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RECONSTRUCTION AND MODERNIZATION OF EASTERN
SIBERIA'S HEAVY INDUSTRY IN 1970s

O.A. Uvarova (a) *

*Corresponding author

(a) Irkutsk National Research Technical University, Russian Federation, 664074, Irkutsk, Lermontov Street, 83, E-mail: histor@istu.edu, +79642648888

Abstract

The article studies the experience of reconstruction and modernization of heavy industry enterprises located in Krasnoyarsk Territory, Irkutsk Region, Republic of Buryatia and Transbaikalia Territory (in the specified period – Chita Region). It analyses a number of documents that initiated the renovation process of the coal and chemical industry. Some enterprises of Krasnoyarsk Territory stopped their existence in the process of introduction of new technology and its adoption. The major enterprises of chemical industry, metallurgical industry and machine-building industry upgraded their engineering and technology. Socialist competition of workers, engineers and technicians aimed at the achievement of the highest rates was in its development. The strategy of industrial modernization and enterprises reconstruction occurred at the regional level, differing from region to region due to objective and subjective factors. The enterprises actively cooperated with the corresponding sectors of scientific research and developed the forms of joint scientific and technical creativity in work collectives. The article contains a number of representative examples of the cooperation between science and production. Despite certain difficulties and problems, the reconstruction and modernization of the enterprises became the most important direction of production development and introduction of innovative solutions. The experience of the past can be in high demand in the current situation.

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Keywords: Regional reconstruction strategy, modernization, production update, science and production association, employees' initiative, factory science.



1. Introduction

In the second half of the 20th century, Eastern Siberia was a rapidly developing region of the Soviet Union. In the 1960s and the 1970s, the richest natural resources explored in the region needed their integration into the production, so hundreds of factories and enterprises were built. The development of heavy industry represented by the majority of USSR industrial sectors was in its final stage. The construction of Irkutsk, Bratsk, and Krasnoyarsk hydroelectric power plants (HPP), of the aluminium plants in Shelekhov, Krasnoyarsk and Bratsk, and of the petrochemical industrial complex in Angarsk was completed. Ferrous and non-ferrous metallurgy, coal industry, mechanical engineering, and timber processing continued to expand and develop. A sustainable growth of the economy was supposed to improve the production. The development and functioning of the enterprises inevitably reached the period of their reconstruction and modernization.

The economy of the USSR was a command-administrative system based on the principle that the state owned the means of production. All enterprises of heavy industry were in the state ownership. Therefore, party and economic institutions developed a strategy of reconstruction and modernization and began to put it into practice. In the period from September 1968 to March 1981, The Central Committee of the Communist Party of the Soviet Union (CC CPSU) and the Council of Ministers of the USSR adopted about 800 decrees, but only 25 of them were related to the renewal of production. There was a certain terminological inconsistency, and only in the middle of the 1970s, USSR State Planning Committee (Gosplan) and the State Committee for Construction, Housing and Municipal Economy (Gosstroy) clarified the issue. The term "reconstruction" meant the reorganization of the main and auxiliary production, which would lead to an increase in production capacity and the output of products without increasing the number of workers. At the same time, there was an improvement of technical equipment of production: machinery replenishment, obsolete equipment liquidation, rationalization of equipment layouts, introduction and extension of the infrastructure. The term "modernization" comprised the advanced engineering and technology introduction, equipment upgrade, mechanization and automation of production and renewal of the main production in general. It also referred to the expansion of production, including the introduction of additional capacity.

2. Problem Statement

In Eastern Siberia (in the specified period it included Krasnoyarsk Territory, Khakas Autonomous Region, Tuvinian Autonomous Soviet Socialist Republic, Irkutsk Region, Chita Region, Buryat Autonomous Soviet Socialist Republic), there were 14 industrial sectors, and the share of heavy industry was about 70% of all industrial production. The active and dynamic development of this segment of the economy depended on continuous improvement of engineering and technology. Conservative methods and outdated equipment were deleterious. Currently, the study of the industrial renovation experience seems to be relevant in conditions of constantly changing circumstances and the search for the possibilities of economic growth.

