

The Culture of Defense Production in the Process of Conversion

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Introduction

... With the end of the Cold War, the opportunity emerged for the countries of Eastern Europe and the Former Soviet Union to move towards de-litization and re-orientation of their production, scientific and human resources from military to civilian use. ' Expectations of broad opportunities for technical change in the of

civilian sphere, which defense industry conversion in the formerly centrally planned economies would provide, were expressed by western experts. For instance, it is expected that "the reduction of weapons-related R&D now, in going on will provide opportunities to increase the rate of economically and socially useful technical change: first, because potentially more scarce and skilled resources will be available for direct employment for this purpose; and secondly, because the more exciting and fruitful fields of technological activity are now related to civilian applications, rather than weapons" (Pavitt 1997:48).

The resources employed in defense production, however, turned out to be less "convertible" to civilian applications than was initially expected. For instance, it appeared that "the competencies in R&D generated under central planning...turned out to be obsolete when brought face to face with the standards of the rest of the world" (Pavitt 1997:52), and "spin-offs from the

- weapons-related R&D, and from basic research in the Academy institutes, do not provide a sufficient basis for the development of technological competencies in the East" (Pavitt 1997:52-53).

Russia and those former Soviet republics that inherited the largest military-industrial complex seem to face the most difficult consequences of successful attempts to adjust to the military retrenchment and to establish a market at the same time. At the start of conversion, the reformers considered

the defense industry to be a pool of resources that would provide opportunities

for upgrading and modernizing the civilian economy. It was also believed that the technological potential of the defense industry provides advantages to this sector in the process of economic transformations and makes its adjustment easier.

Not only were the planned effects not achieved so far, but the opposite processes can be observed: reduction and complete termination in

- some branches of the production of civilian goods within the defense industries, and mass destruction of capabilities and resources previously employed in defense production, rather than their conversion. The notion of

conversion has gradually become a synonym for the destruction of the military-industrial and scientific potential of the country. Since the mid-1990s the government has undertaken steps aimed at returning to the traditional policies in MIC. As K. Gonchar points out, "the reputation of conversion as the alternative use of the research-related peace dividend is diminishing" (1995:8). Although there is evidence of considerable success of conversion efforts in particular industries, such as space and atomic R&D, in general the situation looks as if conversion brought many more losses than benefits so far, and has been connected with extremely high social and economic costs.

Aim of the Paper

Economic and political aspects of conversion are currently the focus of attention of researchers. Social and cultural factors, however, seem to be more essential for understanding the practical problems and obstacles that arise in the process of converting military technologies to civilian applications. The aim of this paper is to discuss the ways in which the defense production culture affects the perceptions and interpretations of conversion and the state policies of conversion, and how the people who share the defense production culture adjust themselves to the realities of conversion.

The main assumption is that the peculiarities of the culture of defense production create the frames for perceiving the ongoing conversion by defense producers, and at the same time shape their responses to state conversion policies. On the other hand, the imperative of defense conversion and new political and economic realities create pressure for redefining the norms, values, and beliefs shared by defense producers. These new realities require essential downsizing of military production, re-orientation of the production according to market rules—and in a large part towards civilian needs—with a re-organization of the remaining part of military production according to the new principles. The new concept of military technology needs to be formulated, however, and the demand for new civilian goods is yet to be shaped. Through the social perception and "measuring" of conversion in terms of values, norms, and practices of defense production, and vice versa, some norms are rejected or re-defined, others are gaining acceptance and taking root, and still others are reinforced and maintain their legitimacy.

Sources of Data and Methods of Data Collection

The paper is mainly based on data from interviews with the top-level management of the defense enterprises in Novosibirsk, Russia. The first series of interviews was conducted in summer 1993 by the research group of the Sociology department, the Institute of Economics and Industrial Engineering, under the leadership of dr L.Korel, in the framework of the project on economic and social problems of conversion in Novosibirsk. I was one of the participants of this research. Forty interviews in 17 enterprises and scientific-research institutes have been collected. The interview was semi-formalized:

part of it consisted in answering the questionnaire, and another part was conducted according to the scheme of a focused interview. Analysis of the results is presented in several publications (Korel et al. 1993a; 1993b; 1994).

