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The Courage of Economic Decisions and Modern Development of the Russian Arctic*

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Abstract. The article analyzes the phenomenon of the courage of economic decisions in the development of the Arctic. Courage is understood as a feature of contractual behavior - the ability to radically change or propose new terms of the development contract, which leads to dramatic shifts in the territorial, technological and organizational structure of the development process. In the modern development of the Arctic, new factors are considered that affect the courage of economic decisions. First of all, these are climate changes, which are pushing back the limits for marine logistics, development and extraction of natural resources in the Arctic from offshore platforms. The paper also considers the manifestations of developmental courage as a result of "infection" of large corporations from small venture companies and as a forced result of contractual intercorporate conflict. For modern development, the important factors that determine the courage of decisions are logistics, platform technologies and the complete or partial rejection of the use of icebreakers in favor of specialized vessels of the reinforced ice class. A point assessment of the courage of economic decisions for 24 projects of modern development of Arctic resources was carried out using the U-ETO algorithm: according to 12 indicators grouped in blocks of "uniqueness", "environment", "technologies", "organization". As a result of the assessment, it was concluded that the courage of economic decisions is not directly related to the capital intensity of investment projects: relatively modest mining projects for new development can outperform ultra-capital-intensive investment projects for the development of hydrocarbons (for e.g., Bovanenkovo or Vankor) if they rely on innovative technologies, organizational structure and the marine environment for its logistics, mining and processing. A major contradiction in the modern development of the Russian Arctic is the contrast between the uniqueness of the natural assets of the field and the traditional methods of its development.

Keywords: *courage of economic decisions, marine economic activity, development of the Arctic 2.0, development projects, courage index, climate change.*

Introduction

Understanding the processes of economic change, including in the Arctic, is usually associated with economic, technological, military-political (geostrategic) factors, and in recent years — with climatic dynamics. In scientific literature, it has become customary to link the beginning of the next cycle of economic development in the Arctic with the situation in world resource markets, with the country's need for budgetary revenues from the export of natural resources or for strategic raw materials for the implementation of a defense, national economic or other major program of national importance.

Without challenging these well-known and recognized external catalysts of the Arctic development process, in this article I would like to focus on the less studied internal factors associat-

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ed with the peculiarities of human behavior, specifically, with the courage of economic decisions, which also play a huge role in the development of the Arctic. What is the phenomenon of developmental courage? What conditions and circumstances trigger it? Can we measure it?

Without pretending in this pioneering study to complete the study of this phenomenon, it will be useful to start moving in this direction. It seems that the characteristics of the development process from the standpoint of courageous economic decisions will be absolutely adequate and justified for the climatically extreme and geographically remote Arctic. Such a view promises to provide an understanding of new facets of this phenomenon.

It would be useful to mean the decisions on "involving in the national economic turnover" of new fields and regions of the Arctic by not just an objective necessity, but manifestations of the energy of will and courage, which are underestimated and ignored today — under the influence of the dominant ideas that the main problems of the development of the Arctic are solved by a simple distribution of funds. This desire determined the purpose of the article — to understand the courage of economic decisions as the most important factor in the economic development of the Arctic. The goal was revealed as a result of solving three tasks.

The first is to harmonize the study of assimilation courage with the development trends of world social science, which are characterized by close attention to the phenomenon of human behavior and its role in economic processes (for example, analysis and assessment of passionarity, creativity, tolerance, opportunism, etc. - develop in the framework of the institutional approach [1, Gumilyov L.N.; 2, North D.; 3, Florida R.; 4, Williamson O.]); methods of individual, single, local, personal scaling to mass and global scaling as a result of the effects of increasing returns [5, Krugman P.] (or passionary induction, as L.N. Gumilyov wrote [6]); efforts to quantitatively measure of purely qualitative phenomena that were previously recognized as impossible for formalized assessments [7, Sinozic T. et al.; 8, Tonkin E., Tourte G].

The second task is to study the influence of new factors, primarily climate dynamics, on the courage of modern economic decisions in the Arctic. From the fact that the climate in the Arctic is changing faster than on the rest of the planet [9, Report ...], a conclusion is not always made about the courage of economic decisions; more often they say about the growing risks for buildings, structures and infrastructure facilities already created in the Arctic over the years of economic development due to the rapid degradation of permafrost; about the risks of loss of certain types of traditional activities for indigenous peoples; about new opportunities for Arctic shipping and navigation, for the development of Arctic tourism and agriculture. But practically no one links existing and planned economic decisions with the factors of climatic dynamics: decisions on the development of new industrial regions of the Arctic are considered in isolation from climatic dynamics, with which they are indissolubly linked.

The third task is to provide the qualitative studies of the phenomenon of courage in the development of the Arctic by a quantitative dimension, albeit the most elementary, but important for comparing different periods of economic development and development projects.

The Phenomenon of Development Courage

Created by the classics of Soviet economic geography [10, Slavin S.V.; 11, Slavin S.V.; 12, Kosmachev K.P.; 13, Mosunov V.P., Nikulnikov Yu.S., Sysoev A.A.; 14, Chistobaev A.I.; 15, Agafonov N.T.; 16, Litovka O.P.], the theory of economic development focused on the territorial and temporal structure of this process, its spatial (bases, development routes) and time (cycles) configurations, issues of information knowledge. A person as a direct participant in this process turned out to be withdrawn from it, and his role was either ignored or underestimated in scientific literature (as opposed to fiction, where, on the contrary, the feat of the pioneers in the development of the Arctic and the North was praised). This approach reflected the worldview position of Soviet social science: people's behavior, their motivations, interests were subjective factors in contrast to pro-

duction relations, which were considered as a basis, as a foundation defining a "subjective" superstructure, consisting of spiritual, creative, cultural values, consciousness, etc.

As the actor approach and actor-network analysis in modern social science are approved which are aimed at atomizing the mass phenomena of social life, giving them a “capillary”, local dimension, from which like from cells collective processes and global networks are formed, the penalties of the “inhuman” approaches to the analysis of economic development became more and more obvious. Indeed, the intellectual breakthrough that occurred, for example, in regional science over the past three decades, is largely associated with the introduction of the concepts and terms of institutional theory and behavioral psychology: for example, entrepreneurship, social embeddedness, development lock-ins, path dependence, etc. [17, Handbook of Regional Science].

