SARI AUTIO-SARASMO

COOPERATION ACROSS THE IRON CURTAIN

SOVIET TRANSFER OF TECHNOLOGY FROM WEST GERMANY IN THE 1960S

In the post-World War II structure of world politics, it was imperative for the Soviet Union to demonstrate its supremacy and to maintain and reassert its position as superpower and leader of the Eastern bloc. The will to prove the 'historically determined' victory of communism over capitalism[1] shaped – among other things – the aims of the Soviet Union's economic strategy during the Cold War, which was based on technological developments that had rapidly progressed during World War II and the immediate postwar years. In the 1950s, the Soviet leadership realized that technological progress had become a more important source of growth in the United States and Western Europe than increases in labour and capital inputs, which until then had formed the basis of the Soviet Union's growth strategy.[2] Under the leadership of Nikita S. Khrushchev (1956–64), policy makers recognized the importance of technological progress for economic growth – an aspect that was henceforth reflected in Soviet plans for economic modernization. The Soviet leadership moreover realized the importance of automation and accepted the need for advanced foreign technology and knowhow as the basis for automatizing Soviet industry.[3] This was a clear continuation

[1] This becomes especially clear in Khrushchev's rhetoric. JOHN LEWIS GADDIS, Cold War, London 2005, p. 84; WILLIAM TAUBMAN, Khrushchev. The Man and his Era, London 2003, p. 427, 511.

[2] JOSEPH BERLINER, Soviet industry from Stalin to Gorbachev, Surrey 1988, p. 249; GEORGE HOLLIDAY, Technology transfer to the USSR 1928-1937 and 1966-1975. The role of Western technology in Soviet economic development, Boulder 1979, p. 59; ERIK P. HOFFMAN/ ROBBIN F. LAIRD, 'The scientific-technological revolution' and Soviet foreign policy, London 1982, p. 93.

[3] Ibid, p. 7-8; SARI AUTIO-SARASMO, Soviet Economic Modernisation and Transferring Technologies from the West, in: Modernisation in Russia since 1900, ed. by MARKKU KANGASPURO/ JEREMY SMITH, Helsinki 2006, p. 104-123, p. 110-111.

of the policies of former Russian leaders, who had turned backwardness into an advantage: Borrowing advanced technology facilitated quick progress.[4]

For the Soviet Union, the problem occurred when conventional nonautomated metal-working machinery was the only relatively developed branch of postwar civil industry – not taking the Soviet military complex into consideration, which is not addressed in this study. Mostly due to Khrushchev's efforts, in the 1950s and 60s the Soviet Union focused on Western Europe and especially West Germany for the transfer of technology that was needed in the Soviet Union.[5] Technology transfer, which is usually divided into two subsections (commercial and noncommercial transfer), has always been a normal part of commercial life and an important source of economic growth throughout the world.[6] For the Soviet Union, the acquisition of technology and knowhow was the most important aspect of transfer, and the line dividing commercial and noncommercial transfer was thin. Foreign technology, mainly innovations from one country, were subsequently put to use in the Soviet Union either directly or as a template for designing domestic production means.[7] Thus, during the Cold War the Soviet Union relied on already existing technology and knowhow in order to accumulate experience and to learn through the active exploitation and imitation of foreign expert knowledge. The main methods involved in this were learning by doing and reverse engineering, i.e. the deduction of the techniques of manufacture from a close examination of the product.[8]

The task of technology transfer from the West was, however, more demanding now than in the interwar years. Before World War II, techno-

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[4] SHEILA FITZPATRICK, The Russian Revolution, Oxford 1994, p. 19; PAUL R. GREGORY/ ROBERT C. STUART, Soviet and Post-Soviet Economic Structure and Performance, 5th edition, New York 1994, p. 8; Technology and East-West Trade Report. Office of Technology Assessment, US Congress, November 1979, p. 214-215, 217.

[5] Russian State Archive of the Economy [Rossiiskii Gosudarstvennyi Arkhiv Ėkonomiki (RGAĖ)], f. 9480, op. 7, d. 805, l. 9.

[6] PHILIP HANSON, The Rise and Fall of the Soviet Economy. An Economic History of the USSR 1945–1991, London 2003, p. 123; Technology and East-West trade Report, p. 100.

[7] PHILIP HANSON, Trade and Technology in Soviet-Western Relations, London 1981, p. 13-14; ERKKI NIRONEN, Transfer of Technology between Finland and the Soviet Union, in: Finnish-Soviet Economic Relations, ed. by KARI MÖTTÖLÄ/ O. N. BYKOV/ I. S. KOROLEV, London 1983, p. 161.

