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PECULIARITIES OF INNOVATIVE ACTIVITY IN UKRAINE

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Brukh O., Sodoma R. Peculiarities of innovative activity in Ukraine

The article substantiates the role of innovative development as a fundamental that determines the economic capacity of the country and its prospects at the world market.

The latest research and publications are analyzed, the main researchers engaged in a thorough study of this topic are selected. The main features of innovative development and innovative activity are determined.

Based on the world analytical information, the problems of innovative development of the national economy are analyzed. The current state of innovation activity in Ukraine is characterized on the basis of international rankings, where Ukraine is represented. Problems in this area are revealed. The article gives analysis of Ukraine's position in the ranking of countries according to the Global Innovation Index (GII), Bloomberg Innovation Index (BII), Global Talent Competitiveness Index (GICT), European Innovation Scoreboard (EIS). A number of indicators which affect innovation activity are analyzed.

A current level of innovative activity in Ukraine in 2020 was investigated as compared to other European countries, and the rating of the results and analysis of innovative activity in dynamics was made.

The effectiveness of the leading countries' innovation policy concerning innovation development, which is based on the principles of systematization, covers special incentives for innovation and creates favorable conditions for doing business in the country, favorable institutional environment and develops factors of innovation production.

Problems of the innovation policy implementation and measures for their solution are revealed. It is determined that the innovative development of the country will highlight the competitive advantages at the current European and world markets.

Recommendations, aimed at development of innovation in Ukraine, have been developed and main directions of improvement in Ukraine's policy are named.

Key words: international rating, global innovation index, innovation activity, innovation development, innovation capacity, innovative policy, innovation activity, strengths and weaknesses, trends, world experience, dynamics.

Брух О., Содома Р. Особливості інноваційної діяльності в Україні

Обґрунтовано роль розвитку інноваційної діяльності як фундаменту, що визначає економічну спроможність та перспективність країни на світовому ринку.

Проаналізовано останні дослідження й публікації дослідників, які ґрунтовно вивчали цю тему. Визначено основні особливості інноваційного розвитку та інноваційної діяльності.

Ґрунтуючись на світовій аналітичній інформації, проаналізовано проблеми інноваційного розвитку національної економіки. Охарактеризовано сучасний стан інноваційної діяльності в Україні на основі міжнародних рейтингів, де представлена Україна та виявлено проблеми в заданій сфері.

Показано місце України в рейтингу країн світу за Глобальним індексом інновацій (ГІІ), Індексом інновацій Агентства Блумберг (ІАБ), Глобальним індексом конкурентоспроможності талантів (ГІКТ), Європейським інноваційним таблом (ЄІТ) у 2020 р. Проаналізовано низку показників, що впливають на інноваційну діяльність.

Визначено сучасний рівень інноваційної активності України у 2020 році порівняно з іншими європейськими країнами, оцінено результативність, проаналізовано інноваційну діяльність у динаміці.

Доведено ефективність інноваційної політики країн-лідерів інноваційного розвитку, яка будується на принципах системності, охоплює особливі стимули інноваційної діяльності та забезпечує сприятливі умови для ведення бізнесу у країні, сприятливе інституційне середовище, а також розвиває чинники інноваційного виробництва.

Виявлено проблеми впровадження інноваційної політики та запропоновано заходи для їхнього вирішення. Визначено, що інноваційний розвиток країни виокремить конкурентні переваги в умовах сучасного європейського і світового ринків.

Розроблено рекомендації, спрямовані на розвиток інноваційної діяльності в Україні, та подано основні напрями вдосконалення інноваційної політики в державі.

Ключові слова: міжнародний рейтинг, глобальний індекс інновацій, інноваційна діяльність, інноваційна політика, інноваційний розвиток, інноваційна спроможність, інноваційна активність, сильні та слабкі сторони, тенденції, світовий досвід, динаміка.

Formulation of the problem. Innovative development and innovative capacity of the country is a determining factor in the direction of economic growth, improvement of quality indicators, development and production of competitive products, economical use of resources, prevention of environmental consequences of industrialization, etc.

At present, most companies are clearly aware of the need to achieve a high technological level of innovative products. However, the problem of the integration system of interaction of the branch science and production, as well as innovative activity of enterprises and its financing acquires special topicality.