In order to confidently use a new concept, it is necessary to give it a detailed interpretation. What is courage in the process of economic development?

In our opinion, this concept has several facets. Courage is not just energy in the implementation of an economic plan. It is the ability to be active that disrupts the routine, often with no hope of commercial outcome. In the development of the Arctic, it often happened that courageous decisions became profitable and economically effective only in the long term, and in the short term they turned out to be losses or were considered wrong. And, as a rule, such actions, such decisions bear the traits of pioneering, uniqueness for the country or even the global Arctic.

The courage of economic decisions is not limited to technological advancement and innovation. For example, the decision of the pioneering development of the Verkhnyaya Kolyma basin in the early 1930s was certainly courage in essence, but it was based on a traditional pick and shovel, that is, it was not originally supported by technological innovations. At the same time, of course, courageous economic decisions in the development of the Arctic necessarily include, along with others, a component of technological and engineering innovation.

As a rule, such decisions cannot be satisfied with the already existing, established territorial structure of development in the form of a system of settlements-bases and an established network of land roads, sea, river and railways, but they certainly propose new configurations, imply expansion into new territories of the pioneering development. It is also true that courage development decisions, as a rule, are based on the creation of new organizational structures that have significant independence in their actions, get carte blanche from the state or a large private enterprise for exploration, prospecting and mining activity.

Of course, not every time period gives opportunities for courage manifestations in economic decisions. The main participants in the development process usually behave rationally in the sense that they prefer not to take risks. Extraordinary, force majeure circumstances should occur in order to give rise to manifestations of courage, up to desperate recklessness, in decisions on the development of various resource objects and regions of the Arctic.

Using the theory of thermodynamics [18, Prigozhin I., Stengers I.], these periods can be called bifurcational, the time of changes in the previous trajectories of the system's development, a radical change in ideas about the very process of development of the Arctic and the value of its resources. Always a favorable field for courage (they are often called "experimental") decisions is a situation of crisis, uncertainty, choice. When the development process goes like clockwork, the need for courageous decisions simply does not arise, and if they do appear, then sometimes they are simply not visible.

Thus, in order to recognize the development of an economic decision as courage, it is necessary to find in it features of uniqueness, manufacturability, it must have signs of a radical violation of the previous trajectory of the territorial, organizational arrangement of the Arctic regions.

Courage as the aspect of contractual behavior

In order to introduce the courage of economic decisions into the apparatus of the updated theory of economic development, all the necessary prerequisites have already been created. First, by the works of the Nobel Prize laureate in economics G. Simon and others [19, Simon H.A.; 20, Simon H.A.; 21, Kahneman D., Slovik P., Tversky A.; 22, Kahneman D.] the importance of the entire psychological procedure, all the prerequisites for making economic decisions is underlined.

Secondly, another Nobel Prize laureate in economics, R. Coase, formulated the task of studying the institutional structure of production [23], which has been developing in recent years in terms of leadership, opportunistic behavior, social embeddedness and others, which introduce a new "soft" institutional component in the field of analysis of material production. There is a process of this inclusion - very economical, very limited in the number of concepts (so that there is no dilution) as a trend in modern economic science, in line with the general institutionalization of the apparatus for studying production processes. Our paper with the category of courage of economic decisions in the context of the essential and conceptual renewal of the previous theory of the Arctic exploration is absolutely in line with this.

Third, the papers of modern classics of institutional economics on the theory of contracts by O. Williamson et al. [24, Williamson O.E.; 25, Izmalkov S., Sonin K.] form the prerequisites in order to understand the courage of economic decisions as a radical redefinition of the terms of the contract (both formal and unwritten), followed by and along with which there are changes in the technological, organizational, territorial structures of development or forming of absolutely new ones. The courage of economic decisions in the development process is, in terms of contract law, the ability to form a radically new, different environment and conditions for the implementation of the contract, in which the development project is carried out. For example, one can turn a contract of sale into an employment contract.

What is a development contract? The established (accepted, recognized) regulation of the behavior of the main actors in the process of economic development fixed and materialized in the territorial, organizational and technological structures of development. Courageous economic decisions are those decisions that radically affect all structures of the development process — territorial, temporary, organizational, technological: they provide fast and efficient logistics solutions through a new transport structure (bases, development routes, clusters, complexes and growth points of new development); radically accelerate the growth of knowledge and the time of passing the information (prospecting, exploration) stage; form new key actors in the development process — super organizations, resource and state development corporations; use new, for example, platform techniques and technologies designed to obtain economic effects on the extraction of natural resources in the Arctic.

Comparative assessment of the courage level in the Soviet Arctic development in 1930–1980

Let us try to apply the formulated criteria of uniqueness, transformations of territorial and organizational structures, and technological advancement to assess courage in the 60-year-long process of economic development of the Soviet Arctic in aggregate, by decades. In this case, the transformation of territorial structures will be understood as the creation of new cities; organizational structures — as the emergence of new super organizations for the development of the North and the Arctic; technological structures — as a mass application of innovations.

The active formation of new cities in the Arctic took place in the 1930s and 1960s. But similarly, in terms of the activity of creating new organizational structures for development, the periods of the 1930s and 1960s were the effective years, when new institutions, organizations, structures contributed to the formation of such a new contract, when a combined model for the development of the North was formed; and then already in 1960-ies, when the combined model was

replaced by the departmental model, oriented for the resources development of the Arctic autonomous regions — Yamalo-Nenets Autonomous Okrug and Chukotka Autonomous Okrug.

For example, the entire first period of the Northern Sea Route Authority's (NSRA) activity was a period of utmost courage in economic decisions regarding the Arctic, because the organization received unprecedented powers from the authorities and the right to extraordinary decisions. There are all the attributes / conditions for courageous economic decisions: the right of economic and political independence, the formation of new economic (super organizations) and social (cities) structures and institutions for a new large-scale task of resource development in the Arctic; penetration into a new environment — new areas of pioneering development and the environment of marine logistics; creation and use of new transport schemes and routes.