[8] MARJATTA HIETALA, Innovaatioiden ja kansainvälistymisen vuosikymmenet. Tietoa, taitoa, asiantuntemusta. Helsinki eurooppalaisessa kehityksessä 1875–1917 [Decades of Innovations and Internationalization. Helsinki in the European Progress 1875–1917], Helsinki 1992, p. 265; Technology and East-West trade Report, p. 100.

logy was transferred through normal trade and mainly in the form of machinery based on innovations that were already widely known. After World War II, the structure of technology transfer and trade changed. With the dawn of the Cold War, technological innovations became tied to military technology and the arms race, which made technology, and especially the transfer of technology, a matter of world politics. Based on Russian archival materials and from the Soviet point of view, this article investigates Soviet technology and knowhow transfer from West Germany in the late 1950s and early 60s in the context of the Cold War. How was transfer from West Germany organized? What kinds of technology and knowhow were transferred? How and why did the Soviet Union acquire specifically these things?

1. Transferring Technologies: The Modernization of the Soviet Economy

Transferring foreign technology thus became one of the main strategies to promote technological progress and economic modernization in the Soviet Union. Soviet 'modernization' emphasized the role of technology and economic growth in the process.[9] Already Lenin realized the need for foreign technology and expertise in the development of Soviet Russia. For Stalin, industrialization was tantamount to modernization. The slogan for the First Five-Year Plan (1928–32), 'Technology decides everything!', set the aim of the industrialization programme.

The main instrument in Stalin's economic growth programme was centralized economic planning, which enabled very high rates of investment to be generated in certain areas. Heavy industry was prioritized with a view to producing machinery for all the remaining branches of the economy. The use of technology, such as tractors and advanced tools, was strongly propagated.[10] Stalin imported foreign technology to the Soviet Union, mainly in the form of machinery from Germany, in order to create a foundation for domestic heavy industry. By importing machinery and prioritizing heavy industry, Stalin managed to industrialize the Soviet Union and to create an immense military-industrial complex before the outbreak of World War

[9] HOLLIDAY, Technology transfer, p. 12-13.

[10] VLADIMIR ANDRLE, Workers in Stalin's Russia. Industrialization and Social Change in a Planned Economy, New York 1988, p. 13, 32; SARI AUTIO, Suunnitelmatalous Neuvosto-Karjalassa 1928-1941. Paikallistason rooli Neuvostoliiton teollistamisessa [Planned Economy in the Karelian ASSR 1928-1941. The Role of the Local Level in the Industrialization of the Soviet Union], Helsinki 2002, p. 105.

II.[11] The paradox lay in the fact that the Soviet Union was able to produce the high technology that was needed in the space programme and in arms control, but was unable to translate these scientific breakthroughs into economically competitive innovations.[12]

The main problem in the Soviet Union was thus not lack of high technology. Rather, there was a lack of the medium-level technology needed for the automatization of basic industry. When the Soviet leadership adopted the idea of modernization based on technological progress and industrial automatization, the need emerged for technologies and knowhow which did not exist in the Soviet Union.[13] Engineering and the mathematical sciences were at a high level and the Soviet research and development system (R&D) was well established and supported.[14] The problem was that the sorts of connections between the civil and military sectors that existed in the West were never established in the Soviet Union, and that the divide separating these two sectors served to isolate the prioritized and developed military-industrial complex from wider Soviet R&D.[15] Resources (funding and intellectual capacity) were allocated mainly to the military-industrial complex.

Not only the problematic prioritization of the economy, but also the restrictions of the Cold War caused the problems inherent in Soviet technology and knowhow acquisition from the West. The United States wanted to prevent the flow of high technology to the Soviet Union and the socialist bloc. The U.S.A. and other Western countries thus raised a high technology embargo against the socialist states, hampering the Soviet leadership's plans to transfer Western technology to the Soviet Union. The Western strategic embargo CoCom, in which the United States took a leading role, was established in 1949.[16] This multilateral export and control mechanism was implemented by NATO members as a response to the Soviet atomic bomb, with the main aim of retarding Soviet technical progress in key

[11] GREGORY/ STUART, Soviet and Post-Soviet Economic Structure, p. 15, 30; see also HANSON, The Rise and Fall, p. 62; on the connection between science and industry during the Stalin era, ROBERT LEWIS, Science and Industrialisation in the USSR, London 1979.

[12] BERLINER, Soviet industry, p. 218; ILMARI SUSILUOTO, Suuruuden laskuoppi. Venäläisen tietoyhteiskunnan synty ja kehitys [History of the Russian Information Society], Helsinki 2006.

[13] RGAĖ, f. 9480, op. 7, d. 805, l. 39-40.

[14] AUTIO-SARASMO, Soviet Economic Modernisation, p. 112.

[15] SUSILUOTO, Suuruuden laskuoppi, p. 172-173. Even the computer systems that were created inside the military complex were incompatible with one another.

