CHAPTER 5

Catching-up Modernization: Synthetic Fiber in East Germany and Poland

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1 Introduction

Research conducted in the 1990s highlights the fact that planned economies in former Eastern Bloc countries were characterized by inherent dysfunctions resulting in considerable development gaps when compared to their capitalist counterparts (see, e.g., Kornai 1992; Balcerowicz 1995). Characteristics such as the lack of competition and barriers to foreign trade resulted in an increasing productivity gap vis-à-vis the West. These characteristics correspond to fundamental features of planned economies, such as socialist ownership, the centralization of decision-making, and information and motivation problems on different system levels (see Buchheim 1995; Gutmann 1999).

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All this leads to a general observation: planned economies underperformed with regard to innovation, that is, technological change resulting in economic progress. Without competition or the pressure to reduce costs, the incentives for companies—which were often protected by a monopoly—to invest in innovation were too weak. The most important goal of company managers was rather to fulfill politically or ideologically motivated plan targets. Risky innovation investments had the potential to thwart plan fulfillment. Investments in technological change, with the West as a blueprint, often had to be decreed by central planners, necessarily resulting in a modernization lag with respect to leading capitalist economies and companies. Besides, the priority of politics over economy increased the risk of allocative inefficiency (Hanson and Pavitt 1987, 19; Gomułka 1990, 97–98).

To shed greater light on modernization attempts at the micro and meso levels of planned economies, this chapter focuses on the synthetic fiber plants in Guben, East Germany, and Gorzów, Poland.[1] The plant in Guben was part of a large-scale modernization program in the chemical industry of Eastern Bloc countries. In 1956, this segment received its own Standing Commission at the international Council of Mutual Economic Aid (CMEA), with headquarters in East Berlin. In February 1958, East Germany and the Soviet Union reached an agreement on the delivery of Soviet raw materials to East Germany and the delivery of East German chemical end products back to the Soviet Union (Karlsch 1999, 292). In summer 1958, the Soviet Union decided to implement a chemicalization program, which was followed by a similar step in East Germany. CMEA countries also reached a decision to construct a transcontinental crude oil pipeline in December 1958 (Neumann 1972, 264–265). However, this did not result in a complete turn to the new and more efficient feedstock oil. The ambivalence between the traditional domestic carbochemical industry and the modern petrochemical industry was one of the characteristics of East Germany's chemicalization program and can be interpreted as a barrier to swift and efficient modernization (Schröter 1996, 113).

The chemical industry received increased political attention in the 1950s and 1960s not only because politicians in East Germany and the Soviet Union understood that they were falling behind the West, but because—in contrast to the Stalinist focus on coal and steel—Ulbricht,

[1] Instead of the more accurate terms "German Democratic Republic" and "Polish People's Republic," this chapter will use the words "East Germany" and "Poland" instead.

Khrushchev, and others were hoping that the dynamically developing chemical industry would become a new field of rapid economic and social progress. Plastic technologies for the mass production of clothes, furniture, kitchens, and cars were meant to become the entry point for a distinctly socialist consumer culture (Rubin 2008, 10–11). According to the East German leadership, the chemical industry in particular—as part of a socialist plan economy—had the potential to successfully compete with the West. East Germany was thus explicitly asking the Soviet leadership for additional scientific and economic support in this field (Hoffmann and Malycha 2016, 80).

This industrial policy had an undeniable impact on the synthetic fiber plants. They were subject to central planning and exhibited fast output growth. However, since the late 1960s, they had already become increasingly reliant on the import of Western technology to keep pace with international standards. Similar to East Germany, the Polish chemical industry became subject to a broad modernization program. However, the Polish chemicalization program was adopted only in 1973, that is, 15 years later than in East Germany (Pojda 1974, 343). Due to the approaching economic crisis, most of the planned activities were not implemented. In the transformation period, both factories were forced to significantly reduce their workforce and product range but managed to survive.

The remainder of this chapter explores the following three questions: What kind of modernization barriers did both plants encounter? Were there significant differences between the two? In which way did these conditions influence the further development path of both plants in the transformation period? The chapter will pay special attention to investment, technology, and the workforce structure, as well as innovation output.

2 Empirical Case Studies: Chemiefaserwerk Guben and Stilon Gorzów

The synthetic fiber plant Chemiefaserwerk Guben (CFG) was established in the late 1950s as part of a large-scale development program for the chemical sector. This chemicalization program designated considerable investments for the extension of existing plants such as Leuna or Buna that traditionally focused on coal as a feedstock, but also the construction of new plants, including an oil refinery and a synthetic fiber plant using Soviet crude oil as a feedstock. The decision to place the new synthetic fiber plant

in Guben was based on the advantageous infrastructure at the proposed site in the city's south, but also the region's textile tradition and various political considerations (Gayko 2000, 161).