Here, there is not one, but a chain of innovative breakthroughs in "from scratch" ideology. That is why this is unconditionally the time of extremely courageous economic decisions for the Arctic. And indirect confirmation is also in the fact that the influence and utilitarian use of these decisions are planned for the long next decades.

It makes no sense to assess the manifestations of the courage of economic decisions in the Arctic in the 1940s, when defense tasks radically changed all the priorities of its economic development. It's better to revisit this problem in the 1950s.

What happens to courage during this period? It atomizes, descends to the lower, individual level of private persons, but loses its mass character, the effect of increasing returns, of infection. Why? For the successful replication of individual courage into a collective one, one needs the proximity of a living example, the stability of the organizational and political external environment: it may even be bad, but stability is necessary, otherwise no manifestation of collective courage is possible.

Large-scale manifestations of economic courage during periods of radical transformations are impossible. Therefore, in the 1950s there were examples of individual pioneering, geological and mining courage, but there were no examples of mass innovation and heroism in the economic development of the Arctic. At the same time, very serious technological successes, innovativeness were observed, but there was no courage in mass economic decisions on the new development of the Arctic.

Another wave of economic courage in the development of the Arctic came in the 1960s as a powerful innovation in the development of oil and gas in Tyumen, golden Chukotka. Here again, the combination of will, independence, new institutions, structures made it possible to move from individual manifestations of courage to the effects of increasing returns and mass innovation.

In the subsequent eras of the 1970-1980s manifestations of collective courage were declining, which was indirectly evidenced by the inability to cope with the problems of depletion of the resource base and the growing environmental costs of economic development. Any manifestation of individual courage in economic development became either an exception, without hopes of reaching the mass level, or was limited to purely technological innovations, rationalization proposals, and the purchase of imported equipment instead of their own efforts. There is a noticeable loss of energy to dare and take risks. Technological innovations, which were characteristic of this period, were an important but insufficient condition for the manifestation of developmental courage.

Now, from these general patterns for the Arctic as a whole, we will move on to the characteristics of its individual regions — the North-East of Russia (within the present-day borders of the Magadan Oblast and the Chukotka Autonomous Okrug) and the North-West (within the borders of the Murmansk Oblast). The courage of economic decisions in the development of the North-East of Russia can be assessed as success in the fight against natural and economic uncertainty. Because it was courage that was a constructive response to the conditions of this external uncertainty (that is, given from the outside by forces that were not influenced by local actors).

The first Dalstroy period of the 1930s was the time of manifestation of the ultimate courage for the entire period: economic decisions were taken from scratch, in conditions of strict time constraints; there was no accumulated experience of large-scale development of the resources of the territory by that time; mistakes were extremely frequent precisely because of the unprecedented novelty of the entire learning process. The commercial success of the new "enterprise" was initially incomprehensible even to its organizers. An indicator of the courage of economic decisions in development is the environment of colossal uncertainty and the constant challenges of alternativeness accompanying and organically inherent in this environment (the choice of the capital - Magadan or Ust-Taskan; the choice of the scheme for the delivery of goods — Arctic or Okhotsk; the choice of the main mining profile — alluvial or ore gold and etc.), which can be extinguished only by quick courageous decisions (sometimes wrong).

Courage is directly related to the level of uncertainty: there is no uncertainty — there is no need for courageous decisions, routine enough. Courage breaks Arctic uncertainty by building new institutions, territorial development structures.

Already in the 1940s the courage of decisions died out significantly, because the process of the development of the North-East began to settle down. Only in the late 1950s, with the beginning of the development of Chukotka, when a lot of pioneers — graduates of the capital's universities went — again the level of courage in economic decisions rose to a higher level, as evidenced by the novel "Territory" and its audacious characters.

The courage of economic decisions is again born from the strong constraints of depletion of the former resource base for development, time and space, and institutional constraints. Courage acts as a tense response to strong external constraints, which the act of a courage, even reckless, economic decision is designed to break.

Both "waves of courage" in economic decisions for the development of the North-East of Russia in the 1930s and 1960s were “non-economic” in the sense that the peak volumes of gold production arose after them — in 1940 and 1974, that is, in the periods of already entering routine development, without courage recklessness. And this always happens: first, courage as altruism, and then (or never after) — the harvest from this courage in the form of the best performance indicators for the entire period; these results and courage are opposite in phase or spaced by a time lag. Figuratively speaking, courage extends to the break-even point and in this sense it is altruistic: these are the stages of exploration, development, equipping and starting of production. And at the operational stage, routinization already begins, and the space for developmental courage is narrowing.

The period of 1970-1980s was already a time of dependence on the path and the associated blockages of development, growing crisis phenomena and unsolicited solutions for their resolution, which had nothing to do with courage. And it coincided with the almost complete loss of economic independence of local mining and exploration divisions in decision-making. When there is no independence, then there is no courage. It necessarily requires a certain level of political decentralization, without which courageous decisions cannot appear. The condition for courage is carte blanche, at least for a short time, without annual micromanaging in terms of planned indicators, compliance with regulations, job descriptions, etc.

And how can we assess the level of courage in the economic development of the Soviet Arctic (the European North-East) in retrospect from the 1930s to the 1980s? Development of the 1920s began with the exploration of the Khibiny subsoil through the Leningrad development base, using the Oktyabrskaya railway; we can say, according to the colonial scheme of penetration into the undeveloped territory with significant reliance on the previous developments of the tsarist time. It was an inertial adherence to the previously established trajectory associated with the development use of the railway.

And only since 1938, when Murmansk became the regional capital, and Kirovsk (Khibinogorsk) became the base of mining and industrial development, conditions have emerged for courageous economic decisions. It is always associated with the delegated / transferred powers from the metropolis (we can call this a new contract).

At the same time, in the colonial scheme of development, the manifestation of cases of individual decision courage is possible, but they never become a mass phenomenon in terms of the effect of increasing returns; for this it is necessary to transfer powers, the right to independence of decisions, the right to make mistakes. The very effect of the increasing returns of the transition from a single manifestation of courage in economic decisions to a collective phenomenon, to the replication and scaling of this process is possible only with decentralization and economic independence, up to autonomy.

