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The Russian Defence Industry – status, reforms and prospects



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English summary

While the Russian military has undergone radical reform over the last four years, the same cannot be said about the Russian defence industry. This industry suffers from among other things a lack of innovation, low productivity, antiquated production equipment, an ageing workforce and corruption. There have been significant organizational changes in terms of consolidation into large holdings based on end product profile, and a considerable renationalization of ownership, but these measures have so far not fundamentally improved the performance of the industry. It is a prevalent view among both politicians, military and independent observers that unless major advancements are made to the way this industry works, much of the big money set aside for rearmament over the next 10–15 years may go to waste.

This does not mean that the whole industry is underperforming. Significant progress is made in branches such as air defence, fighter aircraft and missile technology, whereas the technological lag is most pronounced in military electronics, command and control systems and the use of new materials. The best performing enterprises are those that: (1) could benefit from designs developed at the end of the Soviet era, the so called Soviet technology stock; (2) were able to find export markets when the domestic orders abruptly stopped for 15 years; and (3) had exceptionally dynamic and forward looking individuals in charge. The fighter aircraft producer *Sukhoi* under the leadership of Mikhail Pogosian is a prime example here.

The Russian political and military leadership has both mechanisms of incentive and mechanisms of enforcement to influence the arms industry. Among the most important incentive mechanisms are competition, direct support, the system of procurement and the system of R&D. Monitoring and sanctions are the central enforcement mechanisms. The industrial enterprises, on their hand, if they want to counter the mechanisms of the political and military leadership, can use lobbying, intra-industry cooperation to avoid competition, and procrastination.

This report analyses the political and economic mechanisms the Russian political and military leadership has at its disposal to positively impact the performance of the arms industry. It also shows how the industry may be able to resist the effects of these mechanisms. The arms industry is an integral part of Russian society, and while better performance probably can be achieved with more clever use of the mechanisms and tools at hand, a radical breakthrough may not be possible unless the Russian political and economic system as a whole is transformed.

Sammendrag

Mens det russiske forsvaret de fire siste årene har blitt radikalt reformert, er det samme ikke tilfelle med den russiske våpenindustrien. Denne lider av manglende innovasjon, lav produktivitet, foreldet produksjonsutstyr, aldrende arbeidsstyrke, korrupsjon m.m. Det er riktignok blitt gjennomført betydelige organisatoriske endringer, først og fremst gjennom etableringen av bransjevisse holdingselskaper og en omfattende renasjonalisering, men ingen av disse tiltakene har på fundamentalt vis forbedret forsvarsindustriens produksjonsevne. Det er et utbredt syn både blant politiske og militære ledere, og blant uavhengige analytikere, at hvis industrien ikke blir betraktelig bedre i stand til å levere, så vil mye av de store ressursene som nå settes av for militær modernisering kunne gå tapt.

Dette betyr imidlertid ikke at hele den russiske forsvarsindustrien fungerer dårlig. Betydelig framgang kan spores innenfor bransjer som luftvern, kampfly og missilteknologi, mens teknologiutviklingen spesielt ligger etter de ledende nasjonene i verden innenfor elektronikk, kommando- og kontrollsystemer og utnyttelse av nye materialer. De bedriftene som fungerer best er de hvor: (1) man kunne nyte godt av teknologiske framskritt gjort på slutten av sovjettida, den såkalte teknologiske reserven; (2) man var i stand til å finne eksportmarkeder når det hjemlige markedet mer eller mindre forsvant i 15 år; og (3) spesielt dyktige og fremad-skuende personer satt i ledelsen, her er kampflyprodusenten *Sukhoi* under ledelse av Mikhail Pogosian et godt eksempel.

Den russiske politiske og militære ledelsen har både incentivmekanismer og tvangsmekanismer den kan bruke for å påvirke forsvarsindustrien. Blant de viktigste incentivmekanismene er konkurranse, direkte støtte, systemet for militære anskaffelser og systemet for å finansiere forskning og utvikling. Oppsyn med produksjonen og straff er de viktigste tvangsmekanismene. Bedriftene kan på den andre siden motvirke myndighetenes mekanismer og virkemidler gjennom å benytte seg av lobbyvirksomhet, lage avtaler med andre bedrifter som hindrer konkurranse, eller rett og slett bare trekke ut prosessene.

Denne rapporten analyserer hvorfor det politiske og militære lederskapet så langt ikke i særlig grad har evnet å utnytte de virkemidlene det har til rådighet for å forbedre våpenindustriens produksjonsevne. Den viser også hvordan industrien selv fra tid til annen har klart å svekke eller hindre effekt av tiltak igangsatt av politikere og militære. Rapporten konkluderer med at våpenindustrien er en integrert del av det russiske samfunnet, og at selv om det antakelig er mulig å få den til å fungere bedre med mer kløktig bruk av de virkemidlene som finnes, så er det antakelig slik at et radikalt teknologisk og produksjonsmessig gjennombrudd for russisk våpenproduksjon ikke vil finne sted før hele det politiske og økonomiske systemet samlet er blitt gjennomgripende endret.

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1 Introduction

In the autumn of 2008 the then defence minister, Anatolii Serdiukov launched the most serious reform of the Russian/Soviet military in decades. He did not, however, initiate a similar reform of the Russian defence industry or *oboronno-promyshlennii complex* (OPK) as it is known in Russia.¹ Major elements of the military reform included a transfer from a largely *mobilization* to a predominantly *standing* military posture, a radical slimming and reshaping of the officers corps, a change from a division-based to a brigade-based structure, the introduction of an NCO-corps and the integration of the regional capabilities of the army, air force and navy under new regional multiservice commands. While these changes most likely will contribute significantly to a more modern and combat ready Russian military, it is nevertheless a widespread opinion, both in Russia and abroad, that another necessary precondition for Russian military recovery to succeed is a reform also of the OPK.

Most observers agree that the Russian OPK is in trouble, but the state of degradation is nevertheless a matter of discussion. Some think the industry is on the verge of dying, while others see a substantial potential for recovery.² The rather obvious truth is of course that it varies from branch to branch and even from company to company. The industry is strong in certain sectors, such as for example air defence, fighter aircraft and missiles, and weak in others such as military electronics, command and control systems and new materials. A very approximate estimate by one Russian observer is that 10–15% of the industry is currently performing well.³

A main problem, however, is that the chief customer, the Russian armed forces, is seriously dissatisfied both with the technological level, quality, quantity and price of what the industry can offer. The then Chief of the General Staff, General Nikolai Makarov, plainly stated in November 2011 that “the Russian industry is in general not able to produce the technology that the Russian military needs”, and in August 2012 President Putin strongly criticised the OPK both for its technological backwardness and low productivity and called for an “OPK revolution” similar to what the Soviet Union did with its military industry in the 1930s.⁴

Negative attitudes towards the domestic arms producers among top military and politicians are of course not only a Russian phenomenon. Getting arms production and procurement right is difficult in most countries. The British military historian Max Hastings was probably to the point

¹ The Russian use of the word “complex” may be confusing, since in English the term military-industrial complex usually means a collusion between the military organization of a country and that country’s military industry. Here, however, it only means the sum of arms producing enterprises in the country.

² For a very pessimistic assessment see statements by former Minister of Finance, Aleksei Kudrin in “Kudrin predrek proval gozoboronzakaza”, *Lenta.ru*, 10 January 2012, and Blank, Stephen, “A work in regress? Russian defense industry and the unending crisis of the Russian state”, in (eds.) Roger N. McDermott, Bertil Nygren and Carolina Vendil Pallin, *The Russian Armed Forces in Transition*, Routledge, 2012, pp.151-168. For an assessment that claims the picture is not bleak across the board, see Ruslan Pukhov, “Defending the Defense Industry”, *The MoscowTimes*, 29 July 2011.

³ Interview with Aleksei Nikolskii, military correspondent for the newspaper *Vedomosti*, Moscow, September 2011.

⁴ Ivan Safronov, “Genshtab gotovitsia k voine i konstatiruiet negotovnost k nei voenno-promyshlennogo kompleksa”, *Kommersant*, 18 November 2011, and *ARMS-TASS*, 31 August 2012.

when he wrote that “although Britain makes a shocking mess of buying weapons systems, few other major nations get this right, either”.⁵ Still, because of the turmoil caused by the fall of communism and the subsequent problems with creating a new efficient political and economic order in the country, Russian arms production is in more dire straits today than the arms production of most other major powers.

Militaries and *military industries* are most often separate and independent actors. Sometimes they have common interests and perspectives, but very often they have not. In Russia, the latter tendency is currently strong. This fact has prompted some to claim that the two today are at “Cold War-style loggerheads”.⁶ Both the military and the OPK were in the 1990s, because of political turbulence and very limited funding, largely left to fend for themselves. This situation changed, again for both, in the years after Putin became president in 2000. Political interest in military affairs rose, and funding for both the military and the military industry increased substantially because of the growing Russian oil and gas revenues. In the mid-2000s, however, the political leadership was increasingly disappointed with the very limited military capability that had come out of their boost in military spending. Thus, the Serdiukov-reforms were introduced into the military organization in 2008. Something on a similar scale, as previously stated, has so far not taken place in the OPK.

That is not to say that the structure and government of the OPK did not change at all during the Putin years. The two most important changes introduced were (1) a merging of enterprises according to end product profile into large holding companies, such as for example the *Obedinnnaia Aviastroitelnaia Korporatsia* (OAK) which incorporates almost all producers and designers of aircraft in Russian, and (2) a partial reversal of the privatization of enterprises in the 1990s towards heavier government ownership and stronger government corporate control.

It is a common view in Russia that unless the OPK reforms and improves its performance, the restoration of Russian military power will be only a half-way measure. The very substantial amounts of money now set aside for the production of new military equipment in the period 2011 to 2020 (the so called State Armament Program 2011–2020), will not yield a satisfactory result unless the OPK changes so that it is able to produce military hardware in quantity, quality and of technological sophistication significantly better than it does today. This fact is readily recognised also at the official level. Deputy Minister of Economic Development, Andrei Klepach, acknowledged in late 2012 that because of all the problems and dysfunctions in the OPK “even if there is enough money, it seems impossible to increase the production to the necessary levels”.⁷

Furthermore, the needs of national security have not been the political leadership’s only justification for more money to the OPK. There is also a desire to make the OPK the main locomotive for the technological renewal of the whole of Russian industry as such. This idea, however, may go against current international trends. It is true that historically many

⁵ Max Hastings, “Wasting money saving lives”, *The Daily Telegraph*, 5 February 2006.

⁶ Ruslan Pukhov, “Army Needs a New Beginning”, *The Moscow Times*, 31 March 2011.

⁷ Interview with Andrei Klepach in *Ekspert vooruzhenii*, No. 100, November 2012, p.15.

technological innovations have come from the military to the civilian sphere, especially after World War II, but in the aftermath of the Cold War and the information revolution this trend may have turned. According to the British defence economist Keith Hayward, “while the defence industry may continue to lead in some selective military applications... most future technological innovations will originate in the commercial sector”.⁸ The head of OAK, Mikhail Pogosian, admitted in August 2012 that as much as 70% of the technologies currently employed by the OPK come from the civilian sector.⁹

Reforming the OPK, however, is not an easy task. The respected long-time Russian Finance Minister Aleksei Kudrin left his post in the spring 2012 largely because he disagreed with the financial priority given to rearmament. He had no faith in the OPK’s ability to efficiently turn the big money into arms. According to Kudrin, nobody, including current Vice-Prime Minister with responsibility for the OPK, Dmitrii Rogozin, have any clue as to how to reform the OPK. Kudrin stated that the OPK currently is “untouchable and unreformable”.¹⁰

This study will, with the help of insights from *principal-agent theory* (presented in Chapter 3.1), analyse the political and economic mechanisms that the Russian political and military leadership have at their disposal to influence the performance of the OPK. Principal-agent theory tends to divide such mechanisms into mechanisms of incentive and mechanisms of enforcement.¹¹

1.1 Methodological aspects

The role of theory here is twofold, to structure the analysis and to help identifying principal and agent mechanisms. Furthermore, the study is what John Gerring calls a “single-outcome study”.¹² This means that no attempt will be made to make inference from the findings beyond the case of the Russian OPK. Despite this, there are occasional references to characteristics of the arms industries of other countries. That is because it would be methodologically wrong to assume that single outcomes are only the result of factors specific to that case.¹³ Such outcomes may also be attributed to general causes or social mechanisms, thus making cross case comparisons relevant even if the aim is not to create new theoretical insights.

The sources used in the study are of three types: open Russian media, interviews in Moscow and secondary sources both in Russian and English. The use of secondary sources serves both to assure that the study builds further on already existing knowledge instead of repeating it, and they provide the study with international comparisons where this is appropriate.

⁸ Keith Hayward, “I have seen the future and it works”, *Defense and Peace Economics*, Vol. 16, no.2, 2005, p. 127.

⁹ “OPK po Stalinu”, Editorial, *Vedomosti*, 3 September 2012.

¹⁰ “Kudrin predrek...”, op. cit.

¹¹ Mark A. R. Kleiman and Steven M. Teles, “Market and Non-Market Failures”, in (eds.), Michael Moran, Martin Rein and Robert E. Goodin, *The Oxford Handbook of Public Policy*, Oxford, Oxford University Press, 2008, p. 639.

¹² John Gerring, *Case Study Research – Principles and Practices*, Cambridge University Press, Cambridge, 2007, p.187.

¹³ *Ibid.*, p. 196.

By open Russian media is meant both newspaper and Internet articles, and studies made by think tanks and expert communities in Russia. In addition, the Russia team at FFI have conducted yearly interview rounds in Moscow in which the development of the OPK has been a frequent topic. Sometimes these types of sources have overlapped in the sense that we have conducted interviews with individuals that we have found to write especially insightful articles about the OPK. We believe that we through these interviews have developed a relatively good sense of who these sources are and what their potential biases might be. Still, of course, there is always the possibility that reliability in the study has been lowered because of biases that we did not detect.

One source used frequently in this study is the *VPK Rossii: Strukturnye pokazateli 2000–2010* (The Russian arms industry: Structural indicators 2000–2010) produced by the OPK monitoring company *Teleinformatsionnaia set VPK*. This company, although formally independent, is sometimes referred to as the OPK's own monitoring agency. To the extent that this characterisation is true, that obviously opens up the question of the reliability of their data. It is nevertheless our impression from reading the compilations of data from this company, and also their evaluative or analytical material, that they do not try to portray the state of affairs in the OPK as better than they are. Since the data from this company have been available to us only on a CD-ROM, all references will be to the company as such and to the section and year on the CD-ROM where the information was taken from.

The structure of the study is as follows: Chapter two gives an overall status report on the OPK, and in particular it aims to provide a picture of the current size and volume of the industry. Chapter three gives a short presentation of principal-agent theory, and discusses some challenges of using this theory in the context of the Russian MOD as a principal and the OPK as an agent. Chapter four discusses the mechanisms of incentive and chapter five the mechanisms of enforcement. Finally, the findings of the study are summarised in Chapter six.

2 Current state of affairs in the defence industry

2.1 Size

There are a number of ways to describe the size of a country's defence industry. One can focus on the number of companies, number of employees, industrial output and several other indicators. A combination of such indicators will be used in this study to describe the size of the Russian OPK. In March 2010, then head of the Russian government's Military-Industrial Commission, Deputy Prime Minister Sergei Ivanov, stated that according to the official register of defence enterprises (*Svodnyi reestr organizatsii OPK*), the Russian OPK consisted of 1,729 companies.¹⁴ Two years later, Ivanov's successor Dmitrii Ragozin said the OPK consisted of a 1,350 companies.¹⁵ Although several mergers and probably also some closures had taken place between these two dates, these alone are not likely to explain the significant discrepancy between the two figures. In

¹⁴ *Vzgliad*, 19 March 2010.

¹⁵ Interview with Dmitrii Ragozin in *RIA-Novosti*, 12 November 2012.

2010, the total number of enterprises had over several years increased significantly. This development probably reflected a certain “popularity” with being included in the official register. Among other reasons, companies that are on the register come under stronger government safeguards against bankruptcy than if they are not. Thus, according to Vyacheslav Rodin, editor of the defence industry monitoring agency *Teleinformatsionnaia set voenno-promyshlennogo kompleksa*, the official register has become an increasingly unreliable source for the actual size of the OPK.¹⁶ The drop in the number of OPK enterprises from 2010 to 2012 might therefore also be a result of a certain “cleansing” of the OPK register. According to deputy head of the Military-Industrial Commission, Oleg Bochkarev, the Russian authorities expect the number of companies to stabilize around 1,000 in the coming years.¹⁷

In terms of organization there are currently four levels in the Russian OPK. The first is the company, enterprise or production unit level (1,729 in 2010). The second is the level of unified producers. For example *Sukhoi* is such a unified producer because all of the formerly independent R&D and production units that took part in the production of *Sukhoi* aircraft now are integrated into the unified *Sukhoi* company. The third level is the branch “holdings”. A branch holding is a collection of enterprises with similar or related production profiles. For example, both *Sukhoi* and *MiG* are now together with more or less all other companies engaged in aircraft production parts of the United Aircraft Corporation. By 2013 there were in the excess of 60 holdings, and Russian authorities expected the number to stabilize at about 80 holdings.¹⁸ In 2010 the companies included in the 15 largest holdings together employed about 500,000 out of the two million workers in the OPK. Finally, the fourth level is the level of State corporations. There were in 2013 seven Russian State corporations, of which one, *Rostekh*, was within the OPK. The State corporations are non-commercial in the sense that their aim is not to produce profits but to function as engines of technological development. *Rostekh* was created by the merger of 17 holdings in 2010. It was created to help the holdings with the highest number of troubled enterprises to put these back on their feet.¹⁹ In 2010 the corporation consisted of 580 enterprises (43% of the total number of enterprises) and had 780,000 employees.²⁰

It is furthermore possible to identify an approximate number of “core” enterprises that receive the lion’s share of the defence order. In 1998 this number was estimated at 670. Given the decrease in the overall number of companies described above, a rough estimate could be that the current “core” is about 500 enterprises.²¹ Most of these are now organized into larger holdings. In 2010 there were 16 such holdings, 9 of which employed more than 20,000 people.

¹⁶ Rodin in the introduction on the CD-ROM *Strukturnye pokazateli 2000–2007*, produced by *Teleinformatsionnaia set voenno-promyshlennogo kompleksa*.

¹⁷ Interview with Oleg Bochkarev on the radio station *Ekho Moskvy*, 18 March 2013.

¹⁸ Interview with Deputy Head of the Military-Industrial Commission, Oleg Bochkarev, at the radio station *Ekho Moskvy*, 18 March 2013.

¹⁹ VPK, cadre resources and overall figures, 2010.

²⁰ Petr Mordashov, “Rostekhnologii ne brosiat predpriatia v kriticheskii moment”, *Nezavisimoe voennoe obozrenie*, 17 December 2012.

²¹ See Aleksandr Bekker, “Shatkyi tyl rossiiskoi oboronky”, *Moskovskie Novosti*, 3 February 1998.

Difficulties in measuring the exact size of a country’s defence industrial base are not unique to Russia.²² For example, many companies will simultaneously produce both civilian and military goods. In this case one either has to include as part of the OPK only those companies that reach a certain military percentage in their total production, or one has to add up the “defence share” of each and every company that produces military equipment.²³ Additionally, there is sometimes a gradual change from military to non-military goods. For example, few would classify food consumed by the military as defence industrial production, but what if this food is slightly altered from its civilian form in order to satisfy particular military needs?

Rodin’s monitoring agency claims that the figure of the official register for 2010 was 1,362, not very far from Rogozin’s 1,353. If we, bearing in mind the vagueness presented above, accept the official figure of 1,363 defence enterprises in 2010, then Figure 2.1 describes the spread of enterprises across the different branches of military production. This figure demonstrates one way of identifying the relative weight of the different branches of the OPK. Another way is to count the number of people who work within the different branches. As demonstrated in Figure 2.2, this way yields a relatively different result from just counting the number of production enterprises within each branch.

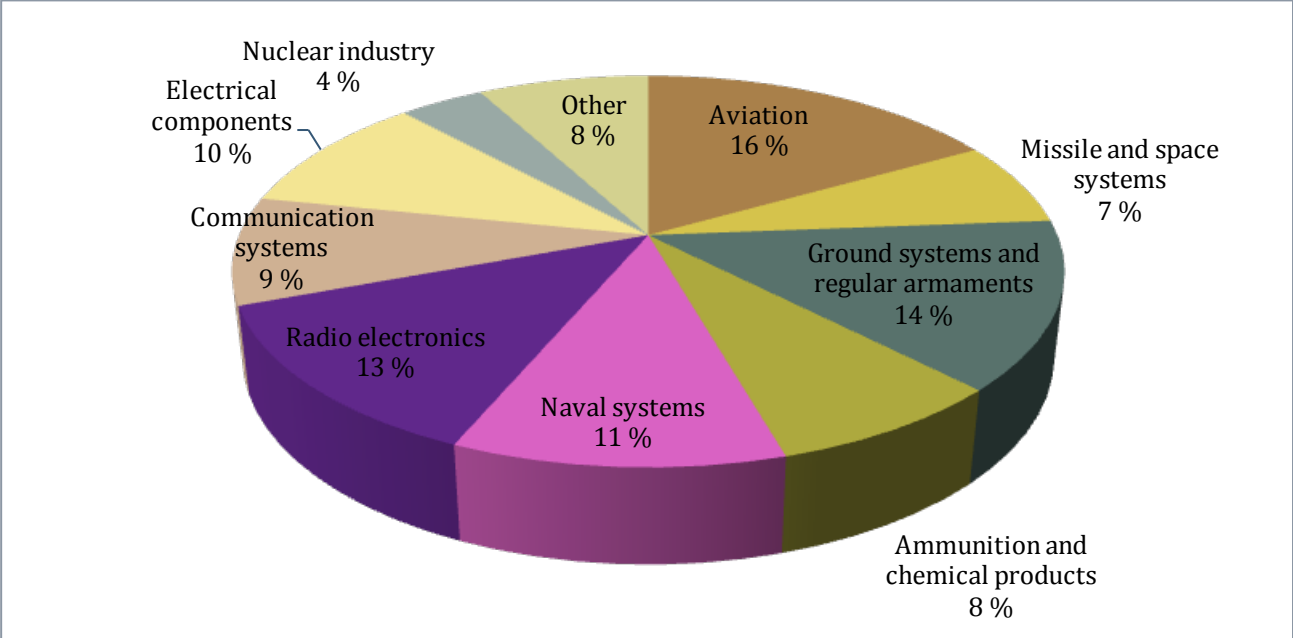


Figure 2.1 The spread of enterprises across the different branches of military production in Russia in 2010. The figure is based on data from VPK, Otrasy VPK, 2010.

²² See J. Paul Dunne, “The Defense Industrial Base”, in Keith Hartley and Todd Sandler, *Handbook of Defense Economics*, Vol. 1, Elsevier, New York, p. 402.

²³ This has for example been done in efforts to estimate the size of the Norwegian defence industry. See Kari Tvetbråten og Arne Martin Fevolden, *Forsvarsindustrien i Norge*, FFI-rapport 2011/00608, at <http://rapporter.ffi.no/rapporter/2011/00608.pdf>.

The data in Figure 2.2, however, cannot be directly compared with the data in Figure 2.1 because the OPK monitoring company *Teleinformatsionnaia set VPK* has used a less differentiated categorization for the latter figure.

