State-Owned Enterprises as Innovation Development Agents: The Comparative Analysis of Russia`s and France’s Cases

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Despite common beliefs that State-Owned Enterprises (SoEs) are generally present in the developing or emerging economies (China, Russia, etc.), SoEs and some other forms of publicly controlled or regulated companies are still functioning in different sectors of most advanced nations (from France to the USA).

This is also true for technology and innovation areas - despite SoE presence there is less apparent. In many developing and emerging economies SoEs and SoE-related enterprises perform a substantial set of technology and innovation functions – from resource accumulation to support of technologies development. Especially this is visible in capital-intensive industries and/or industries with high barriers for market entry and “first mover” risks (aerospace, pharmaceuticals, nuclear, partly automotive, ICT, and machinery, etc.). But in many developed nations SoE presence is still actual in areas like aerospace or some telecomm assets - despite, of course, to a much lesser extent than in Third World or emerging economies.

SoEs as public technology or innovation agents (or a functionally close, but de-jure different case of strong government influence on big private corporate entities like *keiretsu* in Japan or *chaebols* in Republic of Korea) have some evident advantages.

On one hand, the instrument is of a great importance for resolving some key shortcomings of industrial and technology/innovation development – especially for emerging economies, but also for some developed nations (when the letter ones need to “catch-up” some more successful competitors). SoE were and are considered as quite functional as “initiators” and sometimes first (“anchor”) users/markets for innovations, as convenient instruments for redistributing

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1 This paper was prepared with support of Russian Foundation for Humanitarian Foundation, grant № 16-02-00615.
resources for most advanced or prospective directions of societal and/or economic development. An “ideal” mix of problems for SoEs as an instrument includes following ones:

a) shortages of needed resources and need to fast and controllable mobilization of resources (as system theory points, hierarchical systems are to some extent more visible, controllable and manageable for the Regulator);

b) absence and/or relative weakness of private businesses in the respective areas, unwillingness of existing private businesses to take risks, associated with development of “disruptive” technologies and/or long-term, strategic approach to industrial development;

c) challenges for global mature markets entry – in the face of strong foreign conglomerates, controlling respective target markets;

d) need for public control over development of “sensitive” defense, security technologies;

e) need for public control over selected civilian technologies – for achieving wider social or societal benefits (as opposed to pure commercial ones) or, rarely, because of ideological reasons (i.e. belief in the “need” for public control for better achieving “public” interest).

On the other hand, SoEs are also quite convenient for governments.

SoEs may provide a more targeted and at least partly more professional way for both managing industrial development and channeling financial resources. This is due to existence of industry-specific competences among managers (in comparison with a typical “bureaucratic” ministerial officials); more efficient information loops and links to knowledgeable communities, etc.

SoEs also simplify policy tasks for the government as Principal. Instead of becoming a fully-engaged actor, government finds itself as a limited regulator of a process.

Despite a well documented discussion on economic shortcomings of SoEs\(^2\), questions of whether a developing or emerging economy can avoid SoE creation in its rise to innovation heights, and are SoEs effective from this perspective are still less evident. The same could be said about possible and actual respective roles of SoEs in developed nations: are they just an anachronism or bear some more or less important functions in technology and innovations (not necessarily as key economic agents)?

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In order to give at least some limited answers on these questions in this report we will compare some French and Russian policies toward SoEs in the context of respective innovation efforts. The choice of these two nations is explained by the fact, that despite different economic models and stages of development, institutional structure, both economies and the National Innovation Systems (NIS) have a lot in common from the historic, structural, functional and political perspective (see below).

We presume that a comparative analysis of SoEs’ innovation functions and SoE-targeted innovation approaches in France and Russia may not only reveal some important details of their innovation and more general economic policies, but also indicate some specifications of SoEs as national agents for innovation development.

**The similarities of the French and Russian innovation systems**

As it was already mentioned, Russia and France share some similar features in economy and technology/innovations.

In briefly, we can indicate at least three common features.

First, the similarity is apparent in the composition of the both nation’s high-tech sectors. Both are dominated by the capital-intensive, “traditional” high-tech industries related to the defense or dual-use technologies (i.e., aerospace, nuclear etc.) – an apparent legacy of Cold War.