Modern development of the Arctic: new factors of courageous economic decisions

The radical economic reform that began in Russia in 1992 naturally affected the process of economic development of the North and the Arctic. Instead of a centralized state approach to the development of natural resources of the North and the Arctic, there was a transition to a state-corporate model, where the main economic entity was private and state-owned companies, and the state was responsible (and not always) for infrastructure development, setting the rules of the game (tax benefits, incentives for investors, etc.) and industrial policy in the Arctic in general.

Due to the weakness of state regulation in the 1990s and 2000s, the initiative in developing economic solutions for the development passed to corporations. It was they who, in the past 25 years, determined what and in what order to develop in the Arctic. The state simply adjusted to their interests and served their desires. Sometimes it even lobbied. In these conditions, one can speak of the courage of economic decisions only by companies, because in the new conditions the state simply did not have such decisions, as well as an active industrial policy.

The main actor who generated courageous economic decisions was TNC-resource corporations. This courage of decisions had strong differences from the previous scheme of state development of the Arctic: it was marked by the rediscovery of the Arctic sea, the marine environment and new conditions of maritime logistics, which were favored by climate change conditions; experienced the influence of the original venture of small and medium-sized business structures, from which the large ones learned courageous decisions and then replicated them; sometimes it arose as a result of intercorporate contractual conflict.

Compared to the previous state-controlled development model, the courage of economic decisions was now manifested primarily at the local project level, and not at the level of regions and territories of new development and the creation of district and inter-district complexes and clusters. Of course, in the new conditions of state-corporate development, this courage was largely determined by considerations of profitability and commercial attractiveness, conditions of competition with other resource companies in the country and the world.

Let us consider the characteristics of the new factors of the courage of development decisions in more detail.

The role of climate change: from land to marine logistic schemes

The role of climate change as a catalyst for courageous economic decisions has never been the subject of research in the Soviet theory of economic development of the North. Meanwhile, undoubtedly, such a connection existed [26, Aliev R.].

Climate change has repeatedly in human history become a factor that very actively influenced the formation of new institutions [27, Gumilyov L.N.; 28, Diamond J.]. Changes in the natural environment that trigger climatic or zonal changes, have a profound impact on the institutional framework of the production system, systems for the production of material goods, organizational

shell, territorial and temporal structure. The peculiarity of the Arctic due to the fact that they occur here much faster than in the rest of the world, that here the mental, spiritual reaction to these climatic changes (primarily through new contracting, new stereotypes of economic behavior, in the courage of economic decisions) manifested itself extremely distinctly and more than anywhere else. And the Russian sector of the Arctic and the Northern Sea Route became a global champion in understanding consequences of new climatic dynamics due to the fact that in the shallow Arctic seas, the factors of ice recession and replacement of perennial with one-year ice were especially noticeable and occurred much faster than in the deeper-water Canadian Northwest Passage.

Since the 1990s the factor of climatic dynamics was clearly manifested, which was facilitated by the fact that, as often happens, climatic, institutional, organizational and technological changes took place simultaneously and reinforced each other. It was the new conditions of global warming that influenced the willingness of companies to actively work in the marine environment. Courage manifested itself in the revolutionary transition of many companies to a new development contract: the old overland logistics schemes for material and technical supply and export of finished products began to be replaced by sea ones. Of course, the new development contract also influenced changes in the territorial, technological, and temporal structure of development.

The marine environment, especially in the Arctic, always means uncertainty, risks; and in the Soviet era of all-encompassing directive planning, it was career-threatening to follow such schemes. There was a provision of a nuclear icebreaker assistance for vessels with life-support cargo along the Northern Sea Route, there was a year-round export of Norilsk concentrate in the more comfortable western sea sector of the Arctic, but a massive use of marine logistics for resource projects in the North and the Arctic and single navigation of transport vessels throughout the Arctic waters of the USSR never existed, including for defense reasons, ice and technical restrictions (unlike nuclear and diesel icebreakers, the USSR simply did not know how to build high ice class vessels). Therefore, permanent roads were built, pipelines were laid, which transported the extracted resource products to the south. The Papanin epic of the 1930s, in spite of all the heroism and success, paradoxically stopped the country's subsequent efforts in the transport development of the Arctic marine spaces: there was never any talk of the year-round use of the eastern sector and all Arctic marine spaces for navigation.

The main feature of the modern period of the implementation of Russian Arctic projects is the removal of previous prohibitions in matters of their maritime logistics. Economic decisions for the development of natural resources of the land and marine Arctic have become more courageous, technological progress has become much more active in the Russian Arctic than before.

The mitigation of the severity of climate in the Arctic and, as a result, a sharp decrease in the ice coverage of the Northern Sea Route became a powerful factor that led to the revolutionary rediscovery of the possibilities of maritime logistics in the Arctic: it became possible to think of all year round sailing in the Arctic seas, including solo sailing, without icebreaker escort. For this, high ice class vessels, the best satellite ice navigation, insurance of icebreakers in the route, competent insurance of risks, etc., are needed, but most importantly, it became possible to think about this as a reality.

The realities of the last three decades demonstrate the emergence of an absolutely new phenomenon of the maritime logistics complex of projects for the new development of the Russian Arctic. An integral part of this complex, very diversified in terms of its elements, is the shipping development centers: ports, terminals, docking hubs of various types and coastal support bases. Many of these structures are mobile (floating), which was absolutely unusual and uncharacteristic for the development bases of the Soviet land development of the resources of the North and the Arctic [29, Pilyasov A.N., Putilova E.S., p. 26].

All the developmental literature of the Soviet era analyzed the phenomenon of land non-military, outpost, local bases for the development of the North. Even the very possibility of the

emergence of main development shipping centers was not envisaged. Now, many new Arctic projects rely on offshore export and even production schemes — on gravity or stationary platforms.

