

LOGIC OF NUMBERS AND LOGIC OF WORDS

What knowledge base should management decision-making in a sectoral economy rely on? Of course, one of the key factors is technology. Knowledge of technological processes specifically to a particular branch of material production is a fundamental basis for effective managerial decisions. The branches are different, and management decisions therefore must be differentiated depending on the management unit. And what else?

I would single out the triad «Mathematics — Philosophy — Economics». This is an interconnected system of critical thinking, a kind of add-on above technology. But it seems to me that without this add-on the right managerial decision cannot be formed.

In my opinion, the body of knowledge for a good industry manager can be graphically depicted as a double tetrahedron — these are two three-sided pyramids that are closed along one of the planes. Total five peaks of rigid construction.

One can imagine this «double tetrahedron» as a float in a sea of problems — the more stable it is, the better. Each peak is a system of knowledge.

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The Benefits of Critical Thinking

Mathematics is the logic of numbers. Philosophy is the logic of words (inferences). And the economy in this coordinate system can be characterized as a science that operates both with the logic of numbers and the logic of words, that is, a junction that connects mathematics with philosophy.

I should note that in Western educational practice, the subject «Philosophy» today often stands for «Critical Thinking». In my opinion, critical thinking is necessary for the formation and effective existence within the framework of civil society, as well as for the adoption of effective managerial decisions, including the sectoral economy.

Any economic development (whether at the level of a country, corporation or family) can be represented as a stream (constantly replenished, updated, moving forward) of investment projects: some of them are being launched and begin their production cycle, others go to its final stage and having fulfilled their mission, they complete the life cycle and are being eliminated. Therefore, an understanding of the life cycle of an investment project is, in my opinion, the basis of effective management as a prerequisite for effective economic development (and again: whether at the level of a country, corporation or family).



Algebra and Harmony

Any investment project has two interconnected components. Firstly, this is a feasibility study, which calculates the optimal project performance for various external and internal conditions that may change over time. Secondly, a package of legally binding agreements of the operator of the investment project (in the oil and

gas industry – the company subsoil user) with numerous counterparties. Such agreements are built on the principle of «if – then»: the parties agree on how their

IN WESTERN EDUCATIONAL PRACTICE, THE SUBJECT «PHILOSOPHY» TODAY OFTEN STANDS FOR «CRITICAL THINKING»

behaviour transforms in case of any changes in the internal or external environment of the project. All this is necessary to increase transparency and predictability of the actions of participants, to minimize risks associa-

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ted with uncertainty (for which you need to create reserve funds, uncertainty increases the cost of borrowing, etc.).

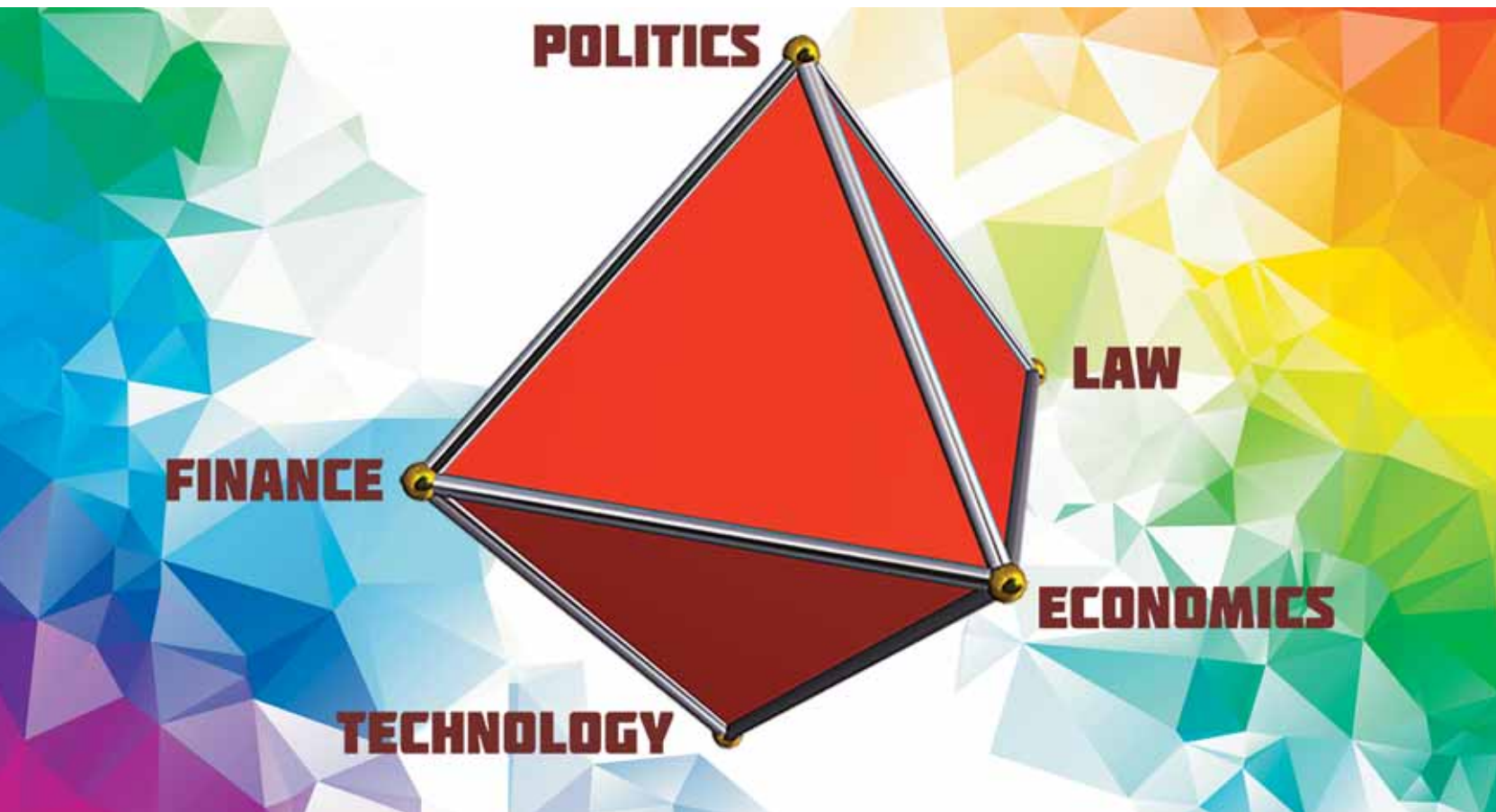
In the field of natural resources development, which include oil and gas, the most important external player