From the formal point of view, there are also significant economic differences between the two nations. France is one of the globally most developed economies, and possesses also an advanced chemical, pharmaceutical and medical industry, as well as certain competitiveness margins in such fields as automobile production, machinery building, renewable energy and electronics. But, in the first hand, Russia historically (in pre-1991 period) has competences and potential is almost all abovementioned industries. On the other hand, since late 2000s it is enforcing growth in the same industries (except renewables). In 2000s this was due to a higher financial reserves from oil and gas exports and rising living standards.

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of the population (a factor to enforce western companies to localize production facilities in Russia). As for now key drivers behind the process are overcoming sanctions – including import substitution – despite, in general, the economy is still trying to overcome system failures of 1990s structural crisis and “Dutch disease” of 2000-2010s.

Strong resemblance can be also traced in the process of the formation of the French and Russian innovation systems, political models, institutions and instruments, used or applied for support of nations science, technologies and innovation development. Historically, both countries repeatedly resorted to etatist instruments, ranging (due to differences in political systems) from planning and other administrative leverages to nationalization of the strategically important industries in order to encourage growth and modernization. Both used a pro-active, interventionist (despite to a very different extent) policies in technology and innovation area.\(^5\)

In these areas both nations historically place heavy accent on “national champions” – big and powerful national companies in public or mixed property - from aerospace and nuclear (Safran S.A., ownership in EADS, Areva in France, United Aircraft Corporation and ROSATOM in Russia) to telecommunications (Orange S.A. - formerly France Télécom S.A. in France, Rostelecom and affiliates of Rostech State Corporation in Russia).

Finally, both nations and their respective economic policies are strongly socially oriented (despite obvious shortcomings of Russian policies in 1990s), sometimes with mixed results for the economic development. And this is also true for the nation’s SoEs which implement a specific set of economic as well as social tasks – like ensuring social stability through the preservation of high employment rates and solving different other structural and ongoing social tasks.

**France**

Before 1990s in France nationalizations and, more broadly, etatist economic and innovation policies periodically gave way to privatization and deregulation waves which was mostly conditioned by the changes of power and fluctuations of the general economic conjuncture.\(^1\) Not considering Charles de Gaulle massive

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technological build-up, the last wave of powerful state interference came up in 1980s during François Mitterrand presidency and as an apparent reaction to global economic downturns of the previous decade. In pursuit of economic recovery and development, in 1982 the French government nationalized 39 banks, 2 financial corporations and 5 large industrial firms: Compagnie générale d’électricité (CGE), Péchiney (chemical industry), Rhône-Poulenc (chemical and pharmaceutical sector), Saint-Gobain (construction materials) and Thomson (electronics and defense sector). Some very ambitious technology and innovation programmes with strong influence in national business sector and SoEs started – from computing to aerospace.

The state “attempted to influence the strategy of the industrial firms that it acquired. Not only did it re-focus the activities of these firms around their main and original sector, but it also steered these groups toward innovative activities such as production of nuclear energy, fibre optics, polymers, information systems and semi-conductors” with help of special “grands programmes” (large programs).

However, since 2000 French policy diverged significantly from its previous mode. In 2001 the French organic law on state finance (LOLF) launched a financial management reform conforming to OECD and EU recommendations. It “introduced the concepts of objective-setting and ex-post evaluation of outcomes, within a new context which allows managers greater freedom in handling of their budget allocations. Programme budgets became indicative, though subject to a ceiling for staff overheads, and rules to favour investment over staff expenditure”.

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The law also included tax and fiscal clauses “aimed at reducing the tax burden... on firms”\footnote{OECD (2014). OECD Reviews of Regulatory Reform: France: Charting a clearer way forward. Paris. P. 52.}.

In 2004 this transformation ended up in the establishment of the French Government Shareholding Agency (Agence des participations de l’État, APE), which marked the final transition from the pattern of state behaviour as trustee or strategic manager to the model of the Government acting as shareholder in relation to companies with its participation.


With the creation of the GSA the logic of government participation changed: the accent passed from full-fledged trusteeship to putting state-owned companies into general competitive conditions of the free market. These were industrial and financial efficiency that became henceforth key indicators.

In order to achieve better performance two main measures were taken. Organizational form and legal status of many enterprises were transformed from public establishments into joint-stock companies or corporations\footnote{Cour des Comptes, L’Etat actionnaire… Op. cit. – pp. 5-7.} and redistribution of shares in favor of private capital proceeded\footnote{Cour des Comptes, L’Etat actionnaire… Op. cit. – pp. 5-7.}.