The implementation of many Arctic projects, of course, creates completely new effects, which were not characteristic of the previous organizational and technological model of predominantly land development: the entire development environment becomes more probabilistic (which means that there is more space for courageous economic decisions), integration of the activities of mining resource corporations and maritime shipping companies exists; companies acquire ownership or long-term lease specialized terminals of Arctic ports; the terms of construction of new production facilities are minimized due to the use of "water", offshore schemes; schemes of floating production platforms and floating factories are being implemented; instead of icebreakers, high ice class vessels (gas carriers, tankers, dry cargo vessels) are increasingly used.

Relay of courage from small to large companies: NAO as a venture ground

The Nenets Autonomous Okrug became in the 1990s a unique platform for pioneering oil-industrial development of the territory from scratch built on completely new market principles by new non-state actors [30, Zamyatina N.Yu., Pilyasov A.N., p. 21]. Dozens of new structures of Russian and foreign subsoil use have appeared here on the well-known since Soviet times, but never developed, hydrocarbon fields (primarily oil). Being experimentalists in their entirety, they actively tested new subsoil use regimes that have become widespread in the world (first of all, the regime of production sharing agreements (PSA) and new logistic schemes for the development of hydrocarbon fields in the roadless region.

A completely new element of logistics of Arctic projects has become the numerous and technologically diverse manufacturing and transport hubs that companies have created in the Arctic to save costs and speed up the transshipment / transportation of extracted natural resources. The first such hubs appeared back in the 1990s, when the process of active experimentation of oil and gas condensate loading / unloading from the shore to a tanker in the absence of ports and terminals began, in ice conditions through temporary pipelines. At the same time, small firms worked out schemes for export oil supplies: for the first time it was a direct scheme for ice-class tankers and a feeder scheme for ice-class shuttle tankers and then line tankers with oil transshipment from the first to the second in the Kola Bay.

In the second half of the 1990s Lukoil came to the Nenets Autonomous Okrug, gradually becoming the largest actor in local subsoil use. Strengthening the influence and economic role in the subsurface management of the roadless Nenets Autonomous Okrug was possible only with the development of efficient transport routes for the export of extracted oil.

Lukoil observed a new logistics solution from small companies [30, Zamyatina N.Yu., Pilyasov A.N., p. 23], but implemented it in a more systematic and a large-scale manner. This company abandoned the traditional southern pipeline scheme for the export of produced oil and implemented the "northern route". In 2008, Lukoil established in the Pechora Sea a year-round permanent offshore ice-resistant loading terminal (FOIROT) Varandey, 20 kilometers offshore (to overcome the limitations of shallow water, which is traditional for the Russian Arctic seas), which is capable of pumping millions of tons of oil onto tankers for export.

Thus, it was Lukoil that was the first to start a completely new process of development of the NSR, associated with its use for the export of hydrocarbons by tankers, and not along the traditional “southern” pipeline route. This courageous economic decision became a true revolution, which ensured a steady increase in the share of hydrocarbons in the total cargo traffic along the Northern Sea Route.

To implement such a feeder scheme, companies usually create transshipment hubs at the place of production and at the place of reloading from the high ice class vessels to conventional ones: for example, in the Kola Bay from the high ice class shuttle tankers to the carrier tankers

that deliver oil for export. Lukoil's experience in creating a feeder logistics scheme has been taken up by other corporations.

In 2016, Gazpromneft commissioned its round-wild, offshore loading terminal, Gates of the Arctic, near Cape Kamenny for transshipment of millions of tons of oil from the Novy Port field. Shuttle tankers operate year-round voyages from the Novoportovskoye field and the Prirazlomnaya platform to the Kola Bay for transshipment via the Gazpromneft offshore terminal Umba (NORD offshore transshipment complex) for further transportation to Rotterdam[1].

NovaTEK purchases / builds at its own expense a flotilla of gas carriers, a marine shipyard for the production of floating LNG plants, its terminals and floating storage facilities in the Kola Bay of the Murmansk region, in the Bechevinskaya Bay of the Kamchatka Krai for transshipment of LNG from high ice class vessels to conventional ones with further transport to European and Asian markets[2].

Roman Trotsenko's AEON Corporation is discussing the possibility of creating a new port of Indiga in the Nenets Autonomous Okrug for transshipment of Taimyr coals from ice-class ships (previously such transshipment was carried out in Murmansk) to conventional ones for further transportation to the markets of Northern Europe[3].

This relay race of courage logistics solutions from small companies to Lukoil, and then to other resource corporations operating in the Russian Arctic, can be regarded as a kind of increasing returns “on the contrary”: in the classic increasing returns, there is infection from one pioneer facility of dozens of neighboring ones, in a state of organizational, technological, geographic proximity, which simplifies this process of "infection". And in this case, there was a process of transferring from many venture companies developments in a new for all marine logistics to one large Lukoil company, from which then these techniques and technologies were transferred on a much more powerful scale than that of small companies / were perceived[4] by other resource corporations in Russia.

Courage of economic decisions as a result of contractual conflict

An interesting example of a forcedly courageous economic decision can be seen at the JSC Acron. For a long time, it purchased apatite concentrate from the PhosAgro holding, but had disagreements on the purchase price. Due to the fact that PhosAgro is a monopoly on the Russian market for the production of these mineral fertilizers, it was able to dictate the sale price. And then, in 2005, a specially created subdivision of Akron, the North-West Phosphorus Company, began the development of a new Oleniy Ruchey apatite-nepheline ore deposit to create its own mining base.

This is an example of how courage development decisions paradoxically can be the result of negotiation disagreements between economic entities, which force one of the partners to radically break the terms of the contract and initiate its own new development project.

[1] The first batch of oil was delivered from the Arctic fields of Gazprom Neft to the storage tanker Umba, which replaced Belokamenka. URL: https://neftegaz.ru/news/transport-and-storage/223145-s-arkticheskikh-mestorozhdeniy-gazprom- nefti-na-tanker-nakopitel-umba-zamenivshiy-belokamenku-dostav (accessed 12.07.2020).

[2] Transcript of the meeting of the President of Russia with the Chairman of the Board of Novatek, Leonid Mikhelson, URL: http://www.kremlin.ru/events/president/news/59894 (accessed 12.07.2020).