Analysis of recent research and publications. Focusing on the problems of economic processes in the field of innovation development, the importance of innovation is considered in many scientific works, including researches of Bondarchuk N. (2013), Honcharenko L. (2020), Zaiats T. (2021), Yermakova O. (2017), Illiashenko N. (2018), Kniazevych A., Kraichuk O. (2011), Mazur N. (2020), Radeva M. (2018), Sulima N., Yakovlev A. (2018) and others.

In her works, Yermakova O.A. (2017) analyzes the world experience of innovative development and shows effectiveness of the innovation policy of leading countries that is based on the principles of systematization, covers special incentives for innovation, and creates favorable conditions for doing business in the country, favorable institutional environment and develops factors of innovative production.

Thus, in the work of Zaiats T. (2021), the problems and priorities of the innovative activity

development and the statement of innovative development guide in a society were analyzed.

In their works, Mazur N. and Sulim N. (2020) substantiate the state and features of innovation in Ukraine, as well as outline possible prospects for improving the efficiency and further development of the innovation processes in our country.

Despite numerous studies on the issue, its aspects require constant monitoring and analysis. It is necessary and relevant to conduct further studies of the state, trends, structural changes, evaluation of innovation effectiveness in all areas of the national economy.

In addition to the analysis of scientific papers, it is also important to consider innovation development in the context of international competitiveness, which is carried out annually by the World Economic Forum within the study «The Global Competitiveness Report» (Bondarchuk, 2013).

Setting objectives. The purpose of the study is to determine the current level of innovation activity in Ukraine in comparison to other countries, performance evaluation, analysis of innovation activity in the dynamics, as well as consideration of issues, factors and areas of innovation activation in Ukraine.

The main objectives of the study of these aspects include analysis of the innovation potential and innovation capacity of Ukraine through the prism of the strengths and weaknesses of innovation development and development of recommendations for performance improving.

Research methods and materials. To solve the set tasks, the analysis of the «The Global Competitiveness Report» was carried out. During the study of innovation development indicators and innovation processes in the economy of Ukraine, methods of system analysis were used to consider innovation as an object for research with a wide range of causal relationships; methods of statistical analysis allowed assessing the state, identifying trends and patterns of innovative development; comparative and graphical methods.

The information base of the research is made by the works of leading Ukrainian and foreign scientists in the field of innovation, «The Global Competitiveness Report», domestic and foreign monographs, analytical publications in professional journals.

Presenting main material. Nowadays, humanity is on the threshold of change, entering the 4th industrial revolution, which determines significant technological changes in the socio-economic, geopolitical and demographic spheres of society. Scientific trends in the world show that innovative projects will become a major breakthrough in the consciousness and worldview of human change soon.

Taking into account the relevant circumstances, Ukraine is faced with the task of forming an economy based on innovative type of development, strengthening defense capabilities, which are possible in case our country is oriented towards the European vector of development. This implies the immediate formation and implementation of the strategic plans that will be able to intensify the use and reproduction of scientific and technological potential and, as a result, increase the country's competitiveness at the international level. A significant factor in the direction of economic breakthrough is the overall innovation modernization. The latest Ukrainian model of economic development should be based on the involvement of advanced technologies and taking steps to increase the degree of openness of both markets, i.e. the European Union and the world.

Ukraine is represented in several international rankings, which assess innovation potential and innovation capacity. The most important are the Global Innovation Index (GII),

the Bloomberg Innovation Index – (BII), the Global Talent Competitiveness Index – GTCT, the European Innovation Scoreboard (EIS).

Analyzing the ratings of Ukraine according to the presented four approaches to assessing the country's ability to innovate for 2015–2020, there is a lack of active policy, as well as a significant breakthrough in supporting innovation by the state and business in general. The basis for Ukraine's innovative competitiveness is made by labor capital, higher education, as well as relevant knowledge and effectiveness of scientific researches.

However, the imperfection of state institutions, unfavorable and vulnerable environment for innovative entrepreneurship, as well as the poor financial and credit system hinder business potential disclosure, create significant obstacles to commercialization in innovation and their impact on the GDP growth. According to the World Bank, Ukraine has been and remains in the group of countries where incomes are below the average (Pysarenko and others, 2021).