Although the initial planning for the synthetic fiber plant started already in 1956, it was the development of new crude oil fields in the Soviet Union as well as closer international cooperation in Eastern Europe that made East Germany's chemicalization program possible (Stokes 2000, 84–85). As in other cases, however, the entire planning and construction process of CFG was plagued by delays amounting to several years and serious setbacks for the realization of the larger chemicalization program (Gayko 2000, 71).

The beginnings of the synthetic fiber plant in Gorzów can be traced back to the late 1930s, when the German dyestuff producer IG Farben built a factory to produce the polyamide fiber Perlon in the city of Landsberg an der Warthe. Here, the link to the prewar period is more obvious than in the case of CFG. Nevertheless, in both cases, the technology was based on experiences and led by experts from the interwar period. This is true not only for the synthetic fiber industry but also for most economic branches which saw a relatively swift postwar reconstruction (Bahr 2001, 41; Grabas 1995, 153–154). After the Second World War, the factory lost up to 80 percent of its asset value, mainly due to war compensation to the Soviet Union as well as shipments to other Polish factories under reconstruction (Hempel 1998, 249). After some years of reconstruction and extension, the factory was officially opened under the name Gorzów Synthetic Fiber Factories (Gorzowskie Zakłady Włókien Sztucznych) by the Polish Prime Minister Józef Cyrankiewicz in 1951. In 1971, the factory received the name "Stilon," which is used throughout the remainder of this chapter (APG 37/13/570, 57, 70).

2.1 Investments

Investments are an essential part of every modernization endeavor. In the beginning, a considerable share of investments is spent merely to extend the factory or its workforce, that is, for extensive growth. Modernization investments in the narrow sense of intensive growth are associated with raising labor productivity through the implementation of new technology. Overall investments can nevertheless give an idea of the political priority given to a factory or branch. Regarding CFG, the second half of the 1960s saw the largest overall investments, whereas investment at Stilon peaked in

the first half of the 1970s. In general, both cases were characterized by overambitious development plans, whose targets were often missed.

As mentioned above, CFG was a typical example of a hasty and politically induced launch of a new branch. As part of the chemicalization program from 1958, it was the second-largest new construction project after the oil refinery in Schwedt. At that time, the exact location of these new plants was still undecided. Table 5.1 shows that planned investments for the extension of existing chemical plants in Leuna and Buna were only slightly higher.

In the following years, these initial numbers were subject to constant changes, resulting in considerable delays in starting production, and in production outputs well below target (BArch DE 1/770, 216; BArch DC 20/7271, 12).

Material presented at a meeting of East Germany's Research Council (Forschungsrat) in 1965 shows that actual investments for the first construction phase surpassed the planned 505.2 million DM and reached 579 million DM, with a share of 203 million for construction work. For the second construction phase, with an envisioned completion in 1972, an additional 522 million DM were earmarked. Here, the share of construction work was meant to be lower, which indicates that a purchase of expensive high technology was planned (BArch DY 30/78871[a], 2).

The entire construction process was plagued from the very beginning by significant delays, resulting in considerable disproportions. Whereas production capacities did not reach the planned levels, the necessary

Table 5.1 Planned investments for construction work as part of the chemicalization program until 1965

	Administrative district	*Investments (in million DM[a])*
Extension		
Leuna	Halle	250
Buna	Halle	250
New construction		
Erdölverarbeitungswerk	Frankfurt/Oder [Schwedt]	310
Chemiefaserwerk	Cottbus [Guben]	235

Source: BArch DC 20-I/3/292. Dokumente und Materialien der 50. Sitzung des Ministerrates der DDR vom 13. Nov., 8. und 18. Dezember 1958: Programm der Entwicklung der chemischen Industrie bis 1965, 38

[a]East Germany's currency had the following units and abbreviations: Deutsche Mark (DM) from 1948 to 1964, Mark der Deutschen Notenbank (MDN) from 1964 to 1967, and Mark (M) from 1968 to 1990.

support facilities such as energy production, workshops, storage capacities, transport, and social infrastructure were more or less punctually in place and lowered the productivity of the entire plant, since these fixed costs could only be spread across relatively limited production. Economies of scale and mass production—which are among the primary aims of planned economies—were thus insufficiently realized (BArch DG 11/386, 10).

Because the largest production increase for synthetic fiber was planned for the second half of the 1960s, more investments were needed in this period. Until 1970, 1.3 billion DM had been earmarked for reconstruction, extension, and new construction in the entire industry. Out of this, more than 700 million DM were meant for the construction and extension of production capacities at CFG as well as the synthetic fiber plant in Premnitz. Table 5.2 highlights that investments in Guben were more than twice what they were in Premnitz.