[16] More detailed: J[OZEF] WILCZYNSKI, Technology in COMECON, London 1974, p. 331.

strategic areas. The embargo was directed against exports of technology that might contribute to military and civilian economic performance, and it was aimed not only at the Soviet Union but at the entire socialist bloc.[17] In addition, tariffs were set high, trade and technology transfer facilities and mechanisms were restricted, and credits were discouraged.[18]

Because no CoCom decision was legally binding for a member nation, all of its decisions had to be unanimous. In spite of its leading role in the embargo, the United States only had a limited ability to persuade its allies to strengthen CoCom.[19] The U.S. embargo policy against the Soviet bloc did not meet with unanimous support in Western Europe. In the early 1950s, Great Britain and France were reluctant to support the embargo of products that could become the subject of commercial trade with the Soviet bloc.[20] Moreover, in the Soviet Union there was great demand for technology that Western Europe could supply. Although the embargo did not manage to prevent trade between the socialist countries and Western Europe, technology transfer from the West was not an easy task for the Soviet leadership. The need for 'capitalist' technology clashed with the idea of the superiority of the socialist system[21] and thus created an ideological problem.

One of the methods used to address the problems involved in transferring Western technology to the Soviet Union was the adoption of the concept of the Scientific-Technical Revolution (STR).[22] The concept STR was popularized in the West in the late 1950s to explain the rapid technological progress unfolding at the time and the changes that followed in its wake. The STR also included the close integration of science, theory, technology

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[17] HANSON, Trade and Technology, p. 223; GARY BERTSCH, Technology Transfers and Technology Controls. A Synthesis of the Western-Soviet Relationship, in: Technical Progress and Soviet Economic Development, ed. by ROBERT AMANN/ JULIAN COOPER, Oxford 1986, p. 115-134, p. 127-128; HANSON, The Rise and Fall of the Soviet Economy, p. 161. As Hanson points out, the Volga automobile plant was reviewed with the aim of ascertaining whether the Italian-made machine tools could be diverted to tank production.

[18] BERTSCH, Technology Transfers, p. 127-128; ERKKI NIRONEN, Neuvostoliitto läntisen teknologian tuojana. Tutkimusraportti 39. Lappeenrannan teknillinen korkeakoulu [The Soviet Union as Importer of Western Technology, Research Report. University of Technology], Lappeenranta 1991, p. 50-53. For a different approach to CoCom: IAN JACKSON, The Economic Cold War. America, Britain, and East-West Trade, 1948–1963, New York 2001.

[19] Technology and East-West trade Report, p. 155-156, 160, 14; ERKKI NIRONEN, Lännen embargopolitiikka murrosvaiheessa [Western Embargo Policy in Transition], in: Ulkopolitiikka [Foreign Policy] 3 (1990), p. 44-49, p. 44.

[20] JACKSON, The Economic Cold War, p. 173, 178.

[21] GADDIS, Cold War, p. 84.

[22] Ibid., p. 87.

and production, and its main elements were various new technological processes. The economic content of the STR included improvements in the factors of production and products, enabling a rapid expansion of production as well as substantial increases in social welfare.[23] The idea of the STR suited the Soviet leadership's aims and served as a useful propaganda concept – both inside and outside the socialist bloc.

One result of the Western embargo was the strengthening of scientific-technical cooperation inside the Soviet bloc. The Council for Mutual Economic Assistance (COMECON) was established in 1949. Economic performance within COMECON was based on a division of labour which, along with the aims of scientific-technical cooperation, was based on priorities set by the Soviet Union. These priorities were standardization, which was connected to the international division of labour, and the transfer of scientific-technical discoveries and designs from one country to another. This mainly involved cooperation and division of labour in R&D within the COMECON area. One country took care of one process and then sent the results on to the Soviet Union, where all strands converged.[24] This was officially intended to serve the common good, but ultimately the main benefit was accumulated in the Soviet Union. That is why the realization of the STR was strongly propagated within COMECON as the Soviet Union's main aim. However, scientific-technical cooperation within the socialist bloc did not solve the problem of the lack of technology. In spite of serious efforts, by the early 1960s the realization dawned in the Soviet Union that advanced Western processes, designs, knowhow, machinery and equipment were still needed throughout the COMECON area. Technology obtainable inside the bloc was no longer sufficient to keep abreast of the STR.[25] This made Soviet networking and cooperation with the West more target-oriented: New opportunities for cooperation were actively sought, and existing ties were strengthened.

[23] WILCZYNSKI, Technology, p. 6-7. Wilczynski attributes the concept to Bertrand Russell.

[24] Ibid., p. 141, 172; Russian State Archive of Contemporary History [Rossiiskii Gosudarstvennyi Arkhiv Noveishei Istorii (RGANI)], f. 5, op. 40, d. 98, l. 98-178; Russian State Archive on Scientific-technical Documentation, Samara Branch [Rossiiskii Gosudarstvennyi Arkhiv Nauchno-Tekhnicheskoi Dokumentatsii, filial v g. Samare (RGANTD)], f. r-20, op. 4-6, d. 227, l. 34; RGANTD, f. r-20, op. 4-6, d. 312, l. 97.