The second series of interviews that I use in this paper were conducted by myself in autumn 1998 with the same management group and in the same enterprises that were selected in the first survey. I conducted 22 interviews with the top managers and an additional two interviews with the head of the industry department of the local administration. Interviews were conducted according to the method of focused interview. All the interviews were tape-recorded. I also refer to some publications by other scholars who analyze the social and cultural aspects of conversion.

New Parameters of a Product and New Principles of Managing Production

The re-orientation of production towards civilian needs required many weapon producers to adjust to the needs and requirements of civilian customers, which are very different from the requirements of the weapon products and parameters of these products. At the same time, the producers need to learn how to operate in the emerging market environment with its rules of competition and searching for the customer, instead of working for a single and permanent customer, with certain rules of how to convince the customer of the advantages of the product. This, according to my data, appears to be one of the major difficulties in conversion. In the words of one of the respondents, "We used to convince concrete customer using concrete arguments: here are the parameters, here are the results of the tests ... Now the situation is quite different: the best product will not be sold if the potential customers will not get to know it. Here quite different skills are needed: to predict needs, to produce a commodity in the shortest time, to inform the potential customers, to convince them. This is the whole science of marketing" (director of holding company).

Such re-orientation requires not only learning new skills, but also changing product stereotypes and priorities internalized by the weapon producers in the past, as well as large amounts of organizational and technical restructuring. All technical and organizational capacities of defense enterprises were designed to produce technically a sophisticated, high quality, but often very costly product. It is not easy to re-shape these capacities "at once." As one of the respondents said, "We can produce very high-quality ceramic products. Maybe, the customers do not need such a high quality, but all our technologies are adjusted to make products this way" (chief economist of microelectronics plant). At the same time, not only the technological capacities, but priorities of the directors sometimes remain the same: "Our main priorities remain technical, the cost in our production is not the main thing" (director of navigation equipment plant).

Another issue is breaking stereotypes with respect to civilian products as low-priority products. In the words of one of the directors, whose enterprise, like many others, specialized in the production of both military and non-military products, "Our civilian products always were of lower quality than the military ones. There were objective reasons for that. Traditionally, the special products were required to be of higher quality" (director of low voltage technique plant).

Responsibility for Technological Capacities and Value of Accumulated Technological Potential

Sophisticated and often unique technologies possessed by the defense enterprises, institutes, and constructor bureaus has always been a subject of pride not only for the employees of the enterprises but for the local community as well. Engineers, constructors, and whole communities of weapon producers participating in the creation of large-scale technological systems, shared the sense of belonging to the great accomplishment. Some quotations from the Newsletter¹ issued by one of the Novosibirsk plants on the occasion of the plant's anniversary would illustrate this point: "Many years of work in the team of scientists and engineers ...are remembered for scientific-technical potential, high-productive and precise technologies, unique realization of many modern achievements of science and technology." (researcher, R&D team of the plant). "The plant became the pride of Novosibirsk oblast and symbol of industrial power of Siberia"(head of oblast administration); "We have many enterprises in the region which are unique. There are no analogous in our country This is not only prestige of our oblast, but prestige of the whole country" (The head of industry department of oblast administration).

In this context, for many enterprises dismantlement of their technologies would mean devaluating their achievements and losing the advantages associated with them. At the same time, they feel themselves responsible for maintaining the technological potential they possess. That is the reason why, for many defense directors, the main priority remains to keep the existing technologies rather than to convert them. One of industrial policy priorities of the oblast administration expressed by the head of industry department was "to keep the technological potential and to create some possibilities for its development." Most of the respondents stressed the importance of keeping the unique capabilities that their enterprises possess.

On the other hand, the unwillingness to convert technologies is sometimes rooted in a view of such a conversion as economically irrational or strategically wrong, when ends would not justify the means. In some cases, conversion of the enterprise would require such enormous amounts of investment that it would be easier to build a new plant instead of converting

¹ "Vpered," Newsletter of the plant, October-November 1998.

laid one. At the same time, it would lead to the loss of some capacities that would appear to be in demand in the future. Besides, the cognitive difficulties involved in finding a technical solution for conversion in some cases also should not be underestimated.