3. Research Questions

The Decrees of the Council of Ministers of the USSR dated September 5, 1968, and October 19, 1972, were of great importance for the renewal of the coal and oil industry. For the coal industry modernization, it was necessary to implement new high-performance equipment, to reconstruct the mining complexes, and to spread the progressive technology of opencast coal mining. The plan was to increase the share of new machinery and upgraded equipment. The training of qualified specialists and improvement of their work was in the focus of renovation policy. Krasnoyarsk Territory produced one tenth of overall coal output in the 1970s (Ivanov, 1977, pp. 13; *National Economy of the USSR*, 1982, pp. 82), so the modernization of the coal industry was the primary concern of economic and party institutions. This issue had been in the agenda of the Bureau of the Regional Committee of the CPSU for many times, and in 1973, at the 11th Plenary Session of the Territorial Party Committee, the reconstruction of the Krasnoyarsk Territory came forward. (Provincial State Agency "The State Archives of Krasnoyarsk Territory" Backlog 26. List of files 8. File 340. Sheet 3-85). The local party organization of the regional union of coal enterprises called "Krasnoyarskugol" paid much attention to the renewal of production (Provincial State Agency "The State Archives of Krasnoyarsk Territory". Backlog 3260. List of files 1. File 20-42). At Nazarovsk open-pit coalmine, the largest in Europe walking excavator ESH 100/100 with a bucket capacity of 100 cubic meters had been in use since 1977. Two rotary excavators ERSHRD-5000 were in the operation at Irsha-Borodinsky open-pit coalmine. The economic efficiency of one such excavator was 700 thousand roubles a year (Buzuev, 1978). At the Malokholboldzhinsky open-pit coalmine, over 20% of the fixed assets became up-to-date during its reconstruction; the fleet of excavators was renewed (State budget Institution "State Archive of the Republic of Buryatia". Backlog 1p. List of files 33. File 8. Sheet 56). In Irkutsk Region, the centre of coal mining was Cheremkhovsky Coal Basin. Here, the greatest attention encompassed the work with the personnel. The leaders of socialist competition and exemplary workers, N.K. Ermakov, V.I. Kotovich, N.G.Konovalov, were the first in mastering new technologies to contribute to early plan implementation (Regional State Agency "The State Archives of Irkutsk Region Contemporary History". Backlog 263. List of files 39. File 44. Sheet 5). The team of coalmine "Vostochnaya" in Transbaikal Territory gained some positive experience.

They gradually developed the algorithm of making plans for new technology and modernization of equipment at each enterprise, and it took the form of socialist obligations. In 1971-1975, the reconstruction of the Nazarovsky coalmine resulted in an increase of its production capacity from 8.5 to 16 million tons. The reconstruction of Chernogorsky coalmine led to the growth of coal production from 1.8 to 2.2 million tonnes (Provincial State Agency "The State Archives of Krasnoyarsk Territory". Backlog 26. List of files 8. File 606. Sheet 10). In the 10th five-year plan, 95% of coal in Krasnoyarsk Territory was extract by means of an innovative method of opencast coal mining. In 1980, the level of automation in the production association "Krasnoyarskugol" was as follows: 41% of the staff practiced manual labour, 39% used the mechanized way of production, 17.8% performed manual work on machines and mechanisms, the remaining 2.2% of workers performed work on automatic machines (Provincial State Agency "The State Archives of Krasnoyarsk Territory". Backlog 26. List of files 10. File 475. Sheet 142). The cost price of 1 ton of coal produced at Kansko-Achinsky coal mines was 7 times lower than the coal of Donetsk mines, 2.7 times lower than the coal of Kuznetsk deposit (they were similar in terms of production), and 2.3 times

lower than Irkutsk coal (Tarasov, 1970, pp. 44-45). The strategy of the complex reconstruction of the coal industry resulted in the following: the degree of mechanized labour in "Krasnoyarskugol" increased to 60.6% in 1982, which was higher than the national average of 40.9% (Provincial State Agency "Provincial State Agency". Backlog 26. List of files 10. File 477. Sheet 54). The machinery upgrade resulted in a significant increase in labour productivity. However, by the early 1980s, these factors had lost their dynamics.

