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Arctic Corporations and Development Risks: Challenge and Response *

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Abstract. The realities of the Russian Arctic in recent decades make it possible to determine a special phenomenon of corporate development risks, which can be structured into resource, institutional and ecosystem risks. The resource risk reflects the contradiction between the conjuncture of the global resource markets and the specific conditions for the development of unique deposits located in the Arctic zone; institutional risk — between federal norms and rules for the development of natural resource deposits and local specific conditions for the construction and operation of resource facilities in the Arctic; ecosystem risk reflects the contradiction between large-scale economic activity and the fragility of Arctic natural systems. As a result of a comparative assessment of the development risks of three Arctic corporations in Russia, it was found that the highest risk is typical for the facilities of Norilsk Nickel, the lowest — for NovaTEK, and Gazpromneft is in the middle. Using the OLI paradigm of John Dunning, it can be argued that Arctic corporations respond to the challenge of development risks by adapting their spatial, institutional and organizational structure to the conditions for the development of resources and resource territories. The spatial factor is most efficiently used by Norilsk Nickel, then NovaTEK, in the strategy of adaptation to development risks, with the receipt of benefits from localization and the creation of a regional cluster, while Gazpromneft is the least effective. The institutional factor is most effectively used by NovaTEK and Gazpromneft, and the least by Norilsk Nickel. The organizational and structural factor as a tool for adapting to risks is most skillfully used by Gazpromneft, weaker — by NovaTEK and Norilsk Nickel. Integrally, the best positions in the strategy of adaptation to development risks are held by Gazpromneft, and the worst positions by Norilsk Nickel, which has the most significant contrast between the size of development risks and the means of adaptation to them. Strengthening the internal competencies of the company and its corporate innovation system is the most important way to successfully cope with the high risks of corporate development of resources and spaces of the Arctic.
Keywords: *development risk, Arctic corporation, OLI paradigm, risk adaptation strategy.*

Introduction

High corporatization is a specific feature of the Arctic and Northern economies [1]. For example, a comparison of the structure of investments in fixed assets shows a twofold excess of the Arctic share in expenditures of production drilling associated with the production of oil, gas and gas condensate extraction, other expenses and costs in fixed assets, which are usually carried out by large corporations — 15.1 % versus 7% in Russia as a whole (section "other investments") [1].

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[1] Statistics of the socio-economic development of the Arctic zone of the Russian Federation. URL: https://rosstat.gov.ru/storage/mediabank/rz0CLQRR/Calendar1-2021.htm; https://gks.ru/free_doc/new_site/region_stat/arc_zona.html (accessed 11 June 2021).

Numerous statistical comparisons of the coastal Arctic territories with areas of the "continental", mainland North, confirm that within the single zone of the North, the Arctic is significantly more corporate in terms of the institutional structure of the economy than other northern areas. For example, the share of corporate income tax and property tax in the total tax revenues of the consolidated regional budgets is higher here [2]. This feature of the Arctic was clearly manifested during the COVID-19 pandemic in 2020, when in certain "corporate" territories, companies essentially took over the state functions of the "high readiness" regime — and not only in matters of free distribution of masks, provision of PCR tests at Arctic airports, but also in support of small and medium-sized businesses in the regions where corporations are present (subsidies for the delivery of goods, interest-free loans for development, etc.) [3].

Arctic corporations face unprecedented risks compared to the more standard and predictable conditions of a large company, for example, in the manufacturing industry in long-established areas. This is evidenced by the frequent postponements of the implementation of large resource projects, and sometimes even their complete cancellation (or postponement for an indefinite period), as was the case with the Shtokman gas condensate field. In this regard, a business decision has to be considered in the context of the extent to which it reduces or increases the total amount of risks and whether the expected super-profits, for which it operates in the Arctic, outweigh the possible damage from the risks of specific development projects.

In the Arctic, therefore, business risks cannot simply be reduced to questions of financial insurance. These are the problems of the entire company's activity, all of its strategic decisions, the whole complex of planning of current and future activities. Corporate risk acquires an integral, expanded interpretation, and all the economic behavior of corporations should be understood in the context of the colossal risks arising here: either as a desire to cope, neutralise, or vice versa — to accept them deliberately.

The subject of this article is the topic of development risks that are forcedly borne by companies operating in the Arctic, and the object of the study is three large Russian corporations, the main material assets of which are located in the Arctic zone: PJSC NovaTEK, PJSC Gazpromneft and PJSC MMC Norilsk Nickel (NovaTEK, Gazpromneft and Norilsk Nickel).

The main research question (objective) of the paper is how do the three Arctic corporations respond to the challenge of high development risks in their current operations? This objective required the solution of three tasks:

- to conduct a comparative assessment of the Arctic companies' development risks (to develop the necessary approaches and methodology);

[2] Calculated on the basis of tables given in the collection: Problemy Severa i Arktiki. Vyp. 5 (razdel «Itogi 2006 goda»). Sovet Federatsii. 2007 god [Problems of the North and the Arctic. Issue 5 (section "Results of 2006"). Council of the Federation. 2007], p. 41–42.

[3] Nornikel': Otchet ob ustoychivom razvitii 2020. Nash Krayniy Sever [Norilsk Nickel: Sustainability Report 2020. Our Far North]. 127 p. URL: https://www.nornickel.ru/files/ru/investors/disclosure/NN_CSO2020_RUS_28.04.pdf (accessed 12 June 2021).

- to show through the evolution of the three components of J. Dunning's OLI paradigm [2] how companies cope with the challenge of development risks;
- to assess the role of companies' competencies and accumulation of knowledge potential for a successful response to development risks.

The novelty of this work lies in the introduction of a new concept of exploration risk, its structure (as a result of integrating our work on the development of the Arctic 2.0 [3] and the classic works of F. Knight [4] on risk and uncertainty and D. North on natural and social risks [5], developing a methodology for comparative assessment of corporate exploration risks and the main forms of company adaptation to them) in Arctic research.

Research methodology. Materials and methods

The core of the proposed methodology is the new concept of development risk, which, in contrast to individual risks (for example, ecological, financial, property, etc.), has a more complex and qualitative (difficult to measure) nature. Development risk emerged as a distinct phenomenon in the Russian Arctic in the 1990s with the transition from the state to the market-oriented, corporate development model. Our numerous recent works are devoted to understanding of its new nature, spatio-temporal organization, territorial framework and other basic features [6–8].

In the state model, the development risk was "dissolved" within a single national-economic complex. However, everything changed with the transition to the corporate model, when it became isolated, and resource corporations began to carry it as the main actors in the modern development process of the Russian Arctic.

