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## New challenges for the high-tech sector of the economy in Ukraine

*Abstract:* In difficult conditions, when at the same time, some industries are collapsing and the digital sector is developing rapidly, the issues of supporting the high-tech sector of the national economy are becoming crucial. The article evaluates the modernization potential of entrepreneurship based on value added indicators of high-tech products. In particular, the dynamics of value added by the costs of production of economic entities by type of economic activity: information and communication technologies, production using high technologies, production using medium, medium, low and low technologies, information sector, services using high technologies, services related to the use of computer equipment and intelligent market services. It is proved that enterprises with high economic status (potential) should influence the growth of value added of goods and services, increasing the innovation component, thereby opening new markets for sales and trade policy. The influence of disincentives in the growth of value added is substantiated, among which – the lack of business scalability, weak legal framework, low level of technological production, depreciation of production assets.

*Keywords:* entrepreneurship, economy, added value, high-tech sector, innovative development, evaluation, innovation.



### Introduction

As a significant part of value added in business shifts from the production stage to the development stage, the role of science, education and technology increases. In Ukraine, the share of value added in production costs of enterprises belonging to the medium-high-tech sector of the processing industry is 3.8%. There is a clear tendency to reduce the cost of research and development in GDP, reducing the share of engineering, social sectors due to higher rates of decline in real production due to insufficient demand for these products and lack of conditions to increase their competitiveness.

The current structure of GDP with underestimated share of services (especially knowledge-intensive diagnostic and experimental, services of commercialization of innovations, consulting) and slightly inflated share of agriculture in the economy of relatively developed countries, does not meet the principles of post-industrial economy. Therefore, an important problem of economic development, which entails negative social consequences, is the weakness of the consumer and the selectivity of the fund-generating segments of the economy, as well as weak support for modernization in high-tech industries.

The main task of this study is to assess the modernization potential of Ukrainian entrepreneurship on the basis of value, added indicators of high-tech products. Unfortunately, the theoretical and normative-legal «gaps» hinder the practical research of the outlined problem. Even more, to date, the Strategy for the Development of High-Tech Industries until 2025 has not been adopted. Moreover, the Law of Ukraine «On Support and Development of Innovation Activity» remains in the draft, which defines the legal, economic and organizational principles of state regulation of innovation activity, establishes forms of state stimulation and support of innovation activity.

However, in the presence of a significant amount of theoretical, methodological, and applied research on this issue in Ukraine and abroad, there is a controversial some theoretical and practical provision.

### **Results and discussion**

Modernization (from the French *moderne*, English *modern* – «latest, new, neoteric, modern») is an update of the process, product, service, and therefore is the basis of innovation and the basis of most innovations. Widely used concepts are modernization of the economy and modernization of enterprises, while the category of «modernization of entrepreneurship» in scientific works is rare, while entrepreneurship is often seen as a factor in modernization.

The content analysis of a number of theoretical sources gives grounds to define innovative modernization of entrepreneurship as a continuous chain process of triage of the most valuable ideas, implementation of innovation results and obtaining the desired KPI, carried out under certain conditions. Such conditions include established processes of cooperation between entrepreneurs, government, universities, corporations; access to human and financial capital; access to customers and consumers (new digital scalable products and services); speed of change of competitors.

Thus, the modernization potential of entrepreneurship is a set of social, economic, financial, cultural resources that provide economic activity in accordance with modern conditions. The realities of today are the timeliness of innovative modernization potential of entrepreneurship.

Innovative modernization is a sustainable process of updating and improving technologies in all spheres of life. Thus, in the EU such a process is clearly regulated in many documents, in particular, the Green and White Papers. The former initiate public discussion, the latter – concrete proposals. The first ones concerning technology, information, verification and innovation are: “*The European Research Area: New Perspectives*”, “*European Space Policy*”, “*The Future of the European Migration Network*”, “*Public Access to Documents Held by Institutions of the European Community*”, “*Agricultural Product Quality: Product Standards, Farming Requirements and Quality Schemes*”, “*Copyright in the Knowledge Economy*”, “*TEN-T: a Policy Review: Towards a Better Integrated Trans-European Transport Network at the Service of the Common Transport Policy*”, “*The Community Patent and the Patent System in Europe*”, “*The online Distribution of Audiovisual Works in the European Union: Opportunities and Challenges towards a Digital Single Market*”, to others – “*Space: a New European Frontier for an Expanding Union: An Action Plan for Implementing the European Space Policy*”, “*Education and Training*” etc.