[25] WILCZYNSKI, Technology, p. 14, 145, 185, 275, 296.

2. Technology Transfer is organized

Khrushchev's methods for overcoming backwardness were technologically oriented and his willingness to adopt new scientific innovations determined the orientation of Soviet economic modernization and decision making the in the late 1950s and early 60s.[26] In 1955, the State Committee for the Introduction of New Technology into the National Economy (Gostekhnika) was established as part of the preparation of the Sixth Five-Year Plan.[27]

In the late 1950s, several projects were launched with the aim of diffusing new technology in the Soviet Union. According to a 1957 resolution of the U.S.S.R. Council of Ministers, some two-thousand examples of imported machines, instruments and new materials had been provided for thorough investigation and utilization in the years between 1955 and 1957.[28] In its own inspection conducted early in 1957, Gostekhnika assessed the realization of the plan drawn up by Soviet ministries and authorities, examining how the new technology had been diffused in R&D institutes and enterprises. The inspection's findings were rather disturbing. Although there had been serious attempts to investigate and diffuse new technologies, no breakthroughs had eventuated. Gostekhnika recommended that more new technologies be obtained for testing and production, that a wider acquisition of technology be pursued.[29]

The division of machine building under the Central Committee (CC) of the Communist Party of the Soviet Union (CPSU) was one of the main party organs involved in the planning of industrial development. According to this division's reviews, plans issued by the CC CPSU for the implementation of new technology in the years between 1957 and 1960 were inadequate in many respects. Coordination between the ministries and authorities was insufficient, which resulted in a lack of interest in implementing new technology in enterprises and R&D institutes.[30] As early as the late 1950s, it became clear that there was a need for a system that would coordinate the

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[26] TAUBMAN, Khrushchev, p. 620. On Khrushchev's attraction to scientists and engineers, see ibid. p. 130.

[27] The system was reorganized several times with different names but the purpose remained the same. ALEC NOVE, An Economic History of the USSR, 1917-1991, London 1992, p. 350; LOREN GRAHAM, Science in Russia and the Soviet Union. A short history, Cambridge 1993, p. 181.

[28] The materials do not reveal whether the process of reverse engineering was involved or not.

[29] RGANI, f. 5, op. 40. d. 67, l. 4-9. It was also mentioned that the acquisition should be directed towards the United States.

[30] RGANI, f. 5, op. 40, d. 52, l. 1-6.

implementation of new technology in the Soviet Union and organize the acquisition of technology and knowhow from abroad.

The plan to create the State Scientific-technological Committee[31] (GKNT) under the U.S.S.R. Council of Ministers was reviewed by the highest party organs at the beginning of 1957.[32] It would introduce a thorough system for investigating the latest findings in the field of technology in the Soviet Union, throughout the Soviet bloc as well as abroad. The GKNT's task would also comprise the acquisition of innovations and the diffusion of these technologies among Soviet R&D institutions. According to the plan, the GKNT was to coordinate all technology and knowhow transfer to the Soviet Union, to facilitate new technology acquisition and to draft implementation strategies for the future. Inside the Soviet Union, the task of the GKNT was clear: to mediate information, propagate new practices and diffuse new technologies.[33] The creation of this new administrative organ was approved by the CC CPSU in 1958 and operational work started immediately.[34] Operations that took place in the late 1950s and early 60s proved that the GKNT was actively fulfilling its tasks as delineated in the plan.

Technology and knowledge transfer from abroad was one of the main objectives in the work of the GKNT. This was achieved mainly through foreign missions (*komandirovki*) carried out by Soviet specialists. The GKNT was in charge of preparing missions and taking care of arrangements in the target countries. Technology advisers in the Soviet embassies and trade commissions collected information on the technology and knowhow in their station countries for the use of the GKNT. The participation of Soviet specialists at international conferences and exhibitions, and their membership in international scientific associations formed an important source of background information for the work of the GKNT. The information collected through these various sources was disseminated inside the Soviet Union via the All-Union Institute for Scientific-Technical Information (VINITI),[35] which was under the jurisdiction of the GKNT and

[31] The Gosudarstvennyi Nauchno-Tekhnicheskii Komitet (GNTK) was the first version of the State Committee for Science and Technology [Gosudarstvennyi Komitet Nauki i Tekhnologii (GKNT)]. In order not to complicate matters, the institution is abbreviated as GKNT throughout; Cf. GRAHAM, p. 181.

[32] RGANI, f. 5, op. 40, d. 52, l. 13-19.

[33] RGANI, f. 5, op. 40, d. 52, l. 13-19.

[34] RGANI, f. 5, op. 40, d. 121, l. 29-30.