The development risk is the sum of private risks (ecosystem, resource and institutional), which characterizes the significant uncertainty in the process of involving large deposits and natural resources areas in the Arctic into the market circulation, varies between the poles of maximum continuity and maximum discreteness, up to stopping the entire process of economic development. The development risk includes threats to corporations at all stages of the deployment of economic development in the Arctic: search (information), construction and operation of resource facilities, promotion of the resource chain to the main world markets. The development risk includes a natural component, which depends on the state of the natural environment and the resource base, and a closely interacting social component, which is associated with the processes taking place in society at different levels — local, regional, national and global. It is the development risk as a complex, integral phenomenon of economic activity in the Arctic that determines the main decisions of the companies operating there.

The internal structure of the development risk is formed by those particular specific components (resource, institutional, ecosystem risks) that reflect the fundamental contradictions in the process of modern economic development of the Arctic. This makes it possible to assess these risks in terms of the strength and severity of the contradiction (imbalance).

Resource risks (global contradictions) can be understood as contradictions of not always reliably determined local (attractive) conditions between local (attractive) conditions of mineral and raw material base, which are not always reliably determined, and its geological and economic evaluation; and the constantly changing and hardly predictable global price of key resources of the Arctic, which can radically increase or nullify the profitability of many Arctic natural resources. In view of the geological uncertainties typical for many Arctic land and shelf areas, uncertainties often exist about the actual size of the resource base. These uncertainties are reinforced by the typical transport inaccessibility of the Arctic resource project.

Institutional risks (contradictions between assets and institutions) can be understood as a tension between the state of the company's main natural and material assets in the development areas, which, as a rule, is very changeable and mobile, and more inertial institutions of the federal and regional levels, which determine the conditions for involvement Arctic natural resources into the market. The phenomenon of institutional remoteness, first described by the Alaskan economist Lee Husky [9], illustrates this contradiction. Local conditions for exploiting natural resources in the Arctic are usually highly specific. Meanwhile, the basic norms and rules, the institutional framework that defines the basic conditions for their exploitation, are far removed from national centres and very often cannot account for the local features of a particular resource object in the Arctic. This is how a conflict arises between changeable assets and inertial institutions, described by Karl Marx for the macro level as a conflict between productive forces and production relations [10].

Ecosystem risks (natural and economic contradictions) reflect the inevitable conflicts of economic development and the limited carrying capacity of the Arctic natural systems. In view of the new climatic dynamics (the average annual temperature fluctuating much more rapidly in the Arctic than in the rest of the world), the role of natural turbulences is again rising, as in the period of pioneering economic development of the Arctic in the early industrialization era. The previous topic of the Arctic ecosystems fragility to anthropogenic, economic impact [11] is replaced by vulnerability of the economic, corporate activities in the face of rapid and unpredictable changes in the natural environment and climate. The current features of Arctic ecosystems (thawing of permafrost soils, increasing climatic variability, reduction of the area covered by Arctic sea ice, increasing of snow cover thickness in many Arctic terrains, etc.) are the source of most serious risks for the companies working there.

The nature of the internal structuring of the development risk into private risks (resource, institutional, ecosystem) significantly depends on the previously discovered fundamental dichotomy of the Arctic resource development process: from scratch — greenfield projects of pioneering development or projects based on the infrastructure of the previous layer of development — brownfield [12].

In greenfield projects, development risk depends on the company's current actions and decisions. As examples of Russian corporations show, an effective way to reduce risks is to scale (rep-

licate) the success of a pilot project to subsequent projects. This saves on knowledge and training and radically reduces risks.

Brownfield projects, on the other hand, are heavily path-dependent: the risks inherited from the past prevail, for example, from previously unfulfilled necessary expenses to renew obsolete equipment. In these projects, development risk is strongly influenced by social factors, uncertainties in the socio-economic environment of the global, national, and local levels. On the other hand, in greenfield projects, development risk is strongly influenced by uncertainties in the resource base, natural environment and climate.

Previous scientific publications on risk assessment of corporate activities in the Arctic [13, 14] tend not to distinguish strongly between greenfield and brownfield projects, and often focus on the risks associated with only the first group of projects. However, the accident at TPP-3 in May 2020 in Norilsk city clearly demonstrated the need to differentiate the risks of new and old projects.

The traditional view that only new Arctic projects carry significant risks for corporations, and that there are no development risks in brownfield projects, should be revised. Due to significant depreciation of equipment, the risks of old development projects may be higher than those of greenfield ones. It is no coincidence that Arctic corporations often prefer to build a project and a development base from scratch, even having a close alternative in the form of an already existing development base or an abandoned resource project of the previous development cycle.

A significant advantage of the development project from scratch is that it is possible to implement a modern high-tech scheme immediately, updating all the advantages of the latest intellectual achievements and organizational, financial schemes, and immediately resolve those issues that have not been solved for decades at old fields and resource facilities of other companies. This advantage of lower development risks of greenfield projects can even, as the recent history of Russian corporations shows, overlap the difficulties of complex, heterogeneous natural assets and the insular position of new development territories, which differ from brownfield Arctic projects in their location in areas with limited, seasonal delivery schedules.

OLI-paradigm of D. Dunning [2] in its classical interpretation is used to characterize the strategies of economic behavior of multinational corporations in the manufacturing industry of developed countries. In this study, it is used for the first time to characterize the response of resource corporations in the Arctic to the challenge of development risks. This is entirely appropriate that, given the high uncertainty of the natural and socio-economic conditions for the Arctic resources development, the companies operating there rely to a much greater extent on non-financial methods of neutralising and adapting to risks through shifts in their territorial, organisational, and institutional structure.

Thus, the main methodological framework of this study was the research on the phenomenon of Arctic exploration 2.0; the views of F. Knight and D. North about fundamental differences between types of risk: measurable risk and immeasurable uncertainty, risk from the physical envi-

ronment and risk from social environment and systems; J. Dunning's empirical OLI-paradigm for describing the behavior of multinational companies in conditions of high development risks.

The empirical data for the study was the annual reports of three Arctic corporations — NovaTEK, Gazpromneft and Norilsk Nickel for the entire period of their publication on the companies' websites [4].

Research results

1. Assessment of development risks of Arctic corporations

It is not enough to simply note that the pressure of risks and uncertainty on Arctic corporations is significantly higher than on large companies in the manufacturing industry in densely populated regions of Russia. They have a completely different nature (Table 1).