In “2014 the French Government clarified its doctrine for actions” which incorporated the following set of major objectives:
• “ensure the Government has a controlling interest in companies of strategic public interest operating in critical areas for France’s sovereignty;
• guarantee the existence of resilient corporations able to fulfill the country’s basic needs;
• support corporate growth and consolidation, particularly in sectors and industries that drive French and European economic growth;
• bail out companies on an ad hoc basis and in compliance with EU regulations in cases involving systemic risk”17.

In the sphere of innovation development these guidelines manifest themselves in the fact that companies with state participation operate on a general basis with all other private actors. The Government exerts influence on their R&D intentions exclusively through general programs to support research, technology and innovations. The French SoEs can benefit from them pursuing their own financial interests which sometimes coincide with those of the Government.

Thus – from point of view of French authorities – a needed synergy was created between the engagement of state in the economy and the capital of some biggest corporations and the need for innovation efficiency and economic effectiveness of this involvement.

In this respect the case of the national project of “sovereign cloud computing à la française” is quite revealing. Initially in 2011 the French Government planned to fund the creation of an enterprise Andromède which would “unite three national giants: Orange, Thalès and Dassault Systèmes”18, the first two of which are partly owned by the state. Due to disagreement between companies with government participation and Dassault Systèmes regarding the principles of the consortium management the latter launched an alternative initiative with SFR. In these conditions the French authorities decided to finance both projects in equal shares to create and support competition19 without giving any privileges to state-owned actors.

Moreover, this pattern of interaction between the French Government and companies with its participation stays intact despite the fact that France launched in 2013-2014 a large-scale plan of industrial modernization and revival called “The New Face of Industry in France” (“Nouvelle France Industrielle”) consisting of 34 roadmaps\textsuperscript{20}. In May 2015 the structure of the program changed: 34 narrower plans were transformed into 10 wider ones with the project “Factory of the future” coming to the fore. This reorganization marked the start of the second phase of the program “The New Face of Industry in France” more keenly oriented towards the market needs\textsuperscript{21}.

In fact the project “Industry of the future” as the central element of the current French innovation initiative is aimed at stimulation of inter-industry relations. Retrospectively France used to achieve such effects through consolidated action based on priority usage of the potential of the SoEs and state involvement in management of grand prograriummes and other administrative actions. This time the Government does not have enough leverage and does not seek to make corporations with its participation assume special commitments in realization of the program. That indicates that at the moment in France SoEs are regarded more as strategic providers of public goods and services as well as social, especially employment, stability rather than agents of innovation development.

However, the role of the French state as strategic manager and not an average shareholder is visible in the energy sector where the Government possesses a controlling interest (84.9 % of EDF capital\textsuperscript{22} and 86.58 % of AREVA capital\textsuperscript{23}). Given the importance and weight of the energy industries in the national economy, issues related to their competitiveness and perspectives become


automatically rather sensitive and attract special attention of the authorities. The case of the renewable energy development in France demonstrates that well.

In early 2000s when it became obvious that the most developed nations launched extensive efforts to create, introduce and adopt renewable energy technologies\textsuperscript{24} France could not afford to stay aside. While it took the state several years to get down to setting comprehensive goals in the field (it was in 2007 at the national assembly of parties concerned “Grenelle de l’environnement” that major priorities emerged\textsuperscript{25}), fragmentary actions were undertaken at once with SOEs playing a special role in their realization.

In 2000 the Parliamentary office of evaluation of scientific and technological choices (Office parlementaire d'évaluation des choix scientifiques et technologiques) was charged with the examination of the then state and perspectives of renewable energy technologies in France. The final report assigned many essential R&D functions in the sphere of renewable energy to the Alternative Energies and Atomic Energy Commission (Commissariat à l'Energie Atomique et aux énergies alternatives, CEA)\textsuperscript{26} which held directly 54.37% of shares of AREVA, group specializing in the nuclear fuel cycle.

Describing the efforts and the achievements of the CEA in developing new green technologies its then CEO P. Colombani stated that AREVA as “CEA’s industrial subsidiary” would back up Jeumont Industrie in the production of wind turbines to boost its competitiveness on the European market as well as “industrialize the fuel cells technology”. In the pursuit these goals the CEA as the major shareholder along with the French state nominated a general delegate supervising AREVA’s actions and accomplishments in the field of the renewable energy\textsuperscript{27}.

