICT is the skill of the 21st century, along with communication skills (including in foreign languages), analytical skills, innovative thinking, creativity, decision tasks, interaction, and collaboration.

The formation and development of information society (IS) involves the widespread use of ICTs in education, medicine, politics, economics, commerce, culture, sports, everyday life, etc. This is determined by several factors (Westerman et al., 2014; Olanrewaju et al., 2014; Accenture, 2015).

First, the development of ICTs in the country significantly accelerates the transfer of information and the accumulated technological and social experience of mankind, not only from generation to generation but also from one person to another. Moreover, ICTs help to deliver information from one user to another over huge distances as quickly as possible (Danko et al., 2016a, 2016b).

Secondly, modern ICTs allow a person to more successfully and quickly adapt to the environment and the ongoing social changes. This provides everyone with an opportunity to receive the necessary information both today and in the future.

Finally, the active and effective introduction of these technologies into people's lives is an important factor in the development of information society and the reform of the political and economic system in the light of the modern industrial society requirements.

Let us consider some of the basic marketing characteristics of the selected countries.

Japan. An island state in East Asia. It is located in the Pacific Ocean to the east from the Sea of Japan, China, North and South Korea, and Russia. Japan covers the territory from the Sea of Okhotsk in the north to the East China Sea and Taiwan in the south. It is commonly known as the Land of the Rising Sun. Japan covers an area of 377,944 km². The estimated population is 126,225,000 people (as of 2018). The capital of Japan is Tokyo (since 1868). The largest Japanese cities are Tokyo, Kyoto, Osaka, Yokohama, Saitama, Fukuoka, Sapporo, Nagoya, Kobe, and Kawasaki.

China. A state in East Asia. It is the largest country in the world in terms of population; it has the third largest territory, yielding to Russia and Canada. The area of China is approximately 9,598,962 km², and its population amounts to 1,386,000,000 people (as of 2018). At the moment, the capital of China is Beijing. The largest Chinese cities are Hong Kong, Beijing, Shanghai, Guangzhou, Shenzhen, Harbin, Chongqing, Taipei, and Tianjin.

South Korea. A country in East Asia, located on the Korean Peninsula. It covers an area of 99,720 km². According to estimates, the population of South Korea is approximately 51,446,201 people (as of 2017). The capital of South Korea is Seoul. The largest cities are Seoul, Busan, Incheon, Daegu, Gwangju, Ulsan, and Daejeon.

India. A state in South Asia. Its population amounts to 1,340,468,000 people, and its territory is 3,287,263 km² – in both of these indicators India is the largest country in South Asia. It is the world second country in terms of population and seventh in the territory. The capital of India is New Delhi. The largest cities include Mumbai, Delhi, Calcutta, Bangalore, and Chennai.

Russia. A state located in Eastern Europe, Central and Northern Asia. The territory of Russia within its constitutional structure is 17,125,191 km² (Cohen & Zysman, 1987); the country's population (within its declared territory) is 146,880,432 people (as of 2018). It is the largest country in the world in terms of territory. The capital of Russia is Moscow. The largest Russian cities are Moscow, St. Petersburg, Novosibirsk, Yekaterinburg, Nizhny Novgorod, Kazan, Chelyabinsk, Samara, Omsk, Rostov-on-Don, Ufa, Krasnoyarsk, Perm, Voronezh, Volgograd, and Krasnodar.

4. Research methodology

The working hypothesis is that if a country chooses to develop with an emphasis on education and high technologies, then it can ensure the high development of ICT in the country (Ekimova et al., 2016).