Firstly, for all Arctic corporations working in both greenfield and brownfield projects, the value of the uncertainty created by the natural environment is always higher than that of companies in the temperate zone. They are more exposed, directly related to its rhythms, force majeure, tied to its resource potential more than their counterparts in the main settlement areas, where the impact of the natural environment is suppressed by social and economic processes.

Secondly, the location of the main material assets of an Arctic corporation is determined by production factors (S-factors), including the most important one — the uneven distribution of unique natural assets across the territory and water area. On the other hand, the location of core material assets of classic companies in developed countries is determined by proximity to the consumer (D-factors). In textbooks on regional economics and distribution of productive forces, this difference is recorded as distribution according to Weber or Lesch-Kristallller [15]. In the first case, the risks depend on the capriciousness of the development of large, unique, “talented”, “single” resources; in the second — from the capriciousness of numerous atomic consumers, their changing values, fashions and trends. In the first case, production factors put pressure on the company roughly, rigidly, without any alternatives and more sudden; in the second case, it is softer and, as if more spread over time, giving the possibility of gradual adaptation to them.

Thirdly, for resource corporations in the process of natural assets development of the territory, the issue of transport logistics and large physical volumes of cargo becomes urgent — first for the delivery for the production site arrangement, then for the export of multi-tonnage resource products. The pressure of the physical cargo volumes to/from a remote, peripheral territory creates production and logistics risks and challenges that merge together. If they are not handled, the entire development project may “drown”. On the other hand, logistical issues do not pose any particular risks for large corporations in well-equipped, well-developed regions. Here, the main issue for launching a new project is the formation of a sufficient pool of investment resources. For Arctic projects, this is not enough.

[4] NovaTEK: annual report 2005–2019, company sustainability report 2004–2019; Gazpromneft: 1999 (Sibneft) - 2019; Sustainable Development Report 2007–2019; Norilsk Nickel: Annual Report 2008–2019, Corporate Social Responsibility Report 2008–2019.

Fourthly, if we consider the corporate innovation system, the main risk for the Arctic corporation is the imbalance in the interaction of the search and operational subsystems, i.e. the failure to ensure the repayment of reserves as a result of production by the growth of new, profitable for the development, natural resources. This imbalance is objectively built into the innovation system due to the inevitable depletion of once discovered unique deposits of natural resources. On the other hand, there is no such doom in the innovation system of manufacturing companies: new R&D discoveries are able to maintain the stability of the production subsystem for a long time [16].

Fifthly, the leading natural resource risk of the Arctic corporation's activities leads to the fact that all three components of the Dunning paradigm — accommodation, institutional and organizational — are aimed primarily at neutralizing it. On the other hand, for processing enterprises, the main risk is associated with the threat of incomplete consumption of manufactured products, and the main components of the Dunning paradigm (O, L and I) are directed to its extinguishing.

Indirect evidence of the high risks of development activity in the Arctic is the significant mobility of spatial (determined by the location of licensed areas of exploration and production activity and large processing industries), organizational (determined by the evolution of the company's internal management structure) and ownership structure (determined by processes of nationalization/privatization, mergers/acquisitions, formation of joint ventures, changes in the structure of share capital, etc.) of manufacturing enterprises. It can be assumed that there have not been such constant rapid changes in the structure of large manufacturing companies in Russia in the last two decades. The external rapidly changing natural and social environment of the activities of large Arctic corporations carries constant risks, which are forced to follow the same quick reaction of the internal structure of companies.

Table 1

Risk and the corporation: differences between mining and processing enterprises

	Resource corporation	Processing MNC
1. The ratio of natural and social risk	All three components of the development risk — resource, institutional and ecosystem — depend in a decisive way on environmental factors, the role of the social environment at all levels in the overall risk is significant, but secondary.	Factors of the social environment, social interactions have the main, primary significance in the total risk of the company. Natural factors (natural environment, climate, ecosystems) are secondary.
2. Factor/demand allocation of the company's main tangible assets	The aggregate risk is non-alternatively determined, first of all, by the presence of unique, single, "talented" production factors, without which the development process will not begin.	The aggregate risk depends on the need, the demand for the manufactured products of numerous atomic consumers, determined by fashion, trends, tastes.
3. Physical volumes or financial resources	The aggregate risk is determined by the transport and logistics factors of transportation of significant physical volumes of material and natural resources.	The aggregate risk is determined primarily by the possibility of forming the required pool of investment (financial) resources.

4. Subsystems of the corporate innovation system (research and implementation)	Risk of inevitable depletion of a once discovered resource province and an increasing imbalance between exploration and production subsystems.	There is no doom of growing imbalance: new discoveries in the research subsystem can support the stable operation of the production system for a long time.
5. OLI-paradigm for corporate risks	All components work to protect against natural resource risks.	All components work to protect against the risks of underconsumption of manufactured products.

Against the background of strong development risks of Arctic corporations, the profile of each company is specific. Let us consider the comparative strength of resource, institutional and ecosystem risks for NovaTEK, Gazpromneft and Norilsk Nickel (Table 2). The assessment was carried out for each type of risk based on the strength of internal contradictions specific to each type of risk — strong, moderate, weak.

Table 2

Comparative assessment of development risks of arctic corporations

Types of risks	NovaTEK	Gazpromneft	Norilsk Nickel
Resource	1*	2	2
Institutional	1	2	3
Ecosystem	1	2	3
Total development risk	3	6	8

*1— weak, 2 — moderate, 3 — strong.

The resource risk is minimal for NovaTEK, because the company specialises in the production of liquefied natural gas, the world market of which has been growing rapidly in recent years. Therefore, the contradiction between global demand and local resource potential is minimal here: all gas fields assets involved in corporate turnover are doomed to be in demand on global markets. Resource risk is higher for Gazpromneft because the company has deposits and assets on the Arctic shelf, the demand for which is lower in the near future due to significant costs and complexity of development and operation of such fields. Overall, the company's resource risk is moderate. Norilsk Nickel produces a wide range of non-ferrous and noble metals, each of which has its own, sometimes contrasting, specific global market conditions. The exploitation of the unique Norilsk deposits has been in production for over 90 years and the first signs of depletion are likely to appear. Therefore, the interaction between the local natural resource potential and global markets is problematic and highly probabilistic for the corporation here, so the resource risk is moderate.

Institutional risk, defined by the severity of the contradiction between natural assets and external institutions that determine the regulations for mining activities, is minimal for NovaTEK: in recent years, as a result of skilful lobbying of its interests by top government officials, the company has achieved uniquely favourable regulatory and legal conditions for its activities. The main adopted strategic documents of the federal level (Energy Strategy [5], Development Strategy of the Arctic Zone of the Russian Federation [6]) contain special provisions for the company's projects.

