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Types, Effects and Conditions for the Use of Digital Intellectual Assets in Industry

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ABSTRACT

Intelligent industrial production represents the future of the global industry and is among national priorities, as it enables the achievement of higher-order competitive advantages based on the effective use of all components of intellectual capital and the adoption of new types of assets that emerge through the implementation of digital technologies — digital intellectual assets (DIA). The **purpose** of this study is to identify the types of DIA, their potential, the effects of their use, and the conditions for their application in industry. The **methodological basis** of the research includes methods of classification, comparative and legal analysis, generalization, and systematization. The **results** include a classification of DIA according to their civil law status; an outline of the advantages of their use as tools for the intellectualization of industrial companies across various sectors; identification of the economic and social effects of implementing these assets in the context of intellectual capital components (human, organizational, and market); and the specification of the necessary conditions for achieving these effects. The findings and conclusions may be useful for the management of Russian industrial companies in developing and improving digitalization strategies aimed at enhancing competitiveness and achieving technological independence.

Keywords: digital intellectual assets; industry; digital rights; results of intellectual activity; effects

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INTRODUCTION

The Concept¹ for Technological Development of the Russian Federation for the Period up to 2030 and the Strategy² for Scientific and Technological Development of the Russian Federation set out objectives and processes that involve, in particular, a sharp acceleration in the development and dissemination of fundamentally new technologies, including digital ones, which are radically transforming markets and production systems. This requires both an improvement in the process of enhancing the intellectualization of Russian industrial production — aimed at developing the intellectual capital of industrial companies (human, organizational, and market)— and the availability of relevant competencies in the implementation of digital technologies, as well as the adoption and effective use of new forms of property: digital intellectual assets (hereinafter — DIAs).

The issues of industrial intellectualization, including the implementation of the “smart manufacturing” concept, have been examined by many Russian and international researchers [1–5]. The Smart Manufacturing project ranks first in the updated Strategy for the Digital Transformation of the Manufacturing Industry until 2030.³ Artificial intelligence (hereinafter — AI) is the core tool of smart manufacturing, and its use in industry is discussed in works [6–9]. The importance of this technology is also recognized at the state level in the National Strategy for the Development of Artificial Intelligence for the Period up to 2030.⁴

In our view, the concept of intellectual manufacturing should be understood more broadly — not only as a means of increasing a company’s productivity and competitiveness through the introduction of digital technologies that enable “smart manufacturing,” but also in the context of developing all components of intellectual capital (human, organizational, and structural). In this regard, the key role is played not so much by the technologies themselves — whose functioning is based on results of intellectual activity (hereinafter — RIA) in digital form — but by their derivatives: digital rights to RIAs and their use. These offer authors and companies new opportunities, such as accelerating knowledge exchange and simplifying the commercialization of their developments. At present, both Russian and foreign scholars mostly focus on digital assets based on blockchain technologies [10–13]. However, the classification and use by industrial companies of non-financial digital assets associated with RIAs largely remain insufficiently explored.

The purpose of this study is to develop a classification of DIAs according to their civil-law status, as well as to identify the opportunities, effects, and conditions for their use in industry.

The information base for this study comprises regulatory documents, works by Russian and foreign researchers on the issues addressed in the article, thematic publications in the media, and data from open sources.

RESEARCH METHODOLOGY

The study employed regulatory and comparative analysis, as well as methods of classification, generalization, systematization, and synthesis.

Current trends and requirements for the digitalization and intellectualization of industrial production, as well as the civil-law status of DIAs, are defined in the following regulatory documents:

1. Presidential Address to the Federal Assembly of 29 February 2024;⁵

¹ Order of the Government of the Russian Federation No. 1315-r of 20 May 2023 “On the Approval of the Technological Development Concept for the Period up to 2030”. URL: <https://www.garant.ru/products/ipo/prime/doc/406831204/>

² Decree of the President of the Russian Federation No. 145 of 28 February 2024 “On the Strategy for Scientific and Technological Development of the Russian Federation”. URL: <https://www.garant.ru/products/ipo/prime/doc/408518353/>

³ Order of the Government of the Russian Federation No. 3113-r of 7 November 2023 “On the Approval of the Strategic Direction for the Digital Transformation of Manufacturing Industries” URL: <http://publication.pravo.gov.ru/document/0001202311090050>.