The review of scientific literature has allowed allocating eight factors that affect the disclosure of the subject. The authors focused on the first three factors since they are the most significant in this study. To confirm the hypothesis, the authors reviewed the existing scientific literature on the topic under consideration. This allowed identifying the maximum number of possible factors (eight factors) that can influence the identification of trends in the development of ICTs in the countries. Until the 1960s, few articles on innovation were published. The only and the most important exception was the work of the famous Austro-American economist Joseph Schumpeter. First, he introduced the concept of entrepreneurship and studied the impact of the business cycle on the birth and death of businesses. Later, when working at Harvard, he turned to big business as a source of innovation able to finance R&D. However, by the time of Schumpeter's death, in the 1950s, the economy was dominated by static, equilibrium mathematical theories and tools typical for the neoclassical school. However, scientists and politicians soon appreciated the importance of the long-term scientific, technological and social development processes which did not fit into the set of equations. The upswing came in the 1960s and is still ongoing. This rise was launched in the US. At the beginning of the "cold war", the country's leadership realized that global supremacy is only possible while maintaining technological leadership. Not only numerous research and technology centers were created, but also organizations involved in the management and economics of the R&D sector. The main of them, RAND Corporation, was established in 1946 on the initiative of the US Air Force. Reputable economists Richard Nelson and Sydney Winter worked specifically at RAND. The founding fathers of innovation research involved university scientists. The most famous of them is Zvi Griliches, who used hybrid corn to show that innovations were spreading in a market economy in a logistic curve. In 1962, RAND economists in collaboration with colleagues, incl. Griliches, released the joint monograph "The Rate and Direction of Inventive Activity", which explored the origin of inventions, the relationship of science and industrial R&D, the allocation of resources for optimal knowledge generation. This paper is available on the web.

Though initially emerged in the United States, the Center's scientific activity rather quickly moved to Europe, where most centers for Innovation Studies are located. The Science Policy Research Unit of the University of Sussex, created in 1965 by Christopher Freeman, was the first and model center of its kind. Under one roof, it gathered economists, sociologists, psychologists and people from the field of engineering and technology, who developed the first specialized master's and doctoral programs. In addition to educational activity and onsite scientific work, the center began to actively involve third-party customers: The International Schumpeter Society (ISS), the Danish Research Unit for Industrial Dynamics (DRUID) and other organizations.

This information allows selecting and evaluating countries' innovative development indicators. The authors chose the following indicators of development for the countries:

- Development of ICTs
- Educational Level
- High-tech development
- R&D expenditure (% of GDP)
- Innovative development
- The number of patent applications (per person)
- Number of trademark applications (per person)
- GDP per capita (\$)

In this study, the authors chose the following research tools: correlation analysis, regression analysis, projection function, which allow establishing the relationship between the development of the chosen indicators and ICTs.

4. Results

Next, the authors will proceed with assessing the indicators required for the study. Countries' ranking by the level of education (United Nations Development Programme, 2017):

Table 1. Countries' ranking by the level of education in 2017

Country	World ranking	Index
South Korea	19	0.862
Japan	22	0.848
Russia	49	0.832
China	86	0.644
India	130	0.556

Source: Compiled by the authors

According to the graphic statistics, South Korea is the leader among these countries in terms of quality and level of education (0.862) (Table 1). South Korea ranks high on this indicator since in recent years the country has managed to successfully implement innovative STEM education system aimed at developing students in the technical direction. This may also be due to the fact that South Korea is famous for encouraging most deserving students – providing grants, scholarships from the government and the university (even to extrabudgetary students). However, education is accompanied by strict control of the knowledge learned by students at school through constant tests and examinations. In this regard, from this perspective, let us conduct further investigation on the innovation index and on the development of high technologies. Russia (0.832) is following close behind South Korea and Japan (0.848). Japan and Russia are roughly similar in terms of education. All Russian and Japanese students strive to get into prestigious universities since the diplomas of higher education obtained at these universities almost guarantee a high level of income to its graduates. China lags far behind Russia (0.644). This lag is due to the fact that in China students simply cram the material, which is why they have no desire to achieve success in their studies. Next comes India (0.556). The low level of education in this country is due to the difficult economic situation in the country, the consequence of which is that people with low income cannot afford to study at universities, because education in India is quite expensive. However, the level of education that can be obtained at Indian universities in India is just as good as in the leading European universities.

Table 2. Countries' ranking in terms of high technologies' development (2017) (IMD World Competitiveness Center. 2017)

Country	World ranking	Index
South Korea	14	87.983
Japan	22	82.17
Russia	30	74.796
China	40	65.207
India	48	57.066

Source: Compiled by the authors

South Korea (87.983) is the leader in terms of high technologies' development among the top five countries, as shown in Table 2. This may be linked to the fact that companies producing high-tech goods in large quantities are actively developing in South Korea. Japan is not far behind in this index; however, Japan is currently catching up South Korea. China is in the 3rd place (Danko & Golubev, 2013). The high-tech market is also actively developing in this country, even though the country is not yet a leader in this area. However, it is possible to predict a fast growth rate in this indicator since the Chinese economy is one of the most stable in the world.