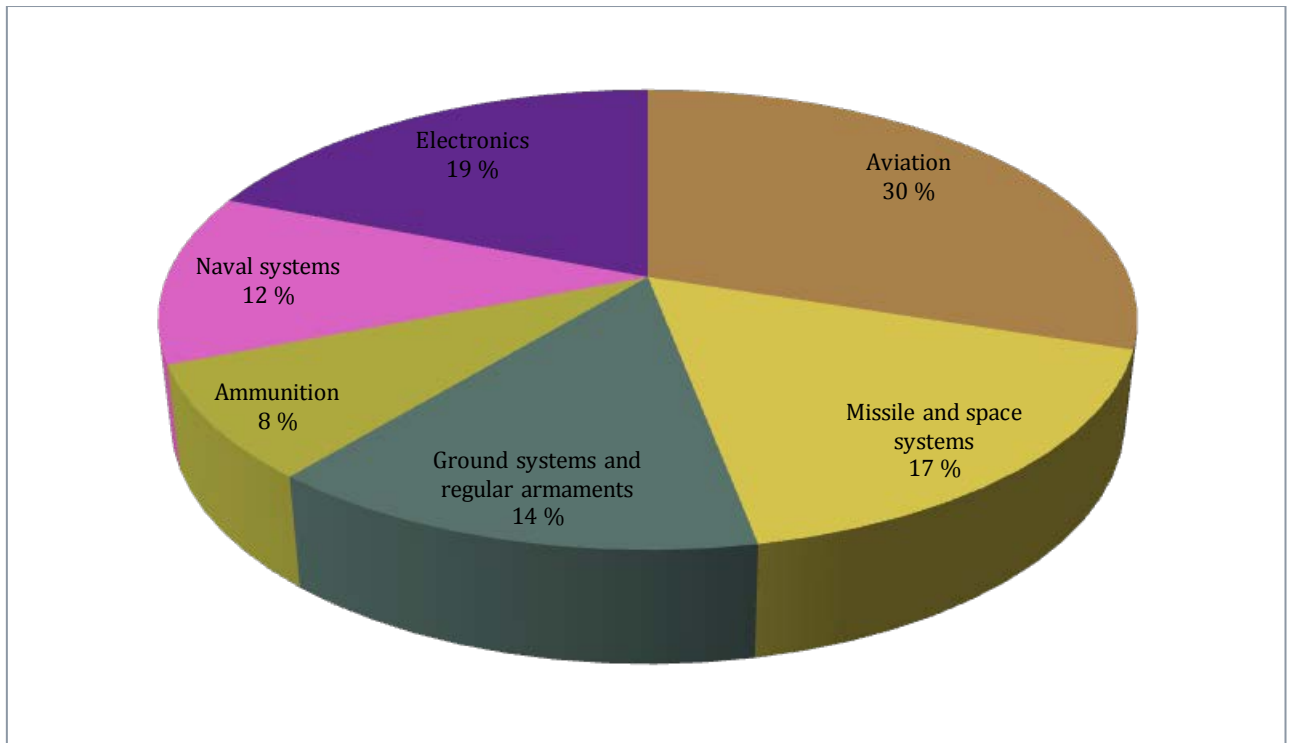


Figure 2.2 Percentage of people employed within the different branches of the Russian OPK in 2010. The figure is based on data from VPK, *Otrasy VPK, 2010*.

2.2 Personnel

As already mentioned in Chapter 2.1, the exact size of the OPK labour force is difficult to determine. The combined labour force of the companies registered in *Svodnii reestr* is about two million. Nevertheless, because of the mix of civilian and military production, the amount of people who are only or mainly producing military equipment must be significantly smaller. There are currently no good estimates available for the size of this latter category.

Problems with the composition and quality of the OPK labour force are often mentioned by Russian observers as probably the most serious of the problems facing the OPK. The industry has in many branches considerable excess of low qualified workers, described by one observer of the OPK as an “extraordinary labour surplus”.²⁴ At the same time, there is a critical deficit of R&D personnel and engineers in almost all branches. In 2001, 80% of OPK companies reported deficiencies of engineers, and this situation has not significantly improved since.²⁵

The first problem, the surplus of low-qualified personnel, is partly a result of the location of many OPK enterprises in so called “mono towns”. These are settlements where a very significant part

²⁴ VPK, the cadre question, 2008.

²⁵ VPK, the cadre question, 2002.

of the population works for one military manufacturer. The Russian government has, in order to avoid social disturbance, been willing to keep these enterprises afloat even if their products have been of questionable military value. The low qualified workers themselves have few initiatives to relocate since their lack of special competence is likely to make it hard to find jobs elsewhere. In addition, they often own a residence where they live now. Also, some companies may deliberately maintain access workforce in order to extract additional subsidies from the government.²⁶

However, the access to labour with higher qualifications was eased somewhat for the OPK as a result of the 2008 financial crisis. Observers point out that there has been a noticeable stream of qualified labour from the exposed export branches and to the OPK after 2008.²⁷

2.3 Output, production equipment and quality

Industrial output from the OPK fell drastically from the fall of the Soviet Union in 1991 and until 1997. In that year the production of military equipment within the OPK was only 9.4% of the 1991 level.²⁸ After 1997, however, there has been a significant recovery in terms of overall output, as demonstrated in Figure 2.3.

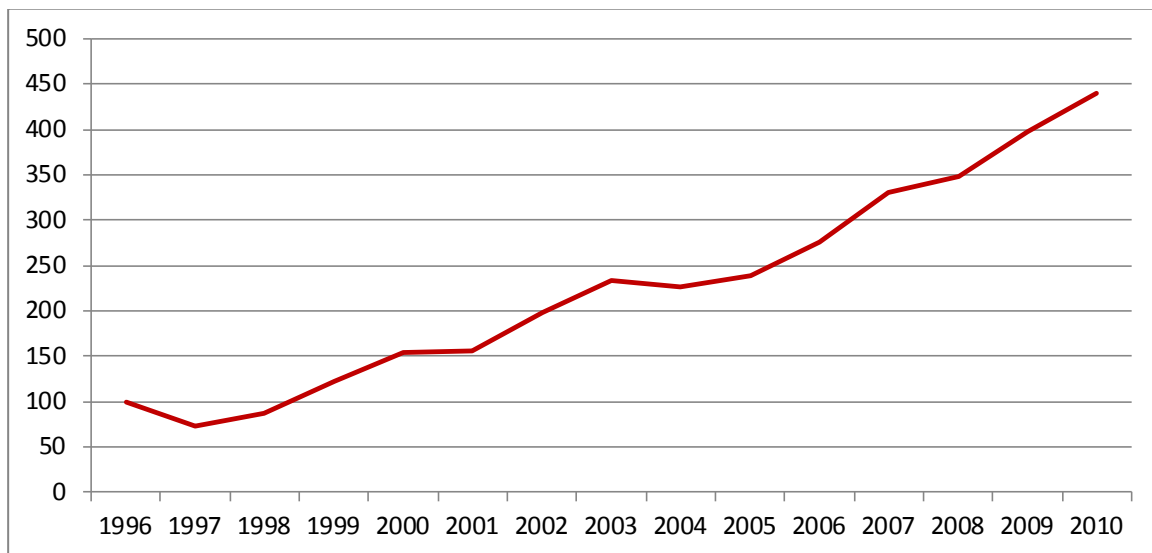


Figure 2.3 OPK output from 1996 to 2010. Indexed graph, 1996 = 100. The figure is based on data from OPK, *Proizvodstvennii potentsial, 2000 to 2010*.

This increase in military production is explained, firstly by a gradual but substantial rise in the arms export, especially to Asia and the Middle East, and secondly by an increase in domestic demand (i.e. the state defence order) starting from the early 2000s. The latter, however, as can be seen in Figure 2.4, did not really take off until the years 2005–2006.

²⁶ Susanna Oxenstierna and Fredrik Westerlund, “Arms Procurement and the Russian Defense Industry: Challenges up to 2020”, *Slavic Military Studies*, 2013, 26:1, p. 19.

²⁷ VPK, the cadre question, 2008.

²⁸ VPK, output, 2000.

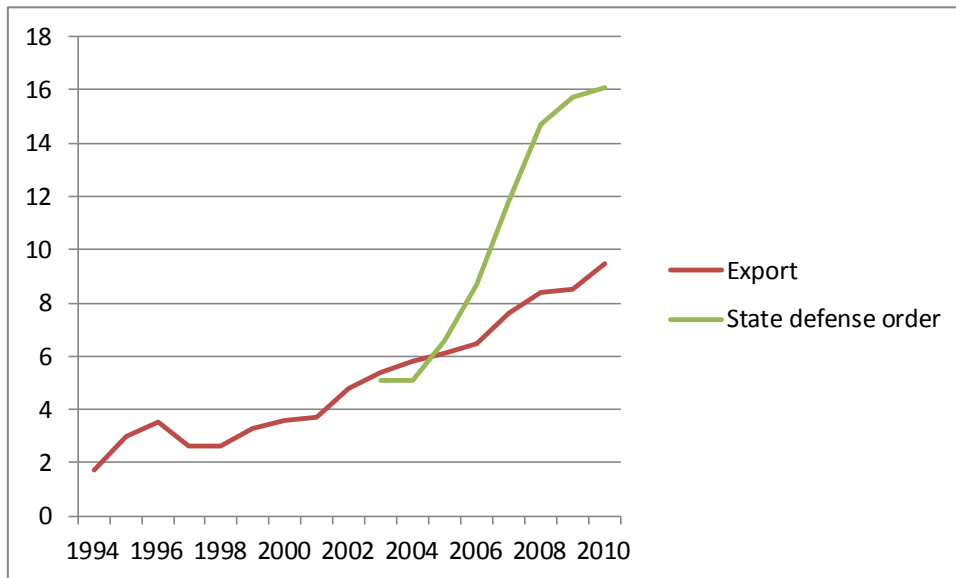


Figure 2.4 Russian arms export and state defence order in absolute figures (billion USD) 1994–2010.²⁹

From Figures 2.4 and 2.5 we see that although the arms export has had a substantial increase also after the dramatic rise in the domestic state order, it still accounted for only about 40% of total sales in 2010 compared to more than 50% in 2004. Furthermore, Fredrik Westerlund has argued, based on figures from SIPRI, that the rise in the nominal value of the arms export in the 2000s largely is a result of the growing costs of Russian armaments and not increased volumes.³⁰

²⁹ Sources: Maxim Piadushkin, “Itogi voenno-tekhnicheskogo sotrudnichestvo Rossii s zarubezhnymi gosudarstvami v 2003”, *Export Vooruzhenii*, January–February 2004, pp. 7–11, and figures from the Centre for the Analysis of Strategies and Technology web site, <http://www.cast.ru/figures/>, downloaded 24 October 2012.

³⁰ Fredrik Westerlund, “Försvarsindustri”, in Carolina Vendil Pallin (ed.), *Ryssk militär förmåga i et tioårsperspektiv – 2011*, FOI-R-3404—SE, pp. 187–188.

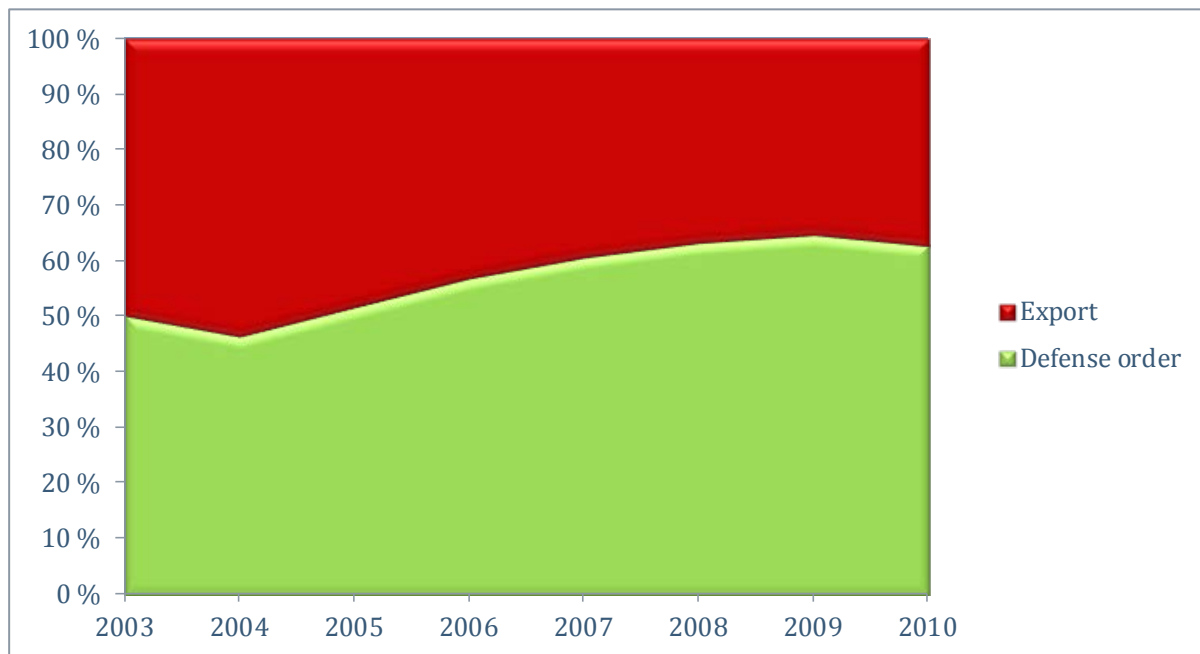


Figure 2.5 Production for export vs. production for the defence order 2003–2010.³¹

In addition, the civilian production in the OPK has also increased in total numbers, although as percentage of total OPK production it has nevertheless decreased in the latter years. The share of civilian production as a percentage of total OPK production used to vary roughly between 40 and 45%, but in 2009 it dipped to 34.4%, and in 2010 even lower, to 31.9%.³² In time this development coincides with the significant increases in the defence order, so that the lower percentage probably reflects higher military spending rather than a decrease in orders to the OPK from the civilian sector.

A similarly positive development to the one in output, however, cannot be detected when it comes to OPK productivity, quality and technological innovation. Russian military production continues to be very labour intensive. For example, in the branch of the OPK producing missiles and space equipment, annual average revenue pr. employee has been estimated to \$ 14,800. According to the same source, this figure is \$ 493,500 in similar production in the USA and \$ 126,800 in Europe.³³

Most managers of OPK companies seem not to have used the opportunity presented by increased orders to replace old labour intensive production equipment with modern less labour intensive substitutes. Since 1991 the amount of production equipment in operation has been reduced by

³¹ Sources: Maxim Piadushkin, “Itogi voenno-tehnicheskogo sotrudnichestvo Rossii s zarubezhnymi gosudarstvami v 2003”, *Export Vooruzhenii*, January–February 2004, pp. 7–11, and figures from the Centre for the Analysis of Strategies and Technology web site, <http://www.cast.ru/figures/>, downloaded 24 October 2012.

³² VPK, production, table 5, *Proizvodstvennyi potentsial VPK*, 2009 and 2010.

³³ VPK, the cadre question, 2007.

around 40%, and most of what is left is more than 20 years old.³⁴ According to Deputy Head of the state corporation *Rostekh*, Dmitrii Shugaev, the renewal rate of production equipment in the Russian OPK is 1% pr. year, compared to 15% in Western enterprises.³⁵ Neither have the specifically designed state support programs for this purpose yielded very positive results yet. Although there are important exceptions to this trend, it might be the case that many companies have chosen to pocket the additional money rather than reinvest to modernize for the future. The greed of company directors and the unfavourable Russian investment climate may explain some of this behaviour, but it should also be kept in mind that many OPK enterprises have significant local social commitments like kindergartens and others services to maintain. In addition, many factory directors consciously avoid technological modernization of their enterprise simply out of fear for the social consequences if a large number of people have to be let go.³⁶ According to the journalist and OPK observer Ilja Kramnik, fear of local social unrest is a major reason why company directors do not make their enterprises more efficient through increased mechanization of the production lines.³⁷

One example contrary to this trend is the Moscow based company *Arsenal*, which among other things produces naval artillery and missile launchers. *Arsenal* in the mid-2000s invested heavily in new production equipment. As a result, by 2007 the workforce had been reduced by a factor of three, and annual revenue pr. employee was quickly on the rise. In 2006 it was \$ 36,000, and by 2010 they estimated to reach \$100,000, not very far from the European average mentioned above.³⁸ Such a reform, however, is much easier to do in Moscow, where alternative employment is relatively easy to find, than in regional towns where the OPK factory is often the main employer.

A further complicating factor is that much of the new production equipment will have to be imported. Russia still has about 300 enterprises that can produce machine tools, but their production has fallen dramatically since 1991, and what they are still able to produce is most often outdated. At the end of the Soviet era the country produced about 70,000 processing units a year, now Russia is producing a little over 3,000.³⁹ A 2009 estimate claimed that in order for the OPK to be able to significantly increase production after 2015, something that the current armament program presupposes, the OPK will need about 200,000 new production machines pr. year from 2009 to 2015.⁴⁰

Another point is that the production equipment that the OPK currently imports and is going to import, both for economic and political reasons, tends to be from China. This means that the technological level is often no radical break with what was there before, and also that the after-

³⁴ Viktor Misanikov, "Pokupaietsia ne stanok, a tekhnologicheskoe reshenie", *Nezavisimoe voennoe obozrenie*, 27 November 2009.

³⁵ Vasilii Sychev, "Obosnovannye opasenia", *Voенно-promyshlennyyi kurer*, 19 October 2011.

³⁶ Viktor Misanikov, "Pokupaietsia ne stanok...", op.cit.

³⁷ Interview with Ilja Kramnik, Moscow, September 2011.

³⁸ VPK, cadre, p.15

³⁹ Ibid., and Aleksandr Mekhanik, "Stanok dlia novogo uklada", *Ekspert*, 18 February 2013.

⁴⁰ Ibid.

purchase producer education and service packages tend to be less comprehensive than if the equipment instead had been purchased from for example the West, Japan or South Korea. The problem is further complicated by the fact that the Russian law on these kinds of purchases for publicly owned companies seems to state that price should be the only criterion for choosing a supplier. Thus, if a certain kind of Western or South Korean production equipment has the potential to significantly increase the technological quality of the end product, this equipment cannot be purchased if there is a cheaper competitor. This is the case even if the production equipment proposed by this competitor will not increase the technological quality at all.⁴¹

A further complication for defence firms in terms of both production equipment and materials, is that they by law are obliged to maintain a capacity for increased production in case of mobilization. These stocks of machines are not to be used in peace time, but they still demand resources for investment and maintenance. This requirement puts significant additional stress on the enterprises.⁴²

On the issue of quality, all available statistics point to a significant increase over many years in the number of complaints from customers, both foreign and domestic. As of October 2009, only 10% of Russian OPK enterprises had adopted internationally certified quality management systems.⁴³ In 2011 there were a total of 2,272 complains on delivered systems and platforms from domestic users.⁴⁴

2.4 Ownership and organization

Around the world, there are different models when it comes to the question of ownership of defence industries. For example in the USA most companies are private, whereas in France they tend to be state owned. In Britain many of them became privatized from the early 1980s and onwards. Since market mechanisms are weaker in the defence industry than in most other industries because of the so called *monopsonistic* character of the defence market, it could be argued that the distinction between private and public ownership is of less significance in this than in other sectors. By monopsonistic is meant that the government “is the prime moving force in determining both the demand side of the market and much of the supply side”.⁴⁵ Nevertheless, it is worth while studying if and to what extent there might be systematic differences in terms of performance between privately and publicly owned OPK companies, and also whether privatization makes the principal less able to control the agent in the case under study here.

⁴¹ Victor Miasnikov, “Zakonodatelnye shlagbaumy na puti modernizatsii”, *Nezavisimoe Voennoe Obozrenie*, 18 December 2009.

⁴² For more on this, see Susanna Oxenstierna and Fredrik Westerlund, op.cit, p. 17.

⁴³ Alla Kassianova, “We Need Wonders at a Reasonable Price: How Sound is Russia’s Current Defense-Industrial Policy?”, in *Domestic Foundations of Russian Security*, PONARS Eurasia Policy Perspectives, June 2011, p. 2.

⁴⁴ Nikolai Novichkov, “Streliaiushchie tsifry”, *Nezavisimoe voennoe obozrenie*, 7 September 2012.

⁴⁵ J. Paul Dunne, “The Defense Industrial Base” in Keith Hartley and Todd Sandler, (1995) *Handbook of Defense Economics*, Elsevier, North Holland, Vol.1, p. 406.

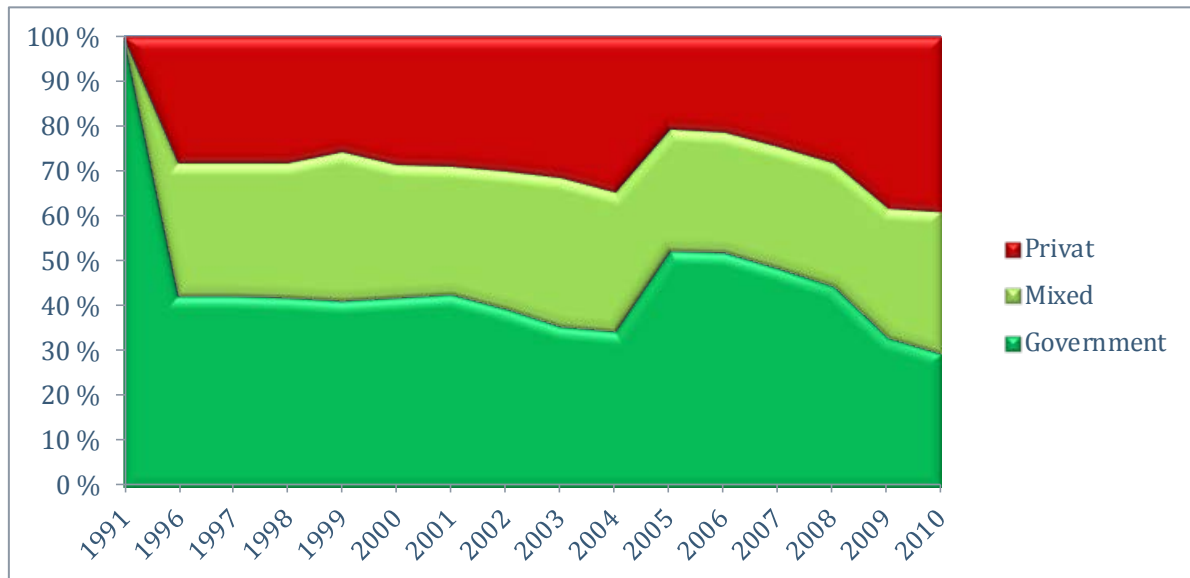


Figure 2.6 Changes in the ownership structure of the Russian OPK enterprises 1991–2010. Detailed figures for the years 1992–1995 were not available. The figure is based on data from OPK, *Sobstvennost v VPK*, 2000–2010.

As demonstrated by Figure 2.6, the ownership structure of the Russian OPK has gone through major changes since the fall of the Soviet Union. In 1991 and 1992 there were a few first examples of privatization, then there was an “avalanche” of privatization in the years 1993–1995, followed by a stabilization until the beginning of Putin’s second term. There were plans for a further radical privatization in the government document *Restructuration and development of the military industry in the years 1998–2000*, but these plans ran into serious trouble after the Russian financial crisis of 1998. In addition to the negative effects the crisis had on private willingness and ability to invest in defence companies, the plan was also hindered by scepticism towards privatization in the new Putin administration and by significant opposition from the OPK directors.

The years 2005 and 2006 saw a significant renationalization, followed by a gradual reprivatisation that finally saw the share of purely publicly owned companies dip under the 40% threshold again in 2009. The relatively high percentage of enterprises with mixed ownership, 31.7% in 2010, means that the share of government involvement is significantly higher than 40%, but it is a case in point here that the government mostly is a minority shareholder in these companies.