These numbers also show that the second construction phase at CFG was meant to start in 1969. Consequently, investments were planned to significantly increase in the 1970s. However, due to considerable delays in the first construction period, these investments had to be postponed. In 1964, it was planned that investments would amortize until 1971 (BArch DC 14/10799, S. 3). However, the mentioned changes regarding production output and structure resulted in considerable cost explosions. Consequently, the payback period grew from seven to ten years (BArch DY 30/78871[b], 3–4, 9). Table 5.3 shows that the second investment peak shifted by around five years from 1974 to 1979 but did not reach the investment amounts of the 1960s.

These numbers also show that investments at the second construction phase were meant to focus on the purchase of technology (intensive growth) and not the mere extension of production capacities (extensive

Table 5.2 Planned investments at the production sites in Guben and Premnitz in million DM, 1964–1970

	1964	*1965*	*1966*	*1967*	*1968*	*1969*	*1970*	*overall*
Guben	120	104	95	60	20	50	100	549
/construction	40	40	23	10	10	30	35	188
Premnitz	–	10	35	70	70	25	25	235
/construction	–	5	20	20	15	10	10	80

Source: BArch DE 1/61539, 4–5

Table 5.3 Planned investments at CFG in million Mark, 1970–1977 and 1976–1980

	1970	*1972*	*1974*	*1977*	*1976*	*1977*	*1978*	*1979*	*1980*
Investments	105.5	149.4	260.0	107.9	59.5	89.4	140.3	191.7	115.5
/construction	–	–	–	–	16.2	20.6	20.6	21.7	21.0
Equipment	–	–	–	–	31.3	55.6	89.5	133.0	75.0

Source: 1970–1977: BArch DG 11/386, 3; 1976–1980: BLHA 903 326. Staatliche Aufgaben des Fünfjahresplanes 1976–1980 für VEB Chemiefaserwerk "Herbert Warnke" Wilhelm-Pieck-Stadt Guben. Rudolstadt-Schwarza 05.03.1976, 4

growth). Such "intensification" should be reached through an increasing effectivity of capital assets (*Grundfonds*) (BLHA 903 763, no pagination). In the 1980s, however, the aim seemed to be a minimization of investments while further increasing production output. This was in line with the overall economic situation. The growing debt burden and increasing difficulties to obtain loans in convertible currencies resulted in another synthetic fiber program aiming at decreasing Western imports (BArch MfS HA XVIII 6804, 2). However, the implementation of this program, together with one of its key topics—the further change in production processes from imported dimethyl terephthalate to domestically produced purified terephthalic acid—was seriously hampered (BArch DY 30/38642[b], no pagination).

The general shift of political attention toward microelectronics in the late 1970s also diverted or detracted necessary investments away from the synthetic fiber and chemical industries (Schröter 1996, 124). Consequently, the combination of missing investments and expected production increases led to diminishing quality and adversely affected customers' production in the 1980s (BArch MfS BV Cottbus AKG 6556, 228, 231).

The main difference between the investments at CFG and Stilon was that investments at Stilon picked up speed more slowly and reached a peak roughly five years later. This underscores that CFG was a hasty and politically induced kick-start project aiming at closing the development gap with Western technology leaders as quickly as possible. Stilon, on the other hand, was developed more gradually, without the political pressure of keeping pace with leading tech countries. The political decision to considerably modernize the factory was made only in 1966 (APG 37/13/459, 76). As mentioned, a chemicalization program with a broad impact was adopted in Poland only in 1973. Due to the upcoming economic crisis in

the second half of the 1970s, this program could not be implemented and had no measurable effect on investments. Table 5.4 shows how investments grew slowly over the decades and reached a peak in the early 1970s. The yearly numbers in the lower part of the table highlight that the largest investments were made in the first half of the 1970s.

The unorthodox periodization in Table 5.4 is based on Hempel's description of general development stages at Stilon. Table 5.5 shows planned investments at Stilon for every five-year plan period, again demonstrating that investments took off slowly and gathered speed only in the late 1960s.

Table 5.6 completes this picture with planned investments for the 1970s and 1980s. It also gives an idea of Stilon's share in overall investments in the Polish synthetic fiber industry. Similar to CFG, Stilon was one of the main investment locations. The numbers show, however, that investments were planned to decrease in the 1980s since the extension of Stilon was meant to be completed.

