

Artículo de investigación

Innovation economy: aspects of economic and information security in logistics innovation

Иновационная экономика: аспекты экономической и информационной безопасности в логистике инноваций

Economía de la innovación: aspectos de la seguridad económica y la información en la innovación logística
Economia de inovação: aspectos da segurança econômica e da informação em inovação logística

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Abstract

In this article you can find the main problems of resource support of innovative economy and the favorable complex decisions on improvement of the existing logistic approaches from the point of view of safety.

Keywords: economic and information security, economic logic, innovation, logistics.

Аннотация

Освещены основные проблемы ресурсного обеспечения инновационной экономики, предложены выгодные комплексные решения по улучшению существующих логистических подходов с точки зрения безопасности.

Ключевые слова: инновации, логистика, экономическая и информационная безопасность, экономическая логика.

Resumo

Este artigo destaca os principais problemas de apoio aos recursos da economia inovadora e oferece decisões favoráveis sobre a melhoria das abordagens logísticas existentes do ponto de vista da segurança.

Palavras-chave: economia e segurança da informação, inovação, logística, logística econômica.

Resumen

En el presente artículo se destacan los principales problemas de apoyo a los recursos de la economía innovadora y se ofrecen decisiones favorables sobre la mejora de los enfoques logísticos existentes desde el punto de vista de la seguridad.

Palabras clave: economía y seguridad de la información, innovación, logística, logística económica.

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Introduction

Logistics is very important thing in the world, not only in the field of state and world economy, but also in the field of technology.

In the era of Industry 4.0 (digitalization), technological development is characterized by an almost uncontrolled growth of information flows. A lot of researchers say that the main

vectors of development of modern society are information processes.

Information process is a process of obtaining, creating, collecting, processing, accumulation, storage, search, dissemination and use of information.

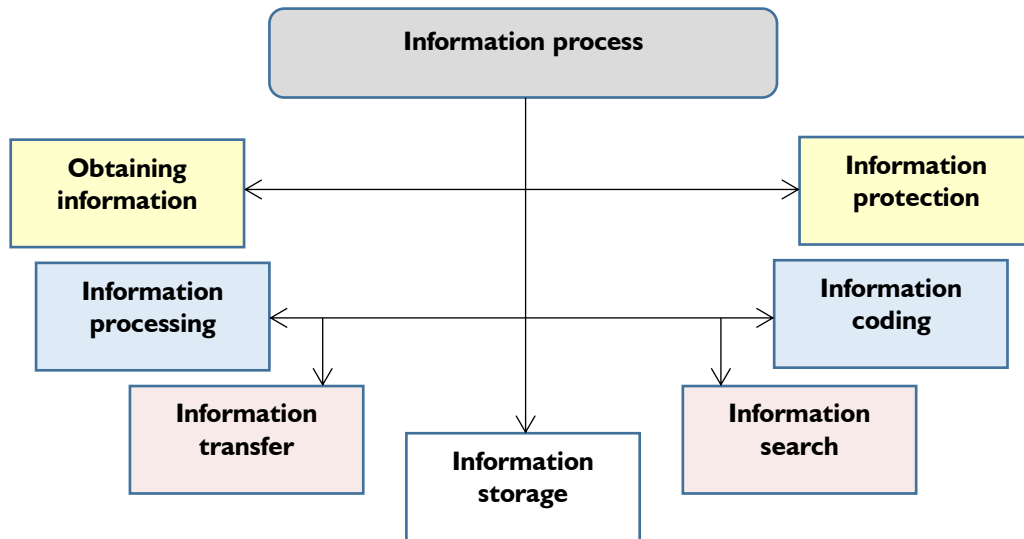


Figure 1. Information process groups

In the period of digitalization, the main activity is carried out within the framework of innovative economy.

Innovative economy is a type of economy based on the flow of innovation, continuous technological improvement, production and export of high-tech products with high added value and the technologies.

