Organizational and legal forms of implementation of megascience projects

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Abstract. Support of fundamental science as a backbone institution for the long-term development of the nation is a priority task of the modern state. In order to fulfill this task, some countries develop an advanced infrastructure of research, development, and innovation, which includes creation and development of a network of unique megascience-class installations which provide solutions to key research tasks of the world scientific agenda aimed at obtaining new fundamental knowledge necessary for the long-term development of the country. The combination of public interests and income generation is a fundamental task that the state is trying to solve, by implementing national programs and using all its tools and methods of influence to achieve the strategic goals of the strategy of scientific and technological development. The scale of megascience projects urges us to think about the choice of their optimal legal structures, which can be divided into two groups: public and private. One of the urgent tasks of lawmakers and law enforcement agencies is to choose (or create) the optimal legal structure of the megascience projects that meets the interests of both the state and private entities.

1. General provisions

Fundamental science, which provides new knowledge and relies on its own logic of development, is to play a key role in the scientific and technological development of modern states.

Support of fundamental science as a backbone institution for the long-term development of the nation is a priority task of the modern state. In order to fulfill this task, some countries develop an advanced infrastructure of research, development, and innovation, which includes creation and development of a network of unique megascience-class installations which provide solutions to key research tasks of the world scientific agenda aimed at obtaining new fundamental knowledge necessary for the long-term development of the country.

A unique scientific installation of the megascience-class can be defined as a single system complex of scientific equipment that has no analogues in the world, created with the involvement of international cooperation resources in order to obtain scientific results that would deliver fundamental breakthrough knowledge, technologies or solutions of global significance, which cannot be achieved using other equipment complexes [1].

If to summarize the requirements that were put forward for scientific facilities of the "megascience" class in various documents, they can be reduced to the following:
1. The relevance and importance of the scientific field for research in which the facility is created.
2. The uniqueness of the facility and the lack of close analogues in the world both in terms of parameters and the possibilities of solving scientific problems.
3. The relatively high cost and complexity of the facility, the development and creation of which requires the cooperation of different organizations.
4. Participation in the creation and development of the unique scientific facility of members of foreign countries who can make not only intellectual, but also material contributions.
5. Perspectives of using the obtained scientific and scientific-technical results for the development of new and improvement of existing technologies and for other practical purposes.
6. Using the facility in the educational process for preparation of students, scientific and pedagogical cadres, advanced training, etc.
7. The duration of the period of the relevance and demand for facility by existing and potential users.

Currently, scientific and technical cooperation within megascience projects usually takes form of scientific collaborations. Often a particular collaboration is referred to as ‘megascience-class project’, ‘megascience project’, or simply ‘megascience’ [3]. Operation of scientific collaborations may bring out various aspects of the legal personality of the collaborations, and of their individual elements as well. To form a scientific collaboration, three interacting key elements are required: researchers (individual scientists and research teams), infrastructure that ensures the continuous functioning of research teams and their projects, and the state as a regulator of relations between scientific organizations and research teams [4].

Accordingly, there are practical issues of forming and formalizing the rights and obligations of these key elements of a scientific collaboration, as well as those of any scientific collaboration (or a megascience project) itself.

Megascience projects, existing or about to be launched in the near future, bring together research teams from different cities, countries, and fields of scientific knowledge. These groups of researchers are united to achieve common goals, according to the decision to create a megascience project made by the state or group of states involved.

The combination of public interests and income generation is a fundamental task that the state is trying to solve, by implementing national programs and using all its tools and methods of influence to achieve the strategic goals of the strategy of scientific and technological development. It is this national task that generates the need to shift the generally accepted approach to the notions of public and private legal personality in the direction of collaboration between private entities and the state. In this respect, we believe that further penetration of private law principles into the public law sphere is very likely, as well as the opposite trend.

Since the activities of the state are carried out to achieve public goals and implement public interests, public entities – subjects of such interests – hold a special place among other subjects of public legal relations. Consequently, public entities have targeted legal capacity. This approach corresponds with the traditional understanding of the role of the state in the development of the national economy, science, and technology: when public education is the main or the only subject of key management decisions and their implementation.

At the same time, it should be noted that the modern high-tech economy in its development follows the interests of individuals who create and develop certain business areas, and the digital information environment in which most transactions are carried out allows you to circumvent most state restrictions and prohibitions. In such circumstances, it seems that strict administrative and command regulation along the vertical line is not fully effective. In order to implement public tasks, the modern state needs to take into account the interests of individuals and use methods of coordinating public and private interests.