[5] Rasporyazhenie Pravitel'stva Rossiyskoy Federatsii ot 9 iyunya 2020 g. № 1523-r «Ob Energeticheskoy strate-gii Rossiyskoy Federatsii na period do 2035 goda» [Order of the Government of the Russian Federation of June 9, 2020 No.

On the other hand, Gazpromneft has less lobbying potential and opportunities to "exclusivise" each of its projects, which was demonstrated, for example, by the long period of normative integration of the Prirazlomnaya shelf project into the context of federal legislation. NovaTEK has proceeds according to the format of exclusive separation of its projects into a "separate production", while for Gazpromneft it looks like a more labour-intensive and agonising process of fitting a unique project into the context of dozens of existing normative legal acts. The status of a subsidiary (spin-off) of Gazprom also prevents the company's top managers from actively lobbying for their projects at the federal level. Therefore, there is a moderate institutional risk. In general, Norilsk Nickel today has no exclusivity in the regulatory "arrangement" at the federal level: the company works on a common basis with all others, regardless of its Arctic status, and encounters attempts to create competition for it on the part of other mining companies at the federal level. Institutional risk in this case is high.

Ecosystem risk is determined by the severity of natural and economic contradictions, conflicts between the fragile Arctic natural environment, rapid climate change and development activities. In a broad sense, ecosystem risk also includes the conflict between the traditional way of life of the indigenous small-numbered peoples of the North and the deployment of mining activities in the territories of their traditional residence. So far, NovaTEK has been able to cope with the challenges of the interests of indigenous peoples in the regions of its development, there are no major conflicts between traditional and new types of economic activity. Although critics note the risks of Sabetta, the company's flagship project, repeating the fate of the modern depressed Igarka (formerly a showcase of the Soviet Arctic), its current situation with permafrost and Arctic ecosystems looks favorable. Gazpromneft has more ecosystem risks: simply because the company's production sites are extremely dispersed, the uncertainty that the natural and economic balance may be disturbed in an onshore or offshore area is higher. However, Norilsk Nickel has the highest ecosystem risk due to its long-term presence in the territory of permafrost, which, under the influence of rapid climate changes, has begun to degrade in recent years.

Thus, Norilsk Nickel has the highest aggregate development risk, while NovaTEK has the lowest one (Table 2). Comparative risk assessment clearly demonstrates that in the Arctic the risks of continued activity in the old industrial territory may be higher, despite its better infrastructure and urbanization, compared to the areas of new development. One of the reasons for this is a radical change in the entire model of economic development of the Arctic in the early 1990s: as a result, companies that were ready to start a new development from scratch, without burdening old assets and problems of the old economic system, have gained an advantage. This contains the Arc-

1523-r "On the Energy Strategy of the Russian Federation for the Period up to 2035"], N 0001202006110003. URL: https://docs.cntd.ru/document/565068231?marker=65A0IQ (accessed 12 June 2021).

[6] Ukaz Prezidenta Rossiyskoy Federatsii ot 26.10.2020 № 645 «O Strategii razvitiya Arkticheskoy zony Ros-siyskoy Federatsii i obespecheniya natsional'noy bezopasnosti na period do 2035 goda» [Decree of the President of the Russian Federation dated October 26, 2020 No. 645 "On Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 203 "]. N 0001202010260033. URL: https://docs.cntd.ru/document/566091182?marker=25UINTU&section=text (accessed 12 June 2021).

tic paradox: with a radical change in the model of economic development, the advantages of the old development infrastructure seem to be zeroed out, because companies are implementing greenfield projects on completely different principles, territorial structures, etc. The Jack London effect [17], when the infrastructure of the former development actively helps to start a new cycle, works only if the principles of the assimilation model itself (for example, corporate-market) are preserved intact. When the model changes, for instance, from government to corporate, the Jack London effect is significantly weakened or completely nullified.

2. OLI-paradigm as a tool for determining the forms of company's adaptation to development risks

It is not the development risks themselves that matter, but the company's response to them. Dunning's OLI-paradigm, developed for a large multinational company, provides us with a tool for analyzing how Russian Arctic corporations adapt to the high risks of economic activity in the Arctic.

2.1. L-factor: social embeddedness + territorial integration (compactness)

This factor (it can be called geographical factor — L — location) is responsible for company's relations with the territory of its presence and for spatial location of the license areas and main processing centres of the company. Skillful L-factor maneuvering can reduce development risks of a company.

Ideally, the company's high social rootedness in the territory of its presence simplifies the process of its "saturating" with local specifics and learning in the process of development activities, which are important for the elimination or reduction of Arctic risks due to the actualization of the potential of implicit local knowledge. It is important to emphasize that this is not the usual corporate social responsibility of a company in the territory where it operates, but the active involvement of dispersed local knowledge and local experts in the production process, exploration and extraction activities. Because, as shown by numerous works [18, etc.], only the simultaneous accumulation of local and global knowledge ensures the success of the corporate innovation system and development innovation process.

The most striking indicator of the degree of social rootedness of a company is the relationship with the nearest urban development base. Modern realities confirm that Arctic companies are actively "grope", which of the nearest urban settlements are able to perform effectively the functions of expert support for a new project before and during the new development process. On the other hand, the fact of transferring the local headquarters of the company from the nearest town to a distant one, i.e. the fact that the local town loses the function of local / outpost base for development, indicates the company's disappointment in the intellectual potential of the local base or further resource prospects of this territory (for example, transfer of the headquarters of Lukoil from Naryan-Mar to the Usinsk city in the Komi Republic). It is no coincidence that after the accident at TPP-3 in May 2020, Norilsk Nickel made active efforts to cooperate with the admin-

istration of the city of Norilsk on the risks and opportunities associated with climate change, i.e. to intensify exchanges of tacit knowledge with local experts.

Practice shows that the more specific the resource is, the more it requires creation of associated infrastructure and production facilities, the more socially embedded the company is (for example, gas production provides a higher social embeddedness than oil one).

Indeed, the degree of social embeddedness, which is important for minimizing development risks, may differ significantly from full integration of the company into the local innovation system and the economic development of the nearest city-base (as a result of active subcontracting with the local manufacturing business, the company has created a production cluster, there is a network / association of local suppliers, etc.) to the situation of complete alienation from innovative processes in the nearest base city, when its participation is limited to festive events and the construction of social (leisure, sports) objects. For example, Norilsk Nickel is firmly integrated with the city of Norilsk, Gazpromneft's integration with the outpost base city of Noyabrsk is average, and NovaTEK's integration with the capital of the Purovskiy District and the company's local headquarters — Tarko-Sale — is weaker (Table 3).