⁴ Decree of the President of the Russian Federation No. 490 of 10 October 2019 “On the Development of Artificial Intelligence in the Russian Federation” (as amended). URL: <https://base.garant.ru/72838946/> (<https://base.garant.ru/72838946/>)

⁵ Address of the President to the Federal Assembly of 29 February 2024 URL: <http://www.kremlin.ru/events/president/transcripts/messages/73585>

2. Order of the Government of the Russian Federation No. 1632-r of 28 July 2017 “On the Approval of the Digital Economy of the Russian Federation Program”;⁶

3. Order of the Government of the Russian Federation No. 1315-r of 20 May 2023 “On the Approval of the Concept for Technological Development for the Period up to 2030”;⁷

4. Decree of the President of the Russian Federation No. 145 of 28 February 2024 “On the Strategy for Scientific and Technological Development of the Russian Federation”;⁸

5. Federal Law No. 259-FZ of 2 August 2019 “On Attracting Investments Using Investment Platforms and on Amendments to Certain Legislative Acts of the Russian Federation”;⁹

6. Federal Law No. 259-FZ of 31 July 2020 “On Digital Financial Assets, Digital Currency, and on Amendments to Certain Legislative Acts of the Russian Federation” (as amended);¹⁰

7. Civil Code of the Russian Federation (Part I and Part IV).

To visualize the research results, graphical and tabular methods of data presentation were used.

⁶ Order of the Government of the Russian Federation No. 1632-r of 28 July 2017 “On the Approval of the Programme ‘Digital Economy of the Russian Federation’”. URL: <http://static.government.ru/media/files/9gFM4FHj4PsB79I5v7yLVuPgu4bvR7M0.pdf> (accessed: 21.05.2025).

⁷ Order of the Government of the Russian Federation No. 1315-r of 20 May 2023 “On the Approval of the Technological Development Concept for the Period up to 2030”. URL: <https://www.garant.ru/products/ipo/prime/doc/406831204/>

⁸ Decree of the President of the Russian Federation No. 145 of 28 February 2024 “On the Strategy for Scientific and Technological Development of the Russian Federation”. URL: <https://www.garant.ru/products/ipo/prime/doc/408518353/>

⁹ Federal Law “On Raising Investments Using Investment Platforms and on Amendments to Certain Legislative Acts of the Russian Federation” No. 259-FZ of 2 August 2019 (latest version). URL: https://www.consultant.ru/document/cons_doc_LAW_330652/

¹⁰ Federal Law “On Digital Financial Assets, Digital Currency and on Amendments to Certain Legislative Acts of the Russian Federation” No. 259-FZ of 31 July 2020 (latest version). URL: https://www.consultant.ru/document/cons_doc_LAW_358753/

RESULTS

Classification of Digital Intellectual Assets and Their Application in Industry

In the authors’ view, DIAs are, on the one hand, identifiable (i.e., separable from the business) intangible assets (hereinafter — IAs) of a company in digital form, and on the other, digital assets, i.e., objects of digital rights [14]. Therefore, to determine the types of DIAs, it is necessary to examine the specifics of digital RIAs and digital rights to RIAs/ the use of RIAs.

RIAs as IAs represent exclusive rights to intellectual property objects, protected by law in accordance with Article 1225 of the Civil Code of the Russian Federation.¹¹

It is proposed to classify as digital RIAs only those results of intellectual activity that exist and have value exclusively in electronic form. Traditionally, these include computer programs and databases.

However, with the development of information and digital technologies, new objects have emerged which, although not included in the list of intellectual property objects, may nevertheless be classified as such following appropriate identification. These include, in particular, 3D models, domain names, big data, websites, digital art objects, and others.

In accordance with paragraph 1 of Article 141.1 of the Civil Code of the Russian Federation, “digital rights shall mean obligations and other rights designated as such by law, the content and conditions of which are determined in accordance with the rules of an information system that meets the statutory criteria. The exercise and disposal of a digital right, including its transfer, pledge, encumbrance by other means, or restriction of disposal of a digital right, shall be possible only within

¹¹ Civil Code of the Russian Federation (Part Four) of 18.12.2006 No. 230-FZ (as amended on 22.07.2024), Art. 1225. URL: https://www.consultant.ru/document/cons_doc_LAW_64629/2a4870fda21fdffc70bade7ef80135143050f0b1/

the information system without recourse to a third party.¹²

At present, in Russia, digital rights include digital financial assets,¹³ utilitarian digital rights¹⁴ — including rights to RIAs/the use of RIAs— as well as hybrid digital rights (hereinafter — HDRs) that combine both digital financial assets and utilitarian digital rights (hereinafter — UDRs). HDRs and UDRs constitute two forms of digital assets related to the management of RIAs.