Innovative modernization is closely related to the digital transformation of business, which according to some scientists is a review of corporate, business, functional strategies and models

of business organization (*Shapovalova et al., 2019*). It is based on robotics of production and business processes, artificial intelligence, multi-channel collection and analysis of big data, etc. That is why there is often a substitution of concepts: instead of innovation projects, companies are engaged in digital transformation.

To analyze the modernization potential of entrepreneurship based on dynamic indicators of value added of high-tech products, we should turn to the conceptual apparatus of value added.

Value added was commonly used in macroeconomics, while at the micro economic level efficiency and effectiveness were measured by profit (economic profit is the difference between income (sales revenue) and economic costs or the difference between accounting profit and internal resource costs; in turn, accounting profit is the difference between accounting profit income and accounting (external) costs).

Nowadays it is obvious for scientific and practical circles that the added value of the enterprise is a value assessment of its work and a source of economic growth.

We agree with the opinion of scientist M.V. Hridchyna, who considers value added “a more fundamental criterion of the company’s performance than profit, because it measures its activities as a whole” (*Hridchyna, 2013*).

The calculation of value added in Ukraine is performed according to the methods:

1. In the most general form: value added is equal to the difference between the value of output and the cost of means of production.
2. In accordance with Commission Regulation (EU) № 250/2009 from 11.03.2009:

The indicator «value added at production costs» is calculated by:

Turnover + capitalized production + other non-financial income (incl. subsidies for production) +/- change in inventories – total cost of purchased goods and services – other sales taxes related to turnover but not deductible – fees and taxes related to production.

3. Gross value added:

Production of goods and services (determined by their value and is the result of production activities of resident economic units in the reporting period) – intermediate consumption (material costs and payment for services) for each type of economic activity and sector (*Osoblyvosti formuvannia..., 2017*).

There are a number of approaches to determining value, added at the enterprise level. Scientists V.M. Kirnos and Ye.V. Protasova, considers value added as a factor that can be used to determine the operating value of the enterprise, which is created and distributed at the enterprise in the course of its activities. Value added, according to scientists, is «the result of joint efforts and is distributed among all participants in the process of production and sale in the form of wages, interest on borrowed capital, dividends and taxes, and its share may remain in the company for its development» (*Kirnos & Protasova, 2013*).

O.M. Svitovyi defines the gross value added of enterprises as the new value created in the process of production and sale of products at the enterprise for the reporting period, including the value of consumed fixed assets (*Svitovyi, 2013*). According to him, value added consists of income of owners of capital (interest on loan capital, rent / rent, profit), consumption of part of the owner’s fixed capital (depreciation deductions) and part of the product produced by the company, which the owner pays employees for participation in its production and sales (accrued wages). H.M. Babinina considers value added as part of the value that is created in the production

process and is its real contribution to the value of a particular product (*Babinyna, 2014*). V.O. Ivanenko considers value added as the difference between the value of manufactured products (goods, works, services) and the transferred (materialized) value of material resources and intangible services consumed in the process of production of such products (intermediate consumption) (*Ivanenko, 2012*). According to the author, the value, added indicator characterizes the amount of labor costs, the amount of profit and costs for its receipt, the structure of income received by the enterprise. Continuing the opinion of V.O. Ivanenko, scientists O.Yu. Ahafonenko and P.A. Bilousko emphasizes the importance of applying value added in economic analysis, as its assessment of the structure of income received by the company increases and deepens the analytical value of the analysis (*Ahafonenko & Bilousko, 2013*). A.G. Kovalenko, Yu.A. Malashenko, and O.O. Kniazieva is synonymous with value added, which includes wages and accruals, depreciation, interest on loans, profits, electricity costs, advertising, transport, etc. (*Kovalenko et al., 2010*)

The correct statement of the scientist V.A. Aleksandrova that “added value can be considered as a useful increase in the value of the product (service) at all stages of the end-to-end business process within one organization (enterprise) and increase the value of the product in the organization of end-to-end business processes for more complex structures (virtual organizations, holdings, etc.)” (*Aleksandrova, 2014:353*) According to the scientist, companies with different economic statuses should pursue “different cost policies in terms of value added of their products and services” (*Aleksandrova, 2014:354*). Enterprises with high economic status (potential) should influence the growth of value added of goods and services, increasing the innovation component, thereby opening new markets for sales and trade policy (*Osoblyvosti formuvannia..., 2017*). Value added in the simplest sense is the difference between revenue and purchased products and services (*Strassmann, 2007*).

Factors-disincentives in the growth of value added are lack of business scalability, weak legal framework, low level of technological production, depreciation of production assets (*Table 1*).

O.V. Chernykh believes that gross value added reflects the level of motivation of workers, the degree of equipment of production, providing it with the necessary equipment and advanced technologies (*Osoblyvosti formuvannia..., 2017*).