There were two levels of the reconstruction management, i.e. a national and regional level. At the regional level, the officials saw the modernization and reconstruction strategy differently. In Chita Region, the Secretary of the Party's Regional Committee Gerasimovich G.P., who oversaw the industry, paid much attention to this issue. In 1970, at the Plenary Session of the Party's Regional Committee, the officials considered the issues of acceleration of technical progress in the industry of the region. In June 1974, at the 2nd Plenary Session of Chita Party's Regional Committee, the members of the committee considered and summarized the experience of the reconstruction in detail. The Report "On measures to increase the volume of industrial production through the reconstruction of existing enterprises with minimal capital investment and tasks of party organizations" presented the guidelines for the enterprise general directors and the secretaries of party organizations to address the problematic issues (State Treasury institution "State Archive of Transbaikal Territory". Backlog 3p. List of files 27. File 22. Sheet 3-148). The representatives of work collectives, exemplary workers, the winners of the socialist competition and engineering and technical workers told about the experience of their working teams and party organizations. During the 9th five-year plan, the Party's policy helped to upgrade more than 3 thousand units of technological equipment, to mechanize and fully reconstruct 57 workshops and production sites, to introduce 334 advanced technological processes, and to mastered 637 new products (ibid. File 22. Sheet 13). The reconstruction of Taseevskaya Gold Factory № 2 (which led to an increase in the percentage of gold extraction from the ore), Kalangujskaya Concentrating Plant (resulting in improved product quality), Chita Machine-Building Plant (which gave an increase in the range of manufactured products) and other enterprises were reported as positive examples of the reconstruction. Due to the reconstruction of the existing enterprises, Chita Region saw a 20% growth of industrial products (ibid. Sheet 16). The insufficient level of renovation of a number of enterprises was partially due to the local peculiarity. In Chita Region, there were many small industries designed mainly to meet local needs. Some of the extractive enterprises worked on small deposits of minerals, which they developed by the simplest tools and means of production.

Since the mid-1970s, the reconstruction had become the most important task of the industrial enterprises of Chita Region. There were integrated plans for the industrial development, in which there was a section of "Socialist Obligations" containing a separate line of measures for reconstruction and modernization of production. The document emphasised the search for optimal solutions based on scientific and technical progress, the introduction of Scientific Organization of Labour (SOL) to increase the level of mechanization and automation. The employees of the Industrial and Transport Department of the Party's Regional Committee monitored the issues of reconstruction. Workers took part in the implementation of the enterprise renewal plans. A number of exemplary workers showed their heroism at work, the lack of indifferent attitude to their duties, and the deep understanding of their tasks. They were the supervisor of

sawyers M.G. Jakushevskij, the head of the drift crew from Akatuj, V.S. Tislenko, arc welders V.V. Golubets and R.T. Bosak and many others.

The example of Chita Machine-Building Plant was a successful experience of reconstruction and modernization. Here, the work collective, the exemplary workers, and the party organization managed to develop the complex approach to the decision of urgent problems in a coordinated manner. The introduction of new machines that contributed to the reduction of the manual labour percentage was in the focus of this approach. They also paid their attention to the reduction of metal used for machine manufacturing, and they addressed the reduction of metal losses during their processing. Another important issue was the increase of the specific weight of products of the highest quality category in the total volume of production. The development and implementation of Integrated Quality Management System based on the enterprise standards was going on: in 1979, 17 standards were developed, and in 1980, the introduction of 30 standards came forward with the total economic effect of 156 thousand roubles per year. The enterprise produced and implemented non-standard equipment, and 35 items of machinery equipment. The technological redevelopment of workshops 1, 2, 4, 11, 15 and 16 was in the plan for 1979. The team was constantly engaged in the streamlining of technological flows and improvement of equipment placement. In 1979, the task was to develop a working project, as well as a nomenclature program and technical task for the reconstruction of procuring production. One of the priorities was the housing construction for the workers, including the hostels and the children's educational centre to bring stability to the working collectives and to motivate the employees for completion the State Plan (Provincial State Agency "The State Archives of Transbaikal Territory". Backlog 3p. List of files 27. File 22. L. 31. Backlog 3p. List of files 45. File 71. Sheet 24, 27).