[3] Roman Trotsenko began designing the port "Indiga" URL: https://www.vedomosti.ru/business/articles/2019/09/05/810514-trotsenko-indiga (accessed 12.07.2020).

[4] I am grateful to Ph.D. Zamyatina N.Yu., who drew my attention to this mechanism of innovative contamination in the schemes of new marine logistics with terminals and transshipments from small venture capital companies to Lukoil, and then to Gazpromneft and NovaTEK.

Comparative analysis of the courage of development decisions

Since the 2000s, when the launch of the development of 2.0 as a salvo deployment of several large-scale new projects at once, an alternative to the traditional, inherited from Soviet times, and the new scheme has emerged. Obviously, it is the new solutions for deployment, logistics and technologies for the implementation of mining projects that are the most daring.

Island (platform) or areal solutions?

In recent years, in the Russian Arctic, a new scheme of the spatial organization of productive forces in pioneer development projects has emerged. These are the Prirazlomnaya platform in the Nenets Autonomous Okrug, the port and liquefied natural gas plant in Sabetta in the Yamalo-Nenets Autonomous Okrug, the Varandey terminal in the Nenets Autonomous Okrug, the Kupol gold deposit in the Chukotka Autonomous Okrug, the project for the development of the Pavlovsky polymetal field and others [29, Pilyasov A.N., Putilova E.S., p. 28-29].

Dozens of scientific articles are devoted to the technical, technological, economic characteristics of these new resource objects, but no one has yet generalized the features of their new spatial organization.

The key feature and their difference from the projects of the new development of the Soviet era are platform solutions, an emphasis on maximum localization and compactness. The principle of maximum concentration and economy in the use of grate spaces is implemented in practice. Cost savings and space savings are directly linked.

And, of course, this scheme ensures that the negative environmental impact of the project is minimized: after all, the perimeter of the project seems to be outlined by a wall of alienation from the rest of the world. The development of the new Pavlovsk zinc-lead deposit on Novaya Zemlya is designed in this algorithm[5].

It is interesting that the companies are adopting the algorithms and technologies of platform solutions from each other: NovaTEK (Arctic LNG-2 and Yamal-LNG) initially acted as its legislator in the Russian Arctic, and then Rosatom picked it up acting through the First Mining Company, which will develop the Pavlovskoye field.

Simultaneously with the platform solutions, which usually rely entirely on maritime logistics, the implementation of more traditional areal development solutions continues which involve vast areas of land space and significant areas in mining and infrastructure development. New imperatives of compactness of economic development objects do not work here.

Logistic solutions: sea or land?

Influenced by the increasingly developed maritime supply and export scheme, Arctic projects can now be differentiated into those with logistics related to sea export and those focused on the traditional overland southern export of final products (NSR projects and southern projects).

The successful implementation of many Arctic projects now, more than ever before, to such an extent depends on the infrastructure of maritime logistics, including high ice class vessels, ports and port terminals for storage and transshipment, that some Russian resource corporations operating in the Arctic are implementing their own expensive programs for the construction of tankers, dry cargo ships, gas carriers in the Arctic version (and the implementation of these programs turns out to be cheaper than the daily fee for icebreaker escort services). The fate of Arctic projects now directly depends on the extent to which they are provided with ice-class vessels ca-

[5] Zhigalov V.I. Platform solutions for the integrated development of sparsely populated and hard-to-reach areas (PR KOT). Development project of the Pavlovskoe deposit. Rosatom. VNIIEF. 17-18.10.2019. URL: http://www.sozvezdye-forum.ru/assets/files/Presentation_2019/closed_session/5%20%D0%96%D0%B8%D0%B3%D0%B0%D0%BB%D0%BE%D0% B2% 20% D0% 92.% D0% 98.% 20% D0% A0% D0% A4% D0% AF% D0% A6.pdf (accessed 12.07.2020).

pable of operating at least in the western sector of the Northern Sea Route without constant icebreaker support.

The no longer forbidden maritime logistics of Arctic projects caused absolutely revolutionary changes in the development and distribution of productive forces: they got a chance to develop coastal resource projects that have been well-known for decades but postponed for decades (Mayskoye gold deposit, Tomtor rare earth deposit, Taimyr Peninsula coal deposits, etc.). On the other hand, the traditional "southern scheme" of development remains, for example, for the Bovanenkovskoye field: deliveries by rail and winter roads, and export by pipeline.

It is the new logistic schemes based on sea delivery and export that are the most daring.

Specialized high ice class vessels or traditional icebreaker assistance?

The modern Arctic projects of NovaTEK, Lukoil, Gazpromneft are practically all serviced by specialized high ice class vessels that do need the help of icebreakers. In the summer of 2018, for the first time, ice-class LNG tankers sailed from Sabetta along the eastern route to China without icebreaker escort at all.

In the modern competition between icebreakers and high ice class vessels, one can see the clash of two ideologies, two production and technological schemes of work in the Arctic. The first, traditional, icebreaking scheme is based on an icebreaker, a clear water channel and an ordinary ship that follows the icebreaker, often in a convoy of other dry cargo ships. In this case, there is no need for offshore reloading from an ice vessel to a conventional one for subsequent work in the clear water of seas and oceans.

This is a "seamless", non-modal scheme of work, which was the main one in Soviet times, when there was simply no offshore reloading from an ice-class vessel to a conventional one. Now it could be a traffic plan of two icebreakers and a conventional gas carrier: the fact is that the width of modern gas carriers exceeds the icebreaker channel and therefore two icebreakers and a wide channel are needed, which, of course, increases the cost of pilotage.

On the other hand, the modern scheme of using ice-class vessels while minimizing the attraction of icebreakers is based on offshore reloading on a conventional vessel when leaving the ice sea "area" and / or the creation of specialized terminals in Arctic ports (coal, oil, and container). This is the new infrastructure that should be created as a price for abandoning the use of icebreakers (it is clear that the high ice class vessels are more expensive than conventional ones). But this scheme is more autonomous, more flexible, maneuverable and faster in delivery (in case of uncomplicated ice conditions — discontinuous ice areas or thin one-year ice). For example, LNG high ice class tankers (Arc7) are used to transport liquefied natural gas from Sabetta.