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Besides, in 2001 AREVA established a special R&D unit Helion “to develop an alternative to nuclear power for naval propulsion” that is hydrogen energy and fuel cells\(^{28}\). In 2007 it was attached to newly created “AREVA Reneawble business group based on in-house expertise in bioenergy and innovations in hydrogen, and with other areas [such as solar and wind energy] added through acquisitions”\(^{29}\).

The SOE Electricité de France (EDF) was also engaged into the support of renewable energy facilities. In conformity with articles 8 and 10 of the Law n° 2000-108 of 10 February 2000 on the modernization and development of the electric public service EDF was obliged to conclude special purchase contracts with renewable energy producers and cogeneration plants on the conditions fixed by the responsible ministry\(^{30}\). Costs related to that were compensated to EDF by the state through the introduction of a tax called “Contribution to the Electric Public Service Charges” (Contribution au Service Public d’Electricité, CSPE)\(^{31}\). These mutual obligations were confirmed and restated in the 2001 and 2004 Public Service Contracts between the State and EDF in the context of the opening of the French electricity market\(^{32}\).

It is worth mentioning that at present this system continues functioning despite the difficulties having occurred since 2007. The major problem consists in the fact that since 2007 EDF expenses on the purchase of wind and solar energy grew faster than the CSPE compensations, which resulted in the deficit amounted to 4,9 bln euros. Given the general indebtedness of EDF in 2013 the French Government agreed to pay off this sum till 2018\(^{33}\). This decision provoked heated


discussions on the reasonability of using EDF as an instrument of renewable energy innovation and development. While certain publications criticize aggressively this mechanism invoking inter alia the precarious situation into which the employment capacity of EDF is put\textsuperscript{34}, others urge the French state to assume its role of strategic manager and push both EDF and AREVA towards greater engagement into the sphere of the renewable energy\textsuperscript{35}.

Meanwhile, financial problems of AREVA, partly caused by insufficient profitability of its activity in the renewable energy sphere\textsuperscript{36}, aggravated the record of the Government participation in the management of the energy giants having added to the equitation risks of massive layoffs. The French state faced the dilemma: saving the nuclear giant required serious expenses reduction including considerable staff cuts leading to social discontent and instability, which was obviously unacceptable for the authorities. Consequently, since 2011 when AREVA first presented its strategic plan of actions stipulating annual dismissal of 1000-1200 French workers till 2016\textsuperscript{37} the Government has been persistently vetoing any attempt to decrease the number of the firm’s employees within the national borders.

The perspectives of AREVA’s recovery stayed gloomy in 2015 and the management of the group decided to “shut down certain part of its ‘renewable’ activities in France”, namely these related to biomass and torrefaction, implying the termination of about 50 employees. As this move was taken against the background of numerous assurances of the French minister of Economy E. Macron that no layoffs would be sanctioned by the Government, it subjected the latter to


severe criticism on behalf of the trade unions. In these precarious conditions the state decided to intervene and reverse the dangerous situation with the help of EDF which became majority shareholder of AREVA NP specializing in nuclear reactors construction.

The above-mentioned facts demonstrate that in 2000s-2010s in the energy sector the French Government did try to use SOEs as agents of innovation development without limiting their role to that of strategic providers of public services and employment. Yet, these attempts turned out to be nor effective neither efficient enough and thus further devalued the overall experience of SOEs operationalization in innovation sphere in the eyes of both French population and official authorities. Obviously, in the context of general economic slowdown such failures convince additionally the French state in the profitability of the model of the Government participation as shareholder with the preservation of the emphasis on its social aspects.

Russia

Russian case is more complicated, since the nation experienced several full-scale, revolutionary socio-economic transformations.

Speaking about SoEs it should be recalled, that in the Soviet Union state ownership was the only form of property and was considered as one of the foundations of the socialist regime. The same was about decisive state role in the economy. But a distant analogues of privatization/liberalization activities of the western and developing nations could be found in the USSR periodic policies for rising economic raison d’etre of enterprises by quasi-market instruments. These kind of activities were seen in 1965 economic (so-called Kosigin’s) reform in development of “khozraschet” regulations, which implied limited use of profit considerations by enterprises and smaller economic agents. It was also one of the focus of Michael Gorbachev’s “Acceleration” and consequent policies, which accents further development of “khozraschet” practices, rising independence and


market orientation of SoEs (1987 Law on State Enterprises), later in the stimulation of private-owned cooperatives and other moves.