In Irkutsk Region, the Decree of the Central Committee of the CPSU issued in 1969 determined the course of the work. It was entitled "On the work of Irkutsk Regional Committee of the CPSU to increase the role of engineering and technical workers in accelerating technological progress at the regional enterprises and construction sites". The document emphasized the importance of personnel issues. Thanks to a large number of colleges and universities in the city of Irkutsk, there was an opportunity to raise the educational and professional level of workers. Irkutsk Polytechnic Institute had been preparing engineers and technicians for decades. Rather frequently, at the meetings of the Party bureaus, plenums, conferences and the congresses for party economics, the reconstruction issues sounded in the overall context of larger problems such as accelerating scientific and technological progress, increase of labour productivity, development of productive forces of the region, etc. In our opinion, the first Secretary of Irkutsk Regional Committee of the CPSU N.V. Bannikov was not fully aware of the importance of the issues of reconstruction and modernization of the industry. This was probably because large enterprises in the 1970s were in their development, and some of them were growing to reach their design capacity.

During the 9th five-year plan, the reconstruction of Irkutsk Plant of Heavy Machinery named after V.V. Kuibyshev began. Engineering and technical workers of the plant worked in close contact with science, introducing the developments of specialized research institutes of the country into their production. This cooperation resulted in the introduction into production of the following innovations: stands of gears and gearboxes testing, static balancing of wheel type parts, an instrument for measuring large diameters on carousel machines, installation for cleaning of the internal surface of pipes of hydro-and pneumatic systems.

The economic effect of the implementation of these technological innovations was more than 100 thousand roubles (*The First-born*, 1983, pp. 149-150). The association of production and science designed the complex mechanized section for processing the filling machines units. Arc welders B.S. Jarovecky and M.A. Shchegolev under the direction of engineer A.E. Shakhov developed and tested the innovative welding technologies. As a result, in welding production, the level of mechanization of surfacing works was 71%, and the level of welding was 70% (*The First-born*, 1983, pp. 37). In the early 1970s, the work at modernization of engineering and management began. A powerful scientific and engineering service was established. Under the guidance of engineers E.A. Marmontov and M.M. Nuremberg, the team of workers managed to solve the complex problem of technological process that was the production of the parts for the dredging bucket mechanism. They also designed a unique dredging chain, which was highly rewarded by foreign specialists. To encourage the workers initiatives, special organs including Civil Engineering Bureaus, Public Patent Offices, and the National Society of Inventors and Innovators organized various forms of cooperation.

Historically, the sector of heavy industry lagged behind in Buryat Autonomous Soviet Socialist Republic in comparison with Krasnoyarsk Territory and Irkutsk Region. In the 1970s, there were about 130 industrial enterprises in this area (excluding light industry and food industry). Whereas, there were more than 480 enterprises in Krasnoyarsk Territory (*National Economy of Buryat ASSR*, 1976, pp. 37; *National Economy of Buryat ASSR*, 1981, pp. 25; *National Economy of Krasnoyarsk Territory*, 1985, pp. 28). In the national economy of Buryat Republic, the share of industrial production fluctuated within 61-64% (*Economic and Social Development*, 1983, pp. 39). Therefore, the development strategy of Buryatia relied on agriculture as the most traditional type of economic activity. However, in the post-war period, the industry began to play a more important role. The Council for Technical Progress established with the support of the Regional Committee of the CPSU was monitoring the issues of technical improvement. It was also responsible for introduction of new techniques and technologies and for reconstruction of existing enterprises. The Bureau of the Regional Committee provided all assistance and followed on the issues of complex reconstruction of the most important enterprises, such as Aircraft Plant, Locomotive and Rail-Car Repair Plants, Instrument Engineering Plant.