The main unit in the innovation economy is innovation.

Innovation is a result of innovation activity, which has been implemented in the form of a new or improved product sold on the market, new or improved process used in practice.

Innovation, as an idea and result, is an intellectual property object (IPO). When innovation is in the form of technology know-how or a unique information service, it is a part of the intangible assets of the organization (enterprise).

Introduction of innovations follows the basic scheme (Figure 2):

- conducting a survey;
- preparation of documentation;
- implementation;
- technical support.

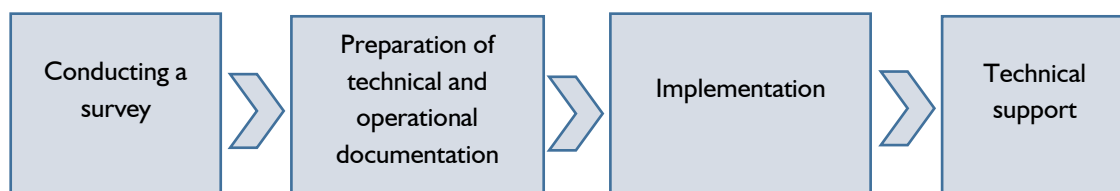


Figure 2. The main stages of integration of an innovation project

Methodology

The rapid development of logistics systems in the period of Industry 4.0 both at the level of microeconomics and macroeconomics is explained by the increased level of competition between the subjects of the economy, the increase in trade turnover and the dependence of activities on technologies and their cost (both for development and implementation). At the same time, the volume of processed information flows increases, which threatens the key factors of logistics – information integrity and completeness. Disruption of information links is most likely leading the stopping of development of market relations, uncontrolled growth of costs and expenses, etc.

Input stream:

1. Information I
2. Financial F
3. Material M
4. Energy E
5. Personnel H

Logistical support (logistics) is an organization of rational process of movement of goods, technologies, services and raw materials from suppliers to consumers in due time.

When working with the concept of logistics support, we consider a set of tools that ensure the development, promotion and implementation of innovations through contour flows (Figure 3).

The development of logistics support contributes to the development of relations (including information), increase of trade turnover and increase of various indicators, which has a positive effect on the economic system, but it will also require high costs for maintenance, security and processing.

Output stream:

1. Information I*
2. Financial F*
3. Material M*
4. Energy E*
5. Personnel H*

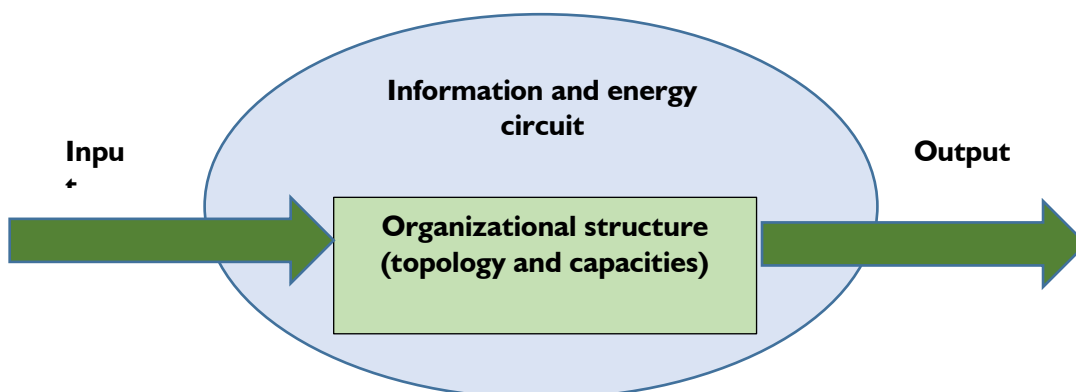


Figure 3. Dynamic contour flows

Changes of innovations can be improving (can be perfecting the previously created product, service, etc., for example, modification of the invented in the European Union and in the United States schemes of cell phones by their manufacturers in China) and radical (offering a fundamentally different product or service, the way to solve the problem, etc.). Its depends on the force of the changes (Pinkovtskaia, Balynin, Arbeláez Campillo & Rojas-Bahamón, 2019).