«Broader Energy Europe»

Russia, being historically a key foreign energy supplier to Europe, is very closely connected with the European countries by ties of energy cooperation, based on the capital-intensive immobile cross-border energy infrastructure which economically predetermined a long-term cooperation and is an objective technical fundament for joint (common) energy space which I call "Broader Energy Europe". This means, the space of «Broader Energy Europe» is not limited to the framework of the European Union or geographical Europe. Besides Russia with its European and Asian parts, it also involves countries of Central Asia, the Middle East, North Africa – the regions involved in the supply of different energy resources, including oil, pipeline gas and LNG. This leaves its mark on the practice of arranging the legal field. It – ideally – should be the same for states united by a cross-border capital-intensive stationary (immobile) infrastructure.

We have to deal not only with creating a favourable investment climate for domestic and foreign investors at the level of national legislation, but also discussing issues related to optimizing the legal field at the interstate level. While improving the legislation, we have to take into account the realities that exist in other countries. In turn, our features are also taken into account abroad. Previously, when most of energy trade was done on the border and cross-border energy investment were insignificant, they paid little attention to it, now the situation has changed with internationalisation and globalisation of energy trade and investment.

Taking into account the differences in the investment climate of different countries becomes an everyday necessity. Russia, the country with the richest energy resources, and the EU countries, whose economies are in need of these resources, have to reckon with them. After all, we are tightly interconnected and are constituent parts of this capital-intensive stationary (immobile) cross-border infrastructure uniting different jurisdictions. This is why international law has been growing in importance to balance different risks and uncertainties, as they are seen from the different ends of the cross-border energy value chain, and to diminish them to the tolerable level mutually appropriate for different sovereign jurisdictions within this chain.



A. Konoplyanik's
"double tetrahedron"
of knowledge.

for an investor (subsoil user) is the host state – the owner of the subsoil.

Issues of the feasibility study of the project belong to the area in which the quantitative economy (economy of numbers, calculations) is dominant, based on engineering/techno-economic and financial-economic sciences. Math dominates here (the logic of numbers).

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The issues of preparing a package of various legally binding agreements belong to the area in which the motivational (behavioural) economy is dominant, based on financial, economic and legal sciences. It is dominated by philosophy (the logic of words). The agreements describe the rights and obligations of project participants necessary to achieve the result outlined in the feasibility study. They also formalize the tendency of participants to take certain actions in the event of certain changes leading to deviations from the programmed result.

It is in this sense that economics (in my opinion, a purely applied discipline, especially with regard to the implementation of investment projects) is a system applied integrator of mathematics and philosophy – purely abstract, at first glance, sciences.