Territorial integration (compactness) means the possibility of obtaining regional effects using common infrastructure, routes and development bases. No less important (and new in comparison with the previous development of the late Soviet period) is the possibility, with a compact, geographically close location of mining sites, to actualize the effect of scaling — replication of advanced techniques, organizational and management practices worked out at the pilot facility to neighboring projects, which provides important savings in knowledge in the face of high arctic risks.

The champion of territorial integration is NovaTEK, which carries out all its production activities in the Yamalo-Nenets Autonomous Okrug, has two clearly defined northern and southern mining zones, in which the license areas are located extremely compactly. In the south, they are confined to the gas transmission pipeline system, in the north — to the marine logistics of the delivery of construction equipment and main production modules, as well as the export of liquefied natural gas. The production activities of Norilsk Nickel are highly integrated within the Norilsk industrial region, but the company has production assets technologically connected with Norilsk in the Murmansk region. Because of this, the degree of territorial integration of Norilsk Nickel can be considered moderate. Gazpromneft is minimally integrated: due to the fact that Gazprom transferred all its oil assets to a subsidiary, they are presented as if in bulk, and it is impossible to obtain a regional effect on them. It is no coincidence that the company is making super-efforts to remotely communicate its fragmented areas and link them to the intellectual headquarters in St. Petersburg.

It turns out that Norilsk Nickel and NovaTEK use L-factors in neutralizing development risks most actively, while Gazpromneft uses them minimally (Table 3).

Table 3

Adaptation of companies to development risks through L-factors

	NovaTEK	Gazpromneft	Norilsk Nickel
1. Social embeddedness	1*	2	3
2. Territorial integration (district and localised effect)	3	1	2
Total by L-factors	4	3	5

*1 — factor is not used, 2 — used in moderation, 3 — used actively

2.2. O-factor: the genesis of the company + the ability to create a joint venture

The founder of the OLI-paradigm, J. Dunning, understood the O-factor as ownership of the company's assets. Specifying and narrowing its concepts for the real conditions of origin and evolution of Russian Arctic companies to make them more tangible (up to the possibility of expert scoring), based on the empirical generalization of the annual reports of NovaTEK, Gazpromneft and Norilsk Nickel, we will understand this component as the circumstances of the company's birth, which determine much in its current ownership structure and behavior in matters of acquisition and sale of assets; and in a more particular sense — as the ability to create joint ventures with other companies, i.e. to maneuver their property, pooling assets and competencies with partners, and thereby effectively reduce the significant risks of new development projects.

Consider how the genesis of a corporation affects its ability to cope with development risks. Norilsk Nickel was established as a state enterprise about 90 years ago, underwent denationalization and privatization during the years of Russia's radical economic reforms, and became a private resource corporation with a diversified share capital structure. Despite the change in the form of ownership, the company has nonetheless retained the social and industrial complex of the Norilsk industrial region: today it owns over a hundred production and service companies in the transport, energy, logistics, repair, and social institutions. This is an unprecedented phenomenon for a private company not only for the Russian, but also for the global Arctic. In fact, the phenomenon of the resources and territory development in the Arctic is preserved here in the integrated sense (with a wide plume of "departmental" objects), as was accepted in the Soviet model of economic development of the North (Table 4). For the company, however, this means significant risks of responsibility for the entire local social and production system not just the natural resource extraction process.

Table 4

Adaptation of companies to development risks through O-factors

	NovaTEK	Gazpromneft	Norilsk Nickel
Genesis of the company	3	3	1
Ability to create JV	3	3	1
Total by O-factors	6	6	2

*1 — factor is not used, 2 — used in moderation, 3 — used actively

In addition, the decades-long development trajectory of the corporation's local natural resources inevitably leads to rutinisation of the process and a lack of innovation. The risks of proper-

ty liability for everything are partially neutralised by deliberate risk avoidance in the development and implementation of a production strategy, which remains very conservative.

The situation is completely different for Gazpromneft, which, after the transformation of Sib-Neft, became a subsidiary of Gazprom, which took over the main oil assets of the parent company. This dependent ownership structure allows Gazpromneft to redirect (impute) the main risks to the parent company and makes its position in this respect comfortable and free enough for innovative experimentation (there is always a solid support foundation). In contrast to Norilsk Nickel, the ownership structure of Gazprom's subsidiary, which has been formed due to its genesis, damps the risks and allows Gazprom Neft to be exceptionally bold in implementing new offshore projects, new logistical schemes, etc. Without a conservative parent company (ready to absorb the risks of an experimental subsidiary), this would be much more difficult.

The situation is completely different for NovaTEK, which is an Arctic startup in the full sense of the word and, unlike Norilsk Nickel, has neither the traditions of three generations of employees during almost a century of development of Norilsk deposits, nor a large conservative parent company, like Gazpromneft. In its modern form, the company was assembled on the competencies of three key top managers: construction project manager L. Mikhelson, geological manager A. Natalenko, and financial manager M. Jetvey. Apart from tangible assets, the ownership of the key competences of the three main top managers played an exceptional role in the company's assembly in the zero years. They were designed to reduce the initial development risks at the sites of the Yamal gas condensate fields in the Purovskiy region (today the so-called southern zone of the company's activity).

Further expansion of the company's activity to the north of the Yamalo-Nenets Autonomous Okrug, to the Yamal and Gydan peninsulas, was associated with the formation of strategic technological, property and financial partnerships with large Chinese, Japanese investors and the French oil and gas company Total. Therefore, the Yamal LNG and Arctic LNG 2 projects received the status of NovaTEK joint ventures. In order to mobilise limited investment resources for several projects at once, the company weakened its sole ownership rights by forming the joint venture consortia Yamal LNG and Arctic LNG 2.

In this ownership configuration — with the legal separation of each new project within the parent company — a portfolio approach was implemented to neutralise development risks: the more stand-alone projects in the company's portfolio, the lower the overall development risk increase for the entire portfolio (individual project development risk is higher than the total risk increase after a new development project is launched).

Compared to Gazpromneft, the situation is reversed: in the first case, development risks are damped by the possibility of redirecting them from the parent company's subsidiary in case of emergency; in the case of NovaTEK, there is no external formation of a new spin-off legal entity, but an internal one (what is called a spin-out in Western literature).

The three Arctic corporations in Russia are radically different in their ability to create joint ventures that ensure consolidation of financial, material assets and competencies, thereby reducing development risks. It should be emphasized that we are considering intercorporate partnerships at the stages of the development process, that is, in search, exploration, construction and operation. Moreover, each company has numerous cooperation agreements with universities, industrial associations, institutes of the Russian Academy of Sciences, etc. We are primarily interested in cooperation between corporations in the economic development of resources and territories of the Arctic.