According to the results of innovation indicators, the Fig. 1 shows that in 2015–2020 Ukraine reduced its activity by two indices of innovation effectiveness. According to the Innovation Index in 2015, this figure was in the 64th position, and in 2020 it was in the 45th position. In 2015, the Global Competitiveness Index was the same as in 2020, but in 2017 this figure corresponded to the 69th position against today's – the 66th position. The indicator on the Global Innovation Index has slightly improved (in 2015 – the 33rd, in 2017 – the 42nd, in 2020 – the 56th). It remained at the level of previous years on the index of the European Innovation Scoreboard and ranked the 36th position.

A significant negative impact on the reduction of efficiency in the innovation sphere was caused by reduction of the expenditures on research and development, and thus the decrease of attractiveness of the research system for young scientists, low concentration of researchers, an insufficient level of innovative infrastructure development, low institutional and financial capacity support for innovators, weak protection of copyrights and, as a consequence, low patent activity of intellectual assets, export-oriented goods with low added value, a small proportion of Internet users in distant areas.

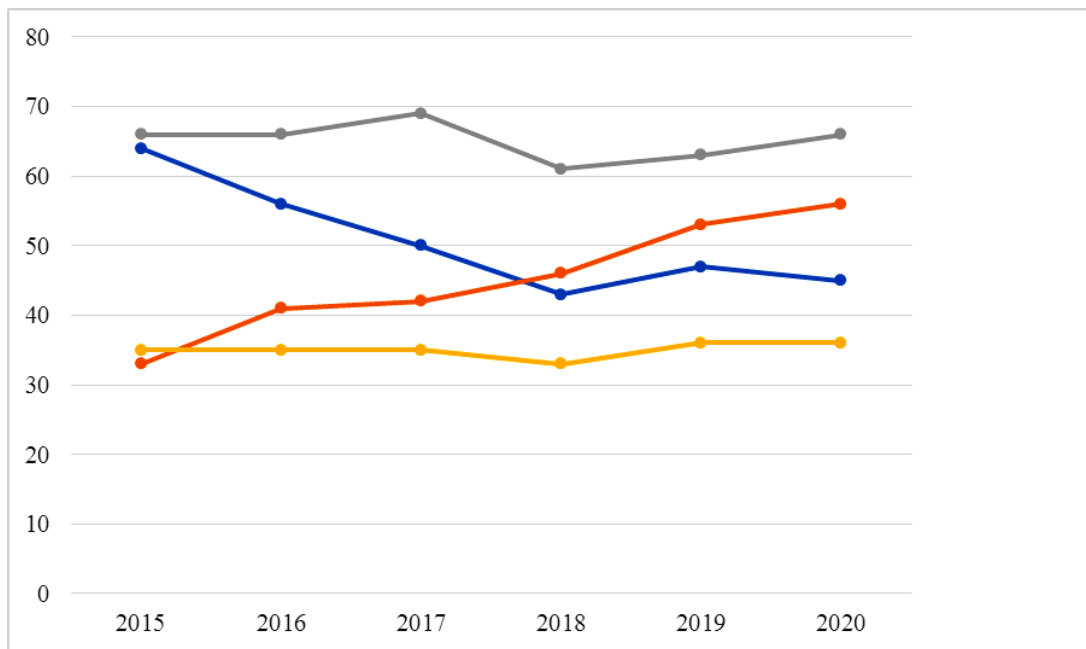


Fig. 1. Innovation capacity of Ukraine rating (by main indices)