Of course, it wouldn’t be appropriate at the moment to proclaim the equality of public and private subjects of modern public legal relations; however, we believe that it may well emerge in the near future. In this regard, at present it is necessary to pay close attention to the legal status of private entities and the order of their interaction with public entities. We believe that one of the urgent tasks of modern
Science is to create a model of interaction between public and private entities, and megascience projects are good examples of such interaction.

2. Organizational and legal forms of megascience projects

The form that collaboration in science and technology should take, the conditions under which it is likely to succeed, the risks that collaborative projects can face and the potential barriers that can stand in their way, have each become major topics within the research and development policies of many countries [5].

The scale of megascience projects urges us to think about the choice of their optimal legal structures, which can be divided into two groups: public and private.

Public legal structures would include:

- international intergovernmental organizations, i.e. ITER Organization, European Organization for Nuclear Research (CERN), Joint Institute for Nuclear Research (JINR, Dubna, Russia);
- transnational and supranational legal entities;
- international consortia of scientific organizations without the status of legal entities;
- European research infrastructure consortia.

Private legal structures are represented by national legal entities (for example, in Europe: European XFEL, Germany; European Synchrotron Radiation Facility (ESRF), France; European Gravitational Observatory (EGO), Italy). In Russia, this category of national legal entities primarily includes state-owned corporations (Rosatom), state institutions (research institutes), and commercial organizations (equipment-making factories) [6].

It is important to note that at the moment there is no system of normative legal acts defining organizational and legal forms in the framework of international and national scientific cooperation in the implementation of projects of the “mega-science” class [7].

One of the urgent tasks of lawmakers and law enforcement agencies is to choose (or create) the optimal legal structure of the megascience projects that meets the interests of both the state and private entities.

3. Organization of megascience projects in Brazil

Brazil's experience in creating unique scientific installations is of considerable interest for understanding legal personality in megascience projects. Currently, the Brazilian Synchrotron Light Laboratory (LNLS) is building a fourth-generation synchrotron, Sirius, which legitimately claims the title of a megascience class installation, since it is to become one of the largest and most technologically advanced synchrotrons in the world. LNLS is part of the Brazilian Center for Research in Energy and Materials (CNPEM). CNPEM is a private, non-profit research institution subordinate to the Brazilian Ministry of Science, Technology and Innovation (MCTIC) [8].

The head of the CNPEM and the Government of the Federal Republic of Brazil (hereinafter referred to as Brazil), concluded a so-called management agreement (contrato de gestão), which is a kind of an administrative agreement. The management contract is enshrined in the Brazilian Constitution (art. 37, § 8), which says that ‘the managerial, budgetary, and financial autonomy of direct and indirect administration may be extended through a contract signed between its administrators and the public authority, the latter’s purpose being to set performance goals for the body or the organization, while the law provides: I - the term of the contract; II - management structure and criteria for the evaluation of the work, rights, duties and responsibilities of officials; III - staff remuneration.’

In the case of the CNPEM, it was recognized as a public organization by the decree of the President of Brazil No. 2405, 26 November 1997, which makes it a specific legal personality, since in accordance with the Brazilian law, public organizations have public duties. These duties are assigned to them by the law or by the management agreement.
In accordance with the Brazilian Law No. 9637/98, 15 May 1998, it is possible to enter into a management contract with private non-profit organizations that carry out activities in the public interest. The management agreement, in this case, establishes the procedure of interaction between the state and the public organization in order to form a partnership between the parties for the sake of education, research, technological development, culture, health, and environmental protection.

Maria Silvia Zanella di Pietro, Professor of the University of São Paulo, Brazil, notes that a management contract is not a private law contract, and when its signatories are public organizations it significantly restricts their autonomy, because although they are private individuals, they will have to comply with the requirements contained in the contract [9].

Management contracts are the instruments responsible for establishing relations between the central government and public organizations, because they establish incentives and guarantees, as well as allow the parties to monitor and control their mutual obligations. The parties of such agreements never have opposing interests, their interests coincide and are aimed at achieving public goals.

These agreements allow different entities to structurize their obligations and rights in the name of common interests and to receive mutual benefits, provided that the actions stipulated in the agreement are effectively performed. The rights guaranteed to a public organization by the management agreement do not exempt it from the obligation to submit to public administration. The organization must properly perform the tasks assigned to it. It will have the right to demand that the state perform its respective duties, insofar as it implements its own responsibilities properly [10].