The above figures, however, are concerned only with the number of enterprises. This means that a company with 50 people employed counts the same as a company with 5,000. Since the volume of defence production in no way is shared equally among the enterprises, the figure of less than 40% of defence companies being publicly owned in reality says little about how much of total production that comes from private vs. publicly owned enterprises. To find exact statistics for this latter distinction has not been possible, but some approximate figures are available. For example, in 2009, 92% of the sales revenues of the 20 largest OPK companies in 2009 were pocketed by

government companies. Experts then started to talk about the final nationalization of the Russian OPK.⁴⁶ For example, 89% of the United Aircraft Corporation, which currently comprises more or less all production related to fixed wing aircraft in the country, is publicly owned.⁴⁷ According to Vasili Kashin from the CAST centre, approximately 80% of the leading OPK enterprises are currently in public ownership.⁴⁸

The government in the mid-2000s saw renationalization as necessary in order to restructure the OPK into a number of large holdings. It was stated from the beginning that reprivatisation would follow when the holdings had been established, and when weak enterprises had been “put back on their feet”. The statistics presented in Figure 2.6 suggest that this policy to some extent was implemented. However, given the highly personalized and corrupt character of the Russian politico-economic system, the suspicion was always there that redistribution of valuable property among government officials and in patronage networks had been an additional motive for the changes.⁴⁹

The self-interest of public officials might be one motive for maintaining a dominating role for public ownership in the defence industry; another and equally important motive is probably a preference in Russian political culture for public over private. One student of Russian political culture, Valerii Lediaev, calls this tendency the Russian “predisposition for the dominance of political (administrative, bureaucratic and statist) factors, which should structure all other aspects of social life, such as the place and roles for social groups including economic actors”. Don K. Rowney and Eugene Huskey likewise point to the strong belief in Russia across historical periods for the preeminent role of the state as the principal agent of change and control.⁵⁰ This trait of Russian political culture has according to two of the most prominent experts on post-Soviet industrial development, the economists Iakov Poppe and Iana Galukhina, resulted in a bias that “if there is a problem somewhere in the economy, then the cure is always a heightened role for the state, concentration of the resources into a few main structures, merging of the small with the large, removal of duplicating production lines and competition. That is, a totally anti-market logic”.⁵¹

Another, more rationalist based motive for strong government ownership, has been the observation that concentration into fewer but larger firms has taken place in most other industrialized countries. This happened first in the USA, and shortly after in Western Europe, and

⁴⁶ Ruslan Pukhov to Alksei Nikolskii in “Krizis ukrepil vertikal”, *Vedomosti*, 9 June 2010.

⁴⁷ Aleksei Nikolskii, “Kak v Brazilii”, *Vedomosti*, 3 February 2010.

⁴⁸ Igor Naumov, “Dmitrii Rogozin vziatsia za chastnykh vladeltsev oboronki”, *Nezavisimaia gazeta*, 2 October 2012, and Stephen Blank, “A work in regress?..”, *op.cit.*, pp. 151–168.

⁴⁹ See for example, Mikhail Kozyrev, “Chem konchitsia protivostoianie Minoborony i MOD”, *Slon.ru*, 20 September 2011.

⁵⁰ Valerii Lediaev, “Vlast, avtoritet i gospodstvo v Rosii: osnovnye kharakteristiki i formy”, in (ed.) Anton Oleinik, (2008) *Administrativnye reformy v kontekste vlastnykh otnoshenii*, ROSSPEN, Moscow, p. 62, and Don K. Rowney and Eugene Huskey, “Introduction: Russian Officialdom Since 1881”, in (eds.) Don K. Rowney and Eugene Huskey, (2009) *Russian Bureaucracy and the State*, Palgrave Macmillan, p. 5.

⁵¹ Yakov Poppe and Iana Galukhina, (2009) *Rossiiskii krupnii biznes*, GU VShE Publishing house, Moscow, p. 162.

it took place more or less at the same time as there was a split into a multitude of small firms in Russia. Here the large corporations became unprofitable because of the absence of domestic orders, and in many cases their different parts therefore split in order to try to survive on their own. Russian authorities subsequently became worried that small Russian companies would have no chance in the competition on the world arms markets against Western goliaths. Thus, a belief that it takes giants to fight giants is probably also part of the explanation for the 2004–2005 renationalization.⁵²

As demonstrated in Figure 2.6, however, there has again been a slow growth in the private ownership share of the defence industry since 2006–2007, and President Putin recently stated that state capitalism is not the government's aim.⁵³ In the autumn of 2011 a special advisory group was attached to the VPK with the task of increasing private investment in the OPK. The group contained a number of prominent Russian oligarchs, including Oleg Deripaska and Vladimir Evtushenkov. If the latter years' reprivatisation of OPK enterprises should pick up speed, this would be in correspondence with Putin's stated goals. However, if in reality about 80% of military production continues to take place in publicly owned enterprises, then Putin's statement was probably not meant for the OPK. In November 2012, Vice-Prime Minister with responsibility for the OPK, Dmitrii Rogozin, suggested that 65–70% state ownership would be a preferable figure.⁵⁴ In the same month the head of the state corporation *Rostekh*, Sergei Chemezov, stated that his company had been able to rescue and put back on their feet a large number of OPK enterprises, and that it was now time to again increase the share of private ownership. He was, however, rather vague on details about what *Rostekh* actually had managed to do with these firms.⁵⁵ Nevertheless, Chemezov's statement indicates that increased private ownership is a goal, at least on paper. Against this background it then seems odd, for example, that the 100% state owned armored vehicle producer, *Uralvagonzavod*, in spring 2013 tried its best to purchase *Motovilikhinskie zavody*.⁵⁶ This enterprise is Russia's main producer of artillery systems, and a dominating percentage of the shares are privately held.

2.5 Dependency on CIS producers

Russia inherited the major part of the Soviet defence industry. In terms of defence industry employees, 74% were working in factories on Russian soil at the time of the Soviet break-up.⁵⁷ This fact alone suggests that Russian post-Soviet dependency on units of the former Soviet OPK now located beyond Russia's borders, would not be overwhelming.

⁵² Vadim Soloviev, "Goskorporatsii: vse tochki nad i rasstavleny", *Nezavisimoe voennoe obozrenie*, 11 December 2009.

⁵³ "Rossia ne budet sozdat gospitalizm - Putin", *Interfax*, 16 September 2012.

⁵⁴ Igor Andreev interviewing Dmitrii Rogozin, *RIA Novosti*, 12 November 2012.

⁵⁵ Anna Razintseva and Aleksandra Terentieva, "Konfety ot Chemezova", *Vedomosti*, 23 November 2012.

⁵⁶ Interview with Nikolai Bukhvalov, General Director of *Motovilikhinskie zavody*, in *Vedomosti* 12 March 2013.

⁵⁷ Calculated based on figures from Julian Cooper, "Society-military relations in Russia: the economic dimension", in (eds.) Stephen L. Webber and Jennifer G. Mathers, (2006), *Military and society in post-Soviet Russia*, Manchester, Manchester University Press, p. 133.

While there was some defence production in almost all the Soviet republics, the majority of non-Russian enterprises were concentrated in the three republics Ukraine, Belarus and Kazakhstan.

Currently, according to *TSV-PK*, about 500 of the 1,363 Russian OPK enterprises have commercial and/or cooperative relations with about 1,200 companies in the CIS states outside Russia.⁵⁸ This figure may seem substantial, but for a number of reasons the high figure for commercial and/or cooperative relations can only to a limited degree be interpreted as actual Russian dependence on CIS producers. First, many of these CIS producers will have few if any alternative customers for their products. Thus, their dependence on the Russian customer is probably as high as or even higher than the other way around. Second, Russia has at least since the early 2000s strived for what one observer has called a “maximum of local manufacturing in arms production”.⁵⁹ While this policy has not always been successful, it continues to gradually decrease the need for imports from the CIS. The eagerness with which this policy currently is implemented is such that Russian experts have started to question to what extent it is sensible.⁶⁰ For example, to build two new plants for the production of helicopter engines, one outside St. Petersburg and the other outside Moscow, costs a lot of money. For the Russian defence budget it would most likely have been much cheaper to continue to buy these engines from the *Motor Sich* plant in Zaporizhzhia in Ukraine where the engines are bought from today.

The Russian import substitution policy is most pronounced in the relationship with Ukraine. This is largely because of this country’s sometimes expressed desire for NATO membership. The Russian military establishment sees less need for such a policy with regard to the imports of military products from Belarus and Kazakhstan. In fact, in January 2013 Belarusian OPK enterprises were granted the same legal regime for competing for Russian state orders as the Russian OPK.⁶¹ A peculiarity of the defence industry developed in Belarus during Soviet times was that most of it was concentrated on the production of parts that would go into the production of complete weapons systems elsewhere. There was a hesitancy in the Soviet leadership to locate final assembly lines in an area situated so close to the West. Thus, the fact that the Belarusian arms industry to a much larger degree than the Ukrainian one is a producer of parts for weapons systems assembled in Russia, plus the anti-Western policy of the Belarusian regime, has made import substitution less of a concern for Russia than in the case of Ukraine. For example, Belarus produces almost all the Transporter Erector Launchers (TELs) for Russian land based ICBMs and other missile systems such as *Iskander* and *Bastion*. These obviously have no market outside Russia, whereas Ukraine can sell or not sell its Antonov planes to whomever it wants. The fact that dependency sometimes is mutual does not as such reduce the Russian dependence on CIS producers, but it does put Russia in a stronger bargaining position than when the CIS producer has alternative outlets.

⁵⁸ VPK, OPK as part of the Russian economy, 2004

⁵⁹ Iliia Kramnik, “OPK Ukrainy: kooperatsia s Rossiei kak zalog sushchestvovania”, *Golos Rossii*, 23 February 2012.

⁶⁰ Vladimir Mukhin, “Obrechennye na razvod”, *Nezavisimaia gazeta*, 5 August 2010.

⁶¹ Olga Samofalova, “Dlia belorusskikh družiei”, *Vzgliad*, 29 January 2013.

It is again not possible to give a good quantitative assessment of the Russian dependence on CIS producers. Russian politicians will have a tendency to play it down while CIS producers tend to do the opposite. Probably the closest one can get to a conclusion is that it is still substantial but gradually on the decrease. Furthermore, Russian politicians are often contradictory in their views on how to deal with this dependence. In August 2011, Dmitrii Rogozin, then recently put in charge of the OPK in the Russian government, at one occasion said that a revival of the Russian OPK would be impossible without re-establishing the ties to the Belarusian and Ukrainian OPK. Only two weeks later he stated that “the Russian OPK is doomed to develop in solitude”.⁶²

3 Principal-agent theory and the Russian OPK

The central aim of all countries with a significant military-industrial base is that this industry should produce weapons of a quality, quantity and technological sophistication sufficient for this country's armed forces to face opponents with confidence. The relationship between the actors involved in the production of the hardware and the military organization itself is often portrayed as one of principal and agent.⁶³ The *principal*, i.e. the national government or national military, tasks the *agent*, i.e. the national military industry, with the job of producing the military equipment that the principal believes he needs in order to fulfil his role as guarantor of national security. Thus, the theoretical framework for the analysis of reforms and prospects for the Russian defence industry will be *principal-agent theory*. This means that principal-agent theory has been used to identify actor mechanisms, and also to some extent to study how and to which extent they have been implemented. In addition, the degree to which their employment has achieved results is also investigated. While the main focus is on the strategy of the government and the military (i.e. the principal), the OPK (the agent) of course also has mechanisms or countermechanisms of its own. In order for the discussion to run more smoothly, however, these latter mechanisms are not analysed in a separate chapter, but discussed in conjunction with the mechanisms of the government and the military.

3.1 Principal-agent theory

Principal-agent theory is a body of theory developed in economics that gradually also has become popular in the other social sciences. Simply put it describes a situation in which one actor – the principal – wants another actor – the agent – to perform a service or produce a good for which the principal is willing to pay. In this situation there are two circumstances that fundamentally characterise the relationship between the principal and the agent in relation to the service or good to be produced. First, the agent knows more about the production process itself than the principal, and therefore has an information advantage (information asymmetry). Second, the principal and the agent have partially different interests with regard to the output of the production process. The principal wants as much as possible, with as good a quality as possible, for as little payment as

⁶² Interview in *RBK-Daily*, 17 November 2011, and interview with Aleksandr Frolov in *Krasnaia zvezda*, 30 November 2011.

⁶³ See for example William P. Rogerson, “Incentive models of the defense procurement process” in (eds.) Keith Hartley and Todd Sandler, (1995) *Handbook of Defense Economics*, Elsevier, Amsterdam, pp. 319–320.

possible. The agent wants as much reward or payment as possible, but has only a limited interest in quantity or quality, since he is not going to use the end service or product any further after he has handed it over to the principal. The relationship between a landlord and a tenant is often mentioned as the archetypical example of a principal-agent relationship. However, given the short description above, the framework also seems to fit nicely with the relationship between Russian authorities and the Russian defence industry. Mark Harrison claims in his study of the Soviet OPK that “the more we closely study this phenomenon [the relationship between the government and the military on one side and the OPK on the other] the more we find that self-interested agents rarely did exactly as they were told”.⁶⁴

The theory then goes on to make predictions about what mechanisms respectively the principal and the agent are likely to employ in order to get end results as close to their original preferences as possible. For example, the principal may employ mechanisms such as competition, monitoring and punishment (sanctions), whereas the agent for his part may interpret/reinterpret the assignment, counter principal monitoring efforts or try to prevent competition from other agents.⁶⁵ Which mechanisms, or mix of mechanisms that are chosen, however, will depend both on the character of the agreed upon transaction, and on the political and cultural characteristics of the principal, the agent, and the external setting.

If we had been talking about a one-off transaction, then the maximum utility for Russian defence capability would have been a result that was as close to the principal’s (MODs) preferences as possible. However, since this is not a one-off transaction – the MOD is for the indefinite future going to sign contracts for new transactions with many of the same agents – the best possible outcome is probably more likely to be one defined as Pareto optimal. This means a situation in which no actor can improve his condition/outcome without making the other actor worse off. In plainer but less exact language, an outcome satisfactory to both the MOD and the OPK is the optimal one. An outcome satisfactory only to the MOD might yield more military capability in the short run, but would be likely to produce less capability in the longer run because both the OPK ability and motivation for performance might have been seriously hurt.

Finally, one of the main criticisms against principal-agent theory is that it takes narrow self-interest as given.⁶⁶ In this way, human propensities for cooperation and other non-selfish motives tend to be disregarded. Thus, for example in this study, motives connected to patriotism or pride in ones work are not taken into account. That is clearly a weakness in terms of getting a “complete” explanation of OPK performance.

⁶⁴ Mark Harrison, “The Political Economy of a Soviet R&D Failure: Steam Power for Aviation, 1932 to 1939”, *The Journal of Economic History*, Vol. 63, No.1, 2003, p. 178.

⁶⁵ Christopher R. Yukins, “A Versatile Prism: Assessing Procurement Law Through the Principal-Agent Model”, *Public Contract Law Journal*, Vol. 40, No.1, Fall 2010, pp. 65–66, and David E.M. Sappington, “Incentives in Principal-Agent Relationships”, *Journal of Economic Perspectives*, Vol.5, No.2, Spring 1991, pp.52–56.

⁶⁶ Charles Perrow, “Economic theories of organization”, *Theory and Society*, Vol. 15, 1986, pp.11–45 and Lex Donaldson, “The Ethereal Hand: Organizational Economics and Management Theory”, *The Academy of Management Review*, Vol.15, No.3, 1990, pp. 369–381.

However, their effects are very difficult to measure, and in the case at hand they have plainly not been strong enough to lift the industry out of the current impasse.

3.2 The MOD as principal and the OPK as agent in the Russian context

In principal-agent analyses the identification of principals and agents is not always straightforward. Both principals and agents may in fact be aggregate units, where the sub-actors within each unit have both conflicting interests and conflicting perspectives. That is also the case in the present study. However, in order not to get bogged down in the numerous details of these potentially conflicting relations, a conscious decision has here been made to concentrate the analysis at the level of aggregate units. Nuances will inevitably be lost as a result of this choice, but that will hopefully be compensated for by greater clarity in the analysis of the main problems. Nevertheless, it was difficult to narrow the definition of actors down to just one principal and one agent. *Thus, in the present case there are three actors at play, the government, the Ministry of Defence (MOD) and the OPK.* This means that there are two principals and one agent, which means that the relations between these two principals will also be of importance for the behaviour of the agent. This is a common complication in principal agent studies.⁶⁷

“Government” in this study means the entire executive branch but not the bureaucracy. Thus, both the president and the cabinet as well as other politically appointed executives are covered by the word “government”, but not the different ministries. A complicating factor here is that individuals within the government other than the defence minister may have opinions about arms procurement. These individuals may be motivated by a number of nonmilitary motives such as for example regional policy or employment. When they have their say, this sometimes distorts or undermines the efforts of the MOD in providing the military with the best possible combination of new equipment.

The MOD is of course formally a part of the government. However, what Mark Harrison has described as the triangular relationship between the Soviet government, the MOD and the OPK, still seems to be an accurate description also of post-Soviet Russian realities.⁶⁸ This is because the Russian government in practice sometimes operates as the principal of the MOD and sometimes as an arbiter between the MOD and the OPK. In the latter case the MOD, notwithstanding its formal subordination to the government, becomes a principal in its own right. Here “the principal” will therefore sometimes be referred to as the government and the MOD, and sometimes just the MOD. Furthermore, the MOD and the military organization are here seen as one actor. There is no doubt that the Russian military sometimes see things differently from people in the MOD, but for the simplicity of analysis these divergences are not further explored here. This simplification is justified by the assumption that both the MOD and the military,

⁶⁷ For more on these kind of questions, see Richard W. Waterman and Kenneth J. Meier, “Principal-Agent Models: An Expansion?”, *Journal of Public Administration Research and Theory*, Vol. 8, No.2, 1998, pp. 173–202.

⁶⁸ Mark Harrison and Andrei Markevich, “Contracting for Quality under a Dictator: the Soviet Defense Market, 1930 to 1950”, unpublished paper, Department of Economics, University of Warwick, at <http://www2.warwick.ac.uk/fac/soc/economics/staff/academic/harrison/papers/quality.pdf>, p. 6.

despite their differences, both want the OPK to produce weapons of a quality, quantity and technological sophistication that can contribute significantly to Russian security. Finally, despite the fact that military enterprises also often have conflicting interests, the OPK is for the same reasons as described above seen as a unitary actor.

Additionally, both the MOD and the OPK are seen as *corporate actors*. A corporate actor is a membership organization whose interests cannot be reduced to merely the aggregation of the self-interests of its members. Sometimes a corporate actor takes decisions that “ignore the interests of certain members or even acts against those interests”.⁶⁹ As members of a corporate actor, the individuals making the decisions have according to Fritz W. Scharpf a “high degree of autonomy from the ultimate beneficiaries of their actions”, and their “own private preferences are supposed to be neutralized by employment contracts”.⁷⁰ In plainer language, they work for what they see as the benefit of the corporation, and do not let neither their own personal interest nor the personal interest of others in the corporation get in the way. However, in reality both the *military* and the *military industry* are corporate actors only to a certain extent. Individuals within those corporate actors will sometimes take decisions in accordance with the corporate actor paradigm, and sometimes they will not – i.e. they will put their own personal self-interest before the corporate interest. This fact cannot be left out of the analysis, since, as will be demonstrated with empirical examples later, it has a significant impact on agent performance and principal satisfaction.

All this means that some of the deviation from the optimal outcome as seen from the Russian military’s side must be explained, not by the problems in its institutional relationship with the OPK, but by “sabotage” from individual agents within both the military’s own organization and the OPK. Thus, outcomes in terms of arms production that deviate from the corporate interests of the Russian military have two sources: the principal-agent problems in the corporate relationship with the OPK, and individuals inside the military and the OPK who put personal before corporate interests.

The “sabotage” of corporate interests from individuals usually takes place in the way that representatives of the MOD join temporary alliances with representatives of the OPK with the aim of siphoning off public funds for private use, i.e. corruption. Arms procurement is officially acknowledged as an area where this problem is particularly acute.⁷¹ This means that arms procurement processes are handled as a corruption scheme where individuals on behalf of the principal and individuals on behalf of the actor conspire to carry out projects that serve their own personal interests and not the interests of the corporate actors they represent.

⁶⁹ Volker Schneider and Raymond Verle, “International regime or corporate actor? The European Community in telecommunications policy”, in Kenneth Dyson and Peter Humphreys (eds.), (1990) *The Political Economy of Communications: International and European Dimensions*, London Routledge, pp. 78–82.

⁷⁰ Fritz W. Scharpf, (1997), *Games Real Actors Play – Actor-Centered Institutionalism in Policy Research*, Boulder, Westview Press, p. 54.

⁷¹ For more on this, see Tor Bukkvoll, “Their Hand in the Till – Scale and Causes of Russian Military Corruption”, *Armed Forces & Society*, 34:2, January 2008, pp. 259–275.

In the cases where this takes place, the principal-agent model is less suited for explaining the outcome in terms of quality and quantity of production.

According to some sources, kickbacks in the placement of military R&D contracts can be as much as 70% of the contract price, and the Russian Centre for Macroeconomic Analysis and Short Term Prognosis has estimated that the Russian defence budget loses 23–25 billion roubles a year because of such kickbacks.⁷² When the arms procurement agency *Rosoboronpostavka* was established in 2007, one of the reasons was to establish an “anti-corruption padding” between the generals and the managers of the large defence companies.⁷³ The military-OPK collusion on the individual level is further exacerbated by the fact that many high ranking officers also serve at the boards of OPK companies while still in service or just after retiring.⁷⁴ According to a statement by the Office of the Military Prosecutor “the affiliations between representatives of the procurement organs, the military and commercial organizations, as well as weaknesses in the legislation in connection with the state defence order are responsible for a rise in criminal acts of more than 1.5 times, something which clearly has had a negative effect on the provision of the troops with modern arms”.⁷⁵

Depending on the quantity and frequency of such military-OPK collusions, they may actually ameliorate the original principal-agent conflict of interest, but, as discussed above, simultaneously weaken OPK performance. However, the “sabotage” argument might be too narrow in the sense that it seems to indicate individuals cannot have two motives simultaneously. It is not difficult, however, to imagine a representative of the MOD who in a certain procurement case accepts a corruption scheme that allows both him and one or more representatives for the agent to siphon off a certain amount of money, but who nevertheless also wants the weapons to be produced for the rest of the money to work well. He knows that he might even himself be reliant on them at some stage in the future. In this case the “sabotaging” individuals would have to try to find a balance whereby the siphoning of funds is possible, but where at the same time the development and production of the arms in question does not suffer too much. To the extent that this is the case, the ameliorating function of military-OPK collusion on the original principal-agent conflict may not be so important after all.

Finally, the severity of the principal-agent conflict is also dependent on the general level of trust between the two actors. This might vary, and the more trust that has been built up, the less the structural problems described in Chapter 3.1 are likely to negatively effect production. Most observers agree that the current level of trust between the military and the industry in general is very low. For example, Ruslan Pukhov from the Russian CAST centre, remarked in connection with the former Chief of the General Staff, Nikolai Makarov’s, enthusiasm for arms import that this was a reflection of “the deepest mistrust and even hostility towards the Russian arms

⁷² Sergei Ishchenko, “Nedovoruzhennye sily Rossii”, *Svobodnaia Pressa*, 9 March 2011.

⁷³ Oleg Vladykin, “Dengi oboronke ne pomogut”, *Nezavisimoe Voennoe Obozrenie*, 11 June 2010.

⁷⁴ Vladimir Ivanov, “Izobresti voenno-promyshlennyi velosiped”, *Nezavisimaia Gazeta*, 5 February 2007.

⁷⁵ Iurii Gavrilov, “Moshennik s polnomochiami”, *Rossiiskaia Gazeta*, 3 July 2012.

industry” from the General Staff.⁷⁶ And, in January 2012, director of the ammunition producer *Bazalt*, Aleksandr Rybas, complained that the OPK felt like an unwanted “stepson” of the MOD.⁷⁷ These statements indicate that principal-agent problems in the relationship between the Russian military and the OPK currently are little ameliorated by trust.

4 Mechanisms of incentive

The mechanisms of incentive are different from the later discussed mechanisms of enforcement, such as monitoring and sanctions, in that they interfere less directly with the production process. They are in a sense “start conditions” that the principal hopes will encourage the agent to perform as well as possible.

4.1 Competition

To what extent the Russian government is relying on competition, and whether it has had any positive effect on OPK performance, is here discussed in terms of *private vs. public ownership*, *large monopolies vs. small competitors* and *exposure to foreign competition*.

The effect of *private vs. public ownership* on the performance of military industries is contested in the international literature. J. Paul Dunne, for example, claims that “it is not state or private ownership itself that is important, but the character of the ownership, the constraints and the policies followed”.⁷⁸ Others, for example Stephen Blank, see the dominance of state ownership in the Russian OPK as one of the main reasons why it is not performing better.⁷⁹ Notwithstanding who is right, there is no doubt that the Russian government sees type of ownership as an important part of its defence industrial policy, and it is therefore interesting to investigate what if any effect the different types of ownership might have had on the performance of the OPK.