Calculations and Motivation

So, we can distinguish two economic approaches to decision making: quantitative and behavioral. In the first case, calculations are at the forefront (the argument known in industrial practice as: «calculations have shown that...»), in the second case, motivational considerations (the tendency of participants to rational behavior in certain circumstances).

On the one hand, feasibility studies, on the other hand, regulatory, contractual regulation, consolidation of a system of reasonable actions aimed at achieving a result justified by calculations. You can specialize in a «quantitative» or «behavioral» economy, but you must understand that both approaches are two sides of the same coin, two parts of a whole aimed at achieving successful managerial result.

For those who intend to deal with the quantitative economy, it is important to have a serious level of engineering and economic as well as financial and economic education. This theoretical knowledge is necessary in order to understand the logic of numbers well. Indeed, in order to agree with the argument «the calculations showed that...», it is necessary to understand and agree with the system of assumptions

underlying these calculations — the devil, as you know, is in the details. And in order to understand them deep comprehensive knowledge is required.

In the field of behavioral economics, financial and economic knowledge is also important. But legal education is also necessary — it helps build a system of motivation and develop the «rules of the game» that are attractive enough for the state and at the same time stimulate investors to finance and develop a particular project and achieve the best results.

In other words, a behavioral economy helps to build balanced rules aimed at achieving mutually acceptable results, within the restrictions set by any legislation (whether national or international law). Moreover, it is extremely useful here to have sufficient technical knowledge, in order not to try to create motivations that contradict, for example, the laws of thermodynamics or the resistance of materials.

As you can see, for making balanced decisions, an integrated approach is required, involving the use of a wide range of available tools. In this connection, an important role is given to philosophy as a field of knowledge that uses critical thinking, which is useful from the point of view of forming a realistic approach to assessing the trends and prospects of an investment project. Indeed, it is through the implementation of investment projects that economic development is carried out.

Accounting and Investment Approaches

In practice, two approaches to the formation of the investment climate manifest themselves: conditionally — «accounting» and «investment» approach. Adherents of the first approach seek to collect taxes «to the maximum» — «here and now». I note right away that in a healthy economic environment, the pragmatic goal is to achieve not «maximum», but «optimum», reflecting the balance of interests of different participants.

Typically, hydrocarbon production projects have very long life spans of several decades. At the same time, the main investment load lies on the project at its early stages, when the field is just being developed, and its production and marketing infrastructure is being formed. At the same time, the main revenues from the project occur in its later stages. And these revenues come unevenly, due to the well-known «bell-shaped» nature of the production curve (growth, peaking, stabilization, decrease).

Therefore, the tax burden on the project must be differentiated. It should be eased in the early stages of the project (a period of high costs and low incomes). And the main tax burden, which allows extracting the bulk of the natural resource rent in favour of the state — owner of the subsoil, should be at the stage of maximum production, when the main investment has already been made. It is very important, as in the marathon race, to correctly distribute the forces and pace. The fiscal regime should also help in this, since paying taxes (deductions for the state to exercise its functions — responsibilities delegated to it by the citizens of the country) is an inevitable duty of each economic entity.

It must be admitted that during the development of oil and gas fields, maximizing taxes for each year creates

negative incentives for the project as a whole. Do not forget that the life cycle of an oil and gas project is much longer than any electoral cycle. Therefore, the desire of officials to collect maximum taxes «here and now», during their stay in the office, in the government, can not only negatively affect the overall economy of projects, but also raise doubts about the integrity of such aspirations.

Double Tetrahedron for a Manager

In my opinion, the body of knowledge for a good industry manager can be graphically depicted as a double tetrahedron — these are two three-sided pyramids (four-faced polyhedrons) that are closed along one of the planes. Total five peaks of rigid construction.

A BEHAVIORAL ECONOMY HELPS TO BUILD BALANCED RULES AIMED AT ACHIEVING MUTUALLY ACCEPTABLE RESULTS

One can imagine this «double tetrahedron» as a float in a sea of problems — the more stable it is, the better. Each peak is a system of knowledge. The base surface is the triangle «economics, finance, law». The bottom (reference) peak is «engineering / technology». These four peaks are in a relatively homogeneous (within the framework of my analogy — in the «marine») environment. The top peak is «politics». And the stability of the «float» is achieved both by the breadth of the base surface (coverage of knowledge in the field of economics, finance, law) and the depth of knowledge in the field of industrial engineering / technology (the deeper this knowledge, the lower «under the sea level» the centre of gravity of the float is located, the more stable the whole structure is).