Consequently, the management contract allows to change the structure of legal personality not only of individuals, but also of the state, assigning to it certain duties related to the obligations assumed by the state in relation to individual public organizations. We believe it possible to use this foreign experience to organize interactions between the state and legal entities of legal structures and of different forms of ownership, in particular, when implementing megascience projects.

To understand the nature of the management contract, it is necessary to briefly review the concept of indirect management used in Brazil. Indirect governance as a form of decentralization of power means that the central authority transfers certain services to legal entities, but exercises the necessary control over them to ensure that they fulfill the goals these powers were transferred to them for.

Initially, the procedure for delegating the performance of services to private companies was used through the conclusion of a concession contract (contrato de concessão), which had the advantage of being able to provide public services without investing public resources. Any concession agreement has two aspects: the state, seeking the public interest, tries to set lower prices affordable to the population, while commercial organizations are focused on making profit, and for this reason are interested in raising prices. Subsequently, the state had to increase its interference in the activities of concessionaire organizations, by providing them with financial assistance or taking on the risks of these private entities. Thus, the concession ceased to be of interest to the state, and the search for new forms of decentralization began.

Currently, in Brazil there are the following types of decentralized entities (legal entities to which the state has delegated a number of its powers): autarchies; public companies and companies with mixed capital; foundations; other legal entities with appropriate powers.

The term ‘autarchy’ consists of two juxtaposed elements: autós (proper) and archia (leadership, management), i.e. literally ‘own leadership’, ‘self-government’. Although the term first emerged in Italian legal theory, it is used in a different meaning in Brazilian law. Currently, autarchies are considered the most appropriate legal structures for the provision of public services. The legal concept of an autarchy is as follows: it is an autonomous institution established by the law, with a special legal personality, own assets, and income, set to perform typical public administration activities that require, for their best implementation, decentralized administration and financing.

Main characteristics of an autarky are: being created on the basis of the law; public legal personality; ability to self-govern; specificity of goals or activities; subordination to the state.
There are two main types of organizations to which the Brazilian state delegates its authority: executive agencies (agências executivas) and regulatory agencies (agências reguladoras). They might be called authorities, but, unlike ministries, they are not by nature executive authorities.

Executive agencies are autarchies or foundations that have concluded management agreements with executive authorities and submitted strategic development plans in a particular field of activity. Their activities are supervised by the relevant ministry. Thus, executive agencies are not specially created legal entities, but previously created organizations that wish to enter into a management agreement.

Regulatory agencies are created as autarchies with a special legal regime – legislative acts grant them greater autonomy in relation to public authorities: in particular, their decisions are not subject to evaluation by other public authorities, with the exception of the authorities related. This provision applies only to executive authorities: regulatory agencies are not exempt from the control of the judiciary, the National Congress (Parliament), or the Court of Accounts (Tribunal de Contas).

The powers of regulatory agencies are clearly defined by regulations or contracts and consist of the following: to act as regulators in the relevant field of activity (by issuing regulations that do not contradict state laws and apply to a limited number of persons); to tender for private contractors for the works, services, or goods; to grant permits; to set tariffs; to exercise control; to impose sanctions; to act as an Ombudsman for complaints; and other powers delegated to them by the state authority. In other words, a large amount of authority is transferred to these agencies from the executive authorities.

Currently, regulatory agencies include the Nacional Electricity Regulatory Agency (Agência Nacional de Energia Elétrica – ANEEL), the National Telecommunications Agency (Agência Nacional de Telecomunicações – ANATEL), the National Agency for Oil, Natural Gas, and Biofuels (Agência Nacional de Petróleo Gás Natural e Biocombustíveis - ANP), the National Agency for Health Supervision (Agência nacional de vigilância sanitária - ANVISA), and a number of others.

Consequently, the management contract allows to change the structure of legal personality not only of individuals, but also of the state, assigning to it certain duties related to the obligations taken on by the state in relation to individual public organizations.

Thus, there is a practice of delegating state powers to entities that cannot be legitimately called private, because they are endowed with public legal capacity and must implement public goals. At the same time, it is also wrong to refer to these subjects as public authorities, because their powers do not fully correspond to the powers of the authority.

We believe it possible to call them parapublic organizations. They are established by public authorities in order to optimize resources, reduce costs, and improve service delivery. To achieve these goals, these organizations are granted special legal capacity, including the right to carry out regulatory functions, control, and distribution of the public financial resources.

