

MODERNIZATION OF SOVIET PULP AND PAPER INDUSTRY AND TECHNOLOGY TRANSFER IN 1953–1964: THE CASE OF ENSO/SVETOGORSK. *Summary*

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Soviet history after the Second World War included both technological achievements in physics and space exploration and apparently outdated industries like forestry and consumer goods manufacturing. Technological backwardness and a need for change in many branches of the Soviet economy were officially recognized by the Soviet leadership following Joseph Stalin's death. Nikita Khrushchev initiated a number of reforms aiming at technological improvement, which he proclaimed to be of great importance. Special attention was paid to the forestry industry, and in 1956 Khrushchev argued that it was vital to renew facilities, improve technologies, mechanize and modernize industries.

However, the Soviet Union faced a shortage of specialists who would be able to develop new and improve existing technologies, and it lacked means to manufacture new machinery. For these reasons, the transfer of Western technologies and learning was seen as vital, and unofficially the Soviet Union took the best of what the West could give to improve the Soviet economy. Official rhetoric, however, did not focus on the Soviet need for Western technologies but described transfer as a form of bilateral cooperation. This became the accepted mode of acquiring technologies by the Soviets during the Cold War.

One of the main sources of new technologies for the Soviet forestry industry was neighboring Finland, a capitalist friend following the Soviet-Finnish war of 1941–1944. It became a source of Finnish homegrown technology and know-how, as well as a channel for transferring technologies from Western Europe and North America. Since cooperation with other Western countries was complicated by the embargo list issued by the United States in 1949, cooperation with Finland was the easiest way of receiving those Western technologies that were actively used by Finnish industries. Finland aimed at neutrality and balance between the two blocs, and it did not conform to all the regulations set by CoCom (the Coordinating Committee for Multilateral Export Controls, created in 1949 by the United States, several NATO countries, and Japan). Cooperation between the Soviet Union and Finland, two countries with different political and economic systems, was established not only on a macro, but also on a micro level, which meant meetings between specialists, trips to industrial sites, lectures, and sharing of technical documents. To a certain extent this shows that, as some historians (in particular Sari Autio-Sarasmo [2010], who is a researcher

at the Aleksanteri Institute in Helsinki) argue, the Iron Curtain was not completely impenetrable, and there were crossings over the East-West border as well as interaction through the Curtain during the Cold War. The Iron Curtain was, thus, rather permeable on a micro level despite the fact that individuals, technologies, and publications did not cross the border very frequently. From a political perspective, cooperation between the Soviet Union and Finland was profitable for both countries. Finnish factories that supplied expensive equipment and provided know-how to the USSR received financial benefits. At the same time Soviet industry received technologies, some of which were, however, secret—and I assume that industrial espionage might have taken place to supplement the official technology transfer.

Autio-Sarasmo's thesis about a permeable curtain on the micro level certainly holds true when we examine a large pulp and paper plant in Svetogorsk, one of the key beneficiaries of the modernization scheme. This industrial site was built in 1887 (and named Enso) in Finland, which then was a part of the Russian Empire. After Finland became independent in 1917, the plant was significantly enlarged, and chloride, cellulose, and other factories, mostly built with Norwegian and Swedish machines, were established. As a result of this enlargement, by the late 1930s the plant was one of the largest in Europe. As a result of two Soviet-Finnish wars in 1939–1940 and 1941–1944, the Soviet Union annexed the plant, aiming to obtain a significant industrial site with advanced technologies. This annexation became more important once the Cold War began and confrontations between the two blocs generated an arms race. Enso produced large amounts of different kinds of cellulose, used not only in making consumer goods but also in gunpowder and, no less importantly, in ballistic rocket production. It is no coincidence that the plant was recognized as being of high importance by the Soviet Union. Even before this period, several instructions issued by the central authorities implied that reconstruction of the plant as quickly as possible was a matter of great urgency. This was, however, not an easy task, as to some extent the plant introduced technologies that were new to Soviet industry, causing a need for labor training. During the war, the Finns (in the late 1930s the population of the area was about 450,000) evacuated inland, with only some staying to live under Soviet rule. To solve the deficit of skilled labor, the authorities encouraged labor migration from other Soviet regions, but those who came were mostly women and unskilled workers. They were skilled enough to rebuild destroyed or damaged factories and buildings in the settlement surrounding the plant but not to repair and launch complicated machinery. The Soviet authorities sought to attract specialists—from other Soviet factories, a local technical school, and even research institutes—to work in Enso. At the same time, the rapidly developing pulp and paper industry in some European countries left its Soviet counterpart behind. Specialists could receive some of the required skills and knowledge from foreign literature, but they needed more training. It is worth noting, furthermore, that during the war some facilities were evacuated by Finnish soldiers. Making the problem even more complicated, the equipment and replacement components required for the factory's facilities were not produced in the Soviet Union. Some of the evacuated machinery was eventually returned by Finland, but by

the 1950s it was outdated. Then, the plant experienced some resource difficulties due to changing conditions of the supply chain. When the plant was located in Finland, it was supplied with pulpwood floated along the Vuoksa River. The new Soviet-Finnish border established after the war made this route impossible, but supply chain on the opposite side (from the inner parts of the Soviet Union) was not well organized. Even though the Soviet Union “(in particular the Russian Federation)” brimmed with forest, timber cutting, which was under the auspices of the Gulag system until the mid-1950s, was poorly managed. All these factors challenged the plant’s operations, and therefore the Soviet leadership considered improvements to be of the utmost urgency. To reconstruct the plant the Soviet authorities thus were forced to solve problems relating to technical, labor, and resource factors.