UDRs may be created for all of the above-mentioned types of RIAs, presented in any form, including electronic (digital), but only if the right to the RIA or a transaction involving such a right is not subject to state registration. For instance, an assignment agreement for an RIA, implying a change of ownership, is subject to mandatory registration with Rospatent and therefore cannot be executed as a UDR. Similarly, UDRs cannot be created for RIAs that are objects of patent law (inventions, utility models, and industrial designs) or trademarks, as these rights are subject to mandatory registration with Rospatent. However, rights to use patented RIAs or trademarks may be converted into UDRs and, serving as an alternative to licensing agreements, offer several advantages over the latter, including:

- automation and simplification of licensing processes: UDRs can significantly reduce the bureaucratic procedures involved in concluding and executing licensing agreements;
- transparency and security: owing to blockchain technology (commonly used for UDRs), immutability of records and transparency of all

transactions involving RIA rights are ensured;

- acceleration of rights circulation: tokens allow for faster and more efficient transfer of rights to use RIAs between market participants.

UDRs represent, above all, a new mechanism for attracting investment in technology development. For example, an oil and gas corporation seeking to finance the development of horizontal drilling technology may conclude an electronic agreement with an investment platform operator, who creates, issues, and lists UDRs on the platform granting the right to use this technology. Contractors of the corporation may then register on the platform and purchase these UDRs; however, the technology itself remains the property of the developer and must be patented to protect its rights. The issuer assumes obligations towards investors, while the guarantor is the operator of the platform on which the UDRs were issued.

Digital rights to RIAs / to the use of RIAs may be applied across various industrial sectors:

1. Mechanical Engineering

Application: Digital rights to patents and technical solutions enable industrial companies to purchase licensed rights to use engineering developments or to commercialize their RIAs without complex bureaucratic procedures.

Example: Agricultural machinery manufacturers obtain UDRs to use a built-in proprietary fuel-saving system without the need for a traditional licensing agreement.

2. Aviation and Shipbuilding

Application: Licensing via UDRs for software used in digital twins of aircraft and vessels; control and protection of intellectual rights during technology transfer.

Example: A shipyard acquires UDRs to use software code for the automatic design of a ship's hull lines.

3. Chemical and Pharmaceutical Industries

Application: Licensing unique chemical formulas via UDRs; automated access management to know-how.

Example: A pharmaceutical company issues

¹² Civil Code of the Russian Federation, Article 141.1. Digital Rights (as amended on 08.08.2024, with changes as of 31.10.2024). URL: https://www.consultant.ru/document/cons_doc_LAW_5142/8568bf88dfcddf96ec39cede2444c36c998fbde3/.

¹³ Federal Law "On Digital Financial Assets, Digital Currency, and on Amendments to Certain Legislative Acts of the Russian Federation" of 31.07.2020 No. 259-FZ (latest edition). URL: https://www.consultant.ru/document/cons_doc_LAW_358753/.

¹⁴ Federal Law of 02.08.2019 No. 259-FZ "On Attracting Investments Using Investment Platforms and on Amendments to Certain Legislative Acts of the Russian Federation." URL: https://www.consultant.ru/document/cons_doc_LAW_330652.

UDRs granting counterparties temporary rights to manufacture a specific medicinal product.

4. Energy and Fuel & Energy Complex (FEC)

Application: Transfer of rights to use patented oil and gas extraction technologies; UDRs for energy grid management algorithms or digital well models.

Example: An oil and gas corporation uses tokens to transfer rights to contractors to access a spatial database of deposits.

5. IT and Industrial Software

Application: Sale of industrial software licences through hybrid digital rights; management of subscriptions to industrial cloud services.

Example: An industrial IoT platform sells access to predictive analytics algorithms for industrial equipment via UDRs.