During the 10th five-year plan, the development of the industrial complex in Buryatia had two major directions: the construction of new enterprises and reconstruction and modernization of existing ones. The constant support of authorities, directors of enterprises, work collectives, aimed at reconstruction and an increase of production efficiency, resulted in considerable achievements of many production groups. The replacement of out-of-date technical means, improvement of technological processes and introduction of automatics bolstered the instrument engineering plant in the 9th five-year plan which led to a 30% increase of the output, to a 50% rise of labour productivity (State Budget Agency "The State Archives of the Republic of Buryatia". Backlog 1p. List of files 34. File 12. Sheet 12). Thanks to scientific, technical and organizational policy, the volume of products sales of the plant called "Teplopribor" increased by 71.8%, the volume of production at the factory called "Elektromashina" doubled, Novobryansk mechanical plant showed a triple increase (ibid. Sheet 12). In the 9th five-year plan, the reconstruction of the steel shop at the locomotive and rail-car repair plant was completed, and the output of shaped steel casting tripled (Prodajvoda, 1974, pp. 110). During the 9th five-year plan, 556 units of new equipment were installed at

the aircraft plant, 160 operating processes were modernized, 108 new technological processes were introduced (*History Outlines of Buryat ASSR*, 1983, pp. 100). Thus, due to the introduction of innovations, the 9th five-year plan saw a 85% growth of industrial products in Buryatia (*Under the Banner of October*, 1977, pp. 208).

During the 1970s, heavy industry of Buryatia underwent significant reconstruction and modernization. Its main production funds increased by 536 million roubles, and the volume of industrial production grew by 19% (*National Economy of Buryat ASSR*, 1981, pp. 8).

In the 10th five-year plan, the industry of Khakassia made capital expenditures totalling 540 million roubles (by 30% - more than in the ninth five-year plan). Industrial production increased by 28%. The main production funds grew by 72.2%. More than 200 units of new high-performance equipment were installed, 18 shops and production sites were reconstructed, more than 600 exercises implementing new technology and scientific organization of Labour were introduced resulting in 3.5 thousand rationalization. All this gave an economic effect of 11 million roubles. Moreover, 150 kinds of new products were mastered (State Budget Agency "The State Archives of the Republic of Tuva". Backlog 2. List of files 16. File 1. Sheet 8, 10).

In the 9th five-year plan, the association named "Tuvakobalt" took a number of measures for the reconstruction of production. These changes included the following: replenishment of the technological scheme by ammonia; installation of centrifuge № 5 and overhaul of four other centrifuges; reconstruction of the adsorption block and reflation of the poor cobalt ores. As a result, cobalt extraction increased 3% into concentrate, and reagents consumption decreased. The cooperation with several research institutes of the country helped to solve the problems and to increase the production. At the end of the five-year plan, three more developments were planned to implement: distillation of tailings; arsenic treatment with magnesium oxide in the apparatus with intensive mechanical stirring; flotation of autoclave leaching tails. Exemplary workers took part in the modernization of production, for example P.G. Tabaev, V.E. Fedorov, V.G. Elokhov, V.S. Krohalev and others (State Budget Agency "The State Archives of the Republic of Tuva". Backlog 120. List of files 5. File 1. Sheet 8, 24).

In conditions of scientific and technical progress, the development of the Siberian industry inevitably had to cooperate with scientific institutions. In order to unite the forces of academic, branch and university science and to put those technical developments into practice by their implementing in the production, the planning of scientific and technical works at enterprises became relevant. However, in practice, the introduction of innovations in engineering and technology, modernization and reconstruction of production proved to be more complicated than it seemed.

The scientific institutions associated with various industrial sectors were available in almost all industrial brunches. In the mid-1970s, there were 14 scientific research and 12 design institutes, as well as 15 departments, subsidiaries, divisions or laboratories of branch institutes located in other regions, but developing Siberian scientific problems (Dolzhykh, 1985, pp. 51).

Irkutsk branch of the National Research and Design Institute of Aluminium, Magnesium and Electrode Industry provide the high potential of the aluminium industry. The following research institutes developed the problems of increasing production efficiency, increasing ore extraction of non-ferrous metals: the Institute of Non-ferrous and Rare Metals (Irgiredmet) in Irkutsk, CvetMetNIIProekt in

Krasnoyarsk and the subsidiary of Scientific and Production Association Sojuzcvetmetavtomatika. The latter was engaged in automation of non-ferrous metallurgy enterprises. It designed and introduced the Automated Control Systems of Technological Processes of mines, quarries, concentrating plants, systems of complex mechanization and automation of dredges, created robotics, etc. Cooperation with "Sojuzcvetmetavtomatikoj" allowed one to quickly and qualitatively reconstruct the production at Norilsk Mining and Metallurgical Plant, Sorsk Molybdenum Industrial Complex, Krasnoyarsk Factory of Non-Ferrous Metals, and the Association "Balejzoloto" .