[35] VINITI [Vsesoiuznyi Institut Nauchnoi i Tekhnicheskoi Informatsii] was established in 1952; it collected and produced summaries of 22,000 scientific journals and publication series, and about 8,000 books from 130 countries in 70 different languages. JOUKO SEPPÄNEN, Tieteellis-tekninen informaatio Neuvostoliitossa. Suomen ja Neuvostoliiton tieteellis-

the Academy of Sciences.[36] This system of collecting information was very effective and thorough.

The system soon received the chance to prove its efficacy. Soviet embassies drew up a multitude of reports about the economic and technological development of the target countries.[37] During their foreign missions, Soviet specialists, who came mainly from ministries and state enterprises, would begin by collecting information from those branches of the economy that were most useful for the Soviet Union. In the initial stages, the information collected during the missions was of a very practical nature. After having visited the selected production units, Soviet specialists wrote up practical suggestions for action based on what they had experienced and observed in the course of their visits. It was essential that such visits involved a clear benefit for the Soviet side: When no such benefit was discernible, no specialists were sent.[38] In the early 1960s, when COMECON proved unable to produce compatible new technology, these missions became more target-oriented and more focused on technological observations. Soviet specialists travelling abroad produced reports with hundreds of pages describing the pertaining technology, illustrated with dozens of photos and constructional drawings, which were then distributed through the GKNT for the benefit of Soviet industrial designers.[39]

However, the influence of the collected information proved to be rather negligible for Soviet R&D. The main reason for this seemed to be the planning system, which on the one hand created a relatively flexible environment in terms of resource allocation and mission-oriented projects. On the other hand, the advantage of flexibility turned into a disadvantage when plan fulfilment became the main aim of the economic strategy. Any new technology based on domestic design or reverse engineering required considerable new resources and new suppliers, which was a considerable problem in the Soviet Union because of the lack of horizontal connections between industries. All branches of industry were forced to compete for the

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teknisen yhteistoimintakomitean julkaisusarja 2 [Scientific-Technical Information in the Soviet Union. Joint Publication Series of the Commission of Scientific-technical Cooperation], Helsinki 1978.

[36] RGANI, f. 5, op. 40, d. 52, l. 13-19.

[37] Cf. the case of Finland in 1960, Archive of Foreign Policy of the Russian Federation [Arkhiv Vneshnei Politiki Rossiiskoi Federatsii] (AVP RF) f. 135, op. 42, p. 89, d. 16, l. 5-24. The case of Sweden is very illuminating. RGANI f. 5, op. 40, d. 157, l. 4-23.

[38] RGAĖ, f. 9480, op. 3, d. 1610, l. 42. This information is based on the Finnish example, but similar things can also be found for the case of the Federal Republic of Germany, cf. RGAĖ, f. 9480, op. 7, d. 816, l. 307.

[39] Cf. RGANTD, f. p-18, op. 2-6. d. 204 for the case of the Finnish enterprise Outokumpu.

same materials, which resulted in departmental barriers. Thus, when plan fulfilment was threatened, the tendency was to shift away from new products towards the safe, established ones.[40] This appears to be the problem also in the utilization of information collected by Soviet specialists.

3. The Soviet Union and West Germany: Cooperation and Suspicion

In contrast to interwar technology transfer, which was limited to machines alone, postwar transfers also involved knowhow and expertise. The Soviet Union promoted cooperation with Western countries particularly actively in the early 1960s.[41] For the Soviet Union, one of the main target countries in Western Europe for technology and knowledge transfer was West Germany.[42] As far as technology transfer is concerned, this was a clear continuation of the Stalinist industrialization process, when most of the machinery had been bought from Germany. In the late 1950s, West Germany was already a developed industrial state, especially in the field of electronics and related technologies that were much needed in the Soviet Union. The need for advanced technology and knowhow was the explicit reason for seeking cooperation with West German enterprises and sending Soviet specialists to West Germany.[43]

After the establishment of the GKNT in the late 1950s, the target-oriented organization of cooperation between the Soviet Union and West German enterprises commenced. Soviet specialists participated in scientific conferences and technology exhibitions in order to collect information and to establish connections with Western enterprises and specialists.[44] A good example of this is the Soviet Union's membership in the International Electrotechnical Commission (IEC), where it was possible to become acquainted with Western standards and the latest findings in the field, as well as to meet other members of the Commission. Soviet participation in

[40] HOFFMAN/ LAIRD, 'The scientific-technological revolution', p. 98; BERLINER, Soviet industry, p. 203; RONALD AMANN, Technical Progress and Soviet Economic Development, in: Technical Progress and Soviet Economic Development, p. 5-30, p. 16; NIRONEN, Neuvostoliitto läntisen teknologian tuojana, p. 23.

[41] BERTSCH, Technology Transfers, p. 117, 120; HOLLIDAY, Technology transfer, p. 47.

[42] As early as in 1960, West Germany was prioritized over the United States when it came to cooperation in technology transfer. RGAĖ, f. 9480, op. 7, d. 805, l. 9.