Unfortunately, Russia and India cannot boast of high rates in this area and significantly lag the above countries. This phenomenon might be due to the unstable economic situation in India and Russia in the world market, as well as the constant crises that hinder the development of the high-tech market. Sanctions are another factor hindering the development of production in these countries. In terms of R&D expenses (research and development), the leader is again South Korea. The remaining countries are arranged in the same order as in the high-tech index. Therefore, it is possible to conclude that R&D expenditure and the index of high-tech development are directly related to one another. As in the previous indicator, South Korea ranks first among these five countries, and Japan, in turn, is very close to South Korea. This is due to the STEM system, which was implemented in South Korea for an in-depth study in technical educational institutions.

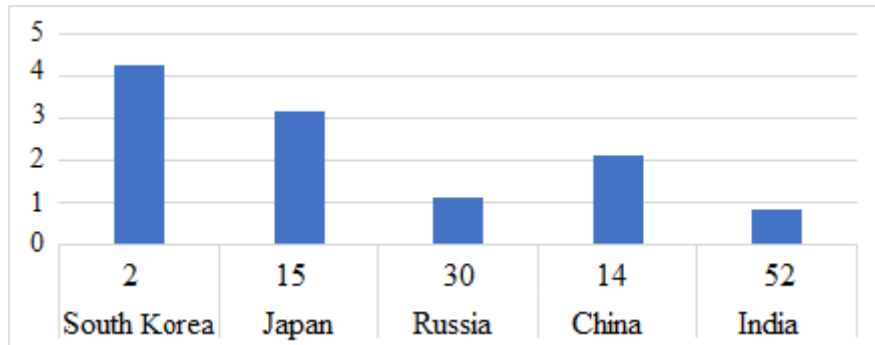


Fig. 1. Differentiation of R&D expenditure by countries (% of GDP) in 2017 (OECD, 2017)

Source: Compiled by the authors

Table 3. Countries' ranking in the Innovation Index in 2017 (World Intellectual Property Organization. 2012)

Country	World ranking	Index
South Korea	11	57.7
Japan	14	54.72
Russia	22	52.54
China	45	38.76
India	60	35.47

Source: Compiled by the authors

Japan ranks second, as it is one of the most innovative countries in the world, like South Korea, in which the development of robotic technology is in full swing. China (52.54) is also very close to these countries, as shown in Table 3. China is actively adopting the experience of introducing innovations from its foreign colleagues. Sad enough, but Russia is again in the last lines together with India. These countries are now experiencing a deep crisis. Moreover, the innovation sector is experiencing a shortage of money, as budget funds are not enough to sponsor the high-tech market and support domestic producers. This explains such a low innovation index (38.76). Today, innovation, research, and development are an important part of political ambitions in most developed and developing countries. Global expenditure on R&D continue to grow, and the share of business is increasing.

The decade of unsustainable development was replaced by global economic growth. However, several things are encouraging. First of all, an increase in R&D expenses – those have increased by 3% in 2016 (there are no more recent data in the report). According to R&D Magazine, total R&D spending in 2016 amounted to more than \$2 trillion, of which the USA accounted for \$521 billion, China – \$427 billion, and Russia – \$56.2 billion. R&D Magazine predicts that in 2018 global spending on R&D will grow by 4.1% to \$2.19 trillion. Russia's strategic goal in terms of scientific development is to return to the list of leading countries, to create a research and development sector capable of conducting fundamental and applied studies in areas relevant to the world economy and science, which are in demand by Russian and international companies. Achieving the competitiveness of the scientific complex on a global scale requires solving numerous objectives, including: improving the quality of human resources; increasing the efficiency of the R&D sector, in particular through the restructuring of several scientific organizations; enhancing the research capacity in key areas; developing coordination mechanisms and tools, and interaction of all participants in the innovation process. The next indicator chosen for the analysis is the index of ICT development.