The enterprises of chemical industry, for example, Tyre Factory and the Factory of Rubber Products, the Plant of Synthetic Rubber in Krasnoyarsk, used the developments of the Research Institute of Chemical Engineering (Niihimash), the Department of the State Project Institute Goshimproekt, Giprohimmontazh. It took much effort to search for non-trivial forms of development of workers creativity at the enterprises. Thus, in the 10th five-year plan, the work of 90% of engineering and technical employees involved in the chemical industry in Krasnoyarsk Territory was based their personal creative plans. The savings from their implementations amounted to about 5 million roubles in 1980. There was a competition among 90% of specialists at the tyre plant according to their personal creative plans; 2413 measures were taken with the total economic effect of 1.385 million roubles. The results were reported in the factory newspaper "Krasnoyarsk Shinnik". At the plant "Khimvolokno", in 1980, 84.2% of engineers contributed to savings of 902 thousand roubles. At the Kansk biochemical plant, 93% of the staff were into the competition, at Krasnoyarsk biochemical plant – 75%, at the factory of rubber products – 98%, at the factory of synthetic rubber – 81.2% (Provincial State Agency "The State Archives of Krasnoyarsk Territory". Backlog. P. 2230. List of files 1. File 161. Sheet 76-78).

Machine building enterprises, including aircraft plant, the plant called "Teplopribor" located in Ulan-Ude, Chita machine-building plant, the plant named after V.V. Kuibyshev in Irkutsk, were in close cooperation with the National Institutes of Electric Welding named after Paton, Vniimetmash and others. There were no institutions with such specializations in Eastern Siberia, which was an obvious mistake of the administrative organs. The divisions of the national institutions solved the energy problems. In our opinion, this was justified as opposed to mechanical engineering. This industry had a high degree of technological uniformity, and, therefore, there was no need for regional institutions.

Almost 60 associations and enterprises of heavy industry had their own scientific bases (they included laboratories, design and technology bureaus, scientific departments, experimental production, etc.). The production association Angarsknefteorgsintez, Sibelektrostal, Krasnoyarsk Heavy Machinery plant (Kras mash), Norilsk Mining and Melting Complex, Locomotive and Rail-Car Repair Plant, Ulan-Ude Aircraft Plant relied on rather large scientific divisions that allowed them to innovate more actively.

An example of effective creativity of workers, of their ingenuity and rationalization can be the plant Sibelektrostal. The scientific sector of the plant have fulfilled during its existence more than 400 research and experimental-industrial works (Lebedinsky & Yatchenko, 1977). The works in the field of cokeless metallurgy, technology of pure iron production on slag plants and in plasma furnaces, technology of magnetizing roasting in HSH furnaces and some others received the author's certificates as inventions. At the cost of 7-8 million roubles spent on the introduction of new technologies, the economic effect was 40-

60 million roubles (Bendersky & Kvint, 1979), which can serve as an example of the high efficiency of the work carried out.

With the passage of time, the leading branches of the national economy saw the formation of chains of scientific and technological progress, which united in a single complex theoretical and applied research, design work and their experimental testing, as well as the introduction of new technology. Training of highly qualified personnel was of particular importance. Several research institutes worked with Norilsk MMC developing 42 scientific topics. In 1977, 18 topics were introduced with an economic effect of 1.5 million roubles. During the 9th five-year plan, the enterprise called "Enisejzoloto" was the employer for the research including 68 topics with the participation of 23 institutes. By 1980, they planned to automate all 250-litre dredges of the association. New enrichment technologies were actively introduced. Sorsk Molybdenum Plant cooperated with more than a dozen institutes. Important topics that were on the agenda: the improvement of ore enrichment technology, development and implementation of Automated Control Systems of Technological Processes at the concentrating plant, development and implementation of nuclear-physical methods of ore testing in the conditions of natural occurrence, introduction of new flotation and ball mills, etc. Krasnoyarsk Plant "Sibtjzhmash" cooperated with 30 institutes. The result was an increase in the level of mechanization in the main production up to 58%. In the early 1970s, 42.5 thousand measures in association with the Scientific Organization of Labour were introduced with an economic effect of 59.8 million roubles, and their efficiency was very high: On 1 rouble of costs the economic effect was 1.83 roubles (Provincial State Agency "The State Archives of Krasnoyarsk Territory". Backlog 26. List of files 9. File 677. Sheet 68).