The ratio between private and public ownership, and its development over time in the post-Soviet period, was presented in Chapter 2.4. To briefly recapitulate, there was a mass privatization taking place in the years 1993–1995, reducing the number of purely publicly owned companies to about 40% of the total number. Then, there was a significant re-nationalization in the years 2004–2005, followed by a slow re-privatization. The latter resulted in the number of publicly owned companies actually dipping under 40% in 2010. This low figure, however, was deceptive, because most of the larger companies were kept in public ownership. Thus, although today a larger number of OPK companies are privately than publicly owned, public ownership is still vastly dominant in terms of employment and overall production volumes. Probably as much as 80% of the leading defence companies are publicly owned.⁸⁰

⁷⁶ Denis Riabokonov, “Divizia ne revizia”, *Profil*, 13 May 2013.

⁷⁷ Aleksei Nikolskii, interview with Aleksandr Rybas in *Vedomosti*, 18 January 2012.

⁷⁸ J. Paul Dunne, “The Defense Industrial Base”, op.cit., p. 420.

⁷⁹ Stephen Blank, (2007) *Rosoboroneksport: Arms sales and the structure of Russian defense industry*, Strategic Studies Institute, at <http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=749>.

⁸⁰ Igor Naumov, “Dmitrii Rogozin vziatsia za chastnykh vladeltsev oboronki”, op.cit.

To what extent a government allows for private ownership in this sector is a principal part of industrial policy. In essence, it is a question of control vs. trust. Public ownership gives more control than private ownership. Private ownership presupposes a significant degree of principal trust, because it gives the agent more room for manoeuvre. For example, the producer of the resistors for the electronic components of many military systems including for nuclear weapons, *Kontakt*, was privatized in the 1990s. In 2009 the owner, Andrei Korobeinikov, decided to finance a new liquor factory in the Russian province of Mari-El. He gave as security the assets of *Kontakt*. The new liquor factory quickly ran into trouble with the state agency for the control over production and sale of alcohol, *Rosalkohol*. Korobeinikov then threatened that all production of resistors to the military would stop if his new factory went bankrupt and he had to hand over *Kontakt* as security. Thus, the privatization in this case could have led to a halt in the provision of very necessary components for weapons production, simply because of the business strategies of a single individual.⁸¹ This example further illustrates the particular risks for the principal if the privately owned producer is a monopoly producer.

Thus, a central question is whether the government and the military can trust private OPK companies to continue to produce military equipment of the quality, quantity and technological sophistication that the armed forces want.

The privatization wave in the early 1990s took place as a part of the general transition from a planned to a market economy. And, although there were critical voices even then, it is likely that the trust vs. control issue was overshadowed by the then dominant market ideology also in relation to ownership in the OPK. The renationalization of defence enterprises of the mid 2000s was not publicly justified by a desire for control through public ownership as such, but it is very likely that this motive also played a role. The government was at the time getting ready to invest huge sums of money in the OPK, and most likely felt a need to make sure that resources were not diverted to non-military purposes.

Russian observers disagree on what effects the large degree of private ownership from the mid-90s to the mid-2000s had on OPK performance. One estimate, based on figures about ownership and numbers of employees in the year 2000, suggest that after five to seven years of private ownership, labour productivity in privately owned OPK companies was little different from in the publicly owned companies.⁸² Yakov Poppe and Iana Galukhina, on the other hand, attribute the increasingly uneven performance of different companies in aircraft production to whether or not they were privatized. According to them, the *Irkut* fighter jet producer has been performing much better than for example the heavy aircraft producers *Tupolev* and *Ilyushin*, largely because it was reformed as a result of its full privatization in the early 1990s.⁸³ Today *Irkut* is renationalized as part of the almost 90% publicly owned OAK.

⁸¹ Denis Puzyrev, "Oboronnyi kompleks Rossii mozhet postradat iz-za bankrodstvo vodochnogo zavoda", *RBK-Daily*, 7 February 2011.

⁸² VPK, the cadre question, p.1.

⁸³ Yakov Poppe and Iana Galukhina, *Rossiiskii krupnii biznes*, op.cit., pp. 177–178.

One concern with regard to the reemphasis on public ownership is that OPK companies again become more isolated from the civilian economy because they participate less in the competition for the civilian market. This might have at least two potentially negative effects. First, they are less exposed to the stimulus of competition that is much more prevalent in the civilian than the military market. Thus, what one observer calls “the dependency mentality of the OPK management” may again become more pronounced.⁸⁴ Second, the publicly stated target of making the OPK a technological locomotive for the civilian economy might be harder to reach. The experience so far is that privately owned OPK companies are significantly more eager than publicly owned ones to find civilian use for militarily developed technologies. To the degree that public ownership is maintained, one will have to rely on a “bureaucratic” transfer of technologies, rather than a “market” transfer in which private entrepreneurs in economic self-interest try to find civilian use for the military technologies. When former Prime Minister, Viktor Chernomyrdin, asked the director of the air defence producer *Novator*, V. Volman, how the company was doing in the civilian market, the latter proudly replied that “no matter what we try to produce, it always comes out as a weapon”, and that therefore civilian production was negligent.⁸⁵

A further danger of the mid 2000s renationalization is that it has increased OPK distrust in the Russian political and bureaucratic leadership. While most likely a majority of companies willingly let themselves be renationalized, largely because this was seen as a security against bankruptcy, many also put up a fight. One of the loudest fights took place when the government holding *Oboronprom* wanted to take over the private producer of aircraft engines, *Saturn*. This company had prospered in private hands. It is the producer of the A-31 engine that all Sukhoi fighter jets use, and it produced the first prototype for an engine for the projected Russian fifth generation fighter the T-50. Yuriï Lastochkin, head of *Saturn*, argued that the creation of multi-layered public holdings would lead to structures that became increasingly bureaucratized and that in the end would demand a lot of state subsidies to stay alive. He also stated that “handing the assets that we were developing for ten years over to random people is not even funny”.⁸⁶ Despite resistance, Saturn was included into *Oboronprom* by presidential decree in April 2008.

Others, because of their stronger lobbying powers, held their positions longer, but were also finally forced to give in. One example is the oligarch Sergei Pugachev. He acquired controlling shares in the two naval dockyards *Sevmash* and *Baltiiskii zavod*. The government naval dockyard holding United Shipbuilding Company (OSK) has since 2008 tried to take over these dockyards, but Pugachev has not been willing to sell at the price offered by OSK.⁸⁷ In November 2010, however, Pugachev’s bank *Mezhprombank* was declared bankrupt, and the shipyards were transferred to the Russian central bank as collateral and later resold to the OSK. Pugachev claims the *Mezhprombank* affair was a scam initiated by the OSK in order to get ownership of the two

⁸⁴ VPK, OPK as part of the Russian economy, 2005.

⁸⁵ VPK, OPK as part of the Russian economy, 2006.

⁸⁶ Nabi Abdullaev, “Fighting to stay private”, *Defense News*, 28 July 2008.

⁸⁷ Yakov Poppe and Iana Galukhina, *Rossiiskii krupnii biznes*, op.cit., pp. 183–185.

shipyards for nothing. He later wrote a letter to President Putin to get help in getting the shipyards back.⁸⁸ So far, however, this wish remains unfulfilled.

There are indications that privatization in several cases has had a positive effect on OPK performance, and thus that a lowering of the current public ownership dominance may be a good idea. The rhetoric from the political leadership is in general supportive of more private ownership (see Chapter 2.4), but it seems that there often is a knee jerk reflex in favour of renationalization as soon as there are problems in any branch. In addition, decisions on private vs. public ownership may also seem to be at least as much influenced by the lobbying strengths of bureaucratic and business groupings as they are by government strategy. All the same, the empirical material does not support a strong inference in favour of the conclusion that type of ownership is a fundamental factor for the performance of the OPK.

Whether national defence industries are best made up of *large monopolies or small competitors* is a relevant question for many national governments. Large enterprises can be more efficient because of inter alia economies of scale, but if they achieve monopoly status, they lose a very important incentive for efficiency. Smaller enterprises cannot achieve the same economies of scale, but may be more flexible and focused on their core business. Also, there may be room for more than one company with similar product profiles within the same defence industrial base. In this case, competition is likely to function as an incentive. Russia in the mid-2000s to a considerable extent chose the large monopoly model.

In addition to renationalization, the merger of many companies with branch similarities into large holding companies has been one of the most fundamental changes to the OPK initiated by the political authorities since the mid-2000s. The first plans for concentrating OPK companies into large holdings were made already in 1997, but the starting point for the whole process was the creation of the Sukhoi holding company in 2001. Sukhoi was later again integrated with most other companies in Russian aircraft production to create the United Aircraft Corporation in 2006.

The officially declared motives for the consolidation effort have been (1) to get synergy effects by joining design and production facilities which do similar work, and (2) that significant mergers have taken place in the OPKs of other countries. Thus, unless the same happened in Russia the Russian companies would lose in the international competition. On SIPRI's 2010 list of the 100 largest international defence companies, the producer of air defence systems, *Almaz-Antei*, was the largest Russian company, occupying place no. 20. There were 15 US, two British, one EU, one Italian and two French companies larger than *Almaz-Antei*. This company's total sales in USD in 2010 were about one tenth of the total sales of Lockheed Martin – the leader of the list. Of the 100 largest defence companies in the world, 45 are US, 11 are Russian, 10 are UK, 9 are French, five are Italian, and the rest from other countries. It is very likely that if the holding creation had not taken place in Russia, the number of Russian companies on the list would have been significantly smaller.⁸⁹

⁸⁸ Egor Popov and Ivan Safranov, "Roman Trotsenko skhodit s verfei", *Kommersant*, 18 June 2012.

⁸⁹ See SIPRI Top 100, at <http://www.sipri.org/research/armaments/production/Top100>.

Independent voices, however, have suggested that a motive of no less importance than international competition has been to move control over the money flows from the directors at the enterprise level to the bureaucrats in the ministries. Control over the money flows is one way of reigning in directors that have become too independent, and in the current context of high Russian corruption it is also a way to improve one's access to siphoning off public money.⁹⁰

Furthermore, there was a strong hope that the mergers into holding companies would result in a process where the successes of the stronger would rub off on the weaker. In this way the weaker companies could be turned around without the government having to get more directly involved in the process. For example, the United Aircraft Cooperation was formed partly on the idea that the more successful military aircraft industry could be used to improve both on the ailing civilian aircraft industry and on the parts of the military aircraft industry in trouble.⁹¹ To illustrate, the military aircraft manufacturers *Tupolev* and *Iliushchin* had serious problems, and it was hoped that their merger with more successful companies such as *Sukhoi* and *Irkut* would pull them out of stagnation.

Relative success, however, was never any guarantee for being allowed to remain independent. In helicopter production for example, things were improving in most companies without governmental interference. Still, the demand for holding creation was no different from in aircraft production. Some of the largely privately owned companies in helicopter production were therefore more or less forced into *Oboronprom*. In some cases they were even excluded from lucrative export contracts until their owners agreed to sell controlling shares to the state holding *Oboronprom*.⁹²

The main argument against the creation of large holding companies has of course been the resulting lack of competition. If an agent knows that the principal can go to nobody but him to get a certain job done, his incentives to perform are lower than if he competes with one or more other agents. One of the most talked about let-downs in Russian military R&D over the last decade has been the several failures of the *Vega* radio engineering corporation. During the 2000s this company received about 7 billion roubles for each of the three projects: new Russian UAVs, avionics for the planned new early warning aircraft A-100, and avionics for the planned new airborne intelligence collector Tu-214ON. In March 2011 the then Deputy Defence Minister, Vladimir Popovkin, publicly reproached the company for its failure to deliver, and by March 2013 the company still had very little progress to show for itself in all the three areas. According to the independent expert Konstantin Makienko, the fiascos at *Vega* should at least partly be attributed to the company's monopoly-like position within military radio engineering.⁹³

⁹⁰ Vitalii Shlykov, "Perdel. Potemkinskii kompleks", *Itogi*, 10 April 2001.

⁹¹ Yakov Poppe and Iana Galukhina, *Rossiiskii krupnii biznes*, op.cit., p. 165.

⁹² *Ibid.*, p. 181.

⁹³ Vladimir Leonov, "Dorogaia Vega", *Argumenty Nedeli*, 23 March 2013, Sergei Smirnov and Alina Chernoiyanova, "Bezpilotniki uletiat v St. Perterburg", *Gazeta.ru*, 7 October 2011 and Sergei Ischenko, "Nedovooruzhennye sily Rossii", *Svobodnaia Pressa*, 9 March 2011.

Furthermore, if the principal is able to increase his power through the creation of conditions for competition, agents may still invalidate that power by agreeing among themselves not to compete. According to the then director of monitoring agency for the state defence order *Rosoboronzakaz*, Sergei Mayev, OPK companies frequently agree not to bid against each other for contracts. When one company then gets the contract at the highest possible price because of the lack of competition, this company pays out compensation to those who did not get the order.⁹⁴

During Soviet times there actually was real competition between both designers and final producers. The Soviet authorities consciously established a system where there were at least two competing design and production environments for each major weapons system. This was an element that set the OPK apart from much of the rest of the economy. It was pioneered before the Second World War in aircraft and aviation engine development, and spread to most other branches of the OPK after that.⁹⁵

Abandonment of competition will imply the removal of a central incentive mechanism, and the question then becomes whether the rationalizing advantages expected to result from mergers can compensate for the loss of competition as an incentive. A number of Russian observers doubt that. As argued by Viktor Miasnikov and Viktor Sergeev, in the absence of competition, all that is left as a stimulator for increased performance is “administrative pressure”.⁹⁶ Another observer noted in 2012 that the government now seemed to regard its job as mostly done by creating these holdings. Little additional effort could be expected from the government despite few indications that the new leaderships of these structure were prepared to take the process further alone.⁹⁷ The military observer Aleksandr Khramchikhin argues that the new holdings, instead of joining the strengths of the participating parts, tend to lead to a destruction of the bureaucratically weak by the bureaucratically strong. This could have been a positive development if the strong were the same time the best performing, and if the winners had been able to integrate the unique competencies of the weak into their stronger organizations. However, as Khramchikhin points out, the strong are more often the ones with the best lobbying skills and positions, and therefore whole areas of technological competence located in the weak actors tend to be lost.⁹⁸ Lobbying is one of the OPK’s prime sources of power. According to one Russian source “the influence of the oligarchs from the OPK is such that the government will have to take their suggestions into account in the formulation of any structural reforms that concern these oligarchs’ interest”.⁹⁹

The danger of monopolies is also sometimes recognized by representatives of the industry themselves. In the mid-2000s Russian aircraft producers successfully for several years prevented

⁹⁴ Nabi Abdullaev, “In Moscow, Unusual Light on Defense-Spending Corruption”, *Defense News*, 16 October 2008.

⁹⁵ Mark Harris, “The Political Economy...”, op. cit., p. 164.

⁹⁶ Viktor Miasnikov and Mikhail Sergeev, “Oboronka skatilas v monopolku”, *Nezavisimoe voennoe obozrenie*, 27 April 2007.

⁹⁷ VPK, general trends, 2006.

⁹⁸ Aleksandr Khrmachikhin, “Premer novii – problemy starye”, *Nezavisimoe voennoe obozrenie*, 21 September 2007.

⁹⁹ VPK, ownership, p. 4.

the merger of the different Russian avionics producers because they feared the negative consequences of a monopoly. This battle was lost in 2009, however, when all avionics producers under the guidance of *Rostekh* were merged into a holding company called *Aviapriborostroenie*.¹⁰⁰

An additional, and predictable, problem with the mergers is the fight for relative positions within the new structures by the different companies. For example, in 2011 the trade union at MiG wrote a letter of complaint to President Medvedev in which they accused Mikhail Pogosian, former head of Sukhoi, of exploiting his newly acquired position as head of OAK to squeeze MiG to the benefit of Sukhoi. The trade union asked Medvedev to stop “Pogosian and Co from ruining the Russian aircraft industry”.¹⁰¹ Similarly, a conflict also emerged between the two best functioning companies within the OAK, namely Sukhoi and Irkut. OAK was first led by the head of Irkut, Aleksei Fedorov, and he was also one of the initiators of the holding. However, in 2011 President Medvedev handed the leadership of OAK over to head of Sukhoi, Mikhail Pogosian. Medvedev thought Fedorov had not been forward leaning enough on the issue of innovation. Fedorov subsequently returned to Irkut, and spent much of his time trying to maintain as much *Irkut* independence from the OAK as he could. In July 2012, however, he, most likely after pressure from Pogosian, was forced to retire. Sources close to the process told *Kommersant* that Pogosian “could not live with two oppositional centres of power within the OAK”.¹⁰²

So far reports on the effects of the holding creations differ. There are few comprehensive studies that discuss the effects of the creation of holdings in any particular branches. However, one exception is Aleksei Bezborodov’s short study of the United Shipbuilding Cooperation (OSK). His conclusions are mainly pessimistic. According to his study, the integration of a large part of Russian military dockyards into one entity has resulted in a structure that is ungovernable because of the large number of sub-holdings; where there are constant internal conflicts of interest, including competition over state orders; and where the main function of the holding has become to serve as an unnecessary and cost escalating intermediary. The holding takes cheap government credits and offers them to the companies within the structure at a higher rate. In addition, the merger of civilian and military dockyards has made it more difficult for the civilian ones to internationalize.¹⁰³ In the years since the creation of OSK, a surprising number of the new vessels for the fleet have come from dockyards independent of OSK. One anonymous representative of Russian procurement authorities stated plainly that they preferred to place orders with independent companies if possible, because they were easier to deal with, there was less red tape, and their products tended to be of better quality and come at a smaller price than from OSK.¹⁰⁴

¹⁰⁰ Mikhail Barabanov, “Ramenskoe priborostroitelnoe konstruktorskoie biuro”, *Ekspert vooruzhenii*, No.5, September-October, 2012, p. 62.

¹⁰¹ Anton Bombilov, “MiG: Mikoian nachal, Pogosian konchit?”, *FORUM.msk*, 21 October 2011.

¹⁰² Ivan Safranov and Maria Cherkasova, “Alekseiu Fedorovu ne khvatilo polnomochiy”, *Kommersant-Daily*, 1 August 2012.

¹⁰³ Aleksei Bezborodov, “Kuda katitsia rossiiskoe sudostroenie?”, *Ekspert vooruzhenii*, No.6, November–December 2011, pp. 70–74.

¹⁰⁴ Aleksandr Mozgovoy, “Bolezny rosta i kurs na Tsusimu”, *Newzavisimoe Voennoe Obozrenie*, 14 June 2013.

There are, however, also more positive evaluations. The missile producing holding *Takticheskoe raketnoe vooruzhenie*, has been presented as “one of the few examples of a successful holding creation”, largely because it was created around an initially undisputed leader firm, thus avoiding the kind of bickering described in the MiG vs. Sukhoi vs. Irkut cases.¹⁰⁵

Olga Zaitseva, Irik Imamutdinov and Alkesei Khazbiev present another positive evaluation of a holding creation. They assert that the creation of a holding had a constructive effect in helicopter production. From 2007 to 2012 the production of helicopters in Russia rose 2.5 times, from 110 per year to 260 per year. In addition, aggregated profits in the helicopter industry rose almost 30 times in the same period.¹⁰⁶ These are impressive numbers, and the mentioned authors attribute them at least partly to the creation of a helicopter holding. However, as stated previously, the helicopter industry did relatively well even before the creation of the holding. It experienced a very sharp rise in the domestic defence order. Just because of the latter, helicopter production and profit rates would have grown significantly even without the holding creation. Thus, while the creation of a holding in the helicopter branch might have been one contributing factors to the increased performance in that branch, how much it actually meant is difficult to say. It should also be mentioned that not all holdings have been created by orders from above, there have also been occasional initiatives from below in the same direction. The aircraft producer *Irkut* did for example initiate such a development when it purchased the less successful aircraft producer *Iakovlev* in 2004.¹⁰⁷

To maintain competition in the production of military goods is a global problem, especially between producers within the same country.¹⁰⁸ It can be argued that to maintain competition between domestic arms producers, one would need a level of defence outlays few countries today can afford. A study of the Russian OPK from United Financial Group and Deutsche Bank in 2005 concluded that because the Russian GDP is only one twentieth of the US GDP, it would for example “not be appropriate” for Russia to maintain two competing companies in military aircraft production such as the USA is doing with Lockheed-Martin and Boeing.¹⁰⁹ In the initial phases of the “holdingization” process, there were plans to combine the desire for larger units with continued domestic competition. One idea was to create two combined aircraft and helicopter companies, one consisting of the aircraft producers *MiG* and *Tupolev* and the helicopter producer *Kamov*, and the other consisting of the aircraft producers *Sukhoi* and *Iliushin* and the helicopter producer *Mil*. These plans, however, were rejected again mostly due to cost evaluations.¹¹⁰

¹⁰⁵ “GNPTs – Zvezda-Strela”, *Periskop-2*, 4 June 2012, at

<http://periscope2.ru/p2library.php?view=digest&subview=simple&data=04062012>.

¹⁰⁶ Olga Zaitseva, Irik Imamutdinov and Aleksei Khazbiev, “K vzletu ne gotovy”, *Ekspert*, 20 February 2012.

¹⁰⁷ See Ruslan Pukhov, “OAK: itogi pervogo goda”, *Profil*, 3 March 2008.

¹⁰⁸ See for example Jocelyn Mawdsley, *The European Union and Defence Industrial Policy*, (2003) BICC Paper 31, p. 18 at http://www.bicc.de/uploads/tx_bicctools/paper31.pdf.

¹⁰⁹ “SPECIAL REPORT – Russian defence industry rises again”, *Jane’s Defence Industry*, 1 February 2005.

¹¹⁰ Konstantin Bogdanov, “OAK: Perestroika na vzlete”, *Voенно-promyshlennii kurer*, 15 June 2011, and Yakov Poppe and Iana Galukhina, *Rossiiskii krupnii biznes*, op.cit., p. 179.

Whether the merger of previously independent companies into large holdings will have a positive or negative effect on the overall performance of the Russian OPK is still too early to conclude. Many indications so far are not very encouraging, but that might be because the new structures have not yet had time to start functioning properly. To measure the effects of holding creation is further complicated by the fact that the holdings, in contrast to the individual companies that make up the holdings, do not have to produce financial reports on their activities.¹¹¹ In terms of principal-agent relations, however, it seems clear that the removal of competition inherent in the holding model has deprived the principal of one means whereby he was earlier able to create incentives for better performance by the agents. Thus, there is a need to substitute this loss of influence with something else. That leads to the final aspect of the competitive incentive discussed here, *exposure to foreign competition*.

The mechanism for promoting inventiveness and efficiency in the OPK is similar here to domestic competition. Shielding from foreign competition will remove important incentives, but to allow it may finally drive domestic producers to bankruptcy, loss of domestic production capacity and consequently a politically uncomfortable dependence on foreign producers. Thus, governments that allow foreign competition must be ready to either accept that their armed forces may come to rely entirely on foreign products in certain sectors, or they must put regulations in place that secure some of the advantages of competition while at the same time prevent domestic producers from extinction.

From Soviet times until about 2007–2008 self-sufficiency in arms was a Russian canon. While there were a few cases of arms import even in Soviet times, for example jet engines from Rolls Royce and Derwent in the late 1940s, nobody seriously questioned the principle of self-sufficiency. The opening up for more significant arms import, mainly from the West, in the latter half of the 2000s must therefore be seen as a Russian political and strategic watershed. By doing this, the MOD as the principal wanted to increase its impact on the performance of the OPK as the agent in at least two ways.

First, the MOD simply wanted to take away the comfort the OPK so far had enjoyed in knowing that they would have to compete with Western technology only in the export markets.¹¹² Head of the air mobile VDV (*Vozdushno-Desiantnye Voiska*) forces and one of the most influential officers in the Russian military today, Vladimir Shamanov, gloated in May 2010 that “last year, when we told the industrialists we would seek alternative producers abroad, they started to tremble”.¹¹³ Predictably, such language created resentment in the OPK. President of the League for support of the arms industry, Aleksandr Brindikov, complained in January 2012 that “in

¹¹¹ Michael Stocker, *The Russian Defense Industrial Base – A Critical Assessment*, Centre for Operational Research and Analysis, Canada, 2012, p. 11.

¹¹² Interview with military observer for the newspaper *Kommersant*, Ivan Safronov, Moscow, September 2011.

¹¹³ Dmitrii Litovkin, “Armia zaputalas v tekhnike”, *Izvestia*, 27 May 2010.