Table 4. ICT Development Index by countries in 2017 (World Bank, 2017)

Country	World ranking	Index
South Korea	2	8.85
Japan	10	8.43
Russia	45	7.07
China	80	5.6
India	134	3.03

Source: Compiled by the authors

As shown in Table 4, Korea (8.85) ranks second in this index in 2017 and first among the 5 countries under study. Next comes Japan (8.43) and Russia (7.07). Russia is far ahead of China (5.6) in this indicator; it is currently repeating the same trends as the rest of the world. High-speed Internet is growing at a tremendous pace. The demand for digital content is significantly increasing; this includes not only books, movies and music, but also educational programs and services. This indicates that ICTs in Russia are gradually reaching a fundamentally different level.

During the study, the authors had to deal with the problem that the population significantly affected the indicators of the number of patent applications, trademark applications, and the GDP. Therefore, the data were recalculated per capita according to the table below "Countries' population".

The following indicators of patent and trademark applications were recalculated per capita, as the number of people in these countries differed significantly. China, for example, has the largest population of 1.386 billion people, and South Korea – the smallest – 51.47 million people. This is almost 27 times less. Thus, the following data were obtained:

Table 5. The number of patent applications per capita by country in 2017 (World Intellectual Property Organization, 2018)

Country	Number of patent applications per one person
South Korea	0.0054
Japan	0.0041
Russia	0.0010
China	0.0003
India	0.00004

Source: Compiled by the authors

Table 5 shows that South Korea (0.0054) is the leader in terms of patent applications per capita, i.e. one patent application accounts for about 185 people. Next comes Japan (0.0041), where one patent application accounts for 244 people. The third line is occupied by China (0.0010), in which, on average, one patent application accounts for 1,000 people. Following China is Russia (0.0003), where one patent application accounts for 3,333 Russian people, on average. India (0.00004) occupies the fifth position – with one patent application per 25,000 people. These statistics are highly evidential for studying the degree of countries' intensity and activity in the creation and registration of patent products.

In terms of trademark applications, Japan (0.0054) shares the first line with South Korea (0.0054). This indicates that one trademark application accounts on average for 185 people. They are followed by Russia (0.0021), with one trademark application per 476 people. The fourth line is occupied by China (0.0010) with one trademark application per 1,000 people. It is noteworthy that China is the undisputed leader in the number of applications for trademarks and patents. However, once these figures are recalculated per capita, the picture changes dramatically and China becomes the fourth in this indicator. In turn, India (0.0003) still occupies the fifth position with one application for a trademark per 3,333 people (Fig. 2).

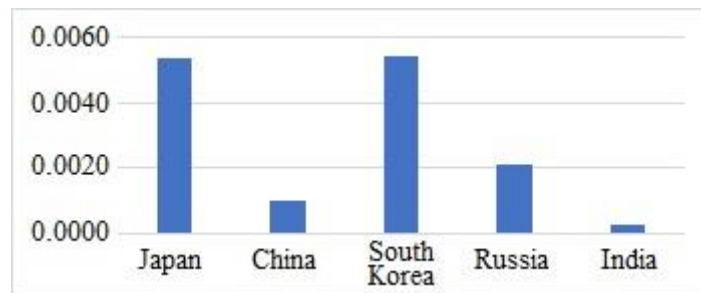


Fig. 2. The number of trademark applications per one person

Source: Compiled by the authors

Table 6. GDP per capita (\$): (World Bank, 2018)

Country	GDP per capita, \$
Japan	38,428.1000
South Korea	29,742.8400
Russia	10,743.1000
China	8,826.9900
India	1,939.6100

Source: Compiled by the authors

It is noteworthy that this is the only indicator by which South Korea (29,742.8400) is not the leader but occupies the second line (Table 6). In this case, the first position is occupied by Japan (38,428.1000). Russia (10,743.1000) takes the third place in GDP per capita, slightly ahead of China (8,826.9900). India (1,939.6100) ranks fifth in this indicator.