Summing up, it is possible to say that reconstruction and modernization had some impact on almost all branches of heavy industry.

Since the beginning of Perestroika, the economy in the USSR has been changed: during privatization many enterprises change their form of ownership; profit became the main focus. Based on these new reasons, the structure of heavy industry in Eastern Siberia changes, which is reflected in the study made by Vinokurov and Sukhodolov (2009).

4. Purpose of the Study

The purpose of the article is to summarize the experience of industrial enterprises in reconstruction and modernization of production, in improvement of engineering and technology. The work highlights a number of factors influencing the process of updating the production and achieving the best production performance. It also noted the shortcomings and problems in this process.

5. Research Methods

The article uses both scientific methods and methods of historical research, i.e. the problem-chronological method, the historical-genetic method, and the historical-comparative method. The use of statistical and historical-sociological methods was justified in the analysis of economic history. The study also applies the Structural analysis techniques. The variety of methods have created a voluminous picture of the past.

6. Findings

The study draws a number of cumulative conclusions in the assessment of the strategy and modernization of the heavy industry in Eastern Siberia.

First, the years before Perestroika had the industrial potential of the region in such a state that it was necessary to upgrade production. The major tasks of the Party and the Government were to carry out the reconstruction and modernization of the industry.

Secondly, the strategy for the development of this process had been defined at the national and local levels. However, such concepts as "expansion", "reconstruction", "modernization", "upgrading of technical equipment" were not clearly defined during this period. This caused an amorphous state of the process and undeveloped strategic settings. Ministries and agencies, local party bodies, as well as party organizations of enterprises paid a lot of attention to the introduction of innovations in the heavy industry, but the results could be better.

Thirdly, at the national level, the state has solved too wide a range of tasks related to the issues of reconstruction. Therefore, the regional strategy compensated possible shortcomings. Such issues were well addressed in the Chita Region and Krasnoyarsk Territory, and they were weaker in Irkutsk Region and Republic of Buryatia.

In the fourth, the key to solving many problems in the conditions of scientific and technological progress was the connection of scientific achievements with experimental production. Increasing the efficiency of work depended on the transformation of science into a direct productive force. Enterprises began to turn to the development of fundamental, branch and university science. Many plants and enterprises of Eastern Siberia cooperated closely with scientific institutions of the region and the country. Somewhere the impact of their interaction was high; somewhere it was lower. It differed from area to area, and from industry to industry.

In the fifth, innovators and inventors contributed to the process through the Civil Engineering Bureaus, Public Patent Offices, and the National Society of Inventors and Innovators. Engineering personnel also sought to participate in the renovation of production.

The author has developed and specified these provisions in a monograph (Uvarova, 2017).

7. Conclusion

Reconstruction and modernization of enterprises were the general direction of development of heavy industry in the specified period. There certainly were some problems and shortcomings. However, the importance of the process is not questioned. Courageous technical solutions were applied. The employees initiated the acceleration of the replacement of obsolete equipment. Highly educated and constantly trained personnel, reasonable combination of moral and material incentives, fresh economic ideas were able to make this process highly effective. In these conditions, the synthesis of innovative experience is of great importance for the development of a strategy ahead of the region.

The research based on a large number of archival data results in some recommendations. Production update is a very complicated process. It requires maximum elaboration of a strategy and tactics, comprehension of each factor, the inclusion of the collective in the common activities, the use of material

and moral incentives. It is necessary to remember that the purpose of production is not only profit, but also improvement of life of workers.

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