Social Functions of Defense Industry Enterprises

One of the functions performed by the defense enterprises in the Soviet society was a "social" one. They were usually taking an active part in developing and maintaining cities where they were located. As one of the interviewed pointed out, "All defense enterprises were 'states in the state.' They were given money to develop the social sphere" (director of condenser plant).

A city-building function of large defense enterprises determined their importance in the life of a local community. This role has been ideologically supported and legitimized. One of the largest plants in the Novosibirsk is characterized by a representative of the President in the following way: "The plant ... has built the whole modern district of the city. It is not even an enterprise, it is a part of our city." (on the occasion of 50th anniversary of the plant). In the first instance, however, the enterprises of the defense complex played a role in social protection of own employees and their families, providing them with social goods and services. The higher social security capacity of MIC enterprises guaranteed them the best cadres and stable work teams. The directors of large defense enterprises, having dozens of thousands of employees and maintaining huge districts of the cities or whole towns, used to see themselves not only as producers, but as "social security providers" as well. Their task was not only fulfilling the state defense orders, it also taking care of the team and the community.

In the conditions of conversion, the task of maintaining the expensive "social sphere" and huge numbers of employees seems to become unnecessary, or even impossible. In the real context of the defense-dependent community, however, things look differently. For a director of a huge enterprise it is easier sometimes to keep all, or most, of the employees at the expense of some profits than to undertake massive dismissals.

Many of the interviewed said they considered preserving existing workplaces and creating new ones to be one of the main tasks of the enterprise at the moment. This is how the chief engineer of one plant explained the strategy of his enterprise:

The main task, or strategy, of our plant is to keep the collective, the high-skilled personnel. That is why we try to organize new workplaces. Sometimes, maybe, at the expense of the amount of output. ... The director said: "There will be no cuts in personnel in the plant. Let us stop asking for increases in salaries, let it be relatively less, but we will provide more

people, instead of pushing them out into the streets." In principle, it was possible to make 200/0 reductions in personnel, and to raise the salaries. But they all are our people! !! Now we will create the new production line. It will give us 500 new workplaces, plus we will keep 1500. This is how we look at these issues, from the "social" point of view (chief engineer of atomic industry plant).

Another plant continues to build and maintain houses: ". ..We are used to this way of things: that we have to build houses, to improve people's living conditions, and we continue to do the same"(director of microelectronics plant). Yet another director was proud to say that"...We are a dying plant, but I still keep the health care point. Because people feel more sure, they know they created and will create those common goods, they have families, they received flats, and their children can count on that" (director of condensation plant). Therefore, in the conditions of crisis and weakness of state institutions, big enterprises actually often appear to be the only authority responsible for the social well-being of the people they employ.

Secrecy This is another feature of the defense industry culture. As is known, in Soviet times the defense facilities were numbered by postbox numbers. This system was introduced in the postwar years, and was used until 1989 (see Cooper 1999). Beginning in the late 1960s, some enterprises were given names again. Many others, however, remained anonymous until the beginning of conversion: "Our plant was top secret. It did not have even the sign outside. Nobody knew" (director of navigation equipment plant). Security arrangements were also part of the internal life of the enterprise. Employees of the enterprises who had access to secret documents were particularly supervised: "In any moment they (military commission-le.) could enter my office and would start checking my table. And if they found any secret paper on the table, I could be sent for an investigation" (chief economist of the apparatus construction plant). As interviews demonstrated, the degree of control over the activities of the management by security services has been reduced significantly during the last decade. Some of the top managers, however, still feel the "eye" of the services kept on them and the capability to interfere into their activity at any moment: "Now there is less control, but all the same, the 'services' do not sleep" (chief economist of the apparatus construction plant).