Russia the decision making process is the following: some high officer has been abroad, sat behind the wheel in some automobile that he liked, and suddenly we have to buy it".¹¹⁴

Second, the MOD hoped import could work as a shortcut to technological progress for the parts of the OPK that especially lagged behind. Instead of finding new solutions through time demanding domestic R&D, the plan was to take advantage of the R&D already conducted by others. According to Deputy Prime Minister with responsibility of the OPK in the government, Dmitrii Rogozin "we need to import, not finished products but technologies and their carriers, i.e. people, ideas, and modern production facilities".¹¹⁵ Here, however, Russia and the foreign producers obviously have very different interests. The foreign producers want to sell as many finished products with as little technology transfer as possible, whereas Russia wants the opposite. These were among the most controversial issues in the negotiations with France for the purchase of the Mistral amphibious assault ships. The situation was further complicated by a division on the Russian side. The negotiations were led by the MOD, and the OPK complained that the MOD because of incompetence or laziness had achieved far too little in terms of technology transfer.¹¹⁶

Technology transfer can alternatively of course also take place through the much more difficult and unreliable process of purchase and copying. China has done this to significant effect, especially with regard to their arms import from Russia.¹¹⁷ Such solutions are, however, borderline legal, and might have a negative effect on Russia's relations with foreign defence firms.

Finally, technology transfer might also take place through the joint development of new technology with foreign producers. This is of course greatly favoured in Russia, and there are several projects both planned and in operation. The probably most important of these is the joint development of the T-50 fifth generation fighter with India. The extent of such cooperation is and will, however, be limited by restrictions on foreign ownership in Russian defence companies. There is no outright prohibition against such ownership, but foreign companies will have to ask permission from the Russian government before acquiring ownership shares both in defence companies themselves and in civilian companies that are significant suppliers to the defence companies. Regulation to restrain or prevent foreign ownership in the OPK was strengthened after Siemens tried to purchase 73.5% of the shares in the steam turbine producer *Silovye Mashiny* in April 2005.¹¹⁸ It also seems that Russian oligarchs may want to keep foreigners out of

¹¹⁴ Interview with the president of the League for support of the arms industry, Aleksandr Brindikov, in *Voенно- promyshlennyi kurer*, 11 January 2012.

¹¹⁵ Dmitrii Rogozin, "U otechestvennogo OPK est budushchee", *Izvestia*, 17 November 2011.

¹¹⁶ See for example interview with Aleksandr Brindikov, op.cit.

¹¹⁷ See Viktor Miasnikov, "Russkie sushki po-kitaiskii", *Nezavisimaia Gazeta*, 22 April 2008, Andrei Fedorov, "Vorovstvo kak iskusstvo", *Lenta.ru*, 11 March 2009 and Vladimir Shcherbakov, "Obeshchat – ne znachit zhenitsia", *Nezavisimoe voennoe obozrenie*, 3 December 2010.

¹¹⁸ Vitalii Shlykov, "Globalizatsia voennoi promyshlennosti – imperativ XXI veka", *Otechestvennye zapiski*, No.5, 2005, at <http://www.strana-oz.ru/2005/5/globalizaciya-voennoy-promyshlennosti----imperativ-xxi-veka>.

this segment of the economy. In January 2013 the oligarch Oleg Deripaska, owner of among other things the military vehicle producer *Arzamas*, said “there is no place for foreign investors in the Russian defence industry”.¹¹⁹

If arms import had been reserved strictly for the branches where there is broad agreement on the existence of a technology lag, it would probably have been easier for the OPK to swallow. However, in February 2012 the MOD web site also advertised a new international tender for the purchase of military helicopters. Helicopter production is, as previously stated, generally considered one of the best branches of the Russian OPK. Thus, the MOD seemed to take the import policy a significant step further with this announcement. Experts called it the first instance of “direct competition” with domestic producers.¹²⁰ It remains to be seen whether direct competition will become a tendency, but it is clear that this development alienated the OPK even further from the MOD.

All in all, the Centre for Analysis of Strategy and Technology in Moscow has calculated that Russia according to current plans will spend around 10 billion euro on arms import in the 2010–2016 period.¹²¹ That is app. 400 billion roubles, or about 2.5% of the 2011–2020 armaments program. However, new contracts may of course also be signed both for the period up to 2016 and for the period after. Thus, the share of armament money that go abroad may increase beyond the 2.5%.

Whether the scare of foreign rivalry will have a significantly positive effect is too early to say. Still, there are already a couple of examples that suggest the competition motive may be having some effect. The first is the rapid development of the new armoured personnel carrier *Bumerang*. The army refused to purchase the domestically produced BTR-90 *Rostok* as a replacement for the currently dominant BTR-80 because they saw no major improvements or innovations.¹²² Some time after that statement, the developer, the *Voенно-Промышленнаиа Компания*, suddenly promised to have the *Bumerang* ready in 2015. This was two years ahead of the original plan, and they argued that it would be “similar to Western models”. Observers saw fear of foreign competition from for example the Finnish *Patria* or the Italian *Centauro* as a major reason for the new attitude.¹²³ Similarly, the military observer Ivan Konovalov also claims a comparable effect in the development of Russian UAVs. According to him, before the purchase of Israeli UAVs, Russian companies “without thinking threw away billions of roubles on projects they knew were worthless”, but that is now about to change.¹²⁴

The above examples suggest that the logic of competition may be working in some cases, but the industry also has other ways of responding. The above mentioned MOD February 2012

¹¹⁹ Pavel Felgengauer, “Russia Is Isolated Politically and Technologically as Relations with West Worsen”, *Eurasia Daily Monitor*, 24 January 2013.

¹²⁰ Aleksei Nikolskii, “6 milliardov konkurentu”, *Vedomosti*, 22 February 2012.

¹²¹ Aleksei Nikolskii, “Mistral – tolko nachalo”, *Vedomosti*, 15 June 2010.

¹²² Egor Sozaev-Gurev, “Bumerang soberut na dva goda ranshe”, *Izvestia*, 12 October 2012.

¹²³ *Ibid.*

¹²⁴ Aleksei Nikolskii, “Te zhe kontrakty v novy ruki”, *Vedomosti*, 27 December 2012.

international tender for helicopters was cancelled already in late spring of the same year, just before a contract with Eurocopter was supposed to be signed. While the official explanation was that the AS 350 and AS 355 helicopters after all did not quite fit MOD requirements, a more likely explanation seems to be that the deal was halted after successful lobbying by the helicopter holding *Vertolety Rossii* (Russian Helicopters).¹²⁵

4.2 Direct support

Principals may also improve their agents' performance through direct support. We here mean resources and advice that are not directly connected to specific orders, but provided by the principal to the agent with the intention of generally aiding the agent's performance.

A discussion of how government support affects the performance of the Russian arms industry could potentially have taken as its point of departure the different government programs for arms industry improvement. However, these are so numerous, overlapping, and suffering from poor implementation that they are not suited for this purpose. In fact, it might be that arms production is the sector of the Russian economy that has received the highest number of conceptual development programs.¹²⁶ For example, the "Foundations of Government Policy towards the OPK" was adopted by the president in March 2010, and then already in December the same year another program called "Development of the Russian OPK to the Year 2020" had been adopted.

Still, the latter program may possibly be taken more seriously than many of its predecessors. First of all, the amounts of money promised are much higher than in previous programs. All in all 3,000 billion roubles are set aside for the OPK to the year 2020, primarily to be used to upgrade and modernize production equipment.¹²⁷ That sum is equal to about 16% of the State armaments program 2011–2020. In general, the government became significantly more active in supporting the OPK financially in the late 2000s, partly as a result of the world financial crisis. In 2009 the arms industry received about 48 billion roubles in direct financial support, and in 2010 a sum equivalent to 4% of the Russian GDP was spend subsidizing public enterprises.¹²⁸ Three of the largest recipients of this money were the three defence giants *Rostekh*, OSK and OAK.¹²⁹ Further, in 2011 the official financial responsibility ratio for modernizing efforts at the defence enterprises was changed. Earlier companies had been expected to finance 80% of any particular modernization effort themselves. Now, after the change, the government was ready to finance 40% instead of the previous 20% of the costs.¹³⁰

While targeted programs, such as the "Development of the Russian OPK to the Year 2020" or the "Development of the Shipbuilding Industry until 2030", launched in 2012, are likely to result in

¹²⁵ Aleksei Nikolskii, "Oboronservis – What Awaits Serdiukov's Legacy", *Moscow Defence Brief*, No.2, 2012, p. 10.

¹²⁶ VPK, general trends, 2000.

¹²⁷ Dmitrii Rogozin, "U otechestvennogo OPK est budushchee".

¹²⁸ Susanne Oxenstierna, "Rysslands militärreform: Leder ökade försvarsutgifter till modernare beväpning?", *Kungliga Krigsvetenskapsakademiens Handlingar och Tidsskrift*, no. 3, 2011, p. 146.

¹²⁹ "Change planned for state companies", *BOFIT Weekly*, no. 1, 5 January 2012.

¹³⁰ Andrei Veselov and Viktor Diatlikovich, "Gosoboronskandal...", op.cit.

some improvement in OPK performance, the overall effect is still very uncertain. Again, some of the money is likely to get lost in corruption and waste. In addition, such support packages may have the negative effect of removing incentives for change from the defence companies themselves. According to one source, increases in government support have often just made the arms industry directors even more convinced that the responsibility for renewal in their sector is with the government and not with themselves.¹³¹ One group of Russian experts, on behalf of the government, conducted a study of the effects of direct subsidies to state enterprises in December 2011. Their conclusion was that the subsidies often lowered the incentive for companies to become more efficient.¹³²

One reason why direct support packages have not been very efficient is that they often seem to have been provided on a relatively unconditional basis. This, however, may change. In 2011 the head of armaments in the MOD, General Vladimir Popovkin, threatened that only enterprises that showed real initiative to change would receive extra financial support in the future.¹³³ Then again, this question is probably not only for the MOD to decide. There needs to be a political agreement at the government level before such a policy can be implemented. The government, in contrast to the MOD, cannot only think about enterprise efficiency and willingness to change when deciding on who should get support. They also have to take into consideration the local social and political consequences of not supporting particular enterprises in need.

In addition to direct financial support, the Russian government has also tried to support the OPK in other ways. For example, in December 2011 a new law allowed shared ownership of military patents between the state and the producer. Earlier these had automatically become state property.¹³⁴ More enterprise control over the results of their R&D could function as a stimulus to more active search for new technologies.

Another government endeavour has been to initiate training programs for new cadres to the OPK. These have so far not yielded significant results, but training of cadres is also an area where several OPK enterprises have shown considerable initiative of their own.¹³⁵ For example, the military electronics holding *Russiiskaia Elektronika* has entered an agreement with the National Research Institute in Moscow. This institute is the main establishment for education in electronics in Russia. The two are jointly going to establish a new College of electronics. In this college 60 students each year will get financial assistance from *Russiiskaia Elektronika* in return for working obligations for this company after graduation.¹³⁶ Similarly, the aircraft producer Sukhoi and the artillery producer *Tulmashzavod* give stipends to students at local universities in return for them coming to work at these enterprises after graduation.¹³⁷ Some companies have even started their

¹³¹ VPK, output, 2009.

¹³² "Change planned for state companies", *BOFIT Weekly*, op.cit.

¹³³ VPK, general trends, 2000.

¹³⁴ Aleksandr Kondratiev, "V Rossii otmenili gosmonopolii na rezultaty razrabotok po oborone i bezopasnosti", *Marker*, 13 December 2011.

¹³⁵ 2012-04-00, The cadre, p.15.

¹³⁶ Ibid.

¹³⁷ Ibid.

own schools. The most famous is the engineering school started by the producer of air defence systems *Almaz-Antei*. As a result of serious efforts in this direction over many years, the average age for an engineer at *Almaz-Antei* was 47 years in 2010, one of the absolute lowest in the OPK.¹³⁸ Similar initiatives have also been taken by others. The producer of aircraft engines *Saturn*, decided to cut its staff by 50%, from 3,000 to 1,500, and make half of the remaining 1,500 undergo a complex program of re-education.¹³⁹ OPK companies currently spend about 3 billion roubles a year from their own earnings on education of their personnel.¹⁴⁰

The government will need to support the OPK beyond the planned increases in the defence order if the industry is to recover. In addition, this needs to be implemented in ways that create incentives for industry leaders to turn their enterprises around rather than to lean back in the expectation that the government now has taken over responsibility. A working formula for how to achieve this has not yet been found. It is not likely to be found unless some politically challenging steps in terms of fight against corruption and programs for handling local dissatisfaction as a result of enterprise closures are taken.

4.3 The system of procurement

The way the procurement process is organized is likely to have an effect on both the immediate and the long time performance of the arms industry. Procurement is therefore an important part of state industrial policy. The government should strive to construct a system of arms procurement that gives the agent the maximum of incentives to produce in accordance with the preferences of the principal.

In Soviet times the procurement system was heavily dominated by the supplier, i.e. the OPK, and the military basically had to take what was given to them.¹⁴¹ Since then the MOD has become the budget holder and thus had its role considerably strengthened, especially after Serdiukov became Minister of Defence in 2007. Currently, arms procurement takes place in three stages. First, a ten year Main Armaments Program (*Glavnaia Programa Vooruzhenii, GPV*) is drawn up by the MOD. However, much of the actual development of the program takes place at the 46th Central Research Institute of the MoD in Moscow. This institute is tasked with translating the operational needs of the armed forces into concrete acquisition plans.¹⁴² Second, the GPV is broken down into yearly state defence orders (*Gosoboronzakaz, GOZ*). This is done by the government's Military-Industrial Commission (*Voenna-Promyshlennaia Komissia, VPK*), with budget limits set by the Ministry of Finance. Finally, contracts are negotiated with the individual suppliers by the above discussed *Rosoboronpostavka*, now under MOD control.

¹³⁸ Ibid.

¹³⁹ Ibid.

¹⁴⁰ Ibid.

¹⁴¹ Julian Cooper, "Military procurement in Russia", in (eds.) Roger N. McDermott, Bertil Nygren and Carolina Vendil Pallin, *The Russian Armed Forces in Transition*, Routledge, 2012, p. 169.

¹⁴² Ibid., p. 171.

Defence economist Keith Hartly has identified three major problems that face procurement agencies: (1) the role of competition, (2) the extension of military outsourcing, and (3) determining prices and profits of non-competitive contracts.¹⁴³ The first of these problems was discussed in Chapter 4.1. The second problem, meaning essentially “private firms bidding for work previously undertaken ‘in-house’ by the armed forces”, is only in its initial phases in Russia and it is therefore too early to conclude on the effects. Thus, the main focus here will be on the issue of pricing and determination of profitability in non-competitive contracts. This kind of contracts in 2010 accounted for 58% of the total number of Russian armament contracts, up from just 26% in 2006.¹⁴⁴

Conceding that the issue of determining prices and profits of non-competitive contracts is an under-researched field in defence economics, Hartley nevertheless states that “theory suggests that the prices for non-competitive contracts should be based on estimated costs assuming efficient behaviour and a government-determined profit margin reflecting normal profits”.¹⁴⁵ This statement immediately raises a number of issues. First, who does the cost estimation, the MOD as the principal or the OPK as the actor or some kind of combination? Second, it is not likely that procurement agents as principals will just “assume efficiency”, as least not in Russia and probably not many other places either. Third, what are normal profits?

Cost estimation was in Soviet times as it is today formally the responsibility of the MOD. However, there was and is no way of doing this other than to rely on data provided by the arms producers themselves. The OPK therefore had and has considerable information asymmetry to its advantage. In the Soviet period, as argued by Mark Harrison, a “cost-plus” system developed where “whatever costs were incurred were covered *ex post* by fixing prices correspondingly”.¹⁴⁶ This was the system in operation more or less until the present day. Contracts were signed using a preliminary (*orientirovochnaia*) price based on agent cost calculations, and then final payments were made according to actual costs, again based on agent calculations.¹⁴⁷

In June 2011, however, the MOD introduced significant changes to the system. First, they demanded from industry a breakdown of prices to a level of detail far greater than before. Second, they started to demand contract prices for three to ten years instead of the usual one to two years. Earlier, the producers were allowed to increase the price by a certain percentage each year, usually following the general inflation in the country.¹⁴⁸

¹⁴³ Keith Hartley, “The Arms Industry, Procurement and Industrial Policies”, in (eds.) Todd Sandler and Keith Hartley, (2007) *Handbook to Defense Economics*, Vol. 2, Elsevier, p. 1168.

¹⁴⁴ Oleg Falichev: “Korrupsionnyj potentsial goszakaza”, *Voенно-promyshlennyi kurer*, 21 March 2012.

¹⁴⁵ Keith Hartley, “The Arms Industry...”, op.cit., p. 1170.

¹⁴⁶ Mark Harrison and Nikolai Simonov, “Voenpriemka: prices, costs, and quality assurance in defense industry” in (eds.) Mark Harrison and John Barber, (2000) *The Soviet defense Industry Complex from Stalin to Khrushchev*, Basingstoke and London, Macmillan Press, p. 13.

¹⁴⁷ See Andrei Veselov and Viktor Diatlikovich, “Gosoboronskandal”, *Russkii reporter*, 22 September 2011.

¹⁴⁸ Ibid.

Because there is no way the MOD can get independent information on prices, and because the level of trust between the MOD and the OPK, as discussed in Chapter 3.2, is so low, there are in reality only two ways by which the ministry can demand reductions in prices. Either, they can state that they do not believe in the information provided by the producers, or, they can claim that even if that information should be correct they just do not have the money to pay the asked for price. Iurii Solomonov, head constructor at the Moscow Institute of Heat Technology, gave an illustration of the latter way when he in an interview with the newspaper *Kommersant* in November 2011 conveyed his personal experience with what he described as “the cave stadium” of price negotiations. According to Solomonov, the negotiations between the OPK and the MOD usually go like this:

- MOD: “let us reduce the price by 10%”
- OPK enterprise: “why the figure 10%?”
- MOD: “that is all we can afford”¹⁴⁹

The determination of prices in non-competitive contracts is further complicated by the fact that the agent in the present case has to operate in a competitive environment with regard to the sub-contractors. This is different from Soviet times, when the arms producers could rely on relatively stable prices for the component parts they had to buy. The OPK therefore argues that this major change from the Soviet days, which significantly increases the uncertainty of final production costs, necessarily has to be reflected in the pricing. Long terms contracts with fixed prices are even more difficult to sign than before, and if they are to be signed, the prices agreed upon need to reflect the possibility of inflation in the prices from sub-contractors.¹⁵⁰ The problem is further exacerbated by what some observers call “the metals oligopoly”. The number of metal producers is low, and they cooperate between themselves on pricing policy. The OPK managers report this fact as one of the main reasons for the rise in prices on their own products. This may of course be a convenient way to explain away their own inefficiency, but it is also probably true to a considerable extent.¹⁵¹

A final complicating circumstance for price negotiation is the 2013 initiated efforts by the MoD to change to “life cycle” contracts for new weapons systems. This will further significantly increase the uncertainty for the manufacturers in their calculations of production costs and profit rates, and might lead them to seek even higher prices than they otherwise would have done. As part of this new initiative, the repair factories that until now have remained independent enterprises under the MoD, will be integrated into the OPK companies.¹⁵²

The MOD and the Russian military have repeatedly stated that they do not trust the price calculations of the OPK. They never did during the Soviet period, and they do not today.

¹⁴⁹ Aleksandr Stukalin interviewing Iurii Solomonov in *Kommersant On-Line*, 7 June 2011.

¹⁵⁰ See Aleksandr Khranchikhin, “Gosoboronnye voiny mestnogo znachenia”, *Nezavisimoe Voennoe Obozrenie*, 28 October 2011.

¹⁵¹ Interview with OPK observer and journalist Ilja Kramnik, Moscow, September 2011.

¹⁵² Denis Riabokonov, “Divizia ne revizia”, op.cit.

The main reason has and continues to be that the OPK, completely in correspondence with how principal-agent theory expects agents to behave, tries to maintain as much secrecy as it can on this issue. As an illustration of the military's distrust of the OPK, one MOD source complained in September 2011 that "they say they have no money, but on the opposite side of the street to the main entrance to MiG there is an elite restaurant called Parizen. There the MiG management spends the equivalent of a month's salary for a regular worker just for a single dinner".¹⁵³

Arms producer profit rates on non-competitive contracts, and the systems by which they are determined, naturally vary internationally. In the UK there is a Government Profit Formula. In 2007 this formula dictated a 5.67% profit rate on costs of production plus additional adjustments for contract risk.¹⁵⁴ A 2011 study by the Defence-Industrial Initiatives Group at the Centre for Strategic and International Studies found that US defence industry profits had risen from below 4% profit in the early 1990s to close to 8% in 2010.¹⁵⁵ Russian OPK profit rates according to one source tend to be around 6 to 7%.¹⁵⁶ This means they have been relatively similar to the UK and US margins. However, President Putin has stated that the domestic profit rate should be around 15%, and former Defence Minister Serdiukov even said that the MOD could accept up to 20–25% profit rate for priority equipment if the pricing calculations became transparent and convincing. Were these promises to be implemented, Russian arms producer profit rates would become among the highest in the world, but so far there is little prospect of this happening. It is also unclear to what extent these statements were based on any serious calculations, and also exactly what they meant by profit in this regard.¹⁵⁷

At the end of 2012 a new law on the state defence order was adopted that introduced a new system of three kinds of prices: fixed prices, prices based on the system of a return of actual production costs, and tentative prices.¹⁵⁸ While this new system, as claimed by the Russian authorities themselves, may make the process of pricing more flexible, it is hard to see how it can ameliorate the main problem. As long as production cost calculations instead of competition constitute the main principle for pricing, and as long as the level of trust between producer and customer is as low as it is in Russia today, the pricing conflicts are likely to continue.

4.4 The system of research and development

Because a technological edge can mean the difference between victory and defeat in combat, R&D is of exceptional importance in the production of arms. In 2010 the R&D sector of the

¹⁵³ Andrei Veselov and Viktor Diatlikovich, "Gosoboronskandal", op.cit.

¹⁵⁴ Keith Hartley, "The Economics of the UK Defence Industrial Strategy", *Security Challenges*, Vol.3, No.2, June 2007, p. 27.

¹⁵⁵ Roy Levy, *Defense Industry Access to Capital Markets*, CSIS Report, April 2011, at http://csis.org/files/publication/110517_DIIG_Defense_Industry_Access_to_Capital_Markets.pdf, p. 4.

¹⁵⁶ Vyacheslav Baskakov, Aleksandr Fomin and Aleksandr Shost, "Na ruchnom upravlenii", *Voенно-Промышленныи Kurer*, 15 May 2013.

¹⁵⁷ Andrei Susarov, "Vziatie pribyli", *Moskovskie novosti*, 14 May 2012, and Aleksei Nikolskii, "Davai Oruzhie", *Vedomosti*, 12 May 2011, and Susanna Oxenstierna and Fredrik Westerlund, op.cit., p. 13.

¹⁵⁸ Interview with Deputy Head of the Military-Industrial Commission, Oleg Bochkarev, on the radio station *Ekho Moskvy*, 18 March 2013.

Russian OPK consisted of 557 different design bureaus, construction bureaus and other types of research organizations.¹⁵⁹ Of these 54% were government owned or where the government had a controlling share. In another 4% the government had negative control, and in 42% the government had less than 25% of the shares.¹⁶⁰ As a part of Russian defence expenditure, R&D used to be steadily around 8–9%, but, as shown in Figure 3.1, based on data reported by Russia to the UN, it declined relatively sharply after 2008 before again rising slightly. In comparison, the USA used 10.5% of its total military expenditure in 2011 on R&D.¹⁶¹

However, since Russian defence expenditure as such has been rising sharply, the lower share for R&D does not mean that total expenditure on R&D has been shrinking. In fact, this figure has been slowly rising at least since 2005, and is planned to rise further.¹⁶² In addition, the OPK companies themselves also spend part of their earnings on R&D. Thus, the actual development of total spending on military R&D is in fact very difficult to identify.