As Thomas P. Hughes (1994) argues, the successful operation of a technological system depends on the interaction of many components: machines, knowledge, organizations, resources, and so-called scientific artifacts (like books and articles). The main thesis of this article is that the modernization of Soviet industry depended on the interaction of these factors. Introduction of a technology was directly connected with the capacity to provide the required components by purchasing machinery and literature, learning from other, more skilled specialists, or even espionage. Since the interacting components influence each other and changes to one element cause changes in others, it was crucial to provide the conditions for their coherent interaction. The social, technological, material (technologies embedded in textual), and nonmaterial (including the tacit knowledge which keeps mechanisms functioning) all interact in the space delimited by this interaction.

Putting modernization in this context, I argue that in the Soviet Union there were not enough resources enabling modernization of the Enso/Svetogorsk plant. Archival sources show that after the plant was annexed, the new Soviet authorities faced problems related to all the above-mentioned components. In that respect, despite the Cold War, Finland provided many required resources. Cooperation with Finland, which actually implied huge costs for the Soviet government, provided the means of modernization: equipment, know-how, and even raw materials like wood. Finnish companies became primary suppliers for the Soviet pulp and paper industry during the modernization period. In the mid-1950s–1960s specialists and workers at the plant demonstrated a growing interest in studying foreign practices in order to develop their skills. This was mostly stimulated by resolutions issued by the central and local authorities as well as by leaders’ speeches published in a local newspaper. Both management and specialists considered foreign expertise as a means of solving the many technical and technological problems they faced.

What resources were provided—and how they were applied by Soviet specialists—directly influenced whether a technology could be successfully modernized or not. Thus, the development of cellulose bleaching production through resource transfer was rather effectively implemented. Finland supplied all the elements necessary for this project, even though this type of cellulose was of great military importance during the Cold War. The Soviet Union launched projects to develop such cellulose in

1930, but by 1950s production was still low. The Finnish company Rauma-Repola, which started operations in 1930s using American technologies, became the main supplier of equipment and know-how for Soviet cellulose bleaching. While also selling machines, it trained Soviet specialists for a short period and sent its experts to help if there were equipment troubles (usually caused by lack of user skills). Specialists from other Soviet industrial sites and organizations travelled to Finland to learn Western technologies, later sharing their experiences at special interplant conferences. This raises the question of whether such technologies were “pure,” or, in other words, did they change through the process of being transferred. This is a question that emerges from the fact that most workers learned to use imported technologies by reading manuals, which were purchased by Soviet institutions and distributed among industrial plants.

Wood waste recycling was another important technology, as it made conservation of wood resources possible by using recycled materials in production. This could help the pulp and paper industry survive despite suffering from erratic supplies of raw materials. Beginning in 1950s, this problem was raised in many articles written by pulp and paper industry employees and published in professional forestry journals, such as *Lesnaia promyshlennost'*. Some specialists were sent to study these technologies in countries that held leading positions in the industry. Some timber mills were ready to deliver their waste to pulp and paper plants, but they did not have the capacity to transport it. Timber mills used Finnish equipment for producing waste but this equipment required frequent replacement of key parts (in particular the cutting blades), which were not produced in the Soviet Union. Many of those who traveled to Finnish factories recommended purchasing this equipment, but their advice was not followed for unknown reasons (comments to this effect appear quite frequently in archival sources). In contrast to cellulose bleaching, waste recycling was perceived as purchasing of techniques, while important replacement parts were not being purchased. The reason for this was probably connected to the strategic value of pulp bleaching, as the government was ready to pay for these technologies, while waste recycling seemed to be of lesser concern.

Due to the successful transfer of knowledge, equipment, and raw materials, specialists from Svetogorsk launched and developed pulp bleaching. This project was accomplished because Finnish experts of the supplying companies travelled to the plant in order to consult with Soviet specialists when some equipment broke down as a result of insufficient know-how. On the other hand, implementation of waste recycling was unsuccessful because supplies were erratic, while trips made by Soviet specialists to learn Finnish waste recycling technologies were infrequent. Although the bleaching facility was built and technologies were launched, production was dependent on the supplier, as only Finnish specialists could fix the machinery when required. Short-term trips to Finnish factories and leafing through foreign journals was not sufficient for the Soviet Union to “surpass” the West—the final goal of Khrushchev’s modernization.

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