5. Conclusions

To date, South Korea is the undisputed leader among the five countries in most of the above indicators (as was noted earlier, it yielded to Japan in only one indicator – GDP per capita). This country places a tremendous emphasis on the development of innovations and has made a huge leap in this industry. It was always followed by Japan, which is a no less progressive country. However, frequent natural disasters affect the investments in the tech industry – the government has to spend huge funds to restore structures destroyed by nature, which of course cannot but affect the development of high technologies. The third and fourth lines were alternately occupied by Russia and China (although China occupied the third line more often). However, it is worth noting that with the calculation of indicators per capita, Russia is not so far behind China, but somewhere even ahead, for example, in GDP per capita and trademark applications. India turned out to be an outsider in almost all indicators among the five countries, which may be due to the difficult economic situation in the country and a large share of poverty among its citizens.

Thus, it is possible to define clear leaders in this analysis: South Korea and Japan. Russia and China are competing on a number of positions. India is still the last in all indicators, although it is absolutely clear that its potential has not yet been revealed – though it can manifest itself in the near future.

To identify the relationships among factors and the level of ICT development, the authors used correlation analysis. Statistical and correlation analysis of the obtained data revealed a strong correlation between the ICT development index and the following indicators: Innovation coefficient (index), Education, High technology development, GDP per capita (\$), R&D expenditure (% of GDP). Correlation analysis showed that Education and GDP per capita (\$) were the most closely related to the ICT development indicator, high technology development, and R&D expenditure. Their correlation with the analyzed indicator was the greatest – 0.962 and 0.870 respectively, which allowed concluding about their strong direct connection since the calculated coefficients had positive values. Based on the regression values, it can be concluded that the change in the development of ICTs is mostly influenced by 2 indicators: education and the percentage of R&D expenditure of GDP. Therefore, the correlation-regression analysis confirms the initial hypothesis ***that if a country chooses to focus on education and high technologies in its development, it can ensure high development of the national ICTs.***

In the study, the authors have clarified that there are at least 2 more factors that have significant impact on the result identification. These are GDP per capita (\$) and R&D expenditure (% of GDP). To determine the development trend of ICT in South Korea, Japan, China, India, and Russia in the next 3 years, the authors collected information on the development of this sphere in 2012-2017, and built a graph reflecting the value of the indicator for Japan, South Korea, Russia, China, and India for this period.

Using the forecast function in Excel, the authors estimated a possible development option for ICT in 2018, 2019 and 2020 (Fig. 3)

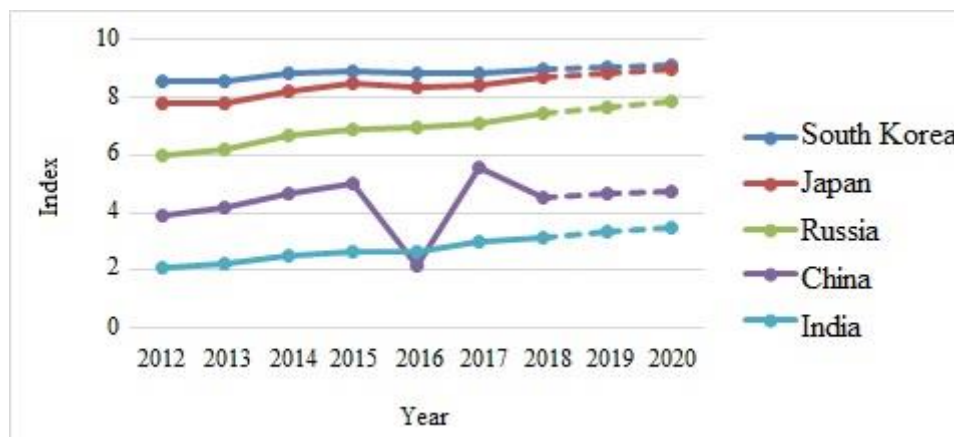


Fig. 3. Projected trends in the development of ICTs for the countries under study

Source: Compiled by the authors

This study has resulted in a series of data which indicate that the development trends (that are fairly stable in their development) are increasing in all countries, except China. This predictive estimate is an estimate of multifactorial development. It reflects general trends, while the development of one indicator is affected by other factors. Since one factor can absorb and neutralize the other, the ideal is to move to a multifactorial study.

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