Thus, DIAs can be divided into the following two classes:

1. Rights to digital RIAs that exist only in electronic form (computer programs, databases, 3D models, big data, domain names, etc.).

2. Digital rights to RIAs or to the use of RIAs, including:

- 2.1. utilitarian digital rights to RIAs or to the use of RIAs on an investment platform, including tokenized UDRs on a blockchain;

- 2.2. hybrid digital rights to RIAs or to the use of RIAs in a distributed ledger-based information system, including tokenized UDRs on a blockchain.

DIAs of the first class include digital RIAs created using information or digital technologies and which have value solely in electronic form. Disposal of rights to RIAs may be carried out in various ways:

1. Traditional:

- a) through licensing (exclusive, non-exclusive, and cross-licensing), which grants the right to use the RIA without a change of the rights holder;

- b) through assignment agreements, which require mandatory registration with Rospatent, as ownership of the RIA changes.

2. Non-traditional:

- a) through UDRs, including UDR-tokens granting access to digital RIAs or the right to use them;

- b) through HDRs, i.e. tokenization on a block-

chain of rights to RIAs / to the use of RIAs with income-generation potential;

- c) through NFT-tokens,¹⁵ i.e. fixation of rights to an RIA and the unique RIA itself (provided the digital asset does not exceed the maximum permissible token size).

The second class of DIAs comprises digital rights to RIAs / to the use of RIAs (UDRs, HDRs). In this case, the RIAs themselves may be traditional (included in the list under Article 1225 of the Civil Code of the Russian Federation) or exist solely in digital form.

Disposal of digital rights to RIAs may be carried out exclusively through non-traditional mechanisms — via UDRs or smart contracts (for tokenized rights). We propose applying the globally recognized token classification by economic function (as introduced by the Swiss Financial Market Supervisory Authority, FINMA, and the United States Securities and Exchange Commission, SEC), according to which there are payment tokens, asset tokens, and utility tokens. Payment tokens are not used for DIAs. UDRs exist only under Russian jurisdiction, but their analogue may be considered utility tokens, with the adjustment that UDRs are additionally regarded as investments. Accordingly, the analogue of the Russian HDR is the asset token, provided that the underlying assets are rights to RIAs.

In the future — subject to regulatory development — utilitarian and hybrid digital rights to RIAs may be issued in the form of NFT-tokens, which in the first case grant a unique right to use an RIA and essentially constitute UDRs; and in the second combine ownership of intellectual property (an RIA) with the ability to commercially exploit it, thus functioning as HDRs. An NFT-token for an RIA is not a DFA, as it does not entail financial obligations.

For example, an industrial company issues an

¹⁵ NFT (Non-Fungible Token) is a non-interchangeable token that verifies a unique ownership right to a digital asset, including a digital IP object (for example, a company's digital logo).

NFT for a licence to use a patented technology. The holder of the NFT-token may use such technology at their facilities. To prevent the creation of additional NFTs for the same technology, a restriction may be incorporated at the token-purchase stage, analogous to the mechanism of an exclusive licence. The current correlation of rights across different token types is presented in *Table 1*.

The final classification of DIAs is presented in *Fig. 1*.

Effects and Conditions for the Use of DIAs in the Intellectualization of Industrial Production

The conditions under which industrial companies employ digital RIAs and digital rights to RIAs/use of RIAs represent the potential opportunities for their application to achieve the expected outcomes of production intellectualization. These outcomes include increased labour productivity, enhanced competitiveness and production efficiency, revenue growth, improved product quality, personnel development, technological leadership, and other similar results.

Thus, the focus is on the conditions required

for transforming the intellectual capabilities of industrial companies — necessary for the application of DIAs — into intellectual capital. Intellectual capital consists of the results generated through the use of DIAs and, according to one of the founders of the theory of intellectual capital, L. Edvinsson [15], comprises three structural components (*Fig. 2*).

Let us examine which economic and social effects may be achieved from the use of different classes of DIAs as a tool for the intellectualization of industrial production, with respect to each structural component of intellectual capital (*Tables 2 and 3*).

The list of economic and social effects resulting from the use of DIAs for the intellectualization of industrial production is not exhaustive and may expand as DIAs continue to evolve.