Control over Implementation

Political and military priorities required creation of a strict system of control over implementation of the state defense orders. This feature has been called by T. Malleret "implementational priority." As he writes, "The party and government apparatus intervened constantly in order to reduce uncertainty in the defense sector, or perhaps more accurately to stabilize it"

(Malleret 1992:87). Regular military commissions and reporting to the high bodies were elements of this system. It guaranteed that a product or technical system of required parameters and quality would be created when necessary when a "command" is given. One of my respondents pointed to the importance of the well-elaborated accounting and reporting system within the defense complex in the past:

Before we had everything fixed, all the standards, there was NOT (scientific organization of work-J.C.), every operation was conducted according to norms, everything was specified in detail. ... Everything was calculated. We analyzed the losses, and the percentage of output, and in which operation the losses happened, and why-that is how it was! Of course, a reporting system existed (chief economist of the electronics plant).

In the conditions of conversion the degree of control "from above" has been substantially reduced. However, the specificities of the established system of organization and management of production and technology requires maintaining the earlier established control and accounting procedures: "Now... there is no such a reporting before the upper bodies any more. Nobody requires that. But for ourselves, we try to keep it, because we got used to it. We have to do this, because there are specificities in our production"(chief economist of the electronic plant).

Cooperative Ties within the Defense Complex

These ties played an essential role in the operation of every defense enterprise. Scientific-research institutes, construction bureaus, and plants constituted one technological chain, or network. Every enterprise in the network took its part in the creation of the final product-a weapon system.

The network was being developed for decades in order to optimize the technological process: "We are one of the participants in the process of developing a very complex system, there are dozens of enterprises in cooperation Each particular enterprise does not create anything superficial, but this "something" appears when we work together, and produce the system ... " (director of scientific-research aviation institute).

In fact, the complex represented a self-sufficient closed system, producing both military and civilian products .." . It was an industrial complex, with all production ties and everything that was necessary" (director of navigation equipment plant).

Some respondents said that it would be very difficult to find a way of development for their enterprise, other than being a part of the established technological chain: "There is no sense to make free such an Institute. as oursIf you make all of us free, you will not re-establish this cooperation again We have been developing this organizational structure for 25 years In

order to be able to use labor resources efficiently. And there is no reason to destroy this structure now" (director of scientific-research aviation institute).

Informal Connections

Some researchers consider different aspects of informal relations in the functioning of the Soviet defense complex (Agurski 1983). As some of my interviews showed, the management and engineering elite of the defense enterprises enjoyed a relatively high degree of professional freedom: "We got used to working in any circumstances, we have always been able to find loopholes not to follow the instructions" (director of the institute of applied physics),

In the conditions of conversion, informal connections play an important role in decision-making on the state level. According to the results of interviews conducted in 1993, the existence of informal contacts was one of the main factors determining whether or not the enterprise will receive financial support from the state: among factors determining the amounts of this support to one defense enterprise or the other, the respondents most frequently named three factors: "the state (strategic) significance of the production" (470/0); the "pushing" abilities of the leader (45%), and his personal connections (39%) (Korel 1994 et al).

Most of the respondents, speaking about the factors determining the "fates" of the concrete enterprise in the process of conversion, stressed the importance of the personal contacts and abilities of the director to "press," to "convince" those who make decisions on the upper levels:

... Each director in the frames of that program tries to solve problems of his own enterprise, because the fate of the enterprise depends to a high degree on the category in the restructuring program to which the enterprise will be ascribed. In the past, there were a lot of... arbitrary actions, and now it is the same Somebody goes there, intervenes This is how these lists are being composed.... All of us, directors, were dealing with these issues. Where, in which list to include the enterprise; we were discussing, trying to intervene In that way something appeared (director of scientific-research institute participating in the developing the Program for Conversion and Restructuring for 1998-2000).

The formal programs, in the view of the respondents, represented itself as just "a paper," whereas the actual decisions concerning the distribution of privatization and funding are made by taking into account the reputation of concrete persons from the director's corps of the defense complex: "You know how it is usually being done....As usual, the money will be given to concrete persons, to directors" (chief engineer of scientific-production association).