In 1990s due to the dissolution of the USSR and economic crisis many sectors, including military industrial complex enterprises, experienced full-scale privatization and deregulation with complex economy liberalization. But this process was in many cases forced and artificial (i.e., without formation of needed institutions, economic agents and culture) and thus inefficient, sometimes almost illegal.

In 2000-2015 winds changed again. A round of industry consolidation under biggest SoEs and banks was enacted\textsuperscript{40}. At first stage (2000-2006) this process took place mostly in defense and security sector – and has some very real reasons of defragmentation and risk management in technology value chains. However in 2006-2014/15 it stepwise expanded on oil and gas sectors, and, simultaneously, on public and some private assets in civilian machinery, partly automobiles and other industries. From a formal point of view rationale was rising industrial and technology competitiveness in areas, where private businesses failed to deliver important economic results, or that were seen as “strategic”.

Despite since 2010 government –at least officially – declared a renewed interest in privatization, in most cases it was mostly laying out excessive or unaligned assets (with simultaneous rise of public property share in the GDP) or selling of relatively small shares of SoEs. The reasons were also far from efficiency and liberalization – from cutting unnecessary costs to (since 2015) rising federal revenues in the situation of economic downturn. No privatization of manufacturing and other technology intensive assets were planned – vice versa, new consolidation moves were enacted (see below).

Since 2010-2012 a special emphasis in federal policy for SoEs was placed on the innovative development. A key instrument were and still are the so-called Programs for Innovative Development (Russian short - “PIRs”) – a special long-term planning documents, fixing general goals, targets, and obligations for R&D, product and process innovation by respective SoE\textsuperscript{41}. In the same period some more

\textsuperscript{40} Some general information on this process in English is presented in: OECD (2013). OECD Economic Surveys: Russian Federation 2013. P.61-64

innovation-focused instruments for SoEs were created, from Technology Platforms (a copycat of the same named European innovation instrument) to Innovation Territorial Clusters. In line with the USA SBIR program and some other global best practices, SoEs were also obliged to rise support and acquisitions from Small and Medium Enterprises (SMEs), especially on the side of SMEs innovative products and services.

These efforts were supported by a range of federal financial and regulatory interventions – starting from rising Federal Targeted Programs in high-technology areas (from nuclear and space technologies and to machine-tool construction) and to harshen regulations for foreign competitors.

Enforcement and controlling functions for SoE`s PIRs and associate efforts were performed by Ministry of Economic Development (elaborated methodology for PIRs and PIR monitoring activities, executes formal control over substance, implementation and results of PIRs) and, to a much lesser extent, by Rosimushestvo (federal agency, de-jure shareholder of biggest SoEs on behalf of the federal government; executed control over PIRs mostly formally, through theoretic influence on SoE`s top managers bonus payments and mandate prolongation).

From the formal point of view all SoEs enthusiastically supported government initiatives and reported significant successes. However, the objective indicators of Russian high-tech and innovation sector economic output, including export revenues from high-tech products and services, share of innovatively active

enterprises, etc.\textsuperscript{44}, showed a much more humble results despite rising R&D expenditures, new SoEs projects and programs and other activities.

Despite formally supported mostly by the expert assessments and interviews with SoE officials, it is quite obvious that most SoEs were mostly imitating innovations (even while supporting ongoing – not necessarily \textit{innovative} – technological and technical activities) and executed quite understandable rent-seeking and associated “formal compliance” behavior as reaction on federal stimulus and “innovation coercion” policies.

Despite ambiguous results, little changed in federal policies in 2014-2016 as SoEs are still viewed as key technology and innovation national agents. And except for some very limited (like so-called National Technology Initiative) and/or non-systemic (like support of SMEs) attempts to revitalize and diversify federal policies, nothing indicates that any change in pro-SoE approach in innovation policy is planned or even considered as an option. Creation of a new State Corporation Roskosmos in technology intensive space area (formerly - federal agency) in 2015, as well as numerous similar steps of a lesser importance (for example, formation in 2013 new Rostech State Corporation subsidiaries - Stankoprom for machine-tool building, and Natsimbio for pharma business) proves this fact empirically.