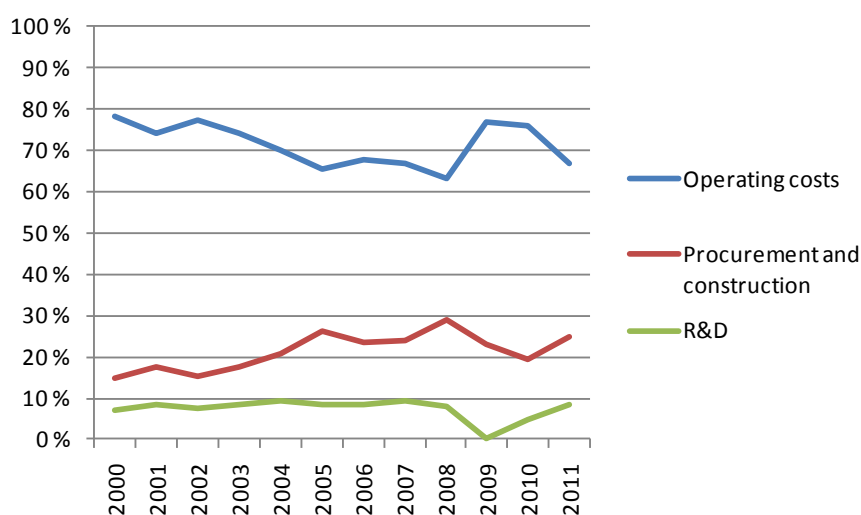


Figure 3.1 Russian expenditure on R&D compared to expenditure on operating costs and investments and facilities in the years 2000–2011. Source: UN data on defence expenditures.

In 2004, when R&D was still given a relatively high priority, there were about 3,500 running R&D projects within the OPK. At that time about 100 were finished each year and 200–300 new ones were started.¹⁶³ This was the culmination of a trend that started in the 1990s, when there was a rapidly increasing number of R&D projects, and which took longer and longer to finish. The trend was an indication both of the decreasing efficiency in Russian military R&D work, and also of the spread of corruption within this sphere. Due to the exceptional degree of principal-agent

¹⁵⁹ VPK, scientific potential, table 6.1.

¹⁶⁰ VPK, scientific potential, table 6.2.

¹⁶¹ *SIPRI Yearbook 2012*, online at <http://www.sipriyearbook.org/view/9780199650583/sipri-9780199650583.xml>.

¹⁶² Una Hakvåg, Kjetil Hove og Cecilie Sendstad, *Skremmende tall: Realismen i det russiske våpenprogrammet GPV-2020*, FFI-rapport 2012/00356, pp. 32–33.

¹⁶³ VPK, scientific potential, 2004.

information asymmetry connected with R&D, corruption is often said to be even more problematic than in other areas of OPK. According to inside sources in Russian defence procurement, kick-backs can in some instances be as high as 80%. In these cases, those who actually conduct the R&D may get as little as 2–3% of the assigned money.¹⁶⁴ One Russian observer estimates that corruption schemes often can account for as much as 20–25% of the price of a certain weapons system.¹⁶⁵ This is of course a non-verifiable estimate, but if it is anywhere near the truth it is not difficult to understand the OPK unwillingness to grant more transparency.

R&D cannot take place without a minimum of willingness to take risks by sinking costs in projects where the outcome is unknown. Often, governments have to purchase R&D as a product separate from the final product. Governments would generally not do this with most civilian goods that it needs. However, because defence firms generally have only one or a few customers (governments), they are in need of especially strong guarantees for demand before they sink costs into R&D. Government contracts for R&D prior to any decision for the purchase of final products is one way of easing this risk for the defence firms.¹⁶⁶ Despite international recognition of this fact, its acceptance in the Russian political leadership is sometimes questionable. Said former Minister of Defence, Sergei Ivanov, "in market conditions R&D should be the headache of the enterprises themselves. If you want your government to buy your products, please invest in R&D from your own profits and stop placing this burden on the government".¹⁶⁷

Russian willingness to take risks by sinking costs in R&D projects became much lower in the late 2000s. By that time it seems the MOD, probably for the reasons just described above, had lost patience. It looks like the MOD at the time decided that rather than lose more money on R&D projects that never finished, and where much of the money was stolen, they preferred to purchase weapons and platforms that were not at the forefront internationally, but that could be produced now. This, however, was naturally never officially admitted. This development in summer 2010 led the Deputy Head of the Military-Industrial Commission, Vladislav Vladykin, to complain that "the MOD says it needs to concentrate its resources on the purchase of arms. Thus, who is going to finance R&D is totally up in the air".¹⁶⁸

In addition to corruption and recruitment, the state of R&D might be the most problematic sphere in the Russian OPK today, and simultaneously also one of the most important for the future of the industry. The sorry state of affairs in military R&D is of course partly a result of the more general problems with innovation and technology development in Russia. In 1990, Russia's share of international trade in high technology products was 6%, in 2008 it was 0.2% or 30 times less.¹⁶⁹

¹⁶⁴ Viktor Miasnikov, "Nenasytnye niokr", *Nezavisimoe voennoe obozrenie*, 27 February 2009.

¹⁶⁵ Interview with Ilja Kramnik, Moscow, September 2011, op.cit.

¹⁶⁶ For more on this see William P. Rogerson, "Incentive models of the defense procurement process", op.cit, pp. 314–315.

¹⁶⁷ VPK, scientific potential, 2004.

¹⁶⁸ Oleg Vladykin, "Dengi oboronke ne pomogut", op.cit.

¹⁶⁹ Natalia Kalinina and Vadim Koziulin, "Glinianye nogi rossiiskogo OPK", *Indeks Bezopasnosti*, No.3-4, 2009, p. 49.

When the main structures of the Soviet OPK were established in the 1930s, the authorities decided to organize production for military purposes into a three layer system of scientific research institutes (NIIs), construction bureaus (KBs) and production factories. These were all independent agencies. The first would come up with new ideas, the second would transform these ideas into prototypes, and the third would produce the final products. This was in contrast to most Western countries where all these stages together took place either in government agencies or in commercial corporations.

The Soviet arrangement worked reasonably well in a system with very few funding constraints. However, when the defence enterprises in the post-Soviet period had to work under at least partly market conditions, the organizational separation of R&D from production started to create problems. When after 1991 export for many enterprises became more or less the only source of revenue, the production factories were in a much better position to profit than the NIIs and KBs. Foreign customers would generally only be willing to pay for final products, not for R&D projects. Thus, in the absence of state orders, the NIIs and KBs became totally dependent on the goodwill of the production factories for funding. The former would receive orders and funding only if a contract signed by the production factories included some demands for further technological improvement, or if the production factory was perceptive enough to realise that continuous R&D would be important for his own success in the longer run. In the short term and quick money mood of post-Soviet Russia, however, that was and still is very often not the case. In contrast to Soviet times therefore, NIIs and KBs have to a significant extent become competitors rather than partners with the production factories for government orders.

In the production of aircraft engines, for example, not only has very little money gone to the relevant NIIs and KBs, but final producers such as *Saliut* and the *Chernyshev* mechanical engineering company have also created substitute KBs within their own factory walls in order to lower even more their reliance on the original R&D structures. General Director Iurii Eliseev of *Saliut* stated in 2002 that he planned to expand the in-house R&D capacity from between 200 and 300 researchers and engineers to about 3,000.¹⁷⁰ According to one source, the main result of this trend is that much R&D now has been reduced to minor improvements on existing models. The hastily created in-house KBs do not have the qualifications and experience for designing new technical solutions and models.¹⁷¹

In another example, in February 2011, Igor Ashurbeily, the director of the air defence producer *Almaz-Antei* KB, had to go. The main reason seems to have been a failed attempt to organizationally integrate the R&D and final production capacities for a major part of air defence production. Both designers and producers were in principle integrated under the name *Almaz-Antei*, but in this case the R&D agency seems, contrary to the overall trend, to have been the one to harvest the most both from export and from domestic contracts. For this reason, the R&D agency insisted that it should remain a separate economic and legal entity within the overall *Almaz-Antei* concern. This secured the R&D agency a continued control of the cash inflow, but it

¹⁷⁰ VPK, scientific potential, 2002.

¹⁷¹ Vladimir Ivanov, "Gde vziat dengi na NIOKR?", *Nezavisimoe voennoe obozrenie*, 21 March 2008.

made the production factory very angry. In the end Ashurbeily was forced to go, but it is still not clear whether a lasting understanding has been reached between the R&D agency and the production factory.¹⁷²

It is of course not possible to give an exact quantitative measure of the overall state of affairs in Russian military R&D. But, most independent experts, both Russian and foreign, and also many in the Russian military and political establishment, frequently deplore the situation. For many the 2008 war with Georgia was the final proof of the technological backwardness of Russian arms. An often stated lesson from this war is that it was won at too high a cost in terms of dead and wounded because of the technologically outdated state of the military hardware. For example, according to Russian experts, in 2015 only about 10–15% of the numerous types of Russian munitions, ranging from air delivered missiles to simple bullets, will satisfy international technical standards.¹⁷³

Nevertheless, the overall picture is not totally bleak. In certain spheres, such as for example air defence, cruise missiles and fighter aircraft and a few others, Russia is still among the world leaders. These systems continue to attract foreign customers, and they are often praised among international experts.¹⁷⁴ One reason for this is that significant technological progress was made at the end of the Soviet period, and that several of these designs came into production in the 1990s and 2000s. This Soviet “technological stockpile”, however, is now largely exhausted.

Another reason for continued technological development in certain areas has been exposure to competition on foreign markets, and in some cases also technological progress as a result of international cooperation. The joint Indian-Russian development of the Brahmos cruise missile is probably the best example here. The missile is internationally seen as technologically advanced, and it is a result of genuine technological cooperation between the two countries.¹⁷⁵ Finally, there will always be a few dedicated and entrepreneurial managers and scientists who make progress even under the most adversarial conditions.

In the 2000s there was a gradual shift in the management of OPK enterprises away from leaders with technical and scientific training to leaders with more general managerial backgrounds. In Soviet times there was no way one could enter a leadership position in the OPK without going all the necessary scientific steps. By the summer of 2012, however, the head of the OAK, Mikhail Pogosian, was one of the few real top OPK managers left who had a scientific background. The effects of this shift on OPK performance are contested. Some experts lament the development and

¹⁷² On the Almaz-Antei/Ashurbeily case, see Ivan Konovalov and Elena Kiseleva, “Igor Ashurbeily stal obychnym zritelem kontserna”, *Kommersant*, 7 February 2011.

¹⁷³ Maxim Shepovalenko, “Promyshlennost boepripasovi spetskhimii Rossii”, *Ekspert Vooruzhenii*, No.2, March-April 2012, p. 54.

¹⁷⁴ See for example Malcolm Davis, “Future Airstrikes: Beyond stealth?”, *Jane’s Defence Weekly*, 15 January 2003, Carlo Kopp, “Asia’s New SAMS”, *Australian Aviation*, October–November 2003 and Robert Hewson, “Briefing: Fighter club”, *Jane’s Defence Weekly*, 12 July 2010.

¹⁷⁵ See for example Norman Friedman, “World Naval Developments”, *Naval Institute Proceedings*, 132:1, January 2006.

see it as one reason among many why the OPK is behind technologically, whereas others claim that “managerially” led enterprises tend to show more modernization initiatives than the ones “scientifically” led.¹⁷⁶

The goal of the 2011–2020 State armament program is that 70% of the hardware should be modern by 2020. When asked what the MOD means when it says “modern”, then Deputy Head of the General Staff, General Andrei Tretiak, in May 2010 defined this as “as good or better than the best international equivalents”.¹⁷⁷ The MOD has of course far from abandoned financing R&D, in fact the money set aside for R&D is increasing in real terms, but they have radically cut the number of projects. They are also in general no longer willing to finance projects that last longer than two to three years.¹⁷⁸ In addition, they are now very reluctant to finance fundamental and exploratory studies. A 1998 government decree established that fundamental and exploratory studies should account for 4% of Russian military R&D. By 2009 this figure was down to just 0.4%.¹⁷⁹ It is questionable whether a firm military R&D base is possible to maintain in the long term if fundamental and exploratory studies should remain at such a low level.

However, there may be change underway. In July 2012 the Russian Duma approved a proposal for the creation of the *Fond Perspektivnykh Issledovani* (FPI) – a Russian version of the experimental US Defence Advanced Research Projects Agency (DARPA). This US government research agency is often presented in Russia as a model for how to make a public research organization efficient and successful. Among technologies developed at DARPA is the APRANET, the precursor to the Internet. DARPA’s job is not to develop technological solutions that can be directly used by the US military, but to produce technological breakthroughs that market forces then can take advantage of and turn into products that the military might want to purchase. DARPA has been criticized, however, because it often takes very long before industry picks up their innovations. Thus, they have adjusted the model so that new projects generally should have explicit military backing to be funded. This, however, led to criticism that they were developing away from the original task of experimenting with revolutionary new technologies.¹⁸⁰

Whether a Russian version of DARPA will be successful is anyone’s guess. The idea is supported, neither by the MOD bureaucracy nor by the OPK directorial corpus.¹⁸¹ One possibility could be that the funds that the MOD sets aside for R&D were allocated directly to the industry,

¹⁷⁶ For those who lament the development, see interview with Konstantin Makienko and Olga Bozheva by the radiostation Ekho Moskv, transcript at <http://www.echo.msk.ru/programs/oblozhka-1/888613-echo/>, downloaded 16 August 2012. For the opposite view see, VPK, scientific potential, 2003.

¹⁷⁷ Discussion between Tretiak and an international group of experts, including this publication’s author, Ministry of Defense, Moscow, May 2010.

¹⁷⁸ Viktor Miasnikov, “Nenasytnye niokr”, op.cit.

¹⁷⁹ Vladimir Fortov and Igor Kaliaiev, “Akademikov sniali s peredovoi”, *Rossiiskaia gazeta*, 28 April 2010.

¹⁸⁰ John Paul Parker, “At the Age of 50, it’s Time for DARPA to Rethink its Future”, *National Defense*, September 2009.

¹⁸¹ Viktor Miasnikov, “Modernizatsia OPK ostaietsia nesbytochnoi mechttoi”, *Nezavisimoe voennoe obozrenie*, 1 October 2010.

especially to the holdings, and that these then purchased R&D directly from research and design institutes. Such a model was proposed by the OSK in 2011.¹⁸²

Still, the establishment of FPI suggests that the government and the MOD are not as indifferent to the issue of R&D as many in the industry claim. In addition, the government and the MOD are not the only sources of money for military R&D projects. The defence companies themselves also increasingly allocate funds for such activities.

Finally, foreign countries may also be a source of Russian military R&D. First, foreign governments may finance military R&D in Russia. For the most part, these governments will only want to purchase finished products, but there are exceptions. India funded R&D in connection with their purchase of the Talwar class frigates, and they funded R&D for the KS-172 air to air missile in order to extend the weapons range for their recently purchased SU-30 fighters. Vietnam funded parts of the development of the *Bastion-P* coastal artillery system, and the United Arab Emirates funded R&D for the close range air defence system *Pantsyr* which they later bought.¹⁸³ In addition, even if it was not a case of direct foreign funding of Russian R&D, head of OAK, Mikhail Pogosian, nevertheless admitted in 2013 that he doubted whether the T-50 fifth generation fighter program would have been initiated if the Sukhoi company had not earned so much money from the sale of SU-30s to India.¹⁸⁴ While significant when it happens, foreign investment in Russian military R&D is nevertheless not going to be the development that puts the sector as such back on its tracks. Second, Russia may gain access to military technology developed abroad through espionage. Russia inherited both the traditions and to some extent the institutions for this kind of activity from the Soviet Union. However, as argued by Fredrik Westerlund, there are usually significant problems with transforming such intelligence into workable technological solutions if the technological base of the spying country is too far behind the country spied upon. Technological espionage can therefore only be a supplement to domestic R&D, and to the extent that it is discovered by the other nation it will destroy the opportunities of potentially valuable legal technological cooperation.¹⁸⁵

Another principal-agent problem in military R&D is that even if the willingness to risk money is there, the end result may still not satisfy the principal because of problems of communication in the process of creating technological solutions that actually answer the tactical and operational needs. The principal needs to be able to describe the requirements sufficiently for the agent to clearly understand them. This puts demands both on the principal's willingness and ability to explain and on the agent's willingness and ability to understand. Russian arms industry sources complain that the military seldom give very specific guidelines for what they want new technology to do, and that the designers themselves often have to guess what the military want.

¹⁸² Milana Chelpanova and Igor Pylaev, "Severnaia verf vooruzhaietsia", *RBK-Daily*, 2 September 2011.

¹⁸³ VPK, Scientific potential, p. 2, and Konstantin Makienko, "Rossiisko-indiiskoe voenno-tekhicheskoe sotrudnichestvo: opyt kachestvennogo analiza", *Eksport Vooruzhenii*, November-December 2003, pp. 7–10.

¹⁸⁴ Sergei Denisentsev, "Partnerstvo piatogo pokolenia", *Odnako*, 18 February 2013.

¹⁸⁵ Fredrik Westerlund, *Russian Intelligence Gathering for Domestic R&D – Short Cut or Dead End for Modernization*, FOI Memo, April 2010.

These sources have suggested that the military need to work more on their military theory in order to be able to deduce technical demands.¹⁸⁶ Even representatives of the armed forces themselves may occasionally admit shortcomings in this regard. According to General Sergei Skokov, former Head of the Army Staff, the problems with implementing an automated system of command and control for the ground forces was partly due to the fact that the military were not able to communicate to industry what their needs were. Thus, the systems developed were largely based on what the scientists and engineers though might be the needs of for example a tank commander, and according to Skokov “we cannot really blame the industry for this”.¹⁸⁷

The overall diagnosis is that Russian military R&D is in serious trouble, especially now that the Soviet “technological stockpile” is running out, and that despite significant achievements in certain sectors, comprehensive structural reform will be needed if Russia is to more broadly reduce the technology gap with the most advanced nations. It is also a question whether the Russian economy is of a size that can sustain a military technological base that is strong across the board. There has so far been little or no willingness to make priorities between the different branches of military technology in terms of accepting dependency on foreign producers for certain systems and platforms for the long haul.

5 Mechanisms of enforcement

The Mechanisms of enforcement are most often implemented during the production process or after the results of this process have been measured. However, since especially sanctions have both a retributive and deterrent function, they in the latter case may work similarly to the mechanisms of incentive in terms of being part of the “start conditions” for the next assignment from the principal to the agent.

5.1 Monitoring and control

Principals are sometimes able to establish systems whereby they can monitor and control the actions of the agents during the production phase. While this might discipline the agent to more closely follow the instructions of the principal, and also increase the principal’s ability to correct deviations on the way, it might at the same time also have negative consequences for agent performance. This is especially the case if the principal intervenes and makes suboptimal changes to the agent’s behaviour based on incomplete knowledge; or the monitoring and/or intervening activities of the principal create agent anxiety that makes the latter waste his time; or the signal of distrust that control entails makes the agent want to rebel against or punish the principal; or to the contrary, the agent stops acting autonomously even where he is supposed to because of a general feeling of no longer being responsible.¹⁸⁸ Trust theory, for example, suggests that “excessive control produces reduced effort and shirking, which may induce a spiral of ever-greater control,

¹⁸⁶ Elena Nikishchenko and Igor Lesovskikh, “Armata v reserve”, *Kommersant*, 22 December 2012.

¹⁸⁷ Interview with Sergei Skokov in *Nezavisimoe voennoe obozrenie*, 14 October 2011.

¹⁸⁸ Cristiano Castelfranchi and Rino Falcone, (2010) *Trust Theory*, Wiley, Chichester, p. 205 and Armin Falk and Michael Kosfeld, “The Hidden Costs of Control”, *The American Economic Review*, Vol.96, No.5, 2006, pp. 1611–1630.

distrust, and malfeasance”.¹⁸⁹ One Russian OPK director in 2013 complained that during the 30 first days after the signing of a contract with the MOD, his enterprise was visited 40 times by different controlling agencies.¹⁹⁰

For the purpose of analysis it is useful in the Russian case to differentiate between three levels of control. Firstly, we have the direct control of production at the level of enterprises, the so called *voennaia priemka*. Secondly, we have the different mechanisms whereby the MOD and the government control the OPK through its military-industrial policy. Thirdly, since most arms procurement takes place in an environment of very limited market mechanisms, we have the bureaucratic organs responsible for price control.

Monitoring and control through the system of officers permanently present at OPK enterprises (*voennaia priemka* – here VP) has a long history in Russia. The service celebrated its 360 years jubilee in 2005. Based on evidence from Soviet archives, Mark Harrison has concluded that the VP system in general made a significant contribution to improving quality during Soviet times.¹⁹¹ However, it was never uncontroversial. As predicted by theory above, few agents like being constantly peeked over the shoulder, and the history of the Soviet OPK is full of complaints made by factory management about the intrusive behaviour of the VP.

In 1934 new regulations were introduced that established the double system of internal Departments for Technical Control (*Otdely tekhnicheskogo kontrolia*–OTK) at each enterprise in addition to the VP. These internal control mechanisms were, however, according to Mark Harrison “largely ineffective”.¹⁹² They have in principle also been in place in the post-Soviet period, but little has been known of their effect. In early 2012, Deputy Defence Minister Aleksandr Sukhorukov declared that demonstration of a satisfactory system of internal quality management would become compulsory in order to achieve or renew a government license for the production of military equipment.¹⁹³ It is so far unclear whether that declaration has been turned into policy.

Under the 1934 regulations the VP would only start control after the OTK had approved a certain product, but in addition the VP was also given the right to monitor the activity in any part of the premises of the factory at any time of the day. One obvious temptation for the factory management under this system was of course to bribe the VP representatives. The archives are full of examples of such bribes. For example, at Factory no. 22 in Moscow in the early 1930s, the VP representatives Semenov and Ivanov were repeatedly given “special presents and financial compensation” from the factory management. This was later seen by the Soviet government as one of the main reasons why this factory supplied the Eastern military district with deficient TB-3 bombers.¹⁹⁴ There is little reason to assume that this is less of a problem today. For example did

¹⁸⁹ Guido Möllering, *Inviting or Avoiding Deception Through Trust – Conceptual Exploration of an Ambivalent relationship*, MPIfG Working Paper 08/1, 2008, p. 16, note 13.

¹⁹⁰ Interview with Ruslan Pukhov in *Profil*, 13 May 2013.

¹⁹¹ Mark Harrison and Andrei Markevich, “Contracting for Quality under a Dictator...” op. cit, p. 3.

¹⁹² *Ibid.*, p. 2.

¹⁹³ Viktor Litovkin, “Uzkoe mesto gozoboronzakaza”, *Nezavisimoe voennoe obozrenie*, 3 February 2012.

¹⁹⁴ Iryna Bystrova, *Russian Military-Industrial Complex*, Alexanteri Papers, no.2, 2011, p. 134.

the Military Prosecutor, Sergei Fridinskii, announce in July 2009 that his agency in the last minute had been able to halt the purchase of deficient parachutes for the air mobile VDV forces for 280 million roubles. Fridinskii suggested that the VPs at the factory in question “not without compensation” had turned a blind eye to the deal.¹⁹⁵

At its zenith, the Soviet VP system employed about 10,000 officers and an almost equal number of civilian specialists. Retired general staff officer and former advisor to the aircraft producer MiG, Colonel Robert Bykov, in 2009 estimated the number of officers in the VP at that time to 7,500.¹⁹⁶ According to the same source, in 2009 there were between 50 and 70 such officers present at each major OPK facility, compared to 80 to 100 in Soviet times. He gave no figures for civilian personnel. Again according to Bykov, the VP system is now mainly financed through the earnings from export contracts and therefore costs the MOD very little. Despite this, former Defence Minister Serdiukov presented plans in 2009 for a further reduction of the VP to only around 1,500 officers. The idea, according to Serdiukov’s deputy, Vladimir Popovkin, was that it would suffice only to have mobile teams of VP officers travelling from enterprise to enterprise and control only finished products.¹⁹⁷ At that time Serdiukov had to retract his proposals, but in April 2011 a new directive was issued for the size of the VP to be halved. The exact size of the VP today is not clear from open sources, but President Putin complained in August 2012 about the “liquidation of the VP”, and said this had been a very bad idea.¹⁹⁸ After the removal of Serdiukov as Minister of Defence in November 2012, Dmitrii Rogozin on Twitter suggested that the service should be increased to 25,000 personnel.¹⁹⁹ That is, more than two times the highest number during Soviet days.