The leader in this process is NovaTEK (Table 4) that forms every new project as an international consortium of companies, banks and funds, i.e. it actively uses the legal framework of JV to develop its fields.

Gazpromneft is a similar leader, using the legal form of a JV for prospecting, exploration and development, i.e. to mitigate risks at all stages of the development process (from pioneering studies to construction and operation) by entering into intercorporate alliances, including those with NovaTEK. Inheriting the tradition of Sibneft, which was one of the leaders among Russian oil and gas companies in cooperation with foreign production and service partners, Gazpromneft is forming a joint venture for prospecting and exploration in areas of poor exploration and remoteness, such as with Shell in the northeast the Gydan Peninsula [7].

Norilsk Nickel, on the other hand, has long made no efforts to form joint ventures in certain areas of its deposits in the Norilsk industrial area, the Murmansk region, and the Trans-Baikal Territory. In 2018, the first agreement of intent to create the Arctic Palladium JV was signed between Norilsk Nickel and Russian Platinum, but in 2020 Russian Platinum withdrew from the agreement — it was not possible to create a joint venture. The reasons are clear: Norilsk Nickel incurs huge costs to maintain the production system and the entire life support system of the Norilsk industrial island area. In these conditions, any partner or incoming company automatically becomes a “free rider”, i.e. it uses the infrastructure and the entire social security system that has been created for decades and is supported annually at the cost of significant efforts and risks of Norilsk Nickel with minimal costs. The reluctance of Norilsk Nickel to enter into strategic partnerships on its “own” corporate territory is understandable, but as a result, an important tool for reducing development risks, which other companies are actively using, remains untapped (Table 4).

[7] Gazprom approved the creation of a joint venture between Gazprom Neft and Shell at Gydan. Gazprom has agreed to sell a 50% stake in Gazpromneft-Aero Bryansk to the Anglo-Dutch Royal Dutch Shell for the benefit of the Anglo-Dutch Royal Dutch Shell, - reads the message from Gazprom. OOO Gazpromneft-Aero Bryansk owns the Leskinsky and Pukhutsyayakhsky blocks in Gydan. Thus, Gazprom approved the creation of a joint venture between Gazprom Neft and Shell under the Yenisei project, which will include the Leskinsky and Pukhutsyayakhsky blocks. Gazprom Neft and Shell are counting on the emergence of a large exploration cluster in the northeast of Gydan. URL: https://www.interfax.ru/business/736683 (accessed 10 June 2021).

2.3. I-factor (internalisation): make or buy + organisational structure transformations

The classical interpretation of the I-factor is the decision of the company, which activities to perform within its scope and which of them — on the "free" market. In other words, it refers to a specific way of saving transaction costs — through the institutions of the company or the market [19]. For Arctic companies, this factor can be specified as decisions on the most important issues of production service (including science-intensive) — to keep it in the company or to isolate it in the form of autonomous market structures; and as decisions on changes in the organizational structure — to a flatter (horizontal) or more hierarchical (vertical) one. The assumption is that the dynamics of this factor are an important part of the company's strategy in neutralising development risks.

Let us now look at how skillfully companies use this tool in their practice. If we evaluate the patent policy, the champion in self-sufficiency is Norilsk Nickel, which develops the maximum share of patents independently in its divisions [20]. The company repeats its approaches in matters of production, social infrastructure and equipping: to make it its own structures and to rely to a lesser extent on external actors. In the conditions of almost a century of existence of the island economic structure — the Norilsk industrial region — such a strategy is quite justified.

On the other hand, NovaTEK relies to the greatest extent on external sources for its patent policy, including developments by Gazprom. But the company also prefers not to accept transport, port and other facilities into its pipeline but rather to enter into long-term contracts. This strategy is the exact opposite of Norilsk Nickel's strategy, but it is explained by the company's desire to minimize development risks by maintaining its mobility and a relatively simple compact internal structure without burdening with numerous and often inertial service and infrastructure organizations.

An intermediate position between these poles is occupied by Gazpromneft, which retained in its core only high-tech production services, for example, geophysics (including seismic exploration), and outsourced increasingly simple production and service operations. However, unlike NovaTEK, it does not charter, but has its own fleet for its Arctic projects.

How to assess three completely different situations in the "make-or-buy" dichotomy in terms of development risks? Let us accept the hypothesis that all extremes of maximum freezing in the Arctic soil and maximum "volatility" and unencumberedness carry greater risks than a moderate average (compromise) situation, which provides the company with the necessary flexibility to cope with development risks. Under this hypothesis, Gazpromneft will have the best positions, while NovaTEK and Norilsk Nickel will have the average positions (Table 5).

Table 5

Adaptation of companies to development risks through I-factors
"Traffic light" assessment of the OLI factors of companies in dealing with risk

	NovaTEK	Gazpromneft	Norilsk Nickel
1. Make or buy?	2*	3	2
2. Flexibility of organisational change	2	3	1-2
Total by I-factors	4	6	3-4

*1 — factor is not used, 2 — used in moderation, 3 — used actively

Let us assess the flexibility of organisational structural transformations and the degree of centralisation of the company's internal management (verticality of the organisational structure). Until recently, Norilsk Nickel was an exceptionally inertial and highly centralised corporation in terms of organisational structure. Other corporations carried out flexible adjustment to changing external conditions, experimenting with their organisational structure, turning it into a more horizontal and networked one, consisting of economically independent and autonomous subdivisions-nodes of a unified corporate network, which is now generally recognized as a good mechanism of adaptation to external uncertainties and risks in conditions of increasing external instability (including in the development environment).

There are also objective prerequisites. In greenfield projects carried out by NovaTEK and Gazpromneft, the probability of radical internal transformations of the corporate organisational structure is higher simply because of the faster pace and change of events that need to be promptly responded to, including through the dynamics of the organisational structure. In the development projects in old industrial territories, the dependence on the previous path is higher, and therefore the transformations in the internal services activities are slower and less radical.

Force majeure circumstances in 2020 (an accident at TPP-3 of the Norilsk-Taimyr Energy Company [8], when over 20 thousand tons of diesel fuel spilled as a result of subsidence of piles onto the adjacent water area) [9], prompted Norilsk Nickel to abandon the previous management vertical divisional management structure (Norilsk, Kola, and Zabaikalsk divisions bear “comprehensive operational responsibility for the production process, infrastructure facilities, financial results and risk management”). New structural subdivisions were established within the Company: the Risk Management Committee under the Management Board, an autonomous Environmental Department, an Environmental Monitoring Center, the Inspectorate for Monitoring Technological, Production and Environmental Risks within the Internal Control Unit, and new positions of Deputy Director for Industrial Ecology and Environmental Protection in the Polar Division of Nornickel and Senior Vice President for Sustainable Development were introduced [10].