At the same time, even one innovation with the current globalization of markets and the

departure from the principles of autarky can lead to the creation of an integrated product market (for example, entrepreneur Elon Musk offers not only one innovation, but a bundle of breakthrough technologies).

This practice eventually leads to an increase in the level of competitiveness in the sense of economic and information security at the level of a single country, enterprise (organization) or individual person.

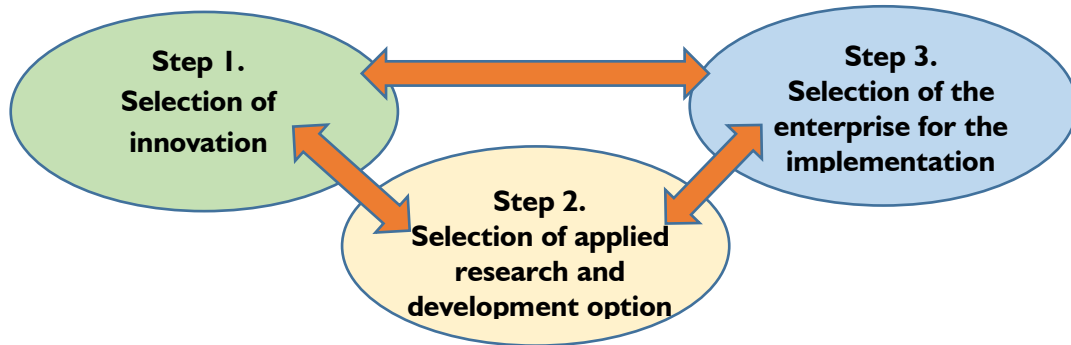


Figure 4. Dynamic contour flows

The launch and support of the logistics flow of innovation takes place according to the following scheme (Sheyanov, 2003):

- finance;
- investment;
- innovations;
- implementation/export.

Finance refers to the search and approval of funds (federal or regional budget, fundraising, attracting shareholders). It is necessary to consider all the risks involved, conducting a preliminary analysis. Raising funds from

shareholders may be considered as part of a crowdfunding campaign. You can use the following formula to calculate a financial goal (Makarova, 2017):

$$FG = NA / (1 - (C + PS + T)),$$

where FG is a financial goal; NA is a necessary amount; C is a fundraising platform commission (%/100); PS is a payment system fee (%/100); T is a profit tax (%/100).

The crowdfunding scheme should consider investment risks (Figure 5).