Given that Table 5.6 refers to planning from 1972, it is very likely that these investments—especially in the 1980s—were not met. When

Table 5.4 Investments at Stilon in million zloty, 1949–1980

I stage (1949–1959)	649
II stage (1960–1968)	962
III stage (1965–1973)	2683
IV stage (1971–1980)	10,600
Overall	**14,894**
1970	551
1971	505
1972	1133
1973	1875
1974	2449
1975	1672
1976	889
1977	381
1978	215
1979	127
1980	62
Overall	**9859**

Source: Hempel (1998, 253, 255, 258, 261)

Table 5.5 (Planned) investments at Stilon in million zloty, 1956–1970

	1956–1960	*1961–1965*	*1966–1970 (plan)*	*1966 (plan)*	*1967 (plan)*	*1968 (plan)*	*1969 (plan)*	*1970 (plan)*
Overall	616.0	731.6	2206.0	71.6	314.7	508.0	1018.1	293.6
/construction	291.8	278.5	700.8	700.8				

Source: APG 37/3/90, no pagination

Table 5.6 Planned investments in the synthetic fiber industry in million zloty, 1971–1990

	1971–1975	*1976–1980*	*1981–1985*	*1986–1990*	*Overall*
ZWS "Wistom" Tomaszów	1085	758	30	33	1906
ZWS Chodaków	303	631	459	609	2002
ZWS "Anilana" Łódź	373	846	69	69	1357
ZWS "Celwiskoza" Jelenia Góra	455	2819	4114	6411	13,799
ZWS "Wiskord" Szczecin	354	973	799	966	3092
ZWS Wrocław	143	308	90	30	571
ZWS "Stilon" Gorzów	**8934**	**7366**	**2670**	**–**	**18,970**
ZWS "Elana" Toruń	8546	7233	–	–	15,779
ZWS Piła	266	19,982	12,631	12,709	45,588
Nowy Zakład PAN	–	1100	3818	4096	9014
Overall [own calculation]	20,459	42,016	24,680	24,923	112,078
Overall investments in the synthetic fiber industry /construction	20,918 9025	42,252 16,652	25,023 7805	25,083 8813	113,276 42,295

Source: APG 37/12/378, 8, 12–22

comparing to Hempel's accounts from the mid-1980s,[2] even for the 1970s there seems to have been a large difference: around 10,000 million zloty (Table 5.4) versus a planned 16,300 million zloty (Table 5.6). The first half of the 1970s under the rule of Edward Gierek, the newly elected first secretary of the ruling Polish United Workers' Party, saw a policy shift toward Western technology imports to modernize the entire country. This policy of purchasing complete Western plants on credit with the aim to pay back the loans using future export revenues nevertheless failed due to changing financial conditions on global markets after the first oil crisis.

[2] Hempel's book was published in 1998 but is completely based on material from the mid-1980s.

This resulted in a considerable debt crisis in the early 1980s and, consequently, falling investments in the entire Polish economy (see Poznański 1986).

Both companies were nevertheless the targets of large investments in the 1960s and 1970s. The main reason for these large allocations to CFG and Stilon was that both plants were the only (Stilon) or by far the largest (CFG) producers of polyamide fiber, which made up a large share of production growth in the overall synthetic fiber industry (BArch DE 1/27850, 34–35; Hempel 1998, 48).

2.2 Technology Level

The production of polyamide fiber was crucial for both companies. CFG also produced polyester fiber starting in 1972, which interestingly had been planned from the very beginning. Due to the inability to develop the necessary production technology itself, however, the political leadership decided in 1967 to import the technology from the West (BArch DC 20/7271, 11–12; Knappe et al. 2009, 22–23). Other products like bristles or fishing line yarn made up a relevant part of the product portfolio of both companies, but did not require high technology. Stilon also successfully produced magnetic tapes, although this accounted for only a small share of overall production. Table 5.7 shows the year of production start of the most important synthetic fiber types.

Most of the core products were produced earlier at Stilon, but the commencement of large-scale production lagged behind CFG, often by several years. This is in line with findings in Sect. 2.1 regarding the timing of investments. Nevertheless, the general timelines of the introduction of new fiber types and the related technology are about the same. Due to the later introduction of new production technologies, Stilon was able to skip intermediate developments such as large-scale production of polyamide fine silk without extruders. In the 1970s and 1980s, modernization attempts in both plants focused on automation, rationalization, and intensification of existing production technologies (BLHA 903 679, 1; APG 37/13/459, 31–32).

Putting into operation new production lines was closely connected to modernization achievements on a more specialized level. These incremental innovations, such as the reuse of wastewater (depolymerization) and the improvement of production processes or extension of the product

Table 5.7 Production start of different types of synthetic fiber at CFG and Stilon in general/on a large scale

Fiber type	*Operation start CFG*	*Operation start Stilon*
Polyamide fine silk production	1965	1951/1968
Polyamide corduroy	1969	1956/1970
Polyamide carpet yarn	1969	1972/1975
Polyester	1972	–

Source: BArch DC 20/9664, 13–14. APG 37/13/459, 76–79

portfolio, took place at both companies (Bode 1998, 166; Krause et al. 2009, 69; APG 37/13/459, 37).