In today’s conditions, it is almost impossible for the majority of businesses to increase pre-crisis gross value added on their own without the participation of the state. A separate, large innovation-oriented business:

- Enterprises that produce and export high-tech products (defense-industrial complex, aircraft construction, space industry, high-tech engineering);
- Enterprises that previously specialized in the production of goods with a high share of value added, but due to lack of modernization became uncompetitive (shipbuilding, automotive and instrumentation enterprises);
- New types of high-tech industries (enterprises for the production of solar panels and other modern high-tech goods that are not manufactured in Ukraine) (*Derzhavna pidtrymka ukrainskoho eksportu*).

According to scientist N.V. Vasiuk, measures to support modernization in high-tech industries, such as engineering, should include long-term results – achieving high business efficiency and long-life cycle of enterprises, which guarantees their sustainable development.

Product, technical and technological leadership in the industry creates a margin of competitiveness that other market participants often fail to overcome. Therefore, the principle of priority presupposes the need to support the development of modernization potential not only of leading companies, but also of outsiders in the industry market (*Vasiuk, 2012:36*). Continuing her opinion, the scientist proposes to form a system of measures to support modernization in mechanical engineering to separate the objectives, levers of influence and responsibility by levels of government and the types of possible modernization strategies.

Based on the work of N.V. Vasiuk should consider «modernization from above» and «modernization from below». Thus, modernization from above allows the initiative of state, regional, state authorities, local governments in the implementation of industrial, innovation, scientific and technical policy and modernization policy. Mechanisms to support modernization in this case are implemented through the formation of state and regional development institutions, as well as engineering clusters. At the same time, bottom-up modernization provides “development of long-term priorities for the development of mechanical engineering with further creation of incentives to participate in the implementation of such projects on the basis of public-private partnership” (*Vasiuk, 2012*).

Nowadays, there is a rapid growth of value, added in the costs of production of economic entities by innovative economic activities.

Value-added indicators of the costs of production of high-tech goods and services, medium-high, medium-low and low-level technologies, information and communication technologies, intelligent market services, services related to the use of computer equipment have a pronounced and clear upward trend (*State Statistics Service of Ukraine, 2022*).

Innovation and prioritization of high value-added products is a major challenge for Ukrainian entrepreneurship. However, the share of technological, innovative, digital, creative products in GDP is quite low.

During the same period, there is a fuzzy trend towards an increase in the number of enterprises that manufacture the above products, except for a decrease in the number of enterprises that sell information and communication technologies in production and products using high technology. The number of employees in these enterprises has decreased, especially in enterprises that produce information and communication technologies in production, products using high, medium, high and medium technologies and in the information sector. Instead, the number of employees has increased significantly in enterprises that provide services related to the use of computer equipment (in 1.2 times). Nevertheless, these enterprises have the highest productivity, as there is a faster growth rate of sales of CRA services (growth rate is 3.7) (*Horiashchenko, 2021*).

Increasing the value added of products can be achieved by reducing the volume of intermediate consumption (cost), by improving integration processes, creating value chains, updating production assets, scalability of enterprises, increasing the level of technical and technological equipment.

Successful implementation of the overall and innovative strategy of the enterprise, the constant creation of added value of the business due to the increase in the value of the enterprise. In the flow of «transition from profit management to value management» in contrast to the usual absolute rate of return, the calculation of business value should be carried out for strategic cost

estimation (which in innovation have their own specifics and differ significantly depending on the scope of activities, interest rates, and capital structure and investor expectations) and economic value (Lavryk, 2005). The added value of the enterprise becomes a kind of tool for managing costs and capital of the enterprise, motivating managers to create the value of the enterprise.

### Conclusion

The material presented in the article in the order of logical presentation and content reveals the author's approach to supporting modernization in high-tech industries. In particular, the ways and means of increasing the gross value added of products are considered. We need to realize that the post-war state will define completely new challenges for the high-tech sector of the Ukrainian economy.



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## Appendix

Table 1. Link resale of goods in wholesale trade in 2020 author's development based on the State Statistics Service of Ukraine

Commodity groups	Wholesale turnover, thousand UAH	Link resale of goods
<i>Non-food products, including:</i>	2024981538,9	2,2 (the average value in this group)
- metal ores	8702939,5	1,0 (the minimum value in this group)
- granules and powders of pig iron and other specimens, or of ferrous metals	33960,5	26,1 (the maximum value in this group)
- steel	4158783,3	1,1
<i>Information and communication equipment</i>	34483678,9	5,4
<i>Basic pharmaceutical products and pharmaceutical preparations</i>	176402885,8	2,5