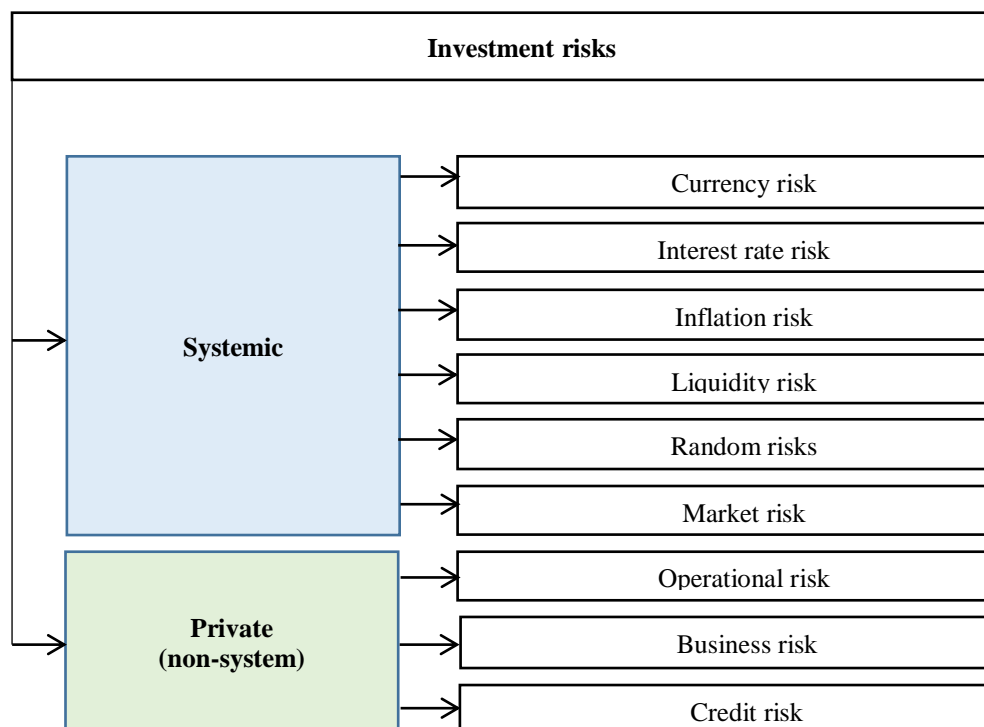


Figure 5. Investment risk

The financial contour of the stream opens in the stage "Investment".

The sub-item "Innovations" is a part of the life cycle of the proposed innovation (in our case, technology), starting from the need and the emergence of the idea and ending with the preparation for implementation.

The last stage is the introduction of innovation in the enterprise or its sale.

When working with the logistics flow of innovation, it is worth remembering the main threats:

- disruption of information links (stopping the business process);
- breach of confidentiality (competitive intelligence, industrial espionage, cyber-attacks, etc.);
- disabling the logistics system (cyber-attacks, social engineering, increased/exceeded information flow, etc.);
- information risk.

There is no technique, which could quantify the amount of risk. First, it depends on the lack of adequate statistical information on the possibility of a particular threat. Second, it is sometimes very difficult to determine the value of a particular information resource (Kiseleva & Iskadzhyan, 2017). Innovation is almost directly related to intellectual property, which has its legal subtleties.

Information risks are also associated with others, including the issue of licensing and electricity. Incorrect information about the configuration of

information processing and storage systems leads to an increased risk of financial degradation.

In the case of power supply, the following method of calculation can be used for small businesses (Goncharenko, Ermolatiy & Pitelinskij, 2019) on the example of Orange PI PC: the equipment operates stably at a voltage of 5 V and a current of 2 A. It is possible to calculate the power consumed by the server (P):

$$P=I*V= 2A * 5V = 10 W.$$

Now we calculate the daily consumption in kWh:

$$(10 W) * (24 \text{ hours/day}) = 240 W*h (0.24 \text{ kWh*day}).$$

It remains to calculate the final price according to the tariffs.

It is almost impossible to build a reliable logistics system if the organization is structured incorrectly, as this will lead to inefficient management and further management mistakes (including in matters of economic and information security). Also, we cannot forget about the human factor.

In order to carry out competent preparation and further verification of work processes, it is necessary to qualitatively approach the modeling of the effective structure of the audit authority in the organization. Here we can find the example of it (see Figure 6) (Goncharenko, Ermakov, Ermolatiy & Pitelinskij, 2018). As for any economic entity, the organization is characterized by risks for the economic entity.