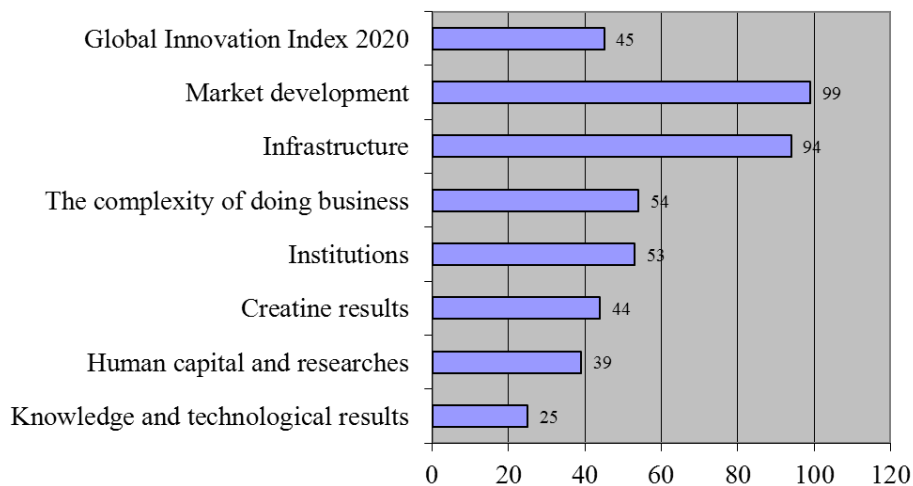


Fig. 2. Rating of Ukraine by the main components of GII in 2020

Source: The Global Innovation Index 2020. URL: <https://www.globalinnovationindex.org/gii-2020-report>

However, there are strengths of Ukraine which include: scientific and technological results, labor potential and research, opportunities to attract talent, market and regulatory capacity in the labor market, innovation, institutional systems, creativity, special skills, penetration of high technologies, etc. Labor resources are an important component of indices, which still remains the most powerful basis in Ukraine.

As it is mentioned above, the basis of our country's innovation capacity is provided

by human (labor) capital and research, as well as scientific and technological results (Fig. 2).

According to the rating indicators, the strong characteristics of Ukraine include cooperation of free trade and industry in research (the 50th position), a significant proportion of women with degrees in relation to employees in % (the 3rd position), the share of exports of IT services in foreign trade (the 9th position), applications for phones based on various mobile operating systems for \$ 1 billion. of GDP (the 15th position), intangible assets (the 23rd

position), the origin of trademarks and patents for 1 billion dollars of GDP (the 5th and 20th positions respectively).

According to this rating, the weaknesses of Ukraine are also highlighted, namely: the share of graduates of higher education institutions in the field of science and engineering (the 82nd position), exports of non-ordinary goods to the total volume of trade in % (the 111th position).

According to the level of infrastructure development, our country took the 94th position in the ranking, whereas it took the 97th position in 2019 respectively.

An important indicator in the ranking is the development of the market, according to which Ukraine ranked the 99th (in 2019 it was the 90th one.) This indicator contains a set of features such as loans – the 86th position, gross microfinance loans – the 79th, investment – the 121st, level of trade and competition – the 45th position.

In general, according to the Global Innovation Index in 2020, Ukraine ranked the 45th.

According to the Bloomberg Agency's Innovation Development Index, Ukraine ranked the 56th out of 60 countries surveyed in 2020, as compared to the 46th in 2018, and the 53rd in 2019. In 2020, Germany, South Korea and Singapore topped the list.

In 2018-2020, Ukraine's rating dropped significantly from the 46th position to the 56th one by such components as research and development intensity by 10 positions, value added production by 9 positions, higher education efficiency by 27 positions, patent activity by 9 positions.

We can see positive changes which took place analyzing 2019 against 2020 in the direction of strengthening Ukraine's position in terms of productivity (2020 – the 57th position, high technology permeability (the 35th position), as well as the percentage of value added to GDP (the 57th position).

As we can see, innovation activity in Ukraine is quite low, which in its turn slows down the process of economic formation in innovative development, does not contribute to raising the competitiveness of our country at the

international level, and significantly reduces the European vector of development.

Analyzing the Ukraine's position in 2020 as compared to 2018 according to the Global Talent Competitiveness Index (GTCI), one can see that improvement is observed of only two indicators of the GTCI, namely: «market and regulatory opportunities» the country rose by 3 positions (2020 – the 94th position), and according to the «index of attracting talent» – by 5 positions (the 93rd position). Overall, the talent competitiveness index fell from the 61st to the 66th position in 2020.

The European Innovation Index is another important indicator, which is calculated on the basis of a comprehensive system of scientific and technological development indicators – the European Innovation Scoreboard (EIS). With the help of this rating one can assess the degree of scientific and technological development of all member states of the Community.

The central feature of the system of indicators according to the European Innovation Scoreboard is the fact that, basing on the selected results of various indicators analysis of individual countries, it is possible to develop an effective EU strategy for science and innovation in the United Europe program. Using the obtained data, certain measures are being developed, which are aimed at raising the level of development of individual countries that have not very high indicators.