IN PRACTICE, TWO APPROACHES TO THE FORMATION OF THE INVESTMENT CLIMATE MANIFEST THEMSELVES: CONDITIONALLY — «ACCOUNTING» AND «INVESTMENT» APPROACH

This image reflects my personal «picture of the world», formed as a result of my professional evolution and as part of the evolution of my ideas about the necessary professional knowledge for the type of activity that I have to do in life — finding a balance of interests of different participants (whether the state — the owner of subsurface resources and a sole or collective investor-subsoil user, or a multilateral interstate community — see «Broader Energy Europe») to minimize the

risks of trade and investment activities for the implementation of investment projects in the energy sector.

The formal education that I received at the Faculty of Energy at the former S.Ordzhonikidze Moscow Institute of Engineering and Economics was subsequently supplemented by knowledge in the field of world energy acquired during my work at the Institute of World Economy and International Relations (then IMEMO USSR AS, now IMEMO RAS named after E. M. Primakov).

IN A HEALTHY ECONOMIC ENVIRONMENT, THE PRAGMATIC GOAL IS TO ACHIEVE NOT «MAXIMUM», BUT «OPTIMUM»

Moscow Institute of Engineering and Economics, having passed a series of transformations, has now become the State University of Management. Apparently, now it is transferring to its students some additional, new «competencies». It is a pity that at the same time, it irrevocably lost (having voluntarily or involuntarily destroyed) that «pyramid of knowledge» that existed before the introduction of various management disciplines into the curriculum.

DURING THE DEVELOPMENT OF OIL AND GAS FIELDS, MAXIMIZING TAXES FOR EACH YEAR CREATES NEGATIVE INCENTIVES FOR THE PROJECT AS A WHOLE

These disciplines are, of course, necessary and important for specialists of a different orientation (non-industry economy). For sectoral economists (including myself), this knowledge, apparently, is also important and necessary, but only if it is given in addition, and not instead of anchor disciplines. Such anchor disciplines were given by the «pyramid of knowledge» of the Moscow Institute of Engineering and Economics during my training there — in the early 1970s.

«Pyramid of Knowledge» of the Moscow Institute of Engineering and Economics

The «pyramid of knowledge» of the Faculty of Energy at the Moscow Institute of Engineering and Economics (industrial engineer-economists for sectoral branches, in contrast to the training of «broad-profile» economists at other universities) was built on the basis of a, firstly, thorough study of general education disciplines (mathematics, physics, chemistry) and general economic disciplines (philosophy, political economy, statistics), but most importantly — the theoretical

foundations of special technical disciplines (heat engineering, electrical engineering). Then, in the next year, the equipment and technology of the fuel and energy sectors were added: coal, oil, gas, electricity — thermal (condensing power stations, cogeneration thermal power stations), hydropower (hydroelectric power stations, pump storage hydroelectric stations), nuclear (nuclear power plants). From the third year, a full-scale study of the economics of the fuel and energy sectors, as well as finance, accounting, etc., began. And already at the end, by the fifth year, additional/auxiliary disciplines (scientific organization of labor, automated control systems), as well as compulsory ones (so-called «scientific communism», etc.) were added as a «cherry on the cake».

Such a stable pyramid of systematized knowledge allowed me to remain within the framework of professional competence during the course of professional evolution (and it took place all the time within the framework of the basic triangle «economy — finance — law» in the energy sphere). However, for this I had to (and still must today, because «if you stand still, you lag behind») build up the missing knowledge, including within and beyond my framework of the «basic triangle», by constant self-education.

Fifth Peak

But let us return to the «peaks». While with four of them everything is clear from the previous reasoning, then what about the fifth?

The answer is obvious. Non-renewable natural resources, which include oil and gas, are the basis of national wealth for most of the countries that own them, the basis of their sovereignty. Therefore, government intervention in a resource economy is inevitable.

In the vast majority of states (there are few exceptions, one of them is the land territory of the United States) the ownership of the subsoil belongs to the state. Therefore, it, like any owner, has the right to establish burdens not only on access to its natural resources (up to a complete ban), but also on the mode of their use. These rules govern the relationship between the host state — the owner of the subsoil and the investor (subsoil user) within the framework of the sovereign-agent relationship. These rules undergo changes over time, with the development of new technologies, national and international law, generally accepted standards of business practice and ethics. They are sensitive to the evolution of markets and the economic space they form. They are also influenced by the constantly changing external regulatory environment for any investment project, reflecting new, constantly developing market realities.

In the «double tetrahedron», the political peak is directed upward and located in a different environment (different from the sea — within the chosen metaphor with a float). The more this peak is disconnected from economic, legal, financial realities (rises above them), the less stable position it creates for our «float». But one cannot ignore these fluctuations, and cannot not to react to them. Otherwise, what may be called «keeling over» in the maritime industry — a float (the whole system) may turn upside down and capsizes. ■