The final scores for the I-factor indicate a very high flexibility and adaptability of the internal structure of Gazpromneft (the company recently began a large-scale digital transformation), moderate flexibility of NovaTEK, which the corporate management seems to consider sufficient given the relatively simple and compact internal structure, and a less flexible internal structure of Norilsk Nickel. Only in the last year the situation has started to change.

[8] Some of the piles, in violation of the project requirements, were not deepened into the rock, and permafrost soils became "fluid" as a result of climate change.

[9] The arctic reason for this accident is that the main fuel of CHPP-3 is natural gas, and the diesel fuel that has spilled is a reserve fuel and is stored in the fuel tank. If the station operated in the main Russian, and not the island Norilsk, settlement zone, then there would be no need to have reserve fuel.

[10] Nornikel': Otchet ob ustoychivom razvitii 2020. Nash Krayniy Sever [Norilsk Nickel: Sustainability Report 2020. Our Far North]. 127 p. URL: https://www.nornickel.ru/files/ru/investors/disclosure/NN_CSO2020_RUS_28.04.pdf (accessed 12 June 2021).

3. Development risks of corporations: priorities for strengthening competencies and corporate innovation system

The generalization of the challenge of development risks and the adaptive response to them of three Arctic corporations in Russia reveals interesting imbalances (Table 6). The arithmetic average of all development risks (point estimate) is the highest for Norilsk Nickel, but its average arithmetic potential for adaptation to these risks (according to Dunning's triad of factors) is the lowest among all three corporations — 3.5. The strongest challenge is followed by the weakest response. The situation for NovaTEK and Gazpromneft is comparable, but still better for NovaTEK, which has the lowest average development risk among all three companies, but has an almost maximum adaptive response potential. On the other hand, Gazpromneft has the best positions in terms of the average adaptation potential (response to risks) among all companies, but it also has a higher average development risk than NovaTEK.

Table 6

Company challenge and response to development risks

	NovaTEK	Gazpromneft	Norilsk Nickel
Final development risk	3	6	8
Average development risk	**1.0**	**2.0**	**2.7**
L-factor adaptation potential	4	3	5
O-factor adaptation potential	6	6	2
I-factor adaptation potential	4	6	3-4 (3.5)
Final adaptation potential	14	15	10.5
Average adaptation potential	**4.7**	**5.0**	**3.5**

Having obtained this general picture of the distribution of companies in the challenge-response space to development risks, it is useful to analyse, on the basis of annual report data, which specific competences each company uses to respond to the challenges of high risks and uncertainty in the development of Arctic resources. After all, it is the competencies, the corporate innovation system and the company's training potential that ultimately guarantee the company's successful response to these challenges. Let us try to stratify these corporate competencies according to the stages of the development process — search and exploration, construction, production, transportation and integral (system) development competencies.

NovaTEK possesses the competencies that are important for the pioneer stage of development of the “smooth”, without loss of knowledge, communication between geologists and oilmen, in fact, the exploration and operational subsystems of a single corporate innovation system: only those license areas are opened that can be easily and quickly involved in the corporate turnover due to clear logistics and proximity to infrastructure facilities. The company's competencies at the construction stage are associated with the art of managing integrated projects, when production, processing, transportation are immediately considered in a systemic unity (also by the competencies of ultra-compact layout of new projects). At the production stage, the competencies of NovaTEK may be inferior to Gazpromneft, but NovaTEK is also beginning to apply technological solutions focused on the use of unmanned schemes and artificial intelligence. In terms of competencies in maritime logistics, NovaTEK became one of the first Russian companies in the develop-

ment of the Northern Sea Route, within the limits of its year-round use for LNG transportation to Asian markets. The company's cross-cutting competencies are its masterful ability to use the institution of a pilot project to save on knowledge while further replicating best practices and experience to other company projects.

Gazpromneft accumulates in its top managers the best engineering traditions of Leningrad technical universities of the late Soviet era. The company's competencies at the prospecting and exploration stage are related to innovative technologies for drilling complex exploration wells (developed at the Gazprom Neft Science and Technology Center). In recent years, the competences of processing big data, creating geological models, etc. have been actively introduced here. The company does not have its own unique competencies at the stage of building new projects; partner competences are used. Since 2017, the Center for Offshore Competencies has been systematising industry knowledge on offshore projects. The November division is working out technologies for additional development of residual reserves at depleted, long-term exploited oil fields. At the stage of logistics and transportation, the company is rapidly developing new competencies in digital solutions, smart logistics, remote control (for example, the Captain program for real-time online support of vessels in the Arctic), and managing its own fleet, including the icebreaker one. The cross-cutting development competencies that are being developed in the company are a system of external and internal corporate communications, cognitive technologies for using artificial intelligence (machine learning, digital assistant, etc.), a knowledge management system, innovations, and distribution of best practices between divisions (through regional centres of specialised competencies — at a certain link in the resource chain, the company's technical solutions library and other corporate institutions). In recent years, the company has embarked on a massive digital transformation.

The pool of *Norilsk Nickel* available competencies is largely explained by its dependence on the previous, almost a century-long, trajectory of economic development of the Norilsk industrial area. No new prospecting and exploration competence is needed, because the reserves discovered in the industrial region will suffice for decades of exploitation. This phenomenon explains the paradoxical geological understudy of nearby Taimyr: the company, over-supplied with reserves for decades, simply had no need for detailed geological exploration of the nearby Taimyr riches, remained poorly studied for decades. Norilsk Nickel's core competencies were accumulated in metallurgy, not in geology. The company's unique competences in construction are related to permafrost, the permafrost formations where the company's main production and social facilities were built. Today, they are supplemented with competencies on the degradation of permafrost and previously constructed foundations of buildings and structures in the context of climatic changes in the Arctic. New competencies at the operational stage are associated with a new spatial layout of old production assets (for example, the Southern Cluster) and innovative modernisation of old, created in Soviet times, production chains for ore processing. Over the past ten years, the company has been developing maritime logistics competence to export its products to Asian markets.

The natural limitations of the unstable Internet on the Norilsk “island” have hampered digital transformation for many years, and only in recent years, the company has begun to rush to overcome its lag in creating digital twins in underground mining processes and sustainable data transmission from underground equipment and faces in mines.