The characteristics of the EIS indicators, in addition to those that determine the direct state of innovation in the country, also include indicators that demonstrate the process in the direction of copyrights protection. This supports the fact that intellectual property is also an important component in ensuring the innovative growth of the country's economy.

The European Innovation Scoreboard provides a comparative assessment of the innovativeness of systems, as well as their strengths and weaknesses. The comparison is based on the 27 EU member states and 10 neighboring countries, including Ukraine. From a methodological point of view, EIS is calculated on the basis of 27 indicators, with countries, depending on the degree of innovation, divided into groups such as:

- «innovation leaders» – states that have a level of innovation development of more than 20% of the Union average;

- «strong innovators» – indicators of rating participants are either close enough to the «sample» or exceed these values;

- «moderate innovators» – the effectiveness of these countries is from 50 to 90% of the average indicator;

- «slow innovators» – their result is below 50% of the average.

Overall, the results of the analysis of EIT indicators for 2020 show, that the EU's innovation potential continues to grow. Thus, in five years, the European innovation system has grown by almost 12% on average. For example, in countries such as Cyprus, Estonia, Greece, Italy and Lithuania, innovation rates have increased by approximately 25%. The best positions are held by the Scandinavian countries (Sweden, Finland, Denmark, Switzerland and

Belgium), whose indicators are much higher than the EU average. Almost all countries that are the former SU countries (but for the Czech Republic) are below the average level. Most likely, the Soviet past is still effecting the process, and will slow down the country's data in the scientific and technological process for a long time to come.

However, it should be noted that considering the global level, the situation with innovative development is not so optimistic in the EU, because countries such as the United States, Japan, South Korea, Canada and Australia are ahead of the EU in terms of innovation.

The strength of Ukraine is a fairly innovation-friendly hub and the impact of employment. There are also high rates of broadband, knowledge-intensive employment, non-research and development innovation costs, as well as export of knowledge-intensive services (IT services) (Fig. 3).

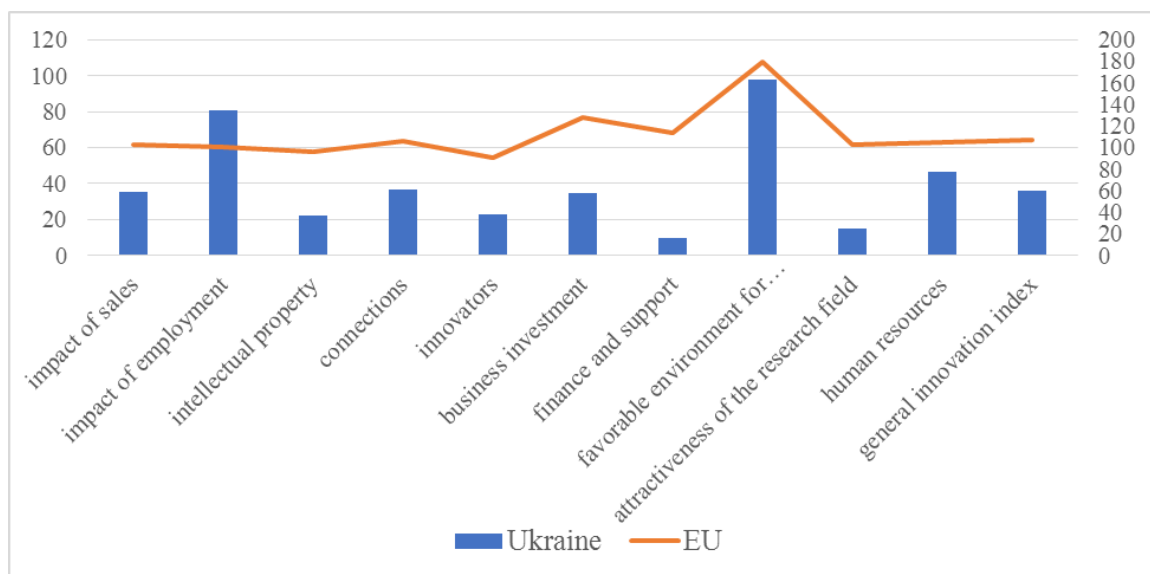


Fig. 3. Comparison of the EIT index components values weight (Ukraine and the EU-27)
 Source: European innovation scoreboard 2020. - <https://ec.europa.eu/docsroom/documents/42981>

Weaknesses of the country include finances and support (in Ukraine this figure was 9.8 in 2020, and in the EU – 113.3), the attractiveness of the research system (15.1 vs. 102.8) and intellectual property (22.4 vs. 95, 9).