Partially this, of course, is explained by lack of investors with needed expertise and resources (also due to the present contradictions with the Western nations), but, presumably, the predominant reason is a “command and control” approach, with overestimation of Soviet successes and suspicions over possibilities and reasons of private investors, resulting from both ideology and negative experience of 1990s.

\textbf{SoEs as innovation agents: comparison}

The two different pathways of SoE utilization as national innovation agent in France and Russia – with a very alike historical starting positions - pose an important “lessons learned” issue. Analysis of both Russian and French cases from this point of view supports three general considerations.

Firstly, for developed nations SoEs as a “pure” innovation agents appear to be effective mostly in the early stages of development of general purpose technology or respective industries, where high risks and uncertainties prevail (as was in Soviet Union and France in the early days of global aerospace “race”). On the consequent stages, even in the situation of ideal mix of problems, use of classic SoE model does not deliver comparable results.

This situation is proved, for example, by Russian civilian aircraft business in 2000s (relative resource scarcity, high international competition, need for moderate competence and technology perfection, and asset build-up), where United Aircraft Corporation – even considering huge potential and its wide international cooperation - still did not provide a breakthrough commercial results. Here we should stress the fact, that Russia experience a paradoxical mix of being simultaneously an emerging economy from a macroeconomic point of view – but with huge high-tech assets (from defense to some ICTs), more educated population and relatively high wages (before rouble depreciation in 2014-2015 and in comparison with most other emerging or developing nations).

Abovementioned inefficiency of SoEs for the “late stage” innovations is very understandable since for successes of mature technologies on mature markets for developed agents obviously need more commercial approach than classic SoEs strengths.

Secondly, socio-economic context of SoE functioning plays a key role for their overall efficiency analysis - disregarding the stage of nation`s economic development. General view of Russian and French cases supports F.Belloc research results, clearly indicating importance of institutional factor for SoE efficiency. From this point of view Russian SoEs experienced a “perfect storm”, when abovementioned challenges, need for commercial, private competences and resources coincided with non-optimal institutional settings and overall Russian policy challenges.

Less evident but possible theoretically is preposition, that classical SoE` s traditional vertical and rigid management system, overburdened by social and/or other non-economic considerations, may play an “inhibiting” role for creative innovation activities, effectively blocking most valuable part of innovations. This SoE “vertical” and hierarchical system also may prevent formation of strong horizontal interactions between the NIS actors - where regulator (SoEs top

management or Government as Principle) needs to play a role of a connector of all other actors. Empirically this is named as one of the chronic problem in both France and Russia. For example, in Russia most of innovation policies focusing SoE includes enforcement of communications with outside actors (from universities to SMEs) – with very humble substantive results.

From this point of view an optimal use of SoEs as innovative agents for the developed nations and advanced emerging economies could rest on analysis of French experience (despite also limited in its efficiency). Conceptualizing on enforced policies, we can formulate a hypothesis, that SoE may play an important role in:

• supporting competition in established industries (thus, forcing a more dynamic approach on the side of private businesses);
• mitigating some all-economy risks of advanced technology development – by sharing resources and/or assets, due to a generally softer requirements for risk management, ability for a longer-term approach, “indicating” prospective areas for potential investors and interest groups, etc.;
• controlling or providing societal benefits in innovation development, that are burdensome for private, commercial enterprises.

However, the question persists whether SoEs is the most convenient instrument for solving this type of tasks. Executing abovementioned functions requires high level of professionalism and stability of policy on behalf of both government and SoE – not even speaking of a proper economic and institutional settings. Simultaneously, all this does not guarantee the Principal (government or general public) from risks and problems, associated with SoEs (from low commercial efficiency to rent-seeking behavior). This is, obviously, the case why almost all nationalization and SoE-centered activities in developed and emerging nations ends up with step-by-step government withdrawal from direct control and shareholding of the enterprises – in favor of indirect or very targeted interventions in economy and innovative processes.

Of course, even considering all these shortcomings SoE might be effective as supportive economic agents and, possible, as one of instruments at hand for unpredictable future challenges for NIS. But as for now the balance of costs and benefits is obviously beyond general SoE approach.