Starting in the late 1960s, foreign technology suppliers became more important for both plants. Interestingly, large-scale contracts with West German machine-building companies like Vickers-Zimmer from Frankfurt/Main for the delivery of production facilities worth 5.4 million Marks were made despite the policy of "Störfreimachung," that is, the replacement of Western imports in favor of national or Eastern European suppliers in order to become more economically independent (BArch DG 11/2541, no pagination). However, these imports of Western technology posed potential challenges. Whereas other sectors of the Eastern European industry were directly affected by the Coordinating Committee on Multilateral Export Controls (CoCom) embargo, synthetic fiber technology did not seem to be restricted by it. However, the reliability of Western technology suppliers was an issue that arose regularly, and not only in the synthetic fiber industry. Cases of noncompliance by Western technology suppliers are frequent in the archive material (e.g., BArch MfS BV Cottbus 7811, no pagination; BArch MfS HA XVIII 30226, no pagination; BArch MfS HA XVIII 13212, 13–14). East Germany's legal bodies likely did have problems regarding legal reinforcement in the West. However, internal analyses of the ministry of state security concluded that the institutions and persons responsible for foreign trade contracts regularly acted in a way that was "mindless and gullible" (BArch MfS BV Cottbus Abt. AKG 7912).

Technology imports from Eastern European partners suffered their own set of obstacles. A constant problem was the rather low reliability of Eastern European supplies, even if formally agreed by central planning bodies (BArch MfS ZAIG 2283). This, in turn, forced ministries or factories in East Germany to conduct ad hoc imports from the West or to start

inefficient small-scale production themselves. Another issue was the slow implementation of relevant R&D results. The close scientific-technical cooperation between research institutes from East Germany and the Soviet Union in the field of synthetic fiber can serve as an example here. After six years of cooperation, promising results regarding fast-spinning technology by leaving out several work-intensive intermediate steps were achieved in 1975. In comparison to the standard method, the new process resulted in a decrease in energy costs by 12 percent, a decrease in material consumption by 20 percent, and an increase of labor productivity by 300 percent. However, due to supply problems from other East German factories regarding the necessary machinery equipment for large-scale production, production could not start before 1980 (BArch DY 30/38571, 2–3).

Aside from these examples of at least partial success, cooperation with Eastern European partner institutions was mostly confined to the bilateral exchange of knowledge. Here, CFG was in contact with all relevant synthetic fiber factories in socialist countries, such as Chimvolokno Chernigov, Chimvolokno Mogilev, Vidlon Vidin, Chemlon Humenné, and Stilon Gorzów. Due to the proximity of CFG and Stilon, at least in the early 1970s, Polish delegations to CFG were the largest in terms of participating persons as well as visiting days (BLHA 903 815, no pagination). In later years, however, the contact between CFG and Stilon seemed to become looser, which, at least after 1981, could be attributed to the general political environment (BLHA 903 815, no pagination; BLHA 903 145, 7).

As mentioned above, the political decision to modernize Stilon was made in 1966. Similar to CFG's development, this modernization attempt was based on a license for high-quality polyamide fiber from the Italian company Snia Viscosa, with production starting in 1968. Later, the further modernization of existing production technologies was based on licenses from Toray Industries in Japan for polyamide fine silk and the West German Barmag-Zimmer for polyamide carpet yarn, with production starting in 1975. These licenses for fundamental production processes were complemented by other licenses or machinery imports from Western companies such as Garbato, Agfa-Gevaert, Reifenhäuser, or Zinser (Hempel 1998, 253–259).

However, there were cautious voices at Stilon that argued in favor of extending in-house R&D capacities. They warned against trying to leave out research steps by buying high-tech solutions abroad, which would lead to the loss of fundamentally understanding technology options

(Trojecki, 2012, 89–90). Consequently, Stilon was one of the companies that at least tried to avoid high-tech imports from abroad from the beginning of the 1970s onward. As in the case of East Germany, this was part of a larger policy of import replacement (Trojecki, 2012, 117). Stilon had had negative experiences with delayed delivery by the high-tech supplier Snia Viscosa, which agreed to pay a delay penalty of 228,000 US dollars in 1969 (AAN 1154/0/38/77, 2–3). This experience likely impacted the decision made in 1972, favoring Toray Industries over Snia Viscosa (AAN 1154/0/67/124, 11).