Let us consider the conditions that must be established to achieve the above-mentioned effects and to enable the implementation of DIAs in the operations of industrial companies. In this context, “conditions” refer to the organizational, legal, and resource support required for this process.

1. Organizational and legal support for the

Table 1

Comparative Characteristics of Various Tokens

Criteria	NFT	Utility token	Asset-token
What does it provide?	Proof of ownership	Right to use an RIA	Ownership + commercial use of an RIA
Can it be sold?	Yes	Yes, if permitted	Yes
Does it grant usage rights?	No	Yes	Yes
Can it generate profit?	No	No	Yes
Example	NFT for a 3D engine design	Token granting the right to use software	Token for a patent with a licence

Source: Compiled by the authors.

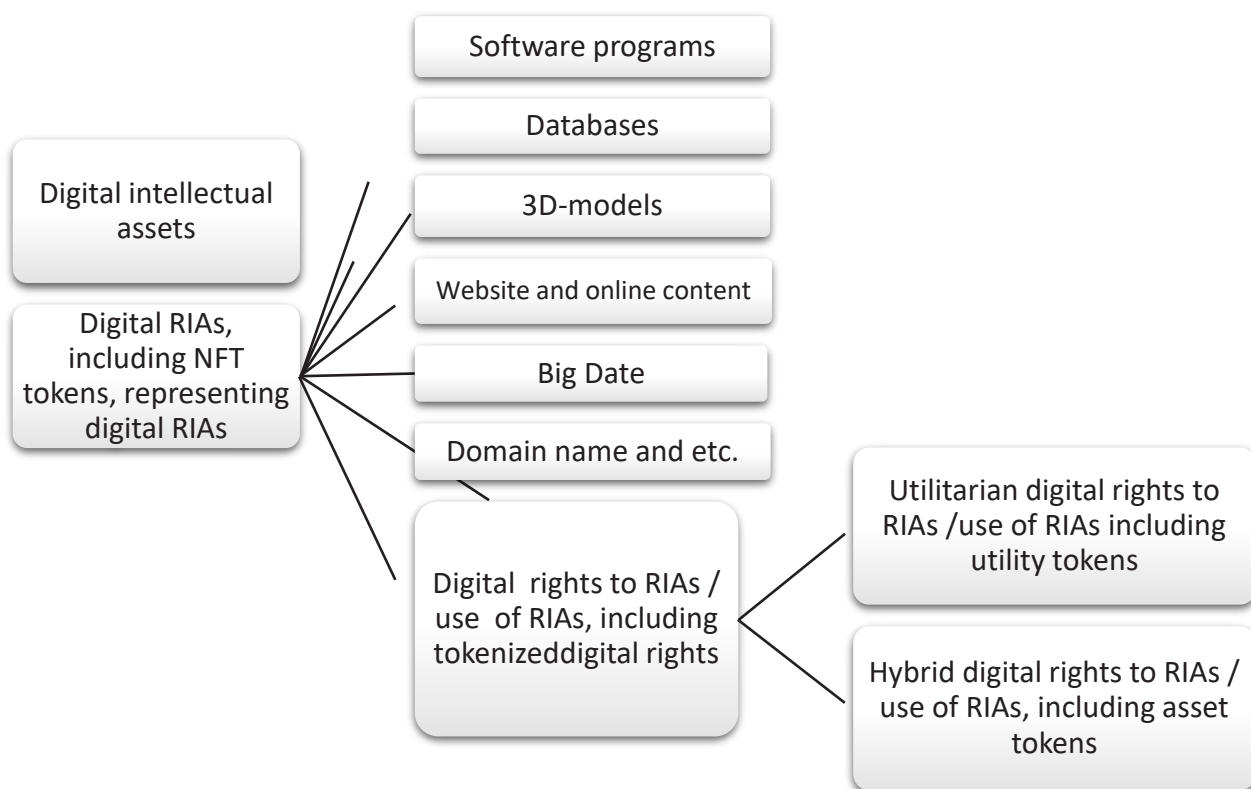


Fig 1. Classification of Digital Intellectual Assets

Source: Compiled by the authors.