Conversion "from Above" and its Interpretations by the Defense Directors

The interviews with the managers clearly showed their discontent with the ways conversion was introduced "from above." In the course of the interviews, two stages in the state's policies of conversion in the end of the 80s and the beginning of the 1990s were discussed: (1) "planned"

conversion 1988-1992, when an attempt was made to use the technological capacities of the defense sector to improve the situation in civilian production

and (2) "spontaneous" conversion that had started in 1992, when the state had withdrawn from the regulation of the defense production. In the following pages, I briefly discuss each of these and present interpretations of these policies by the defense directors.

1) 1987-1992-"Sharing Technological Capacities with the Civilian Sector"

The main task of the first stage of conversion was to force the defense enterprises to produce more civilian products, while keeping the same level of

costs:

defense production. In the words of M. Gorbachev: "We have decided to instruct the defense ministries to help light industry, the food industry and the cultural sector to resolve certain issues, to get rid of bottlenecks" (Sherrin 1988:55). The enterprises had to develop new products or increase the output

costs:

of the existing civilian products. Every enterprise received an assignment of exactly which kinds of products and in which amounts they shall produce. Conversion policies were accompanied by an ideological campaign. Directors of

many defense enterprises were heavily criticized in the media for poor quality of their civilian goods. Some defense ministers and directors have been criticized.

Conversion of this period has been redesigned and implemented in the form of the "centrally planned" economy, and represented itself as a traditional Soviet-style reform. It can be argued that, to a certain degree, the

objectives of this reform have been achieved, and many defense enterprises have begun production of new goods or increased the amounts of their "traditional" civilian goods. However, in the view of the directors, in many ways this reform has failed to achieve what it planned to achieve. The main points of criticism were follows:

Conversion policy has failed to take into consideration the technological profile of the defense enterprises: "They decided that if we can make missiles, then to produce teapots is not a problem at all (director of a machine-building plant); "They forced us, the atomic industry, to solve milk problems; aviation was given meat, and we were given mutton (chief engineer of atomic plant); "The complex technology has been replaced by God knows what, shovels and the like" (chief engineer of electronic plant).

It failed to take into consideration actual demand for certain kinds of

- civilian goods: "The task was to produce 1000 units of equipment for the milk industry annually~ we organized a production line for these amounts of products, and afterwards it became clear that nobody needs them~ this was too much for the country; and we still have them stored" (chief engineer of atomic plant); "There are many tractor plants in our country; they produce even more than necessary; why should the tank plant produce more tractors?" (director of machine-building plant).

It failed to take into consideration such basic factors as the time and funds

- needed to organize and start the new production; "It was not possible to start this production "at once." We needed time for preparing the production facilities, we needed certain amounts of investment..." (director of electronic plant).

(2) 1992-1993 Spontaneous Conversion The essence of the second stage of conversion consisted of sharp cuts in defense orders and delegation of "actual decisions about conversion projects to the enterprise directors themselves" (Holloway and McFaul 1995:2] 2). According to the Russian Law on conversion first published in 1992, and put into operation on January 1, 1993, the decision-making initiative was passed to the enterprise: "the participation of enterprises undergoing conversion in state and regional programs is strictly voluntary and based on the principles of economic interest and competitiveness" (Palms & Company 1995). According to the Law, enterprises were entitled to develop, produce and sell arms and military equipment under licenses according to the procedure stipulated by Russian Federation Legislation (Art.9, p.e.). A possibility to be privatized appeared for all the defense enterprises, because the labor collective of an enterprise undergoing full conversion was given the right to submit an application for the privatization (Art.6, p.2). The freedoms and opportunities provided by the new legislature intended to give strong incentives to the producers to convert their technologies to civilian applications. However, they turned out to affect the work of the enterprises in an opposite way, paralyzing both their defense and their civilian production. There were several reasons for that. The reasons named by the respondents can be reduced to several main points:

- The "abrupt" character of conversion, which did not allow the enterprises to adjust gradually to the changes in the production profile: "There was not any conversion. The state order was reduced to zero during one year. And this was the end of conversion" (director of electronics plant). Many respondents believed that the "piecemeal" approach to conversion would be much more successful. It would give the producer, in the words of one of the respondents, "Time, possibility to re-orient ourselves; three years would be enough to replace our [defense] products by

other [civilian] products" (deputy director of the textile equipment plant);