A more courageous and more innovative solution is to switch to the use of high ice-class vessels in maritime logistics and to partially or completely abandon the use of classic, traditional icebreaker assistance for conventional transport vessels.

The score of the courage of decisions in the main projects of the Russian Arctic development

It is the investment project that is now the main unit of measurement for the new development of the Russian Arctic. In Soviet times, the economic development of the Arctic and the North was thought and planned for areas, large new territories, vast territorial production complexes, and now the key element of development 2.0 is a localized cluster — a pole for the growth of new mining activity or the restructuring of an old production facility. Therefore, it is absolutely natural to assess the courage of economic decisions of precisely these basic elements of the modern development of the Arctic.

For this purpose, 24 investment projects[6] of new development and modernization of old development were selected, both already ongoing and planned for implementation in the coming years, located in various regions of the Russian Arctic and related to the extraction of fuel, energy and mineral resources.

Our task was to construct an index of the courage of economic decisions and compare all projects for this index (estimate its value). The "assembly" of the index, which was carried out according to the "U-STO" algorithm, was based on the use of the previously described blocks "uniqueness", "environment", "technology", "organization". It was based on the working hypothesis that the courage of development decisions is a multidimensional phenomenon that cannot be reduced to any one facet, for example, technological innovation. It must necessarily include features in varying degrees of uniqueness, novelty, innovation, pilot character in spatial (territorial), technological and organizational sections.

In the "uniqueness" block, it was assessed whether a given project has features of uniqueness for the country or the world; whether this project is a pilot / flagship for the company and / or the place of its deployment, so that later it can be replicated in new areas; whether this field was discovered in the USSR or already in the new Russian time. Here and further, all evaluations were carried out in binary logic: 0 — lack of uniqueness, pilot character, discovery in Soviet times; respectively 1 — uniqueness, pilot, opening in modern Russian time (it was assumed that involvement in the use of a completely new, recently opened project is a more courageous step than relying on storage facilities and reserves from the Soviet era).

In the block “environment” it was assessed whether new large elements of the territorial structure are formed as a result of the project implementation (for example: shift, port, terminal, etc.); does the logistics, understood both as the delivery of goods for the object, and as the export of products to the consumer, have features of novelty or is it traditional (sea or land, ice-class ships or icebreakers?); whether the project enters a new business environment or remains the same (for example, from land to sea).

In the "technology" block, it was assessed whether it was about development from scratch, that is, greenfield, or about the modernization of a previously created mining facility, that is, a brownfield-type project; whether there are features of the most modern platform technologies in the project or not; whether the stage of processing is envisaged at the same time at the place of production (it was assumed that the very fact of locating a processing plant in the Arctic is courage, because the traditional scheme provided for production in the Arctic, and processing in the developed regions of the country).

In the “organization” block, it was assessed whether the project was accompanied by the creation of a new structure “for it” (it is assumed that in this case the factor of decentralization of power works, which always favors courageous economic decisions); does the project have a special legal status (for example, territory of advanced development, special economic zone, etc.); is the project accompanied by the formation of intercorporate alliances, agreements (it is assumed that the union of partners in the project who were competitors before is an act of economic courage).

As a result, the index of courage of economic decisions in a specific project is the result of evaluations in binary logic ("yes-no" — 1—0) for 12 indicators grouped in the block "uniqueness", "environment", "technology", "organization". A project that has features of uniqueness and inno-

[6] I express my gratitude to E.S. Putilova, who selected and characterized these 24 production projects in the Russian Arctic, including LNG projects: Yamal-LNG and Arctic-LNG-2; for hydrocarbon production — Prirazlomnoye, Novoportovskoye, Vankorskoye, Payyakhsky, Messoyakhsky, Yaro-Yakhinskoye, Tirekhtyakhskoye, field, Bovanenkovo, Vaneivisskoye; coal Taibass and Syradasayskoe, gold ore — Kupol, Mayskoe, Nezhdaninskoe, Kekura; non-ferrous metals — Pavlovskoe, Baimskoe; rare earth — Tomtor, nickel and copper — the southern cluster of the ultimate potential resources, the expansion of the Kola MMC; apatite mining — modernization of JSC Apatite and the merger of the mines of apatite-nepheline ores Rasvumchorr.

vation in territorial, technological and organizational dimensions (new environment, technologies, organizations) is recognized as truly courage (Table 1).

Experts may have questions about the correctness of the awarded marks. For example, why do the Arctic LNG 2 and Yamal LNG projects have “zero” in terms of inter-corporation alliances? Doesn't the implementation of these projects involve the conclusion of dozens of contracts with subcontractors, including those from large, world-class companies? But we are interested in agreements on joint development of a natural facility, when former competitors, for example, in gas production, suddenly join forces due to the unprecedented complexity of the facility and the need to “combine” competencies. This phenomenon did not appear in the designated projects. On the other hand, the project for the development of the Nezhdaninsky gold deposit, for which a joint venture between PJSC Polyus Gold and JSC Polymetal was established, refers to the case of an inter-corporate alliance.

Questions may arise as to why one coal project in Taimyr involves the creation of a new special organizational structure (Taibass), and the other does not (Syradasai project)? We took all this information from project descriptions available on the Internet. This means that in one case the alleged owner considered such an organizational action necessary, in the other not.

The question may arise why the Vankor project has “zero” according to the criterion of penetration into the new environment, and the Payakhskaya group of fields does not have? But the fact is that the development of Vankor and all of its logistics are land-based, while the development of the Payakhskaya group provides for the use of marine logistics for the development of the field. And, as has already been noted many times, the revolutionary going to sea with technologies for production, processing, and high ice class vessels is the most important factor in the courage of modern development decisions in the Russian Arctic.

It is important to note here that the simple preservation of the previous offshore schemes, for example, the export of concentrate from Chukotka in the projects of the Baimskoye field, the Kekura, Mayskoye projects is not a manifestation of courageous economic decisions. Because these schemes were known and were used back in Soviet times in the form of icebreaker escort of dry cargo ships, lighter carriers, etc. The use of new technical means, organizational schemes, elements of the territorial structure (routes and development bases) makes them revolutionary.