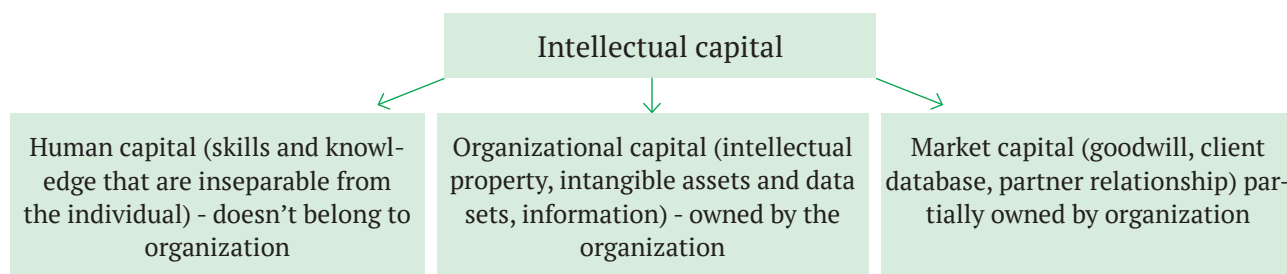


Fig 2. Structure of Intellectual Capital According to L. Edvinsson

Source: Compiled by the authors according to [15].

implementation of DIAs aimed at the intellectualization of industrial production involves, on the one hand, improving the regulatory framework in the field of DIAs and developing government support measures for industrial intellectualization as a whole. On the other hand, it requires the development of internal regulations, corporate standards, and the organizational structure of an industrial company, all of which should be oriented towards enhancing the efficiency of

business process digitalization and intellectualization.

The key directions for the development of Russian legislation in the field of digital assets (including DIAs) are presented in Fig. 3.

Organizational measures for government support may include:

- developing the infrastructure of a unified digital space, including the creation of state digital platforms for managing intellectual

Table 2

Economic Effects of Using DIA as a Tool for Intellectualization of Industry by Components of Intellectual Capital

IC components	Digital RIAs	Digital rights to RIAs (use of RIAs)
Human Capital	Increased employee income from managing and monetizing rights to RIAs	Expanded opportunities for commercializing own developments through new licensing formats
Organizational Capital	1. Growth of company revenues from internal use and commercialization of RIAs 2. Increased productivity through the digitalization of business processes based on RIAs	1. Companies can create new revenue models, e.g., licensing via smart contracts. 2. Expanded opportunities to attract additional investment in development through utility tokens. 3. Transparency of digital registries enables tracking of authorship and ownership of RIAs, reducing losses from counterfeiting and missed profits.
Market Capital	1. RIAs facilitate data exchange and scientific-technological cooperation between companies, increasing production efficiency. 2. New RIAs improve competitiveness and profitability through the development of customer-centric business models	1. Tokenization of RIA rights simplifies their sale, leasing, and transfer to third parties, reducing transaction costs. 2. Easy transfer of RIA rights via smart contracts supports faster adoption of advanced solutions in industrial production and increases the company's investment attractiveness.

Source: Compiled by the authors.

Table 3

Social Effects of Using DIA as a Tool for Intellectualization of Industry by Components of Intellectual Capital

IC components	Digital DIAs	Digital rights to RIAs (use of RIAs)
Human Capital	1. Development of innovative digital competencies among personnel. 2. Development of new forms of corporate training based on digital educational technologies.	1. Emergence of new professions and jobs related to the management of digital rights, data analytics, and cybersecurity. 2. New mechanisms for copyright protection.
Organizational Capital	1. Broader access to innovations and technical documentation through digital platforms. 2. Integration of RIAs into production processes reduces paperwork and supports environmental monitoring.	1. Simplified procedures for registering IP rights motivate companies to engage in innovative activity. 2. New forms of IP protection and commercialization foster the company's innovative development.
Market Capital	1. Enables dissemination of scientific discoveries and developments through open access, facilitating knowledge transfer. 2. New RIAs strengthen the company's business reputation as a technological leader. 3. Facilitates interaction with stakeholders within a unified digital industrial ecosystem.	1. Companies gain the ability to collaborate securely with partners worldwide by concluding smart contracts and remotely licensing joint developments. 2. Ensures transparency and controlled dissemination of RIAs under state regulation.