- The price policies: the prices on energy, spare parts, and resources were increasing faster than the prices for products of defense enterprises;

- Absence of clear priorities and guidelines in the sphere of defense and civilian production: "It was not clear, what the state wants to achieve as a result of conversion" (director of low voltage plant); "The policy was: we do not need the defense, there is nobody to protect ourselves from" (chief economist of semiconductor plant). The status of the defense enterprise under conversion remained uncertain: on the one hand, it has not been released from its obligations to the state (obligation to maintain mobilization facilities, to execute the state military order); on the other hand, the earlier ordered and already produced weapons were not paid for by the state, while the state funding of conversion has not been provided in the amounts initially envisaged. Although the enterprise is not paid for what has been ordered by the state, "in accordance with Russian laws, it has no right to reject the execution of a state military order" (Vorobyev 1995).

- Tax policies: the enterprises under conversion, having high expenses connected with developing new production lines and technologies, have not been given any tax postponement. As a result, they quickly accumulated huge debts~ even the enterprises which managed in the end to develop competitive products could not operate because of the indebtedness;

- Custom policies: opening market to foreign producers and absence of the protectionist measures with respect to the domestic producer. The State has to support the domestic producer, to protect it." "The state spends its money for conversion, but it absolutely does not care about support of the civilian production, does not take protectionist measures to support these commodities" (director of the low-voltage plant).

- Absence of state guarantee in the financial sphere.

The policies of that period were interpreted by one of the respondents the following way: "The only aim of the government program of conversion was to destroy the industry, and they have achieved what they had to achieve" (director of machine-building plant).

In order to understand the attitude of the directors toward state policies during this period, it is important to take into consideration specificity and distinctiveness of defense production culture. It was rooted in the nature of tasks accomplished by enterprises for decades: creating products that would serve the interests of national security and would "strengthen the defense abilities of the country. Many defense producers believe this to remain their main task even in the new conditions: "Profit. ...yes, this is the main thing. But we are not going to get it at any price. We remain patriots of Russia and while changing the structure of production try to keep our defense abilities."²

The state is considered to be fully responsible for making clear decisions concerning conversion of defense enterprises, if it expects the enterprises to keep producing such and such military products in such amounts; and if it does not need certain products anymore, it has to provide the corresponding enterprises with funding necessary for re-orientation of their production capacities towards civilian needs. That is why the state's sudden withdrawal from regulating conversion has been perceived by many of the directors as "betrayal"; some others used the expression, "We have been left to our own ends and means" (chief economist of optics plant).

Not all of the initiatives "from above," however, have been subject to criticism. "Conversion as arms exports" has been viewed as an absolutely justified strategy under present conditions. As many respondents stressed, "the country has to trade its military products." "We could produce in lower amounts, but to export. The weapons market is known to be one of the most profitable." The loss of weapon markets at the stage of conversion was perceived as one of the most serious mistakes of the government: "We should not have left the weapon markets" (director of the electronics plant).

(3) 1994 ... "Reestablishing Relationships between the State and Military-Industrial Complex"

Since 1994, attempts were made to slow down conversion and "to reestablish a coherent relationship between the state and the military industrial complex regarding conversion and privatization" (Holloway and McFaul 1995:214). In 1998, a draft project of the new Program for Restructuring of the Defense Industry has been prepared, according to which, "military production shall be concentrated on the limited number of state unitary enterprises ... " ("Osnovnyje ... " 1998:8) The rest of the defense enterprises, according to the project, should be privatized.

The intention to create a "core" of the defense industry caused fears on the part of many defense directors who suspected their enterprises could find themselves "outside" of this core. Some respondents believed that their enterprises that are located in Siberia are potential "victims" of this policy: "Now they want to create a core of defense enterprises. I am afraid that they will create this core behind the Urals. Because our Siberian plants are not needed. There are analogous enterprises in the European part of the country.

² Director of holding company, Saratov, Izvcstiya, May 15, 1990.