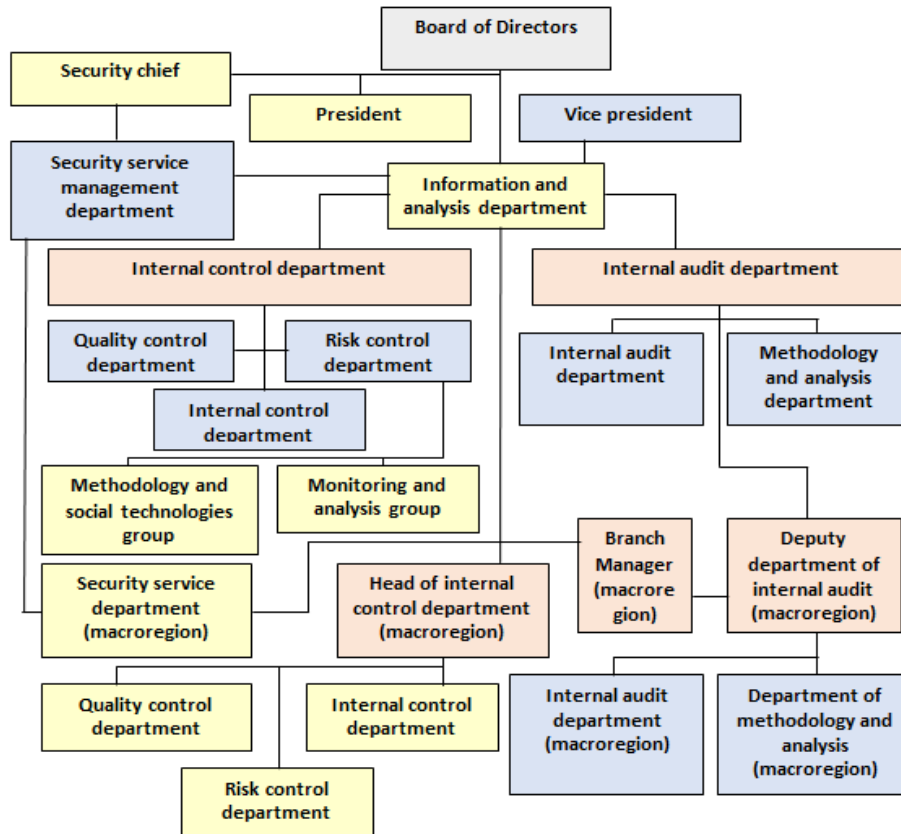


Figure 6. The structure of the organization, which has branches

Results and discussion

Considering the approved Strategy 2020 (Komarova, Zamkovoï & Novikov, 2018) and

the previous studies (Okunev, 2013), we can make some conclusions about the dynamics of the development of innovative support in the Russian Federation (Figure 7-8).

