

INNOVATIVE OBSOLESCENCE AND ITS IMPACT ON PRODUCTION DEVELOPMENT OF INDUSTRIAL PRODUCTS

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Summary: Contemporary industrial development of industrial products defines a new attitude towards their innovative obsolescence, which is of major importance to physical obsolescence. The purpose of this article is to clarify the essence and establish the impact of innovation obsolescence on the socio-economic and social outcomes of this activity. Assessing the impact of this activity on the scale and timing of manufactured industrial products is of the utmost importance for the timely removal of the negative effects of the innovation impact. It arises under the impact of new innovative solutions with more advanced, more productive and better techno-economic indicators than those introduced before.

KEYWORDS: INNOVATION, INNOVATION OBSOLESCENCE, INNOVATION ACTIVITY

1. Technical-economic essence of the concept of innovative obsolescence

Innovative obsolescence. The current stage of technical development is characterized by the overriding importance of innovation towards physical obsolescence. Therefore, a very important point in this direction is the correct determination of the degree of innovation obsolescence. This means determining the impact of innovation not only on the technical, economic and social outcomes of industrial activity, but also on their negative effects from the rapid obsolescence of in-service innovative products. The development of the technology and the commissioning of new innovative machines leads to substantial changes in the methods of its operation on the one hand, and on the other to the improvement of the methods for changing the character of the work and increasing the qualification of the personnel. Taking into account these internal and external impacts, which characterize the qualitative side of innovation development, reveals not only the mechanism of its impact on production results but also its impact on the various aspects of the production process. Consequently, it can be concluded that the impact of innovation development is also a global result of obsolescence technology and lagging at the level of the technologies put into operation by today's ones. The further use of innovative outdated technology and technological processes leads to certain losses, the extent of which will depend on the extent of this lag. The assessment of this impact is of the utmost importance for timely elimination of the negative effects of the impact manifested in the two forms of innovation obsolescence. The first form of innovative obsolescence is an inevitable consequence of innovation in technology and technology in manufacturing industries. The second form of innovative obsolescence arises under the impact of innovative solutions expressed in the new, more modern, more productive and better-engineered and built-in machines than previous ones.

The first form of innovative obsolescence is an inevitable consequence of the development of technology and technology in manufacturing industries. The growth in labor productivity and the ways in which technologies, materials and labor are used for their production lead to an annual change in their cost. The pace of this change depends on the increase in the productivity of public labor and on the growth of the national income considered in terms of its distribution for accumulation and consumption.

The change in the cost of production means as a result of changes in their reproduction is the first form of innovative obsolescence. It is characterized by a partial devaluation of the operating means of production and derives from the sphere of their production, which covers all means of labor without affecting their consumer value. Globalization and its consequences for industrial development in the world greatly diminish the negative effects of this form of innovative obsolescence. Their removal is carried out on the basis of their periodic adjustment to their replacement value, reflecting the current conditions of development. For this reason, there is no need to prematurely replace them with new ones, as new ones are not more productive. Consequently, the second most important form of innovation obsolescence is the most important.

The second form of innovative obsolescence emerges under the influence of innovative solutions expressed in the new and more modern, more productive and improved techno-economical indicators constructed and introduced in comparison with those produced before. In these cases, the efficiency of the use of old machinery and equipment will be significantly lower and will devalue themselves to a certain extent. The effect of using such a technique will be reduced as the magnitude of this decrease will depend on the power of the manifestation of the factors characterizing their innovative obsolescence. The second form of innovative obsolescence contains some features that most fully reveal its essence and the economic consequences of its influence on the elements of production. The main feature is that it causes partial or total depreciation of labor resources and their consumer value, resulting in the need to replace the technically outdated equipment with a new one before the expiry of its physical wear and tear. The economic feasibility of such replacement is not determined by the very fact of the emergence of new machines of similar technological purpose but by the degree of innovation obsolescence, leading to a devaluation of the machinery and equipment in operation, and the level of decline in economic efficiency from continued use. However, it should be borne in mind that the loss of consumer value and the need to replace machines with new ones is conditioned by a number of factors reflecting the specific directions of the impact of innovation development. The interrelation of the manifestation of the first and second forms of innovative obsolescence is shown in Figure 1.