Table 5.8 shows that, in line with the general investments for the purchase of machinery and equipment, investments for technology imports declined significantly in the second half of the 1970s. The share of machinery imports, especially from the West, decreased significantly after 1974.

The general economic downturn in Poland starting in the mid-1970s resulted in a halt to modernization at Stilon and an end to the general chemicalization program adopted in 1973. Production output was meant to stagnate, whereas the quality of products should improve gradually (APG 37/12/379, 4). Despite considerable investments made between 1966 and 1975, the machinery park was fairly outdated, with more than 50 percent written off in 1983. This also meant that spare parts were either costly to import or even no longer available (APG 37/12/379, 33; APG 37/13/459, 40). Due to the modernization policy between the mid-1960s and mid-1970s, however, a large share of Stilon's machinery suppliers were abroad. Out of 240 suppliers, 62 were in West Germany, 39 in Italy, 21 in the US, 18 in England, 16 in Japan, 14 in East Germany, 9 in Switzerland, and only 35 in Poland (APG 37/13/459, 35).

2.3 Workforce Structure

The implementation of modernization efforts due to investments and technology is closely related to the workforce of a given organization. A proper education level among at least parts of the workforce is crucial for efficient implementation. Besides, the R&D workforce is a common yardstick in innovation research to measure the input of resources to increase innovation output (see Sect. 2.4).

Figure 5.1 shows the overall development of the workforce at CFG and Stilon. After a continuous increase at Stilon in the first 15 years, a plateau was reached in the mid-1960s. The governmental decision in 1966 to further extend the plant led to a swift employment increase in the

Table 5.8 Investments for the purchase of machinery and equipment at Stilon in złoty, 1972–1979

	1972	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*
Overall	433,201	1,114,721	1,436,960	975,371	418,216	63,661	70,783	57,239
/import in %	84.4	90.0	64.9	62.7	56.1	5.9	9.3	4.2
/import from capitalist countries in %	77.1	82.7	52.8	53.4	12.3	7.0	6.0	4.2

Source: Trojecki (2012, 95)

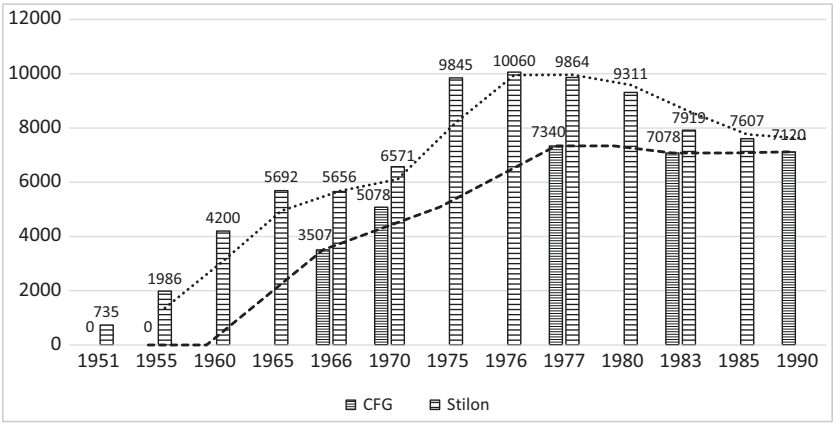

Fig. 5.1 Overall employment at CFG and Stilon, 1951–1990. Source: CFG 1966: BArch DG 11/273, no pagination. 1970: BLHA 903 681, 8, 1977: BArch DC 20/9664, 15, 1983: BLHA 903 206[a], 4. 1990: BLHA 903 853, no pagination. Stilon 1951–1985: APG 37/13/459, 42

following decade. After a peak in 1976, a slow decline set in. Similarly, the first 15 years at CFG were characterized by a steady increase in overall employment. Like at Stilon, however, a stagnation set in in the mid-1970s. The dotted trend lines highlight the overall development.

The majority of these employees were production workers hired within the region. In CFG's case, around two-thirds of employees were meant to be women, which was in line with the region's tradition in the textile industry. In later years, workers were also recruited from other parts of the country and abroad due to East Germany's chronic lack of labor. In the beginning in 1966, the first 250 Polish employees arrived at CFG on the basis of a bilateral agreement between East Germany and Poland (BArch DC 20/4582, 6–7). Up until 1970, the Polish workforce consisted of around 1000 persons. This was mutually advantageous. The Polish side was able to provide its population in the border region with well-paid jobs, whereas East Germany side could fill in labor gaps without the necessity to provide them with permanent housing (BArch DC 20/18439, 4–5). Not least because of the political turbulence in the beginning of the 1980s, the size of the Polish workforce did not increase further, but rather was complemented by individuals from Vietnam, Cuba, and Mozambique. In mid-1983, out of a total of 7078 employees at CFG, there were 1498

workers from abroad, of which two-thirds were from Poland (BLHA 903 206[c], 1). Regarding Stilon, there is no information about the employment of foreign persons on a large scale before 1990.