There also seems to have been a change in the instructions to the VP in 2007, so that they now have less direct responsibility for controlling the quality of finished products but at the same time have taken on new responsibilities in helping with the establishment of prices. Possibly, this is an attempt by the MOD to overcome some of the information asymmetry on price calculation that the OPK has enjoyed.²⁰⁰

It is not possible to estimate quantitatively the degree to which the presence of the VP today improves the quality of Russian military production. Certainly, there will be corrupt schemes going on between factory management and VP officers also today as in Soviet times. The generally high level of corruption in Russian society is well known and officially acknowledged, and so is also the corruption within arms production. However, also within the present VP there will be honest officers who try to prevent colleagues in operational units from being supplied with low quality or malfunctioning equipment. Thus, it seems likely, despite the rising number of

¹⁹⁵ Vladimir Demchenko and Anton Zaritovskii, “Desantnikov astavili bez khoroshikh parashutov”, *Izvestia*, 10 July 2012.

¹⁹⁶ Robert Bykov, “Voennaia priemka v opasnosti”, *Nezavisimaia gazeta*, 3 September 2009.

¹⁹⁷ Vladimir Popovkin, “Oruzhie idet v voiska”, *Krasnaia Zvezda*, 18 June 2009.

¹⁹⁸ Vladimir Ivanov, “Vozrozhdenie iz pepla”, *Nezavisimoe voennoe obozrenie*, 3 August 2012.

¹⁹⁹ *Lenta.ru*, 21 November 2012.

²⁰⁰ VPK,output, p. 21.

complaints from the armed forces about the quality of the materiel, that the situation would have been even worse without the presence of the VP.

At the second and third levels of control, industrial policy and price regulation, a structured system of agencies was in the post-Soviet period not really set up until the years 2006–2007. By that time three agencies had been created, the government military-industrial commission (VPK), *Rosoboronpostavka* (Russian military supply service) and *Rosoboronzakaz* (Russian military procurement service). The main idea was that the VPK should develop and implement industrial strategies, the *Rosoboronpostavka* should implement the procurement part of these strategies, including the signing of contracts with enterprises on behalf of the MOD, and the *Rosoboronzakaz* should control the implementation of the signed contracts in a fashion similar to what the Russian Accounts Chamber was doing in the civilian sphere. To understand where this system came from, it is necessary briefly to describe the system of OPK control in the Soviet period.

During Soviet times the political leadership tightly controlled the OPK. The Defence Council made all major decisions on development and procurement, and the Defence Industry Department of the Central Committee worked as the executing agent of the Defence Council. Further, the Military Industrial Commission under the Council of Ministers had an important coordinating task. Under the Council of Ministers were also the nine different ministries that conducted the direct supervision of the different branches of the defence industry. In the late 1980s these ministries operated a total of about 150 major assembly plants, around 1,000 other plants producing military equipment, one central design office each, and in addition varying numbers of design bureaus. Furthermore, defence production always had high political priority in the Soviet Union. This meant that the political leadership often took direct control over major weapons programs, not trusting this to the bureaucracy.²⁰¹ For the OPK of the 1990s, the collapse of the Soviet system meant exceptional freedom in combination with the absence of demand.

Where the principal ended and the agent began was much more blurred in the Soviet system than it is today. This did not mean that the general principal-agent problems of diverging interest and asymmetric information were absent, but it did mean that the principal to a much larger extent than today was able to control and influence the decision making of the agents. According to Julian Cooper, about 10,000 bureaucrats were engaged in managing the OPK in Soviet times. By 2006 this number had been reduced to about 500.²⁰² Two Russian observers in 1999 concluded that “the government no longer has any means by which to control processes in the OPK”.²⁰³ However, since domestic orders still were few and far between, at that time the consequences of this limited control were not very severe.

²⁰¹ Irina Bystrova, *Russian Military-Industrial Complex*, op.cit., pp. 9–10.

²⁰² Julian Cooper, “Developments in the Russian arms industry”, in *SIPRI yearbook 2006*, p. 436.

²⁰³ Dmitrii Paison and Sergei Sokut, “Upravliat khochetsia – rychagov net”, *Nezavisimaia gazeta*, 13 March 1999.

The government VPK, a recreation of the Military-Industrial Commission from Soviet times, had been established already in the 1990s. However, recreation of historic institutions does not automatically mean that they will function in the same way under new political and economic circumstances. The Government VPK (policy development) became, under the leadership of Sergei Ivanov, according to one observer a “powerless structure that yielded all power to the MOD”.²⁰⁴ Ideally, this commission should have worked both as a political arbiter between the MOD and the OPK, and as an implementer of industrial policy in the OPK. It seems, however, never to have achieved the authority necessary to do this.²⁰⁵ Similarly, the military observer Aleksei Nikolskii stated as late as 2011 that the VPK so far has not come into a position where it is able to “order any company or OPK branch to do anything”.²⁰⁶

The *Rosoboronzakaz* (control) was established in 2003 (called Goskomoboronzakaz from 2003 to summer 2004), and *Rosoboronpostavka* (implementation) in 2006. Both agencies on paper fit nicely into the division of labour described above, but neither have in reality been able to influence much of what has been going on in their respective spheres of competence – procurement implementation and procurement control. A main reason is what Valerii Lediaiev has called the dominance of *personal* over *legal* legitimacy in Russian bureaucratic culture. Individuals are accepted as authorities in this culture, less because of the formal prerogatives ascribed to their position than because of who they are and to which other individuals of influence they are connected.²⁰⁷ Thus, the failures of both *Rosoboronzakaz* and *Rosoboronpostavka* to take advantage of the roles of influence they were intended in controlling the OPK, have been explained largely by the low bureaucratic/political capital of the individuals in charge of these agencies. *Rosoboronzakaz* was from 2003 to 2004 led by Georgii Matiukhin, and *Rosoboronpostavka* was from 2006 to 2010 led by Viktor Cherkesov. In both cases, the establishment of the agencies were at least partly seen as the creation of refuges for individuals who had fallen out of the inner circles of power.²⁰⁸ This sent a strong signal to the OPK about how low these structures were valued by those at the top of the political hierarchy. It also sent a signal to those working within these two agencies that whatever they did their actions and proposals would carry only limited weight. For *Rosoboronzakaz* this state of affairs changed somewhat when Andrei Belianinov replaced Matiukhin in 2004. Belianinov was still inside Putin’s inner circle. According to Aleksei Nikolskii, he managed to turn the agency into a relatively influential auditing agency.²⁰⁹

²⁰⁴ Aleksei Nikolskii, Iulia Taratuta and Dmitrii Kazmin, “Vozvrashchenie preemnika”, *Vedomosti*, 23 December 2011.

²⁰⁵ Ruslan Pukhov, “Army Needs a New Beginning”, *The Moscow Times*, 31 March 2011.

²⁰⁶ Aleksei Nikolskii, “Evoliutsia rossiiskoi sistemy zakupok vooruzhenii i voennoi tekhniki”, *Ekspert vooruzhenii*, No.85, 2010, p. 7.

²⁰⁷ Valerii Lediaiev, “Vlast, avtoritet i gospodstvo v Rosii: osnovnye kharakteristiki i formy”, in (ed.) Anton Oleinik, (2008) *Administrativnye reformy v kontekste vlastnykh otnoshenii*, ROSSPEN, Moscow, pp. 71–72.

²⁰⁸ Aleksei Nikolskii, “Evoliutsia...”, op. cit., pp. 6–7.

²⁰⁹ *Ibid.*, p.6.

Rosoboronpostavka was not equally lucky. According to Igor Korochenko, a member of the MOD's own public advisory council, "the new structure was blocked by the different power agencies from the beginning, nobody was ready to part with such an advantageous function as the placing of orders for arms."²¹⁰ The agency's weakness was demonstrated again after Anatolii Serdiukov became Defence Minister in 2007. Serdiukov almost immediately started a reorganization of the procurement system. However, instead of transferring the authority to sign contracts with the enterprises to the agency that had been created for this purpose, *Rosoboronpostavka*, he decided to create a new parallel department for the state defence order within the ministry for this function.²¹¹ By doing this he also precluded the fulfilment of one of the main goals behind the establishment of *Rosoboronpostavka*, namely that one agency would have the responsibility for the implementation of procurement for all the power structures in Russia. Currently, it is a source of great inefficiency that the armed forces, the Ministry of the Interior, the FSB and others all conduct their own procurement. Prices could have been forced down considerably if the different structures had joined their efforts when placing orders for the same products.²¹²

Because of the bureaucratic weakness of the *Rosoboronpostavka*, five out of the ten original purchasing structures within the MOD managed to defend their rights to continue purchasing outside the *Rosoboronpostavka* system. This in the end left *Rosoboronpostavka* with the responsibility for the purchase of little more than fire arms. However, the absurdity of the situation finally became too apparent, and in the summer of 2010 significant changes were made. Serdiukov agreed to make *Rosoboronpostavka* the main agency of arms procurement on the precondition that it was subordinated to the MOD. He also installed his close confidant Nadezhda Sinikova as new head of *Rosoboronpostavka*.²¹³ This move was accepted by the government, and *Rosoboronpostavka* at the same time took over the responsibility for agreeing prices on military equipment with the industry from the government VPK. Thus, *Rosoboronpostavka* finally became an influential body, but at the cost of its institutional independence. In essence, the government's attempt at establishing an independent intermediary between the MOD and the OPK had failed.²¹⁴ By 2012 between 50 and 60% of the state defence order went through *Rosoboronpostavka*, and in 2013 this figure was expected to reach 100%.²¹⁵

Despite these differences in the degrees and modes of control, however, certain characteristics of control seem to be similar across the Soviet and post-Soviet periods. First, political control over enterprise directors was/is difficult to exercise under both regimes, also in publicly owned enterprises. In terms of control over the Soviet OPK, Irina Bystrova states that "the most influential group of the Soviet OPK in the conditions of the Cold War became in fact the defence-

²¹⁰ Ivan Konovalov, "Prezident postabil Minoborony novuiu strukturu", *Kommersant*, 18 May 2010.

²¹¹ Valerii Lediaiev, "Vlast, avtoritet i gospodstvo...", op.cit., p. 7.

²¹² See Maria Tsvetkova, Aleksei Nikolskii and Natalia Kostenko, "Rosoboronpostavka", *Vedomosti*, 15 June 2010.

²¹³ Vladimir Mukhin, "Prezident poobeshchal razbor poletov", *Nezavisimaia gazeta*, 21 March 2011.

²¹⁴ Oleg Vladykin, "Dengi oboronke ne pomogut", op.cit.

²¹⁵ *RIA-Novosti*, 11 August 2011.

industrial managers”.²¹⁶ This means that the 2011 observation by Mikhail Kozyrev that “even in factories that are government property, or where the state has a controlling share of the stocks – real decision power rests with the company or factory director” has a clear historic precedence.²¹⁷ Such a similarity under radically different systems of control is an indicator of the limits of control that the principal is able to establish over the agents in the setting discussed here. The Editor in Chief of the main Russian OPK newspaper *Voенно-Promyshlennii Kurier*, Mikhail Khodarenok, in September 2011 told the author of this report that “nobody controls the OPK”.²¹⁸ It has been suggested that one of the reasons for the establishment of *Rostekh* was to rein in what had often come to be called the *direktorskaia volnitsa* or the directorial outlaws.²¹⁹ While the strong position of company directors under both systems may be partly explained by structural factors that limit public political and bureaucratic control, it is also explained by the fact that many directors from the Soviet period survived the transformation of political and economic regime. As late as 2008 Russian experts stated that a majority of defence enterprises were still run by directors who achieved their position during Soviet times.²²⁰

Second, one peculiar form of control that the MOD actually holds over OPK enterprises is that the latter are not free to choose sub-contractors. The exact rules for the choice of sub-contractors are not available through open sources, but it has been a constant complaint by OPK enterprises that this crucial process is in the hands of the MOD. Exactly why the MOD wants to control this is not clear. For the enterprises the problem arises when the MOD demands reduced prices on equipment from the final producer at the same time that it does not force the sub-contractors to reduce their prices. In October 2011, head of OSK Roman Trotsenko demanded that “either the MOD continues to control the choice of sub-contractors, but then also makes sure that their prices are within reason, or, alternatively, they let us, as professionals chose which sub-contractors to use”.²²¹ Shortly thereafter, the OSK in fact was granted the right to independently choose its sub-contractors.²²² It remains to be seen whether this is the result of the bargaining strength of the OSK or of a change of policy in terms of control from the MOD.

The sub-contractor issue, although important enough for many enterprises, is still somewhat less problematic today than it used to be. This is because many OPK enterprises have started to produce most of the items that sub-contractors earlier produced themselves. Alexandr Golts describes how the close to 1,500 parts of the Sukhoi-30, production of which in Soviet times took place all over the country, now more or less all are produced at the Sukhoi factory at

²¹⁶ Iryna Bystrova, *Russian Military-Industrial Complex*, op.cit., p. 11.

²¹⁷ Mikhail Kozyrev, “Chem konchitsia protivostoianie Minoborony i BPK”, *Slon.ru*, 20 September 2011.

²¹⁸ Interview with Mikhail Khodarenok, Moscow, September 2011.

²¹⁹ Petr Mordashov, “Rostekhnologii ne brosaus predpriatia v kriticheskii moment”, *Nezavisimoe voенnoe obozrenie*, 17 December 2010.

²²⁰ Nabi Abdullaev, “What Russia’s Defense Industry Needs Now”, *Defense News*, 28 July 2008 and Konstantin Makienko, “K voprosu o krizise v rossiiskoi oboronnoi promyshlennosti”, *Eksport Vooruzhenii*, No. 1, 2008, p. 2.

²²¹ Vladimir Kudelev, “Avianostsy budem stroit, no ne skoro”, *Voенно-promyshlennii kurer*, 26 October 2011.

²²² Ivan Safronov, “Oboronzakaz po fakticheskoi stoimosti”, *Kommersant-Daily*, 2 November 2011.

Komsomolsk-na-Amur.²²³ The 15 year break in domestic orders from the OPK had as a result that a large number of sub-contractors just disappeared. When their main customers did not order anything for 15 years, they either changed their production profile or went out of business. In most cases the OPK final assembly enterprises were able to fulfil export orders during these years simply by using what they had in storage at the end of the Soviet period. It is very likely, however, that the tendency for final producers to produce themselves what sub-contractors made before, has significantly contributed to the increases in prices on military products.

5.2 Sanctions

Yet another way the principal can influence the work of the agent is by sanctions or threat of sanctions. The purpose is to prevent unsatisfactory work by the agent in question, or to deter other agents from the same thing. In Russia both companies and individuals can be held legally responsible for breaches of contract in the defence order. Companies can get fines, and individuals can get both fines, lose their jobs or be sent to prison. Individuals can be punished both outside and inside the legal system. There is, however, no register of how sanctions have been used in post-Soviet times in an effort to improve the performance of the OPK.

Direct threats of sanctions have not often been used against the OPK in the post-Soviet period, but in May 2011 President Medvedev in a meeting with defence bureaucrats and major enterprise directors threatened them by saying they better remember what happened to those who did not fulfil their obligations during Stalinist times. He then went on to remove three directors of OPK enterprises from their positions. This act was at the time seen as without precedent in the post-Soviet period.²²⁴ The May incident was followed up by several other dismissals throughout the year 2011. Among those who lost their jobs were such highly placed figures as the director of Russia's most important naval shipyard *Sevmahs*, Nikolai Kalistratov. In August 2012 a special commission was established in order to evaluate the personal responsibility of OPK managers in cases of serious non-fulfilments of contracts.²²⁵ This led to the introduction of new regulations in February 2013. According to the new rules, heads of companies that repeatedly are late on their deliveries for the defence order may be banned from such kind of work for a period of three years. The same punishment will also be given to heads of companies that are found guilty of deliberately exaggerating the production costs of their items with more than 10%. However, also the other side in defence contracts may be individually punished. Public employees that are found guilty of delaying the disbursement of funds for the fulfilment of such contracts may be fined from 30,000 to 50,000 roubles (between 1,000 and 1,500 USD). According to a former MOD representative, however, one may question how much these regulations will improve performance. It will not be easy to prove guilt, and *Rosoboronzakaz*, the agency that is tasked

²²³ Aleksandr Golts, "Voenno-parodiinii kompleks", *The New Times*, 14 March 2011.

²²⁴ Konstantin Makienko, Aleksei Nikolski and Natalia Kostenko, "Paketnoe sokrashchenie", *Vedomosti*, 18 May 2011.

²²⁵ Inga Vorobeva, "Za sryv gosprogrammy vooruzhenii vvedut personalnuiu otvetstvennost", *RBC-Daily*, 3 September 2012.

with enforcing the new rules, does most probably not possess the resources in terms of people and time to do that job.²²⁶

Few representatives of the OPK were convicted of fraud or corruption until the late 2000s. Since then, however, there have been an increasing number of cases. This development has taken place in parallel with a similar development within the military organization. It is probably too early, however, to see any effects on the level of corruption and bad performance as a result of this new trend to increasingly use sanctions. In Transparency International's 2012 Defence Companies Anti-Corruption Index, all nine Russian companies investigated are in the two lowest categories, meaning that they are among the defence companies of the world that do the least to fight corruption in their own enterprise. Here, however, it should also be pointed out that 47% of companies from all countries were placed in these two categories.²²⁷

6 Summary and conclusion

The Russian military currently has serious doubts about the defence industry's ability to deliver the arms they need for future combat. In this situation the political leadership is sometimes on the side of the military, complaining and making demands on the OPK, and sometimes it tries to be an arbiter between the two. Rarely in the post-Soviet period has the political leadership taken the OPK's side against the military. The OPK, on the other hand, retorts that it takes time to overcome the consequences of the 15 year lapse, that the military often do not know what they want and that in general they do not understand how industrial development takes place. Moreover, bureaucratic red tape is often preventing the industry from doing what it wants to do even when it knows how. While this description probably is true for relations between the military and military industries in many countries, the crisis of trust is particularly acute in the Russian case.

The removal of Serdiukov as defence minister in November 2012, however, may signify the change to a stronger political backing for the OPK. While the exact mix of motives for relieving Serdiukov of his job is still not clear, it is likely that OPK lobbying was one of them. Political statements and decisions made after Serdiukov was removed indicate that the views of the OPK may now be met with greater political sympathy.

There are a number of mechanisms at hand both for the military and for the political leadership to try to improve the performance of the OPK. As explained in the introduction to this study, these mechanisms are often divided into mechanisms of incentive and mechanisms of enforcement. In Chapter four the incentive mechanisms of competition, direct support, system of procurement and system of R&D were discussed and in Chapter five the enforcement mechanisms of monitoring and sanctions were discussed. The main findings of the report in terms of how these mechanisms have been employed and what effect they have had are summarised below.

²²⁶ Aleksei Nikolskii, "Diskvalifikatsia dlia nepunktualnykh", *Vedomosti*, 20 February 2013.

²²⁷ Transparency International, *Defence Companies Anti-Corruption Index 2012*, p. 8 at <http://companies.defenceindex.org/>.

1. *Competition* can be both domestic and foreign. In studies of the Soviet OPK, domestic competition is often presented as a major stimulant for technological innovation and industrial progress. The Soviet authorities deliberately created two or more competing development, design and production milieus for many of the major weapons systems. As presented in Chapter 3.5, the current creation of major branch holdings is doing away with much of the domestic competition. The high degree of domestic competition in the Soviet period, however, was made possible by the extraordinary amounts of money that the Soviet Union was willing to spend on defence. Such levels of spending are no longer viable. This is demonstrated by the fact that domestic competition has also been scaled back in most Western countries. Nevertheless, a major stimulus for creativity and improved performance has been lost. It is true that many of the entities that make up the new holdings continue to compete also within the new holdings, such as for example MiG and Sukhoi within the OAK, but this competition seems to be more about control over the holdings than about who produces the better planes.

This report has also discussed the potential effects of ownership on OPK performance. Significant parts of the industry were privatized in the 1990s, and then much of this was renationalized in the mid-2000s in connection with the creation of holdings. If one counts the number of enterprises, there is currently a majority of OPK enterprises that are either private or with mixed private-public ownership. However, if one instead considers the volume of military production, the public ownership part may be as high as 80%. There has been a small reprivatization in certain sectors in later years, but the signals coming from the political leadership on this question are now very mixed. Sometimes more private ownership is proclaimed an aim, and sometimes it is portrayed as a danger to national security. While some companies, such as the aircraft producer *Irkut*, seemed to perform better under private ownership, it is difficult to detect any systemic effect of ownership on enterprise performance. There are publicly owned companies that perform just as well as the privately owned ones. What seems to be more in common for the well performing companies than the ownership structure is that they inherited a particularly good technological base from the Soviet period, that they were able to convert this technological base into products that could do well on the export market, and that they had particularly innovative, dedicated and good managers. Thus, the structure of ownership might not be the most important variable for explaining OPK performance.

Foreign competition was introduced in the late 2000s. The Soviet and later Russian taboo on arms import was rather suddenly cancelled, and the OPK was not at all prepared for this development. The Russian military have been explicit in that the purpose of arms import is not only to get weapons that they like from other countries, but also to stimulate the domestic industry to perform better. So far the industry has mostly responded with lobbying efforts to limit the import as much as possible, but a few examples, such as the accelerated development of the new *Boomerang* armed fighting vehicle and new Russian UAVs, may indicate that the opening to foreign competition is beginning to have some of its intended effect.

2. *Direct support* to the OPK, not connected to orders for arms, has increased in tandem with the increases in the defence order. First among such initiatives is the 3,000 billion roubles “Development of the Russian OPK to the Year 2020” program from 2010. While it seems unavoidable that the effects of this program are going to be undermined by the usual problems of corruption, waste, unqualified personnel and so on, there is nevertheless reason to believe that the program will have some positive effects on OPK performance.
3. The *system of arms procurement* is constantly changing. One of the main questions seems to be to what extent it should be under MOD control. Experience from the last five to seven years, essentially since Russia again started to spend serious money on rearmament, is that the more the procurement process is left to the MOD bureaucracy and the OPK themselves, the bigger the chances are for deadlock and delays in the fulfilment of orders. Direct involvement of the political level as a neutral third party often seems necessary for the processes to move forward. However, so far the MOD has been relatively successful in subordinating agencies meant for third party roles, such as *Rosoboronpotavka* and *Rosoboronzakaz* to itself. Thus, the arrival of big money for rearmament has had the unfortunate side-effect that trust between the military and the OPK has become even lower than before because there is more to fight over now. This fact has had a negative effect on the rearmament process. It seems likely that these negative effects will continue unless the political level is able to take more control over the process in the capacity of an arbiter between the military/MOD and the OPK.
4. The *system of funding for R&D* has been and is suffering. This is both because of the often unsettled relations between KBs/DBs and the final production factories, and because of the special problems with corruption in this sphere of activity. Overall money for R&D is actually increasing, but as a percentage of the defence order it has been in decline. To a certain extent this probably reflects that after 15 years of little or no procurement, there is within certain branches probably no longer any patience left to wait for new designs. Here one is ready to accept only slightly improved models as long as their delivery is relatively certain in the near future. The long term future of R&D is further hampered by an especially low willingness to finance fundamental and exploratory studies, but here the 2012 establishment of a Russian equivalent to DARPA in the US may signify a new approach.
5. Going back to the times of Peter the Great, *monitoring* is one of the oldest instruments employed by the political and military authorities in Russia for influencing the performance of the military industry. Historical research indicates that the system of *voennaia priemka*, while challenged by corruption and misconduct also during Soviet times, still had a significantly positive effect on what the industry produced. The system is still in operation, but much reduced since Soviet times. Recent efforts to again strengthen the *voennaia priemka* demonstrate that at least some in the Russian leadership believe in its potential positive effects also today. It is not possible to give any

quantitative estimates of the system's potentially positive effects on industry performance, but it is likely that the fact that representatives of those who are going to use the products can oversee their production will prevent at least some mistakes that otherwise would have been made.