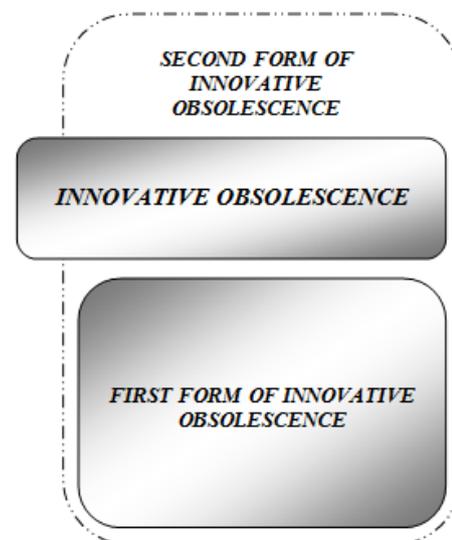


Fig.1. The interrelation of the manifestation of the first the second form of innovation obsolescence

2. Specificity and regularity in the development of innovation obsolescence

It has been shown that there is a certain dependence between the productivity of the technique as a level reached and the periods of its technical development. It is reflected in the achieved technical degrees of development, taking into account the differences in the respective levels and the increase in productivity. Productivity and technical performance indicators are closely interrelated and interdependent, as they are deflated by technological developments at a given moment, and on the other hand it is the result of the productivity gains achieved as a stage of technological development and scientific and technical progress. The physical nature of these dependencies is expressed in shortening the periods of creating new technical solutions, inventions, technologies, modern constructions, know-how, etc., and increasing their productivity in absolute and relative dimensions for each new period. It follows that periods of innovative obsolescence of technology are becoming shorter over time, and technical levels are getting higher in each subsequent period. These are objective technical laws that, with technological developments, mark fast pace for each subsequent period.

Consequently, the future development of industrial activities will be characterized by ever higher technical levels, increasing productivity, rapid innovation obsolescence and global intensification of processes and activities. Moreover, these additions form new spheres generating a new environment of development, flexibly balanced by the impact of internal and external factors.

Now we can not only talk about innovations and innovative processes, but about an innovative production system that is considered in a complex way. The impact of the technical and information environment determines the basic requirements for the technological behavior of the companies. They create the prerequisites and conditions for a new attitude towards rapidly advancing innovation obsolescence as an integral and necessary part of the global development of industry and society.

3. Trends in changes of product and process parameters under the influence of innovation obsolescence

Technological development and, in particular, its effects, manifested in the form of innovative product and process obsolescence, lead to producers' attitude towards searching for ways and means of improving and changing their parameters. The trend of changing the parameters of innovative products and processes as a result of their rapid innovative obsolescence has already formed a new alternative concept for innovation development. It also puts new requirements both on the consumer nature of innovative products and on the methods, approaches and ways of their production.

The main directions that provide an effective way out of the constraints imposed by rapid innovation obsolescence to create competitive innovative products are being actively applied by many companies in aircraft, automotive, electronics and more. This new approach, quickly adopted by industrial companies, already shows its advantages in the following directions:

1. The shortest possible cycle from an idea to an innovative product.
2. Industrial companies form their vision of market and competition, depending on the innovative development of the modern industry in the world.
3. Companies are adapting their innovation policy towards global industrial policy at a global level.
4. Organizations strive to solve high-tech problems and produce highly innovative products.
5. Flexible technological forms of production are used.
6. Localize their production where it is most profitable and the effect of realization of innovative solutions is greatest.
7. Innovative obsolescence imposes conditions that companies must comply with. This stems both from the

technological attitude and from the strong impact of consumer interest.

8. More companies are starting to apply flexible technological and organizational forms of behavior to the surrounding industrial and market world.

4. Trends in the change of the consumer qualities of products and processes under the influence of innovation development

The main directions that provide an effective way out of the constraints imposed by rapid innovation obsolescence in creating competitive innovative products are being actively applied by many companies in the following directions:

- Design and production of innovative products with the highest possible reliability and short service life;
- Examine the design and production cycle as a continuous process and use engineering, simulation, virtual performance, and other methods to shorten the cycle as much as possible. This is illustrated in Figure 2.