Source: Compiled by the authors.

property (national registries of patents, digital licenses, etc.);

- establishing innovative technology parks and competence centers for the implementation of digital RIAs in industry;
- creating sector-specific infrastructure for the commercialization of digital RIAs, including through the tokenization of digital rights to RIAs / use of RIAs;
- ensuring the participation of Russian companies in international distributed ledger systems for digital rights to RIAs / use of RIAs;
- concluding agreements with foreign partners on the mutual recognition of digital RIAs, among other measures.

Organizational and legal support for the effective digitalization and intellectualization of

business processes at the enterprise level should include the areas presented in *Fig. 4*.

2. Resource support for the implementation and use of DIAs aimed at the intellectualization of industrial production includes four fundamental components: financial, human, material-technical, and informational-service.

When considering the industrial sector as a whole, government support can undoubtedly play a key role in creating the necessary conditions:

1. Financial:

- allocation of grants to industrial companies engaged in the development and implementation of digital RIAs;
- provision of government subsidies, preferential lending programs, tax incentives, and

Harmonization of the taxation procedure for tokenized assets with the taxation of hybrid digital rights; establishment of VAT and personal income tax rules for transactions related to the issuance and execution of UDR and HDR, including RIA rights .

Creation of regulatory conditions for the tokenization of digital non-financial assets, including title NFT tokens, as well as development of procedures for accounting corporate investments in DFA and UDR, including RIAs

Establishment of legal conditions allowing clients to conduct transactions with digital rights through the existing financial infrastructure, including financial intermediaries.

Legal support for the execution of smart contracts on the platforms of information system operators (investment platforms) where DFA and UDR are issued; standardization of basic requirements for such smart contracts.

Harmonization of legislation governing the circulation and accounting of digital rights, including RIDs, with the legislation on the circulation and accounting of exclusive property rights in IP, including IA.

Fig 3. Main Directions for Improving Legislation in the Field of Digital (Intellectual) Assets

Source: Compiled by the authors.

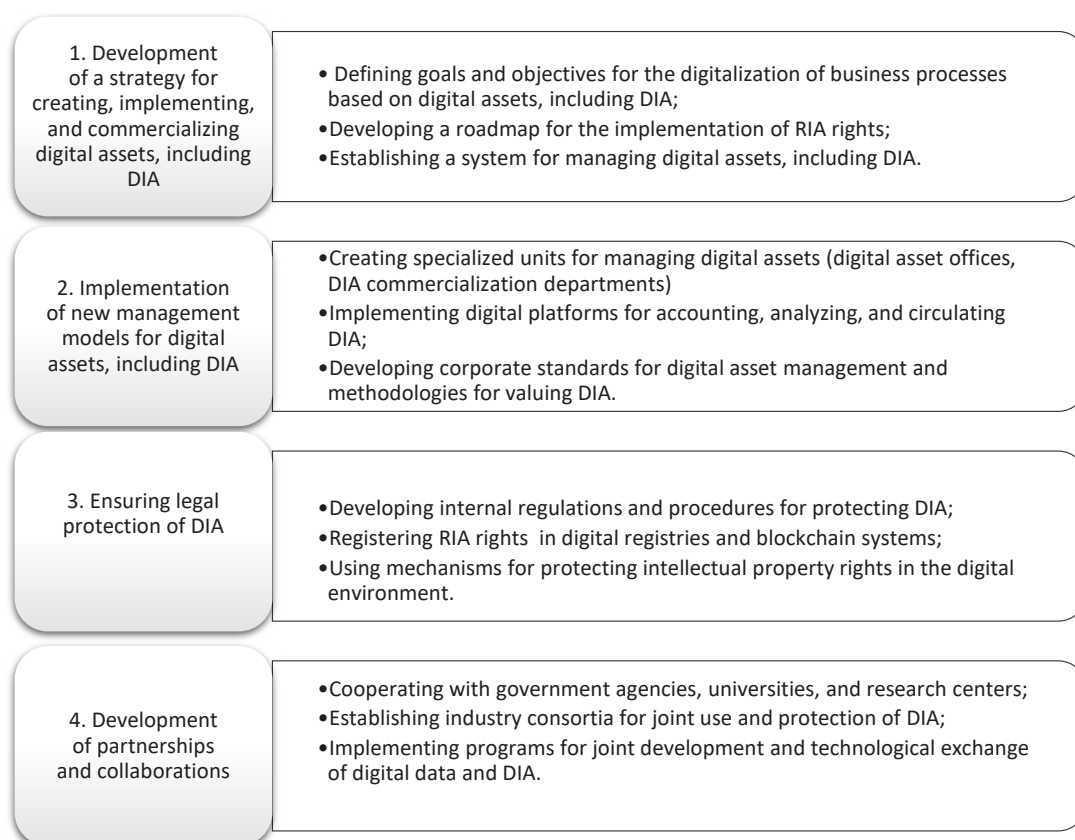


Fig 4. Organizational and Legal Conditions Created within a Company for the Use of Digital Assets, including DIA