The synthetic fiber industry is situated between the research-intense chemical industry (supplies) and the rather low-tech textile industry (customers), but also light and heavy industries (tires, conveyers). Hence, well-educated graduates in chemistry, textile technology, and machine building but also mathematicians, economists, and lawyers were needed (BLHA 903 681, 9). In the case of CFG, these graduates were recruited at the large technical universities in Dresden and Karl-Marx-Stadt, but also smaller technical colleges in Forst, Köthen, and Halle. There were also constant endeavors to upgrade the education level of the existing workforce. Table 5.9 shows the numbers of what were called "*Hoch- und Fachschulkader*" (i.e., graduated specialists) at CFG. At least in the given time period, a peak of R&D personnel was reached in the mid-1970s.

These graduates were employed in all production units of CFG, but mainly in the R&D division established in 1963. The highest numbers of employees were reached here in the 1970s, with up to 550 persons, although only roughly one-third of them were graduates (BArch DG 11/273, no pagination). A considerable share of them were also employed in production units (BArch MfS BV Cottbus Abt. AKG 6562, 260; Knappe et al. 2009, 77). The issue of employment being incommensurate with education level was also the case at Stilon (Trojecki, 2012, 142). Especially with regard to the employment of graduates in simple production processes, the lack of labor seems to be a common phenomenon that was not confined to the synthetic fiber industry in East Germany and Poland. The matter also reflects access restrictions to higher education and subsequent declining numbers of students in East Germany after 1969 (Fraunholz 2003, 59–60).

Table 5.9 Overall amount and share of university and college graduates at CFG, 1966–1981

	1966	*1970*	*1973*	*1977*	*1981*
University graduates	123	224	328	1011	383
Technical college graduates	272	422	758		631
Share of graduates in the entire workforce	11.3%	12.7%	14.2%	14.8%	–

Sources: 1966: BArch DG 11/273, no pagination. 1970, 1973: BLHA 903 681, 9. 1977: BArch DC 20/9664, Informationsbericht, 15. 1981: BLHA 903 206[a], 3

Regarding the share of graduates in the entire workforce at Stilon, the numbers seem to be quite similar to those at CFG. At the end of 1980, the number of white-collar employees (*pracownicy umysłowi*) reached 1132 out of an overall workforce of 9311 (APG 37/1.5/61, 3–4; Hempel 1998, 269). This is a share of 12 percent, which is quite similar to the share of 14.8 percent at CFG in 1977 (see Table 5.9). In contrast to CFG, however, Stilon's R&D section, established in 1958, employed only 109 persons in 1985, of which 42 were white-collar employees (APG 37/13/459, 37). This is only around one-fourth of the official number of graduates in CFG's R&D unit.

2.4 Innovation Output

The innovative power of a system can be measured through its patenting. However, patents as an innovation output are not unproblematic, especially in the context of planned economies, whose innovation systems have distinct characteristics. First, there were two types of patents in East Germany: the "exclusion patent" (*Ausschließungspatent*), which secured for the inventor the full property rights of an innovation, and the "economy patent" (*Wirtschaftspatent*), which did not (Wiessner 2015, 256, 259). Second, there were specific modes of innovation, such as activist movements or the innovators movement ("Neuererbewegung"), which mainly focused on raising labor productivity, but also incremental innovations (Flade 2022). Third, results of innovation were regularly left unprotected, at least abroad.

The reason for this was a mixture of neglect and economic constraints. Complaints about incapable offices responsible for property rights were common throughout the entire period (BLHA 903 558, 1–2; BArch DF 3/2485, 12–13; BArch MfS BV Cottbus Abt. AKG 6557, 236–237). Besides, costly patenting in the West was not always decisive, since large shares of exports went to socialist countries (BArch DE 4/20074, 3). With regard to patenting in Eastern Europe—the destination of a large share of exports—patenting as an effective means to protect but also share innovation was hampered by legal and monetary dysfunctions. Although an official agreement had been reached at the CMEA's second meeting in August 1949 in the Bulgarian capital Sofia, resistance to the free exchange of technical documentation and to scientific-technical cooperation endured. Technologically well-developed countries like Czechoslovakia and East Germany were especially opposed to such an agreement. East

Germany thus restricted the free exchange starting in 1953, and after 1956 almost completely canceled it with the argument that this kind of cooperation would endanger exports (Herzog 1998, 15).