6. *Sanctions* are mostly related to cases of corruption where perpetrators are sentenced for what they have done. There is no denying that corruption is a very serious problem that affects the performance of the OPK on many levels. In the last few years there has been an increasing willingness on behalf of Russian political and legal authorities to investigate and punish cases of corruption, also in the OPK. However, figures from the Main Military Prosecutor show no downwards trend for the number and severity of cases. While the figures for rising corruption may partly be a result of increased efforts to fight corruption, they are also most likely a result of the fact that the dramatic increases in orders to the industry have the effect that there is now much more to steal.

Warning signals to, and sackings of, the directors of OPK enterprises are now more common. Medvedev's 2010 outburst that they better remember what happened to saboteurs during Soviet days is a case in point here. Such actions may also be seen as a kind of sanctions, but any positive effect on OPK performance is doubtful. Most OPK leaders are probably more likely to take offence as a result of such statements, and few will fear that the legal practices of the Stalinist area are likely to return.

The Russian OPK is not dying. It is, however, because of the lack of orders for 15 years and because of the weaknesses that characterise the Russian political and economic system as such, in serious trouble. A radical improvement will be difficult to achieve unless this political and economic system is made to function more efficiently. The industry will most likely never return to its Soviet capacity, but that might not necessarily be the best role model either. Historical research shows that the Soviet OPK, despite serious achievements, also suffered from grave weaknesses.

With a steady stream of orders, domestic and foreign, a thorough and serious reform of the political and economic system in which the OPK is embedded, and a willingness to strive for restoration from the patient himself, recovery is possible. Nevertheless, even in the case of recovery, the patient is likely to be left with scars from his illnesses that possibly never cure. He might again become a fit individual, but probably not one who is able to do all the things he was able to do before.

References

- Abdullaev, Nabi, "Fighting to stay private", *Defense News*, 28 July 2008.
- Abdullaev, Nabi, "What Russia's Defense Industry Needs Now", *Defense News*, 28 July 2008.
- Abdullaev, Nabi, "In Moscow, Unusual Light on Defense-Spending Corruption", *Defense News*, 16 October 2008.
- Barabanov, Mikhail, "Ramenskoe priborostroitelnoe konstruktorskoie biuro", *Ekspert vooruzhenii*, No.5, September–October, 2012.
- Bekker, Aleksandr, "Shatkii tyl rossiiskoi oboronky", *Moskovskie Novosti*, 3 February 1998.
- Bezborodov, Aleksei, "Kuda katitsia rossiiskoe sudostroenie?", *Ekspert vooruzhenii*, No.6, November–December 2011, pp. 70–74.
- Blank, Stephen, *Rosoboroneksport: Arms sales and the structure of Russian defense industry*, Strategic Studies Institute, <http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=749>, 2007.
- Blank, Stephen, "A work in regress? Russian defense industry and the unending crisis of the Russian state", in (eds.) Roger N. McDermott, Bertil Nygren and Carolina Vendil Pallin, *The Russian Armed Forces in Transition*, Routledge, 2012.
- Bogdanov, Konstantin, "OAK: Perestroika na vzlete", *Voенno-promyshlennii kurer*, 15 June 2011.
- Bombilov, Anton, "MiG: Mikoian nachal, Pogosian konchit?", *FORUM.msk*, 21 October 2011.
- Bukkvoll, Tor, "Their Hand in the Till – Scale and Causes of Russian Military Corruption", *Armed Forces & Society*, 34:2, January 2008.
- Bykov, Robert, "Voennaia priemka v opasnosti", *Nezavisimaia gazeta*, 3 September 2009.
- Bystrova, Iryna, *Russian Military-Industrial Complex*, Alexanteri Papers, no.2, 2011.
- Castelfranchi, Cristiano and Falcone, Rino, *Trust Theory*, Wiley, Chichester, 2010.
- Chelpanova, Milana and Pylaev, Igor, "Severnaia verf vooruzhaietsia", *RBK-Daily*, 2 September 2011.

Cooper, Julian, "Society-military relations in Russia: the economic dimension", in (eds.) Stephen L. Webber and Jennifer G. Mathers, (2006), *Military and society in post-Soviet Russia*, Manchester, Manchester University Press.

Cooper, Julian, "Developments in the Russian arms industry", *SIPRI yearbook 2006*

Cooper, Julian, "Military procurement in Russia", in (eds.) Roger N. McDermott, Bertil Nygren and Carolina Vendil Pallin, *The Russian Armed Forces in Transition*, Routledge, 2012.

Davis, Malcolm, "Future Airstrikes: Beyond stealth?", *Jane's Defence Weekly*, 15 January 2003.

Denisentsev, Sergei, "Partnerstvo piatogo pokolenia", *Odnako*, 18 February 2013.

Demchenko, Vladimir and Zaritovskii, Anton, "Desantnikov astavili bez khoroshikh parashutov", *Izvestia*, 10 July 2012.

Donaldson, Lex, "The Ethereal Hand: Organizational Economics and Management Theory", *The Academy of Management Review*, Vol.15, No.3, 1990, pp. 369–381.

Dunne, J. Paul, "The Defense Industrial Base", in Keith Hartley and Todd Sandler, *Handbook of Defense Economics*, Vol. 1, Elsevier, New York.

Falk, Armin and Kosfeld, Michael, "The Hidden Costs of Control", *The American Economic Review*, Vol.96, No.5, 2006.

Falichev, Oleg, "Korrupsionnyj potentsial goszakaza", *Voенно-promyslennyj kurier*, 21 March 2012.

Fedorov, Andrei, "Vorovstvo kak iskusstvo", *Lenta.ru*, 11 March 2009.

Felgengauer, Pavel, "Russia Is Isolated Politically and Technologically as Relations with West Worsen", *Eurasia Daily Monitor*, 24 January 2013.

Fortov, Vladimir and Kaliaiev, Igor, "Akademikov sniali s peredovoi", *Rossiiskaia gazeta*, 28 April 2010.

Friedman, Norman, "World Naval Developments", *Naval Institute Proceedings*, 132:1, January 2006.

Gavrilov, Iurii, "Moshennik s polnomochiami", *Rossiiskaia Gazeta*, 3 July 2012.

Gerring, John, *Case Study Research – Principles and Practices*, Cambridge University Press, Cambridge, 2007.

- Golts, Aleksandr, "Voenno-parodiinii kompleks", *The New Times*, 14 March 2011.
- Hakvåg, Una, Hove, Kjetil and Sendstad, Cecilie, *Skremmende tall: Realismen i det russiske våpenprogrammet GPV-2020*, FFI-rapport 2012/00356.
- Harrison, Mark, "The Political Economy of a Soviet R&D Failure: Steam Power for Aviation, 1932 to 1939", *The Journal of Economic History*, Vol. 63, No.1, 2003.
- Harrison, Mark and Simonov, Nikolai, "Voenpriemka: prices, costs, and quality assurance in defense industry" in (eds.), Mark Harrison and John Barber, *The Soviet defense Industry Complex from Stalin to Khrushchev*, Basingstoke and London, Macmillan Press, 2000.
- Harrison, Mark and Markevich, Andrei, "Contracting for Quality under a Dictator: the Soviet Defense Market, 1930 to 1950", unpublished paper, Department of Economics, University of Warwick,
<http://www2.warwick.ac.uk/fac/soc/economics/staff/academic/harrison/papers/quality.pdf>
- Hartley, Keith, "The Arms Industry, Procurement and Industrial Policies", in (eds.) Todd Sandler and Keith Hartley, *Handbook to Defense Economics*, Vol. 2, Elsevier, 2007.
- Hartley, Keith, "The Economics of the UK Defence Industrial Strategy", *Security Challenges*, Vol.3, No.2, June 2007.
- Hastings, Max, "Wasting money saving lives", *The Daily Telegraph*, 5 February 2006.
- Hayward, Keith, "I have seen the future and it works", *Defense and Peace Economics*, Vol. 16, no.2, 2005.
- Hewson, Robert, "Briefing: Fighter club", *Jane's Defence Weekly*, 12 July 2010.
- Ishchenko, Sergei, "Nedovoruzhennye sily Rossii", *Svobodnaia Pressa*, 9 March 2011.
- Ivanov, Vladimir, "Izobresti voenno-promyshlennyi velosiped", *Nezavisimaia Gazeta*, 5 February 2007.
- Ivanov, Vladimir, "Gde vziat dengi na NIOKR?", *Nezavisimoe Voennoe Obozrenie*, 21 March 2008.
- Ivanov, Vladimir, "Vozrozhdenie iz pepla", *Nezavisimoe voennoe obozrenie*, 3 August 2012.
- Kalinina, Natalia and Koziulin, Vadim, "Glinianye nogi rossiiskogo OPK", *Indeks Bezopasnosti*, No.3-4, 2009.

Kassianova, Alla, "We Need Wonders at a Reasonable Price: How Sound is Russia's Current Defense-Industrial Policy?", in *Domestic Foundations of Russian Security*, PONARS Eurasia Policy Perspectives, June 2011.

Khramchikhin, Aleksandr, "Premer novii – problem starye", *Nezavisimoe voennoe obozrenie*, 21 September 2007.

Khramchikhin, Aleksandr, "Gosoboronnye voiny mestnogo znachenia", *Nezavisimoe Voennoe Obozrenie*, 28 October 2011.

Kleiman, Mark A. R. and Teles, Steven M., "Market and Non-Market Failures", in (eds.), Michael Moran, Martin Rein and Robert E. Goodin, *The Oxford Handbook of Public Policy*, Oxford, Oxford University Press, 2008.

Kondratiev, Aleksandr, "V Rossii otmenili gosmonopoliiu na rezultaty razrabotok po oborone i bezopasnosti", *Marker*, 13 December 2011.

Konovalov, Ivan "Prezident postabil Minoborony novuiu strukturu", *Kommersant*, 18 May 2010.

Konovalov, Ivan and Kiseleva, Elena, "Igor Ashurbeili stal obychnym zritelem kontserna", *Kommersant*, 7 February 2011.

Kopp, Carlo, "Asia's New SAMS", *Australian Aviation*, October–November 2003.

Kozyrev, Mikhail. "Chem konchitsia protivostoianie Minoborony i MOD", *Slon.ru*, 20 September 2011.

Kramnik, Iliia, "OPK Ukrainy: kooperatsia s Rossiei kak zalog sushchestvovaniia", *Golos Rossii*, 23 February 2012.

Kudelev, Vladimir, "Avianostsy budem stroit, no ne skoro", *Voенno-promyshlennii Kurier*, 26 October 2011.

Lediaiev, Valerii, "Vlast, avtoritet i gospodstvo v Rosii: osnovnye kharakteristiki i formy", in (ed.) Anton Oleinik, *Administrativnye reformy v kontekste vlastnykh otnoshenii*, ROSSPEN, Moscow, 2008.

Leonov, Vladimir, "Dorogaia Vega", *Argumenty Nedeli*, 23 March 2013.

Levy, Roy, *Defense Industry Access to Capital Markets*, CSIS Report, April 2011, at http://csis.org/files/publication/110517_DIIG_Defense_Industry_Access_to_Capital_Markets.pdf

Litovkin, Dmitrii, "Armia zaputalas v tekhnike", *Izvestia*, 27 May 2010.

- Litovkin, Viktor, "Uzko mesto gozoboronzakaza", *Nezavisimoe Voennoe Obozrenie*, 3 February 2012.
- Makienko, Konstantin, "Rossiisko-indiiskoe voenno-tekhnicheskoe sotrudnichestvo: opyt kachestvennogo analiza", *Eksport Vooruzhenii*, November–December 2003.
- Makienko, Konstantin, "K voprozu o krizise v rossiiskoi oboronnoi promyshlennosti", *Eksport Vooruzhenii*, No. 1, 2008.
- Makienko, Konstantin, Nikolski, Aleksei and Kostenko, Natalia, "Paketnoe sokrashchenie", *Vedomosti*, 18 May 2011.
- Mawdsley, Jocelyn, *The European Union and Defence Industrial Policy*, BICC Paper 31, 2003.
- Mekhanik, Aleksandr, "Stanok dlia novogo uklada", *Ekspert*, 18 February 2013.
- Miasnikov, Viktor and Sergeev, Mikhail, "Oboronka skatilas v monopolku", *Nezavisimoe voennoe obozrenie*, 27 April 2007.
- Miasnikov, Viktor, "Russkie sushki po-kitaiskii", *Nezavisimaia Gazeta*, 22 April 2008.
- Miasnikov, Viktor, "Nenasytnye niokr", *Nezavisimoe voennoe obozrenie*, 27 February 2009.
- Misanikov, Viktor, "Pokupaietsia ne stanok, a tekhnologicheskoe reshenie", *Nezavisimoe voennoe obozrenie*, 27 November, 2009.
- Miasnikov, Viktor, "Zakonodatelnye shlagbaumy na puti modernizatsii", *Nezavisimoe Voennoe Obozrenie*, 18 December, 2009.
- Miasnikov, Viktor, "Modernizatsia OPK ostaietsia nesbytochnoi mechtoi", *Nezavisimoe voennoe obozrenie*, 1 October 2010.
- Miasnikov, Viktor, "DARPA po-russki vovse ne DARPA", *Nezavisimoe Voennoe Obozrenie*, 3 August 2012.
- Mordashov, Petr, "Rostekhnologii ne brosait predpriatia v kriticheskii moment", *Nezavisimoe Voennoe Obozrenie*, 17 December 2010.
- Mordashov, Petr, "Rostekhnologii ne brosait predpriatia v kriticheskii moment", *Nezavisimoe voennoe obozrenie*, 17 December 2012.
- Mozgovoy, Aleksandr, "Bolezny rosta i kurs na Tsusimu", *Newzavisimoe Voennoe Obozrenie*, 14 June 2013.

Möllering, Guido, *Inviting or Avoiding Deception Through Trust – Conceptual Exploration of an Ambivalent relationship*, MPIfG Working Paper 08/1, 2008.

Mukhin, Vladimir, “Obrechennye na razvod”, *Nezavisimaia gazeta*, 5 August 2010.

Mukhin, Vladimir, “Prezident poobeshchal razbor poletov”, *Nezavisimaia gazeta*, 21 March 2011.

Naumov, Igor, “Dmitrii Rogozin vziasia za chastnykh vladeltsev oboronki”, *Nezavisimaia gazeta*, 2 October 2012.

Novichkov, Nikolai, “Streliaiushchie tsifry”, *Nezavisimoe voennoe obozrenie*, 7 September 2012.

Nikishchenko, Elena and Lesovskikh, Igor, “Armata v reserve”, *Kommersant*, 22 December 2012.

Nikolskii, Aleksei, “Kak v Braziliï”, *Vedomosti*, 3 February 2010.

Nikolskii, Aleksei, “Krizis ukrepil vertikal”, *Vedomosti*, 9 June 2010.

Nikolskii, Aleksei, “Mistral – tolko nachalo”, *Vedomosti*, 15 June 2010.

Nikolskii, Aleksei, “Evolutsia rossiiskoi sistemy zakupok vooruzhenii i voennoi tekhniki”, *Eksport vooruzhenii*, No.85, 2010.

Nikolskii, Aleksei, “Davai Oruzhie”, *Vedomosti*, 12 May 2011.

Nikolskii, Aleksei, Taratuta, Iulia and Kazmin, Dmitrii, “Vozvrashchenie preemnika”, *Vedomosti*, 23 December 2011.

Nikolskii, Aleksei, interview with Aleksandr Rybas in *Vedomosti*, 18 January 2012.

Nikolskii, Aleksei, “6 milliardov konkurentu”, *Vedomosti*, 22 February 2012.

Nikolskii, Aleksei, “Te zhe kontrakty v novy ruki”, *Vedomosti*, 27 December 2012.

Nikolskii, Aleksei, “Oboronservis – What Awaits Serdiukov’s Legacy”, *Moscow Defence Brief*, No.2, 2012.

Nikolskii, Aleksei, “Diskvalifikatsia dlia nepunktualnykh”, *Vedomosti*, 20 February 2013.

Oxenstierna, Susanna, “Rysslands militärreform: Leder ökade försvarsutgifter till modernare beväpning?”, *Kungliga Krigsvetenskapsakademiens Handlingar och Tidsskrift*, no. 3, 2011

- Oxenstierna, Susanna and Westerlund, Fredrik, “Arms Procurement and the Russian Defense Industry: Challenges up to 2020”, *Slavic Military Studies*, 26:1, 2013, p. 13.
- Paison, Dmitrii and Sokut, Sergei, “Upravliat khochetsia – rychagov net”, *Nezavisimaia Gazeta* 13 March 1999.
- Parker, John Paul, “At the Age of 50, it’s Time for DARPA to Rethink its Future”, *National Defense*, September 2009.
- Perrow, Charles, “Economic theories of organization”, *Theory and Society*, Vol. 15, 1986, pp. 11–45.
- Piadushkin, Maxim, “Itogi voenno-tekhnicheskogo sotrudnichestvo Rossii s zarubezhnymi gosudarstvami v 2003”, *Export Vooruzhenii*, January–February 2004.
- Popov, Egor and Safranov, Ivan, “Roman Trotsenko skhodit s verfei”, *Kommersant*, 18 June 2012.
- Popovkin, Vladimir, “Oruzhie idet v voiska”, *Krasnaia Zvezda*, 18 June 2009.
- Poppe, Yakov and Galukhina, Iana, *Rossiiskii krupnii biznes*, GU VShE Publishing house, Moscow, 2009.
- Pukhov, Ruslan, “OAK: itogi pervogo goda”, *Profil*, 3 March 2008.
- Pukhov, Ruslan, “Army Needs a New Beginning”, *The Moscow Times*, 31 March 2011.
- Puzryev, Denis, “Oboronnyi kompleks Rossii mozhet postradat iz-za bankrodstvo vodochnogo zavoda”, *RBK-Daily*, 7 February 2011.
- Razintseva, Anna and Terentieva, Aleksandra, “Konfety ot Chemezova”, *Vedomosti*, 23 November 2012.
- Riabokonov, Denis, “Divizia ne revizia”, *Profil*, 13 May 2013.
- Rogerson, William P., “Incentive models of the defense procurement process” in (eds.) Keith Hartley and Todd Sandler, *Handbook of Defense Economics*, Elsevier, Amsterdam, 1995.
- Rogozin, Dmitrii, “U otechestvennogo OPK est budushchee”, *Izvestia*, 17 November 2011.
- Rowney, Don K. and Huskey, Eugene, “Introduction: Russian Officialdom Since 1881”, in (eds.) Don K. Rowney and Eugene Huskey, *Russian Bureaucracy and the State*, Palgrave Macmillan, 2009.

Safronov, Ivan, “Oboronzakaz po fakticheskoj stoimosti”, *Kommersant-Daily*, 2 November 2011.

Safronov, Ivan, “Genshtab gotovitsia k voine i konstatiruiet negotovnost k nei voenno-promyshlennogo kompleksa”, *Kommersant*, 18 November 2011.

Safranov, Ivan and Cherkasova, Maria, “Aleksiu Fedorovu ne khvatilo polnomochiy”, *Kommersant-Daily*, 1 August 2012.

Samofalova, Olga, “Dlia belorusskikh družiei”, *Vzgliad*, 29 January 2013.

Sappington, David E.M., “Incentives in Principal-Agent Relationships”, *Journal of Economic Perspectives*, Vol.5, No.2, Spring 1991.

Scharpf, Fritz W., *Games Real Actors Play – Actor-Centered Institutionalism in Policy Research*, Boulder, Westview Press, 1997.

Shcherbakov, Vladimir, “Obeshchat – ne znachit zhenitsia”, *Nezavisimoe voennoe obozrenie*, 3 December 2010.

Schneider, Volker and Verle, Raymond, “International regime or corporate actor? The European Community in telecommunications policy”, in Kenneth Dyson and Peter Humphreys (eds.), *The Political Economy of Communications: International and European Dimensions*, London Routledge, 1990.

Shepovalenko, Maxim, “Promyshlennost boepriprav i spetskhemii Rossii”, *Ekspert Vooruzhenii*, No.2, March–April 2012.

Shlykov, Vitalii, “Perdel. Potemkinskii kompleks”, *Itogi*, 10 April 2001.

Shlykov, Vitalii, “Globalizatsia voennoi promyshlennosti – imperativ XXI veka”, *Otechestvennyye zapiski*, No.5, 2005, at <http://www.strana-oz.ru/2005/5/globalizaciya-voennoy-promyshlennosti----imperativ-xxi-veka>.

Smirnov, Sergei and Chernoiwanova, Alina, “Bezpilotniki uletiat v St. Perterburg”, *Gazeta.ru*, 7 October 2011.

Soloviev, Vadim, “Goskorporatsii: vse tochki nad i rasstavlenny”, *Nezavisimoe voennoe obozrenie*, 11 December 2009.

Sozaev-Gurev, Egor, “Bumerang soberut na dva goda ranshe”, *Izvestia*, 12 October 2012.

Stocker, Michael, *The Russian Defense Industrial Base – A Critical Assessment*, Centre for Operational Research and Analysis, Canada, 2012.

- Susarov, Andrei, "Vziate pribyli", *Moskovskie novosti*, 14 May 2012.
- Sychev, Vasilii, "Obosnovannye opasenia", *Voенno-Promyshlennyi Kurer*, 19 October 2011.
- Tsvetkova, Maria, Nikolskii, Aleksei and Kostenko, Natalia, "Rosoboronpostavka", *Vedomosti*, 15 June 2010.
- Tvetbråten, Kari and Fevolden, Arne Martin, *Forsvarsindustrien i Norge*, FFI-rapport 2011/00608, at <http://rapporter.ffi.no/rapporter/2011/00608.pdf>.
- Veselov, Andrei and Diatlikovich, Viktor, "Gosoboronskandal", *Russkii reporter*, 22 September 2011.
- Vladykin, Oleg, "Dengi oboronke ne pomogut", *Nezavisimoe Voенnoe Obozrenie*, 11 June 2010.
- Vorobeva, Inga, "Za sryv gosprogrammy vooruzhenii vvedut personalnuiu otvetstvennost", *RBC-Daily*, 3 September 2012.
- Waterman, Richard W. and Meier, Kenneth J., "Principal-Agent Models: An Expansion?", *Journal of Public Administration Research and Theory*, Vol. 8, No.2, 1998.
- Westerlund, Fredrik, *Russian Intelligence Gathering for Domestic R&D – Short Cut or Dead End for Modernization*, FOI Memo, April 2010.
- Westerlund, Fredrik, "Forsvarsindustri", in Carolina Vendil Pallin (ed.), *Ryssk militär förmåga i et tioårsperspektiv – 2011*, FOI-R-3404—SE.
- Zaitseva, Olga, Imamutdinov, Irik and Khazbiev, Aleksei, "K vzletu ne gotovy", *Ekspert*, 20 February 2012.
- Yukins, Christopher R., "A Versatile Prism: Assessing Procurement Law Through the Principal-Agent Model", *Public Contract Law Journal*, Vol. 40, No.1, Fall 2010.

List of abbreviations

BTR	<i>Bronetransporter</i> (Armored personnel carrier)
CIS	Commonwealth of Independent States
DARPA	Defence Advanced Research Projects Agency
FPI	<i>Fond Perspektivnykh Issledovaniï</i> (Foundation for Promising Studies)
GDP	Gross Domestic Product
GPV	<i>Glavnaia Programma Vooruzhenii</i> (Main Armaments Program)
KB	<i>Konstruktorskoie Biuro</i> (Construction bureau)
MOD	Ministry of Defence
NCO	Non-Commissioned Officer
NII	<i>Nauchno-Issledovatel'skii Institut</i> (Scientific research institute)
OAK	<i>Obedinennaia Aviastroitelnaia Korporatsia</i> (United Aircraft Corporation)
OSK	<i>Obedinennaia Sudostroitelnaia Korporatsia</i> (United Shipbuilding Corporation)
OPK	<i>Oboronno-Promyshlennii Kompleks</i> (Military-Industrial complex)
OTK	<i>Otdel Tekhnicheskogo Kontroliia</i> (Department of technical control)
R&D	Research & Development
TSV-PK	<i>Teleinformatsionnaia Set VoЕННО-Promyshlennogo Kompleksa</i> (Information Network of the Military-Industrial Complex)
UAV	Unmanned Aerial Vehicle
VDV	<i>Vozdushno-Desantnie Voiska</i> (Airmobile forces)
VP	<i>Voennaia Priemka</i> (Military reception)
VPK	<i>VoЕННО-Promyshlennaia Komissia</i> (Military-Industrial Commission)