Discussion

A large and still poorly researched topic, only slightly touched upon in this work, is a comparative analysis of the development risks of greenfield and brownfield projects. The 2020 accident at the Norilsk TPP-3, the gradual aging of material and natural assets involved in the national economic turnover back in Soviet times, the rapid degradation of permafrost put forward the topic of protection from risks in the old industrial territories of the Arctic as the most important one. Meanwhile, the bulk of the work devoted to the topic of economic risks in the Arctic, has so far turned to new development projects.

It is obvious that the mechanisms of corporate protection and adaptation to development risks in new and old projects, with some common features, have significant specificity. In the first case, the institution of pilot project and scaling up the best practices for future projects is often used; in the second case, companies often prefer to rely on their existing competences and proven experience.

The work touches upon an important topic that requires special research — how to implement a modern portfolio approach to risk management (and it is necessary, because it guarantees that the risks increase in a separate unit does not mean an equal increase in risks for the entire company — additional risks are partially damped within the corporation), the company must reform its internal organisational structure. This is evidenced by the latest experience of Norilsk Nickel. The over-centralised management structure of the company, in fact, removed responsibility for admitted force majeure situations from the lower level and redirected risks and responsibility to the upper level of the corporation's management. The corporation had to make a radical change in the internal structure from a vertical to a flatter one, consisting of subsidiaries (Zapolyarniy, Kola, Zabaikalskiy) that received significant autonomy. Obviously, in conditions of high uncertainty in the development of Arctic resources, the organisational structure of a corporation should be more decentralised, with more rights delegated to polar divisions than, for example, in the branches of the same corporation in a densely populated temperate zone (in this case a vertical hierarchical corporate management structure within the Polar Division itself could be justified).

The present study has not yet succeeded in providing a systemic view of the company's adaptation to development risks — the forms of response were considered according to the components of the OLI-paradigm. The task of integrating individual reactions into the overall picture of a corporation's strategy for coping with high risks in the Arctic is a challenge for further studies of this topic. However, it is obvious that such an integration platform should be the idea of the com-

pany's common pool of competencies and its corporate innovation system. Only by building up their potential, the company guarantees itself successful protection against Arctic risks.

Conclusion

1. Corporate development risk is a relatively new phenomenon in the socio-economic development of the Russian Arctic. In the Soviet era, it was not singled out separately because all the uncertainties caused by the special conditions of the Arctic and the North were assumed not by the Arctic economic entities, but by the all-Union state departments, trusts and central administrations. Everything changed with the beginning of a radical economic reform in Russia, when large corporations became the main actors in the economic development of the Arctic resources. Now, instead of the state, they undertake the risks of economic exploitation of deposits, onshore and offshore areas of new exploration. Corporate development risk is structured into resource risk, which reflects the contradictory interaction of global resource markets and the local unique resource base of the Arctic; institutional risk, which reflects the contradiction between remote unified state institutions that determine the rules for the development of Arctic resources, and the very specific local conditions of a particular resource project; ecosystem risk, which reflects the natural and economic contradiction between intensive development activities and the fragility of the Arctic ecosystems.

2. In the old-developed areas of the Arctic, corporations often bear greater risks than in the areas of new development. This is confirmed by the comparative score of the aggregate risks for Arctic corporations, which turned out to be the highest for Norilsk Nickel, which has been developing non-ferrous metals in the Norilsk industrial region for about a century (lower than the value of NovaTEK and Gazpromneft). The most dangerous situation in terms of risks is not just accumulated old tangible assets, but old assets in the context of a radically new institutional development environment that has arisen. In these cases, man-made accidents, force majeure situations are almost inevitable for the company.

3. In order to assess the corporation’s response to the challenge of development risks, it is fruitful to use the OLI-paradigm of J. Dunning. Acquaintance with all publicly available annual reports of the resource companies NovaTEK, Gazpromneft and Norilsk Nickel allowed us to specify the general parameters of the paradigm for the specific conditions of the Arctic resources development (to give its parameters a narrow interpretation).

Geographic factor L (location of the company’s assets) is understood by us as the degree of social rootedness of the company in the territory of presence (first of all, in the nearest cities-bases of development) and the ability to obtain spatial effects on the compactness of projects and on their clustering with infrastructure and service facilities , connectivity with each other, in areas of new development.

Ownership factor O (ownership of the main material, natural, intellectual assets) in our case is understood as the genesis of a specific Arctic company (in other words, where the compa-

ny's assets originally came from and how they were acquired by the current owners) and the company's ability to create joint ventures, enter into strategic partnerships with other corporations, thereby obtaining an inter-corporate effect on pooling resources, competence and risk sharing.

Organisational factor I (internalization — the tendency to take assets internally or use them under contracts with structures in foreign markets) is understood as a type of corporate organisational structure (vertical — hierarchical, horizontal — network or hybrid) and the ability to flexibly adapt the type of contract in production service to specific conditions of place and time: in some cases, to take it for independent execution, in another case — to outsource it to external departments.

Concretisation of J. Dunning's OLI-paradigm allowed us to carry out a comparative assessment of companies' adaptation strategies for all three factors. The most successful was Gazpromneft, then — NovaTEK, the least successful in developing an adequate response to the challenge of risks is Norilsk Nickel.

4. Each Arctic corporation has its own separate "profile" on how to protect from development risks. NovaTEK is extremely successful in the ability to obtain regional and localised effects in the space of new development, in the ability to create a joint venture and mobilise the competencies of top managers to neutralise development risks, weaker in the art of internal organisational structural transformations and the degree of social rootedness in the territory of presence. Gazpromneft is a champion in the ability to create a joint venture and thereby share risks with others. The company, as a subsidiary of Gazprom, has the advantages of a conservative parent structure that supports it and, at the same time, freedom to experiment (this is a superfavorable situation for innovation), has considerable flexibility in organisational restructuring and the ability to determine exactly which production service units in specific circumstances of space and time are rational to leave within the company and what should be outsourced. The company's position in terms of opportunities for spatial effects is weaker, and its social embeddedness in the territory where it operates is weaker. On the other hand, Norilsk Nickel has the best positions among the three companies in terms of social rootedness, but loses in terms of flexibility of organisational transformations, ability to create joint ventures, accuracy of decisions, what to do and what to buy on the foreign market.

Norilsk Nickel has the strongest imbalance between the size of development risks and the adaptive capacity to respond to them; Gazpromneft and NovaTEK have a much smaller imbalance. Modern versatile competencies and a strong corporate innovation system focused on the search for radical innovations can reduce the imbalance between the challenge of development risks and the corporation's response to them.

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