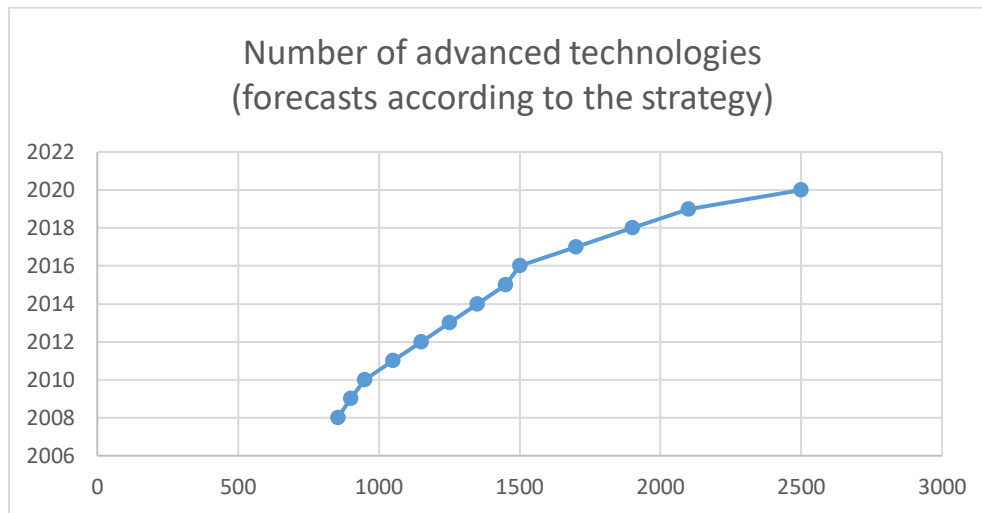


Figure 7. Number of advanced technologies offered with the trends

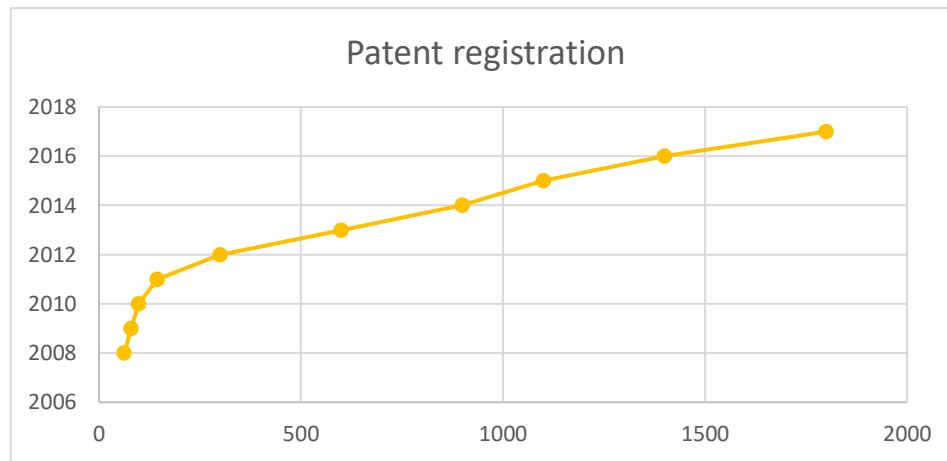


Figure 8. Number of patents

However, even if we imagine that all risks are considered, a competent structure of the organization (or an analogue for a larger unit of economic activity) is drawn up, on the basis of which the logistics flow will be launched, all legal subtleties are solved, there is a number of security issues.

The current practice of socio-economic relations in the XXI century gives requirements for information security, as the most important asset of any modern enterprise (organization). High standards of information security have the need for an effective security policy of the enterprise and the continuous improvement of methods and

technologies to ensure economic and information security (IS).

Before the introduction of IS systems, it is necessary to understand from what it is necessary to protect the subject of the economy. It should be considered that for each enterprise and for each specific case, when assessing the security, its priority risks associated with the features of protected organizational structures that implement business processes are highlighted (Pitelinsky, 2008). When assessing risks, it is necessary to determine the factors affecting the effective operation of the enterprise (Figure 9).

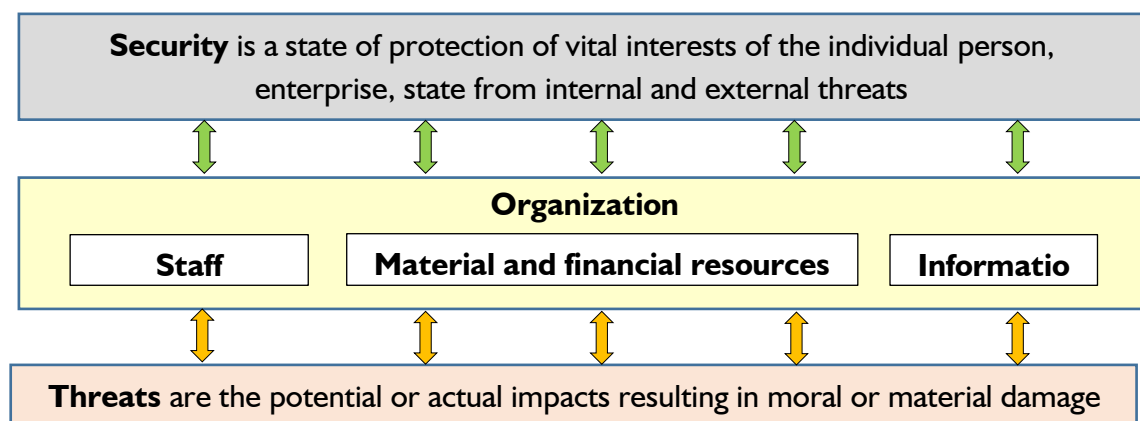


Figure 9. Factors affecting the effective operation of the enterprise

The main threats to the logistics streams from the point of view of safety are:

- violation of information links (stopping the business process);
- violation of confidentiality (competitive intelligence, industrial espionage, cyber-attacks, etc.);
- disabling the logistics system (cyber-attacks, social engineering, increased information flow, etc.);
- information risks (receiving or giving outdated or incorrect (false) information, repudiation, etc.).

Some of the possible consequences are:

- huge cash losses;

- loss of competitiveness;
- loss of the image of the subject (subjects) of logistics.

Any of the presented consequences may lead to the impossibility of further economic activity.

Data on technologies and their implementation should be adequately protected against all kinds of leaks and delays at all stages of the life cycle, from legal to technological. However, the question of training of personnel involved in the work of logistics systems is almost always open. Unprofessional and/or unnecessary personnel increase the probability of failure of key logistics system nodes, as well as increases the likelihood of privacy violations.

With the help of social engineering methods, cyber-attacks and other destructive effects, the logistic flow can be stopped without the possibility of recovery.

Conclusions

After the above, we can make the following recommendations, which we need to realize:

- integrated, comprehensive approach to the protection of innovations and technologies;
- support of stable information links (including state-business interaction);
- a rational approach to the ratio of investment/innovation;
- the perception of the business process not as a "quick profit", but as a complex procedure that requires careful analysis (including preliminary), constant monitoring and control (focus on continuity and reliability);
- more thorough training with their further distribution (and distribution of the load on those).

Given the amount of work, to maintain the protection systems up to date requires a full staff in the office of information security, but in practice, often replaced by two or three specialists. This is fundamentally wrong.

Incomplete staff will be able to either keep the existing system up-to-date or respond to various incidents. Full (integrated) "coverage" in problem solving is not possible.

With the increasing number and quality of innovations, business processes and logistics systems need technical, legal and information risk management and security measures to protect innovative technologies at all stages of production and operation.

References

- Goncharenko, G.Yu., Ermakov, I.K., Ermolatiy, D.A. & Pitelinskij, K.V. (2018). Computer psychology or a universal approach to the vulnerabilities of confidential information. *Information security issues*, 4, 62-67.
- Goncharenko, G.Yu., Ermolatiy, D.A. & Pitelinskij, K.V. (2019). On some of the activities and means of securing your home server. *Information security issues*, 1, 47-52.
- Kiseleva, I.A. & Iskadzhyan, S.O. (2017). Information risks: methods of assessment and analysis. *ITportal*, 2.
- Komarova, N.V., Zamkovoï, A.A. & Novikov, S.V. (2018). The Fourth Industrial Revolution and Staff Development Strategy in Manufacturing. *Russian Engineering Research*, 39(4), 330–333.
- Makarova, E.N. (2017). Evaluation of the efficiency of the crowdfunding company. *The problem of accounting and Finance*, 28, 35.
- Okunev, M.A. (2013). Status and trends of innovative development of the Russian economy. *Bulletin of Perm national research Polytechnic University. Social and economic Sciences*, 131-140.
- Pinkovtskaia, I.S., Balynin, I., Arbeláez Campillo, D.F. & Rojas-Bahamón, M.J. (2019). Small business development in Russia: results of the assessment of sectoral structure and number of employees. *Espacios*, 40(7), 6.
- Pitelinsky, K.V. (2008). Organization as a system of dynamic contour flows. *Cross-sectoral information service*, 143 (2), 36-40.
- Sheyanov, V.V. (2003). Logistics support of innovation and investment activity (thesis). Samara, Samara state University of economics.