Given the reduced amounts of production now, those plants can manage. I think that they can bury our Siberian enterprises, first of all the "Siberian plants" (chief economist of the electronic plant).

Strategies of Adjustment:

Several methods of adjustment of the defense enterprises to the new economic realities can be distinguished:

1. Conversion based on the existing technological potential of the enterprise: diversification of production, dual-use technologies, modification of military products and technologies for civilian use, exports of weapons and non-military products developed on the basis of existing technologies; Radical change of the Technological Base of Production: developing radically new technologies and products, buying new technological production lines, or "mini-plants" and, sometimes, establishing an independent company using facilities and cadres of the mother enterprise; Changing Organizational Structure: reducing the number of management levels, centralization of managerial functions, introducing rigid accounting procedures, and closing unprofitable production lines;

2. Privatization Bankruptcy Preserving Existing Technological Capacities and Profile of the Enterprise

According to the data derived from interviews with managers of Siberian defense enterprises in 1993, "45% said that their enterprise began disassembling the old production lines, 50% were adopting new technologies, 17% were making organizational restructuring, while 37% reported that privatization of their enterprises was in progress" (Korel et al. 1994).

Each method of adjustment presupposes certain changes in the

production culture of the enterprise. The first strategy of adjustment is connected with less radical changes than other strategies. The same technologies are used and products developed with minor modifications. Some enterprises just substitute the reduction in the output of military items with the increased output of civilian goods that they were already producing before. Those possessing dual-use technologies change the application, or customer of their product. Those who find markets for their military products work for export. Obviously this strategy can be used only by those enterprises that possess particular technological capacities (dual-use technologies, particular sorts of weapon "in demand," established facilities for civilian production, etc.).

The director of the plant producing electronic chips for various types of equipment says: "there is no problem of conversion as such for me. We just increased the share of production of chips for civilian customers and decreased the share of the chips produced for military purposes. It is even

eaier for us, because the chips for civilian purposes are cheaper and quicker to produce." The second strategy suggests deeper changes in the production and technological culture. It requires substantial amounts of investment for retraining the personnel and changing the production facilities of the enterprise and is more difficult to implement. It is being chosen when the management sees no other ways for their enterprise to survive in the new conditions, and when it is not hoping for the "state orders" to return. As one of the interviewed says, "We understood that we can count only on ourselves now; we are not expecting that state orders will return, and we do not waste time talking about patriotism" (chief engineer of the semiconductor plant). An example of this method of adjustment would be an electronics plant starting to produce boilers, detailed here:

An electronic plant specialized in details and spare parts began to produce a completely new civilian product: boilers. Since autumn of 1998, after the dollar exchange rate increased and foreign competitive firms began to leave the Russian market, demand for the boilers made by the plant began to grow quickly, and the management believes this product will allow the enterprise to work in a stable fashion. The strategy of the director for the near future is to create a joint venture together with Chinese partners who will install their technological lines and equipment, while the plant will provide its spaces, infrastructure, and cadres for the new production. The director is convinced that the strategy chosen by the enterprise is the only means of survival for the majority of the large enterprises formerly working for defense, which possess idle facilities and obsolete technologies.

The third strategy focuses on the optimization of structures of managing the production, while the production specialization may remain the same. This is the method of adjustment for some enterprises possessing dual-use technologies:

During the last few years, the scientific-production association has been directing its efforts towards organizational restructuring. A number of administrative services were liquidated. Previously, production and R&D departments were separated. Now these functions are united, and new departments are created according to technological specialization. Technical specialists now work directly in production. Management functions were centralized as well. According to the opinion of the chief engineer, this reorganization allowed productivity to increase substantially,

and the same amount of work is performed with 5 times fewer the number of employees. On the other hand, technical-economic parameters of production (percentage of outputs, coefficients of use of materials) are much higher. Now the people have to solve the problems they face by themselves, as there is no one that they can ask. Therefore, says the chief engineer, the problems are solved more quickly, and less time is spent on unnecessary discussions. Previously, the process of developing a product from the beginning through the experimental sample took, as a rule, 1.5 years. Now it takes about six to seven months.