Another important index for assessing the ability of countries to implement and use

modern advanced and / or breakthrough technologies is Technology Readiness Index (TRI). It is formed of the following five components: the introduction of information and communication technologies (ICT), human resources (skills, abilities), research and development (R&D),

industrial use, and access to financial resources (Fig. 4).

Analysis of Figure 4 shows that Ukraine has a quite high rating for such components as: the level of education (skills) of the population (the 40th position in the ranking) and research activity (the 47th position in the ranking), as well as the share of technology in industrial production (the 58th position in rating). However, in 2020, the country has a low rating on

such indicators as the level of ICT infrastructure (the 66th position in the ranking) and the accessibility of companies to financial resources (the 97th position in the ranking).

For Ukraine today, an effective method for building innovation potential is to integrate into the world and European economic and technological space, i.e. to establish close international scientific and technological cooperation.

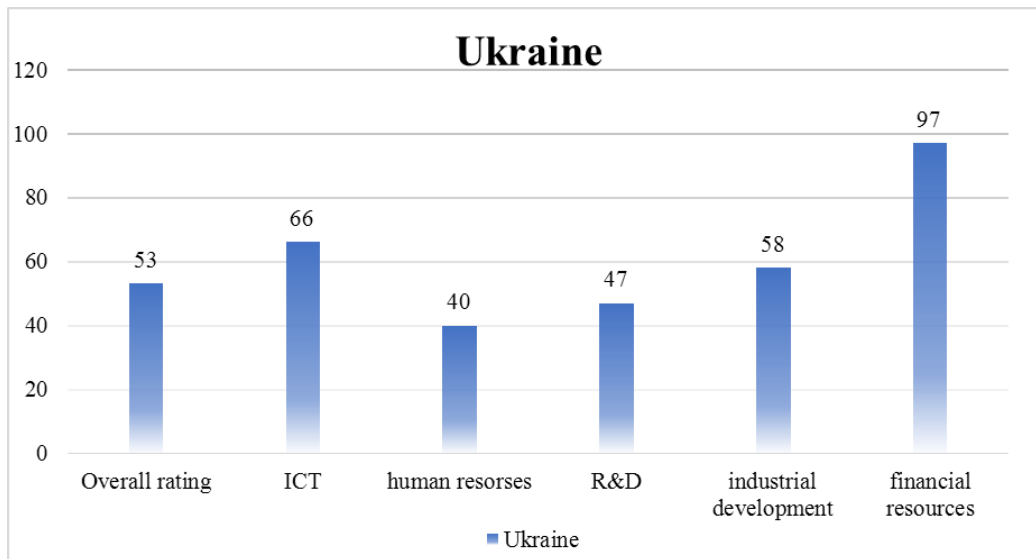


Fig. 4. Rating of Ukraine according to Technology Readiness Index for 2020

Source: UNCTAD, *TECHNOLOGY AND INNOVATION REPORT 2021 CATCHING TECHNOLOGICAL WAVES: Innovation with equity*. Pages 137–138.

Conclusions and prospects for further research. An important vector of Ukraine's development is to set value orientations based on innovative development. Contrary to the low international ratings of innovation in the Ukrainian economy, the country's population welcomes transformations associated with innovation, demonstrating its position in openness to science, technology, modern technology, willingness to use these results. However, pessimistic attitude to global changes in market relations, distrust of the chosen course, skepticism in the success of ongoing reforms oppose the establishment of values in innovation development.

Therefore, it is extremely important for Ukraine to intensify formation of a holistic model of innovation development based on the European model in order to reduce significant technological backlogs, as well as to avoid new outbreaks of systemic crisis in the domestic economy. Such positive results can be achieved through the integrative use of all permissible instruments of influence related to the current innovation policy of the country. The scientifically substantiated solution of the Ukrainian economy problems and development on the basis of innovation is currently an extremely important issues.

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