4. Legal entities with special status in Russia

Realization of scientific projects of the "megascience" class becomes a catalyst for activating the processes of institutional, organizational and informational transformations of Russian science. Based on the analysis of the current legislation of the Russian Federation, the organizational and legal models for creating scientific projects of the "megascience" class are possible:

- scientific project of the "megascience" class as a structural subdivision of the base organization.
- creation of a separate legal entity for the implementation of project of the "megascience" class.
- creation of an international intergovernmental organization for the implementation of project of the "megascience" class [12].

Russian legislation also contains examples of legal entities with a special status that allows them to implement public tasks and functions.
In the cases specified by the Federal Law of 29.07.2017 No. 216-FZ “On Innovative Science and Technology Centers and on Amending Certain Legislative Acts of the Russian Federation”, the powers of the management company to carry out the functions of managing the innovation science and technology center in by their nature, they are similar to the powers of state bodies of the constituent entities of the Russian Federation and local authorities [13].

The state and other public entities can participate in legal relations both independently and through their own authorities, as well as through the establishment of state-owned corporations or companies, state and municipal unitary enterprises, institutions, autonomous organizations – all of them can be called parapublic organizations.

Under present-day conditions, state bodies operating in the field of megascience projects cannot exercise their powers without the participation of state-owned corporations and companies. The main differences between these subjects of law and state bodies are, firstly, the limited scope or complete lack of power, and, secondly, a certain degree of independence from the state. The state is not responsible for the obligations of corporations and companies, and they are not responsible for the obligations of the state. At the same time, these entities are called upon to implement public goals and therefore have special legal capacity, in the sphere of functioning of megascience projects as well. All their activities should be aimed at achieving the goals for which they were created, and the scope of their powers is determined by federal laws, as well as the acts of government bodies.

State-owned companies are created to provide public services and perform other functions in the interests of the state. State and municipal unitary enterprises, institutions and autonomous organizations are of strategic importance for the economy of Russia, because they are created to solve important tasks in the fields of economy, social security, national defense and security, and scientific and technological development.

5. Non-State legal entities in the UK

In the UK, the equivalent of state corporations and public institutions is a special entity – QUANGO (quasi-autonomous non-governmental organization, hereinafter – Quango). Another abbreviation is also used – NDPB, a non-governmental public body.

Quango has a number of features:

- it is a non-profit organization;
- it has a specific mandate to exercise certain powers or public functions;
- its activities are guided not only by the priority of performing public tasks, but also by the principles of economic efficiency;
- its employees are not subject to restrictions that are typical for civil servants;
- remuneration of its employees is significantly higher than the remuneration of civil servants;
- it operates under the auspices of a specific public authority or within its system.

A significant number of such organizations were previously called ‘the Commission’, and their main task was consulting on certain issues. Since the mid-2000s, the number of Quangos has been declining. The main criticism of them was the inefficient use of public funds. Even the term ‘quangocracy’ was in use [14].

At present, the number of Quangos in the UK has decreased, but they continue to operate under the state authorities. Their legal status is enshrined in laws, such as the Public Bodies Act 2011, as well as by-laws of the authorities that established them. These organizations operate in various spheres of society and exercise certain state powers to regulate (or self-regulate) education, healthcare, and business support, and to solve a number of social problems [15].

Thus, the dispositivity in the existence of these quasi-autonomous non-governmental organizations is expressed in their separation from state authorities (‘arms-length bodies’) and granting them the status of a non-state legal entity. At the same time, Quangos are given certain public powers and operate on public funds.
6. Final provisions

It is clear that the involvement of non-state actors into the implementation of public authority functions is a global trend. Although the optimal structure for devolution of powers has not yet been developed, significant steps in this direction have been taken, in particular, in Brazil and the United Kingdom. In the sphere of creation and operation of megascience projects, this trend is of particular importance, because the implementation of the goals and tasks assigned to the unique megascience-class scientific installations always goes along with the allocation of public funds. Implantation of the institution of contract, autonomy, financial independence, and self-government in the mechanism of public administration will allow to solve a number of major issues, in particular, the problem of efficient use of state monetary resources.

Thus, dozens of scientific collaborations that have a narrow specialization but share a common global goal can operate within a single megascience project, and one of the tasks of the management bodies created within a megascience project is to organize effective interaction between these collaborations, which can be achieved in various ways, one of those being the choice (or creation) of the optimal legal structure for the implementation of megascience projects.

It is obvious that the problems of legal personality in the implementation of megascience projects should be studied taking into account the norms of civil law, administrative law, budget law, and international law based on the principles of interdisciplinarity, efficiency, independence, cooperation, financial security, freedom of movement of goods and financial resources, and priority of public interests over the interests of individuals.

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