The “poles” of the distribution of projects according to the index of courage of economic decisions are quite clear. Naturally, NovaTEK's LNG projects are gaining the maximum score. It is also understandable why projects for the modernization of old mining facilities in the Murmansk region have a minimum score: we are talking about a relatively routine procedure for the technological modernization of old production facilities, which is usually incomparable in terms of innovation and audacity of economic decisions with pioneer projects and pioneer development.

The "middle" cases are more interesting. For example, the project for the development of the Kupol gold deposit in Chukotka has the high place. For the index of courage, the capital intensity of the project does not matter, but only the qualitative manifestations of innovation, audacity in economic decisions are very important. Therefore, despite the fact that the Kupol project is not comparable with the Vankor project, it is higher in terms of the courage index of economic decisions.

This is the significance of assessing projects by the index of courage: it does not duplicate those already known to us, but offers new forms of distribution, in which the growth poles, modest in investment costs can outstrip significantly more capital-intensive projects, but very traditional in terms of forms of implementation.

The relatively modest place of the Tomtor project may surprise you. However, despite its obvious uniqueness, there are not so many truly courageous and innovative solutions in its development. Therefore, it is inferior to other, more obviously pioneer and flagship projects.

The large, world-class Bovanenkovo gas field scores only “three” on the Courage Index. Why? As experts admit, the scheme for the development of this field seems to be borrowed from the 1970s, with the introduction of minimal changes to it. Therefore, it is not surprising that the project has such low scores on the index of courage: it is absolutely routine, with the obvious uniqueness of the field's reserves. This is the manifestation of the problems of modern development 2.0 of the Russian Arctic: unique, world-class, natural objects are often "taken" by very traditional, even archaic for our time technologies and organizational schemes. And the index of courage just denotes this contradiction.

Table 1

Assessment of the level of courage in the implementation of development projects for the Arctic resources

	UNIQUE			ENVIRONMENT			TECHNOLOGY			ORGANIZATION			
Project (field)	Uniqueness in the world, country	Pilot flagship	Opened in Russia or USSR	New territorial structure	New logistics	New environment	Greenfield / brownfield	Platform technologies	Recycling at the production site	New organizational structure	Special legal status	Inter-corporate alliances	Total score
Arctic LNG-2	1	1	0	1	1	1	1	1	1	1	1	0	10
Yamal LNG	1	1	0	1	1	1	1	1	1	1	1	0	10
Prirazlomnoye	1	1	0	1	1	1	1	1	0	1	1	0	9
Kupol	1	1	1	1	1	0	1	1	1	1	0	0	9
Pavlovskoe	1	0	1	0	1	1	1	1	1	1	0	0	8
Novoportovskoe	1	1	0	1	1	1	1	1	0	0	0	0	7
Vankorskoe	1	1	0	1	1	0	1	0	0	1	0	1	7
Baimskoe	1	0	0	1	0	1	1	0	1	1	0	0	6
Taibass	0	0	0	1	1	1	1	0	0	1	0	1	6
Payakhskie	0	1	0	1	1	1	1	0	0	0	0	1	6
Maiskoe	1	0	0	1	0	1	1	0	0	1	0	0	5
Tomtor	1	0	0	0	1	1	1	0	0	1	0	0	5
Yaro-Yakhinskoe	0	1	0	0	1	0	1	0	0	1	0	1	5
Syradasayskoe	0	0	0	1	1	1	1	0	0	0	0	0	4
Tirekhtyakh	0	0	0	0	1	1	1	0	0	0	0	1	4
Nezhdaninskoe	0	0	0	1	0	0	1	0	0	1	0	1	4
Kekura	0	1	0	1	0	1	1	0	0	0	0	0	4
Messoyakhskie	0	0	0	1	0	0	1	0	0	1	0	1	4
Bovanenkovo	0	1	0	1	0	0	1	0	0	0	0	0	3
Vaneivisskoe	0	0	0	0	1	0	1	0	0	0	0	1	3
Southern cluster of the Norilsk Development District	0	0	0	0	1	0	0	0	1	0	0	0	2
Modernization of OJSC Apatit	0	0	0	0	0	0	0	0	1	0	0	0	1
Expansion of the Kola MMC	0	0	0	0	0	0	0	0	1	0	0	0	1
Merger of Rasvumchorr mines	0	0	0	0	0	0	0	0	0	0	0	0	0

Conclusion

As the distribution of new projects in the Russian Arctic according to our proposed index of courage shows, the reliance on marine logistics and related marine technologies for production, processing and transportation is of unprecedented importance for gaining a high status in this rating (for example, a feeder logistics scheme, platform distribution service, etc.). A quarter of all projects ranked first in the courage rating rely on maritime logistics. The main factor that predetermined the courage transition to maritime logistics and the development of new Arctic projects was the very rapid climate change and ice retreat in the shallow Russian Arctic seas.

Climate change triggers a cascade of positive effects for Arctic projects: there is the courage, even the audacity to work in a previously forbidden marine environment, not only in the field of marine logistics, but also in the creation of offshore production and processing gravity platforms. For example, NovaTEK is locating a plant of plants in Belokamenka that produces concrete platforms — modules for liquefied natural gas plants, which are then transported by barges to specific resource fields in Yamal. And, apparently, in most cases they will be located offshore, on platforms, near resource deposits.

In this scheme, the concept of offshore takes on a completely new meaning: it is on water that the natural gas produced on land is processed (liquefied). And this is a completely new ideology of the project and a new scheme of spatial organization, possible thanks to new modular technologies for the construction of industrial facilities in the Arctic.

Participation in discussions on the issues of Arctic navigation, the use of the Northern Sea Route at international and Russian forums convinces us that an absolutely new reality is emerging here: new technical possibilities in the design features of ships and navigation services; absolutely new for the Arctic requirements of commercial speed (before, happiness was the very fact of safe navigation in ice); the regularity of the movement of vessels along the route; accuracy of cargo delivery. Traditional ideas about how the Arctic and the Northern Sea Route can be used are changing rapidly.

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