Privatization allows for the possibility of attracting investors and acquiring independence in decision-making. It also gives directors a possibility to gain full control over the enterprise and get their share in it. Directors can be divided into two groups according to their attitude towards privatization. The first group includes those who believe that privatization can change (or changed) a great deal in the operation of their enterprise. Others think that in the present conditions, when state enterprises have enough autonomy, the form of ownership does not make big difference. Below are two examples of the plants that have chosen this strategy of adjustment:

The plant that produces cartridge cases was privatized in 1992. The director of the plant believes that the decision to privatize the plant was right: "There are no direct instruments of interference into the activities of the enterprise Once in five years I have to get a license that entitles me to manage a defense enterprise. If you are the owner of the enterprise with sufficient share, you can implement your policy more independently On the other hand, there are some disadvantages of the position of the 'hired' director: when the enterprise is in state ownership, the minister may be not satisfied with the work of the director, but the director still holds the position. Here, in the holding society, this is not

possible. "

A small machine-building plant was created one year ago on the basis of the production association, which had previously specialized in producing missiles. The financial crisis and threat of bankruptcy forced the association to split into several independent state enterprises. This allowed the association to reduce substantially the burden of overhead costs that it had inherited. The director of the plant, former deputy director of the association, is convinced that . the

decision to split the association into several small enterprises was timely and helped the plant to survive in the new market

environment. During one year, the new enterprise that inherited the debts of the mother plant managed to reduce the losses substantially. The top management is planning to privatize the plant and is currently shaping the portfolio of the future shareholders. There are at least two reasons for privatizing the plant, as the director believes: "first, those who buy shares will connect their future with the future of the plant, not only because they work there, but because this will be part of their property, and second, privatization will allow us to attract investment."

Bankruptcy is an "extreme" measure, chosen when the enterprise is not able to "survive" without external support. This does not always entail radical changes in the management team. In some cases bankruptcy appears to be a way to lead an enterprise out of a crisis situation, while in others it would just result in worsening the situation, and could lead to a state of stagnation. There were two types of attitudes towards this procedure among those interviewed: "This is normal procedure, if the management team has to be changed" and "Bankruptcy should not be allowed; it leads to the destruction of the enterprise, it has to be postponed as much as possible."

An example of bankruptcy helping the enterprise to find a way out of crisis would be an electronic equipment plant: The electronic plant was the first in Novosibirsk to go through the procedure of bankruptcy. This happened in 1994. It took the management one year to get out of bankruptcy. As the chief economist of the plant recalls: "This, I think, helped us. First, we were called to the commission. The Agency on bankruptcy had just been created. And specialists there helped us As a matter of fact, it was a very good lesson. We centralized all operations, stopped production of many items that were not profitable. It forced us to change radically all that we were doing before."

The strategy of preserving the existing potential is being chosen by the directors who expect these technologies to be "requested" again in the near future. They believe that the state defense orders will eventually be restored for their plants: "We keep all our facilities, because we know that tomorrow they will come and order what we have been producing before." One of the factors contributing to sustaining such expectations is the fact that enterprises who possess so-called "mobilization facilities" were not yet released from the obligation to maintain them.

To summarize, the peculiarities of the defense production culture, such as technological capacities, organizational structures, values and beliefs spread by the producers of weapons, and norms and practices of weapon production, have a significant impact on the methods and outcomes of

conversion. This culture affects the strategies of adjustment to the new economic realities. Conversion as arms export as well as "conservative" variants of conversion are often preferred, while preserving existing technological potential and workplaces are considered to be the tasks of primary importance. There are clear signs of discontent of defense industry managers with state conversion policies. Apart from the obvious mistakes and miscalculations of policy makers, contradictions exist between the model of conversion designed by the government and implemented from above, and the image of conversion shared by a large number of the defense elite. As the experience of conversion has shown, attempts to transform the existing defense production culture may be connected with irresolvable problems and unjustified social and economic costs, especially when specificities of culture and technology of defense production are not taken into consideration. This circumstance is clearly recognized by the managers, and to a large extent explains their attitude toward conversion as such and toward the state conversion policies.

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