[43] RGAĖ, f. 9480, op. 7, d. 805, l. 39-41.

[44] RGANI, f. 5, op. 40, d. 121, l. 54-55.

the IEC was very active and its general meeting was held in Moscow in 1957.[45] A key event was the international congress and exhibition in Düsseldorf in November 1957. During the conference, Soviet specialists visited not only the exhibition stands but also the production units of West German enterprises in order to familiarize themselves with projects for the automation and development of the machine-building industry. After the excursion, the CC CPSU received a detailed report from the Soviet delegation analysing the main areas of German technology. Based on the specialists' visits to various technology exhibitions, Soviet interest came to focus in particular on firms like Siemens and AEG, which were pioneers in the field of control systems.[46]

According to the system of the GKNT, Soviet ministries and subcommittees suggested the themes of missions and nominated the specialists to be sent. It appears that in the late 1950s and early 60s, when the specialists were mainly senior engineers and technicians from related Soviet ministries and production units, no special selection process, i. e. the estimation of reliability or demand of party membership, took place. Knowledge of the language of the destination area might have been mentioned in the material and was perhaps regarded as an advantage.[47] The names and positions of the nominated specialists were sent to the GKNT by the proposing organization (mainly ministries and state enterprises), and the GKNT then forwarded the supported propositions to the organs of the CC CPSU. In the 1970s, especially in the fields with strategic stature, e.g. atomic energy, the specialists and their families were thoroughly investigated by the party organs (among others) with regard to their political reliability.[48]

The level of implementation also proposed initiatives for visits, but the contacts were established at the state committee level.[49] Research institutes and production units actively suggested missions to West German enterprises when a special technology or information was needed. The Electrotechnical Institute V. I. Lenin proposed a commission to West Germany in order to familiarize its specialists with the enterprises AEG and Siemens-Schuckert.[50] The contact point between the state committees and

[45] RGANI, f. 5, op. 40, d. 67, l. 104-115; see also http://www.iec.ch/index.html, accessed 27 April 2009.

[46] RGANI, f. 5, op. 40, d. 98, l. 9-20. These firms also participated actively in the work of the IEC: RGANI, f. 5, op. 40, d. 67, l. 59.

[47] RGANI, f. 5, op. 40, d. 121, l. 38.

[48] RGANI, f. 5, op. 66, d. 196, l.128; 130; 134-136.

[49] Cf. RGAĖ, f. 9480, op. 7, d. 805, ll- 7-8; 12; l. 119.

[50] RGAĖ, f. 9480, op. 7, d. 805, l. 57. In Russian archival material, the enterprise is referred to as 'Siemens Sukkert'.

West German enterprises was the Soviet embassy in Bonn. According to the assignments issued by the GKNT, the embassy made contact with the selected enterprises. It also collected information on the enterprises and the advanced technology, which was then sent to the GKNT and VINITI.[51] On the Soviet side, visits were well prepared from the point of view of information acquisition. Soviet specialists had a clear plan of action: The sending organization attached a list of questions on technological processes that needed to be answered in the course of the visit. The action plan also included a strategy for disseminating the information in the Soviet Union after the specialists' return home.[52] The main aim of the Soviet Union in this type of cooperation was to obtain the needed information, not necessarily to establish commercial connections with West German enterprises.

Interest in cooperation was mutual – visits were also suggested from the German side to Soviet partners.[53] These visits were reciprocal and, especially in the late 1950s and early 60s, active in both directions. Soviet specialists were mainly engineers, i.e. persons who could apprehend the information during the visits. On the West German side, groups of visitors were smaller and composed by the directors of the collaborative enterprises.[54] In West Germany, there were several reasons why cooperation with the Soviet Union was seen as an opportunity. One of the main reasons was without doubt economic benefit – the Soviet Union represented an eligible trade partner. Markets were large in the Soviet Union, and the country had a high credit ratio.[55] West German companies had taken note of the strong demand for their products in the Soviet Union. In order to advertise the supply, West Germany arranged a technology exhibition in Moscow in August 1962.[56]

An interview with the director of the exhibition, Otto Wolff von Amerongen, in the economic journal *Handelsblatt* from May 1961 was translated by the Soviet embassy. Von Amerongen stated how important it was that the personnel working at the exhibition stands knew Russian and

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[51] Cf. RGAĖ, f. 9480, op. 7, d. 805, l. 200-203; 204; 205-206. The material included catalogues, advertisements, literature and other published information that was openly accessible.

[52] RGAĖ, f. 9480, op. 7, d. 816, l. 304.

[53] Cf. RGAĖ, f. 9480, op. 7, d. 816, l. 74-75; 76; 78.

[54] RGAĖ, f. 9480, op. 7, d. 816, l. 74-75; 88-89.

[55] HANSON, Trade and Technology, p. 123; from the point of view of West German enterprises: KARSTEN RUDOLPH, Wirtschaftsdiplomatie im Kalten Krieg. Die Ostpolitik der Westdeutschen Großindustrie 1945-1991, Frankfurt am Main 2004.