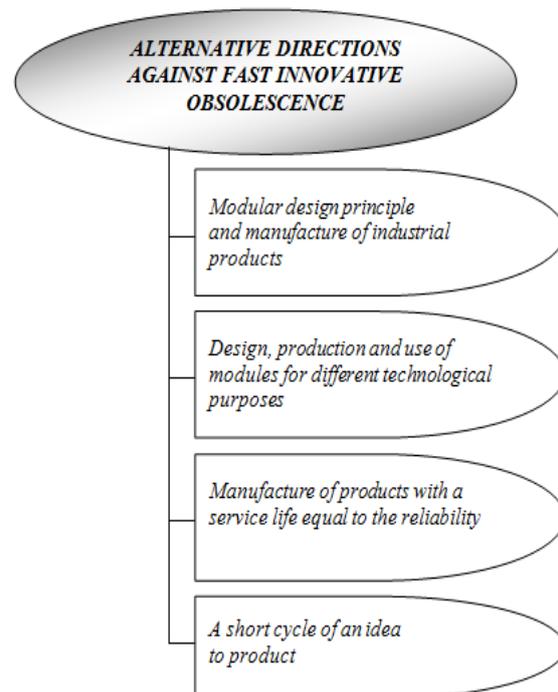


Fig.2. Main directions providing an effective way out of the constraints imposed by rapid innovative obsolescence in creating competitive innovative products

In essence, this means that a global innovation policy is starting to emerge, and its manifestation begins to adopt flexible innovative solutions, striving to greatly reduce the harmful effects of innovation obsolescence. So the share of innovation of a universal nature included in innovative products is relatively decreasing. By contrast, the number of innovative solutions with different technological uses is growing. This development, together with new manufacturing concepts and the global electronic environment, defines the integration essence of today's industry, less and less influenced by innovation obsolescence.

Conclusions

In conclusion, the following theoretical and practical conclusions can be drawn:

1. Innovative obsolescence and its impact on the industrial development of industrial products have been investigated.
2. The technical and economic nature of the concept of innovative obsolescence is analyzed.
3. The peculiarities and norms in the development of the innovation obsolescence are considered and on this basis are

formulated: the change of the parameters of the products and the processes and the change of their consumer qualities under the influence of the innovation obsolescence.

References

1. Antonova D., Possibilities for Management of the Process of Creation of New Industries, Ed. A-Group, Rouse, 2009
2. Ajam M., Managing a project across the project life span, 2011
3. Böhler T. M., Industry 4.0 – Smarte Produkte und Fabriken revolutionieren die Industry, In: Produktion Magazin, 10. Mai 2012
4. Damyanov D., Innovations - technology, organization, management, financing, politics, Ed. Primax, Rouse, 2013
5. Demirova S., Trends in determining the lifetime of the machines depending on innovative obsolescence and physical wear 52nd STC Riga, Latvia, 2014
6. Dima I., Industrial Production Management in Flexible Manufacturing Systems, IGI Global, 2013
7. Errol S., Greg T., A Delphi examination of public sector ERP implementation issues. International Conference on Information Systems. Atlanta: Association for Information Systems, pp. 494–500, September 9, 2009
8. Erumban A., Innovation, Obsolescence and Retirement: An Exploration Based on Data for Dutch Manufacturing Firms, 2008
9. Hassani H., How to do the Final Year Projects, 2012
10. Kurz R., Quality, obsolescence and unsustainable innovation, Ekonomski Vjesnik/Econviews, God. XXVIII, BR. 2/2015. str. 511-522, 2015
11. Novikov D., Models and methods of organizational management of innovative development of the firm, izd. URSS-Moscow, 2006
12. Sørensen J., Stuart T., Aging, Obsolescence and Organizational Innovation, 1999
13. The Co-creative Meeting: Practicing Consensual Effectivity in Organizations (SpringerBriefs in Business), Springer, 2013
14. Tukkel J., Innovation Projects Management, BHV-SPb, 2013
15. Yashin S., Analysis of the effectiveness of innovation, Izd. BHV-SPb, 2012