Source: Compiled by the authors.

investment funds for innovative companies implementing DIAs.

2. Human Resources:

- introduction of educational programs on the creation and management of DIAs at universities and colleges, along with specialized training and professional retraining of personnel;
- development of collaboration between business and universities to facilitate knowledge exchange in the field of DIAs.

3. Material-Technical: This component supports the implementation of the organizational government measures described above, aimed at creating and developing infrastructure for working with digital intellectual assets, including:

- development of government platforms for buying, selling, and licensing digital RIAs, integrated with payment systems and IP management mechanisms;

- development of smart contracts for automatic transfer of rights and royalties;
- creation of an ecosystem for technology transfer (intellectual property exchanges).

4. Informational-Service:

- organization of government forums and exhibitions on digital intellectual assets in industry;
- publication of methodological materials and manuals for enterprises on DIA classes;
- development of an informational portal for businesses, including news, case studies, and successful examples of DIA implementation;
- establishment of government competence centers and analytical platforms on management, legal protection, and valuation of digital intellectual assets;
- ensuring cybersecurity for state-business interaction within the framework of the unified digital space.

1. Financial resources	• Allocating budgets and seeking extra-budgetary funding for the development, implementation, and commercialization strategy of digital intellectual assets (DIA); • Promoting venture and corporate investment in DIA.
2. Human resources	• Enhancing staff qualifications in the development, implementation, and commercialization of DIA; • Developing corporate training and retraining programs in collaboration with educational institutions.
3. Material and technical resources	• Developing and implementing corporate platforms for managing DIA; • Using blockchain technologies to ensure transparency and protect rights to RIAs; • Automating processes for licensing, rights transfer, and accounting of RIAs.
4. Information and service resources	• Developing cyber protection systems for intellectual assets; • Monitoring digital rights through smart contracts and secure registries; • Tracking unauthorized use of DIA; • Participating in various DIA-related forums and industrial exhibitions.

Fig 5. Resource Conditions for the Use of DIA in the Company

Source: Compiled by the authors.

Resource support for the implementation and use of DIAs as instruments for industrial intellectualization at the company level also requires a set of measures across these four components (Fig. 5).

Further research on DIAs as instruments for the intellectualization of industrial production could focus on specifying all the organizational, legal, and resource-related conditions, as well as the outcomes of DIA implementation, using concrete examples from Russian companies.

CONCLUSION

The conducted study allows the following conclusions:

1. Industrial intellectualization is understood not only as a process aimed at implementing digital technologies, primarily based on artificial intelligence, but also as the development of all elements of a company's intellectual capital through new opportunities arising from the use of DIAs.

2. DIAs are proposed to be classified according to their civil-law status in terms of exclusive rights to digital RIAs that exist solely in electronic form (e.g., computer programs, databases, 3D models, domain names, etc.) and digital rights to RIAs / the use of RIAs, including UDRs and HDRs. Based on the proposed classification, possible methods for the commercialization of DIAs are examined.

3. The economic and social effects of applying DIAs as tools for the intellectualization of industrial production are revealed. It is established that the use of DIAs allows industrial companies to reduce costs, accelerate the adoption of innovations, increase investment attractiveness, and protect intellectual property. From a social perspective, this leads to the creation of new professions, greater customer-centricity in the economy, enhanced trust in the business environment, improved corporate reputation, and broader access to advanced technologies for economic actors and

society as a whole. At both the macro and micro levels, the organizational, legal, and resource-related conditions necessary for leveraging DIAs to achieve socio-economic effects in industrial intellectualization have been identified.

The results obtained by the authors may be useful to the management of industrial (and other) companies when developing their own digitalization strategies that take advantage of the benefits offered by DIAs.

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