[56] http://www.welt.de/welt_print/article754448/Der_Eisbrecher.html, accessed 27 April 2009.

understood Russian history and politics, as well as German history and politics.[57] This comment demonstrates the West Germans' serious attitude towards cooperation and trade possibilities with the Soviet Union, as well as the sensitive relationship still lingering between the old enemies.

Technology and knowhow transfer between the Soviet Union and West Germany was very active at the end of the 1950s and the beginning of the 60s. Despite the promising beginnings, however, the approaches of the West German partners were not always consistently positive. The attitude towards the Soviet delegates turned negative – at least for a while – in the early 1960s. In April 1962, the Soviet embassy in Bonn reported that Soviet specialists were being accused of 'industrial espionage' by German newspapers, which caused deep concern at the embassy. This campaign and related vilifications entailed cancellations of proposed visits by Soviet specialists to West German enterprises. According to the Soviet embassy, one of the reasons for the 'misunderstanding of the Soviet specialists' was the poor impression created by the Soviet delegates' refusal to answer any questions concerning production in the Soviet Union or the nature of their missions. The Soviet embassy demanded that delegates be trained to deliver 'open' information before being sent abroad.[58] The problems caused by their ignorance of 'open' information and the fear of divulging 'not-open' information certainly must have had a strong impact on the abilities of the Soviet specialists to establish relationships and networks with West German specialists.

The accusations of industrial espionage caused delays in the missions of Soviet delegates to West Germany.[59] These allegations seemed to be the first in a series of problems connected to technology and knowhow transfer between the Soviet Union and West Germany. In spring 1963, Siemens-Schuckert very reluctantly decided to continue cooperation with its Soviet partners. In the ensuing discussion, the German partners proved unwilling to expand technical and economic cooperation. The directors of Siemens-Schuckert invoked the CoCom restrictions to explain their refusal to continue selling electrical locomotives to the Soviet Union. They were worried about the possible problems such sales might entail for the West German government or Siemens-Schuckert.[60] This was the first instance in which

[57] RGAĖ, f. 9480, op. 7, d. 805, l. 32.

[58] RGAĖ, f. 9480, op. 7, d. 805, l. 138. In the late 1950s, discussions were held on open and secret information concerning the scientific and technological development level of the Soviet Union and its production.

[59] RGAĖ, f. 9480, op. 7, d. 805, l. 153-154.

[60] RGAĖ, f. 9480, op. 7, d. 805, l. 404-406.

CoCom is mentioned in the archival materials as a possible factor restricting technology transfer between the Soviet Union and West Germany.

The tone of the report prepared by the Soviet embassy on the negotiations with Siemens-Schuckert was rather concerned. It also strongly emphasized the importance of the Soviet leadership's support for the cooperation: The outcome of the trade negotiations with West German partners should be positive. Although cooperation with West German firms was important for the Soviet Union, it was also noted in the report that the Soviet representatives reminded the leadership of Siemens-Schuckert that they were not the only possible partners for the Soviet Union. The main cause for concern expressed in the report was that the West German attitude towards Soviet initiatives had changed drastically over the course of the past six months. The West German partners had visited Moscow in late autumn 1962 and the visit had been successful in many respects.[61] This case demonstrates the volatility of these sorts of cooperation agreements.

4. Conclusion

Technology and knowledge transfer between the Soviet Union and West Germany is an interesting example of the interactions between countries with different economic and political systems. It shows that technology and knowhow transfer across the Iron Curtain was possible in spite of the restrictions set by the Cold War political rivalry. This becomes apparent when we focus on Europe and European actors. In Western Europe, political issues were left aside when there was a clear commercial benefit involved in the transfer. This case study demonstrates that West Germany's collaboration with the Soviet Union was quite independent. Thus, there was no uniform trade policy towards the Soviet Union throughout the Western bloc as defined by the United States. From the Soviet point of view, economic modernization based on technology and knowledge transfer from the West was considered so valuable that special emphasis was placed on dispelling ideological problems inside the Soviet bloc. The case study also shows that Khrushchev, as leader of the Soviet Union, was open to collaboration with a clear economic benefit for the Soviet side. Soviet–West German cooperation is thus also a good example of the possibilities of bilateral policy utilized by the Soviet Union in the 1960s.

From the vantage point of the Soviet Union, it was a question of acquiring technology and knowhow that could be used to fill the gaps that existed

[61] RGAĖ, f. 9480, op. 7, d. 805, l. 404-406; on the visit see RGAĖ, f. 9480, op. 7, d. 816, l. 74-75, 76, 77.

in Soviet expertise and production. The general aim of the cooperation between the Soviet Union and West Germany in technology and knowhow transfer had been defined as early as in the late 1950s. The Soviet Union's technological level was problematic: It had a successful space programme and computer-based arms control systems, but no capability to translate these innovations into the technological solutions that were essential for the automatization of basic industry. In modernization based on technological progress, the automation of industrial production was the basis for transforming extensive economic growth into intensive growth. As mentioned at the outset, the main problem in the Soviet Union was that there was no connection between the military-industrial complex and the civil sector, as had become established in the West after World War II. Attempts to create advanced technology based on intra-bloc cooperation through COMECON proved to be unsuccessful already in the early 1960s, and this compelled the Soviet leadership to seek cooperation with West European partners through different channels and arrangements. The change in attitudes towards the West and the opening up to cooperation seem to have taken place at the same time. In the early 1960s, the Soviet Union was very active in forging cooperation agreements with Western countries.

For the Soviet Union, the organization of technology and knowledge transfer was a relatively easy task in the early 1960s. As early as in the mid 1950s, a system had been created to organize the acquisition of foreign technology and knowhow and the diffusion of the related information. The establishment of the GKNT created a system that proved to be very effective. The strategy for acquiring technology and knowhow created for the GKNT under Khrushchev was successful and, in contrast to most other systems established by Khrushchev, it remained in place until the end of the Soviet era. The system to collect information was quite effective, but the diffusion of the collected information proved to be more or less ineffective. Because of the inability to translate the collected knowhow into domestic innovations, the Soviet Union was to remain dependent on foreign technology throughout the entire Soviet period.

In the Western bloc, West Germany was one of the main partners for the Soviet Union in technology transfer in the late 1950s and early 60s. In many ways, Soviet-West German cooperation was similar to the scientific-technical cooperation (*nauchno-tekhnicheskoe sotrudnichestvo*) that the Soviet Union launched and promoted among many Western governments in the mid 1950s.[62] Soviet-West German cooperation involved not only tech-

[62] BERTSCH, Technology Transfers, p. 117, 120; HOLLIDAY, Technology transfer, p. 47. The Soviet-West German agreement on scientific-technical cooperation was concluded in 1959. The cooperation was still based on direct connections between the GKNT and West

nology transfer but also the transfer of knowhow and expertise. From the point of view of the Soviet Union's basic scientific-technical cooperation with the West, the main difference in the West German cooperation was that the Soviet Union worked directly with enterprises, not with commissions, as was the case with Finland, for example. In contrast to basic scientific-technical cooperation, which was noncommercial, Soviet-West German cooperation was mainly commercial. This proved to be one of the problems in the early 1960s, when attitudes towards its Soviet partners cooled in West Germany.

The effective system of Soviet acquisition of technology and especially knowhow seemed to be in conflict with the idea of commercial cooperation. During their missions, Soviet specialists collected information based on well-planned agendas. Commercial technology transfer remained at a rather moderate level because reverse engineering was one of the main aims of technology acquisition. Soviet learning by doing was based on examining the product itself and deducing the techniques of the manufacture, e.g. electric locomotives or process techniques. When the Soviet Union bought technology for the purpose of reverse engineering, the benefit for the Western partner was not necessarily as high as expected because no further purchases followed. Accusations of industrial espionage in the early 1960s can also be understood as the outcome of the organized Soviet style of collecting information. Problems arose when the benefit was not mutual and reciprocity did not come to fruition.

The crux of the matter was the Soviet Union's unwillingness or ineptitude to recognize the difference between commercial and noncommercial transfers and the meaning of license and patent agreements. Similar attitudes towards cooperation with the Soviet Union can also be observed in Finland, where the obviously target-oriented behaviour of the Soviet delegates was sometimes perceived as inappropriate. The main reason for the negative attitude here was the Soviet side's eagerness to obtain detailed information on those processes that were forbidden under patent agreement.[63]

The CoCom embargo did not prevent technology transfer between the Soviet Union and West Germany, but CoCom restrictions were used by West German partners as a pretext for certain decisions. Despite the cooler phases in cooperation and some disagreements between the partners, the

German enterprises. Archive of the Russian Academy of Sciences [Arkhiv Rossiiskoi Akademii Nauk (ARAN)], f. 579, op. 13, d.147, l. 1-15.

[63] Neste Oy:n vastaus TT-komission tiedusteluun [Response from enterprise Neste to the inquiry of the ST-commission] 16 October 1961. File Ad 13/3647-55, Foreign Ministry Archive, Finland [Ulkoministeriön arkisto (FMA)].

long tradition of technology transfer between the Soviet Union and West Germany continued. Economic cooperation expanded and intensified even after Khrushchev's removal from power. In the late 1960s, Siemens started to export third-generation computers and components to the Soviet Union and the COMECON countries.[64] In the end, however, although the Soviet Union managed to trade with the West and to transfer foreign technology notwithstanding the restrictions created by the Cold War, it failed to modernize its economy and to create a basis for intensive economic growth.

[64] WILCZYNSKI, Technology, p. 113.