Regarding CFG, starting in the 1970s, the numbers of patent applications at the East German Patent Office (*Amt für Erfindungs- und Patentwesen*, AfEP) stabilized at around 30 per year. This amount was in line with comparable factories in Eastern Europe (BArch DC 20/9664, 29). However, some of the granted patents were not used at all. In a report from 1978, all five patents not in use anywhere in the chemical industry in East Germany were held by CFG (BArch DY 30/38642[a], no pagination). This can be attributed to problems in transferring research results into production. The majority of granted patents, on the other hand, were incremental innovations to improve the production process and were unproblematic to implement (BLHA 903 342, 2).

In the beginning of the 1980s, decision-makers pushed to increase the innovation output and implementation at CFG and throughout the synthetic fiber industry. The number of CFG's patent applications was meant to increase from around 30 to 50 in 1984 and 57 in 1985 (BLHA 903 206[b], 1–2).

Figure 5.2 shows the number of granted patents in East and West Germany documented in the database of today's German Patent and Trademarks Office (*Deutsches Patent- und Markenamt*, DPMA), according to the date of application. Almost all of the 117 documented patents are economy patents, awarding the inventor with a payment but not property rights. A significant increase is visible in 1984 and 1985, but appears to be a flash in the pan, with numbers falling again in the years that follow. Furthermore, the very short period between the abovementioned innovation output targets and the swift increase in granted patents indicates that innovation output was politically, and not technologically, induced.

Regarding Stilon, the general background for innovation was similar to that at CFG. A large share of innovations was related to the rationalization of production processes and, therefore, aimed at increasing labor productivity. The specific modes of innovation such as the rationalization movement (*ruch racjonalizatorski*) partially led to adverse incentives, where companies and inventors strove foremost to fulfill plan targets or increase personal incomes (Trojecki 2012, 165).

Nevertheless, there were genuine innovations resulting in stable numbers of patenting. Figure 5.3 shows the number of patent grants according to the year of registration at the Polish Patent Office (*Polski Urząd*

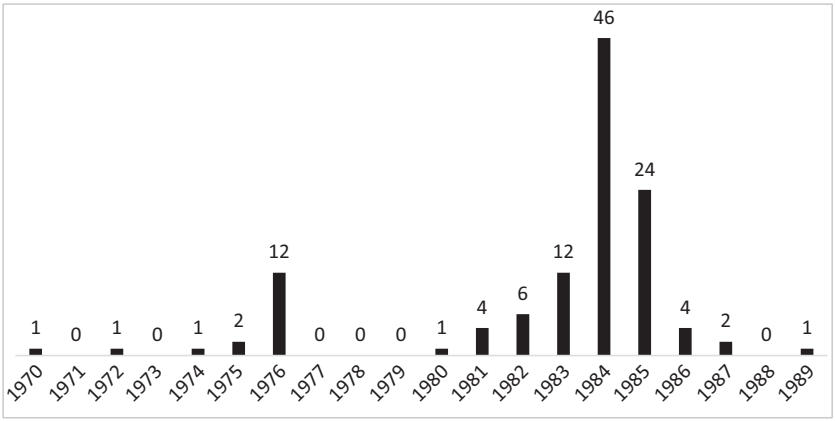

Fig. 5.2 Patent grants for CFG documented in the database of the DPMA, 1970–1989. Source: https://depatisnet.dpma.de/DepatisNet/depatisnet?window=1&space=menu&content=index&action=index accessed August 5, 2020

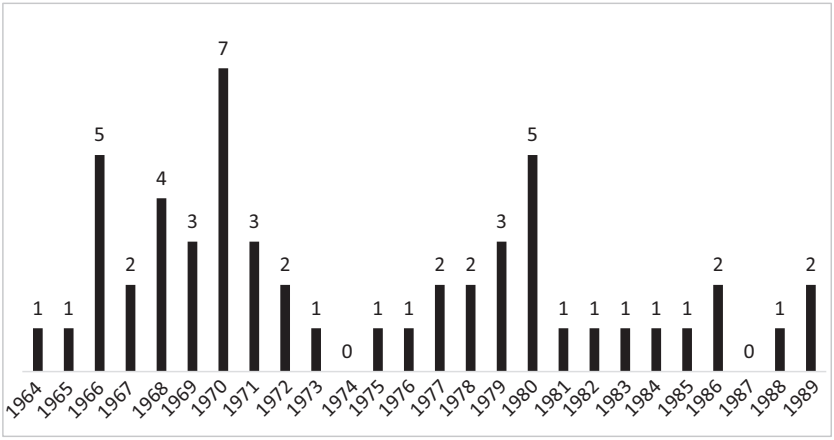

Fig. 5.3 Patent grants for Stilon documented in the database of the Polish Patent Office, 1963–1989. Source: https://ewyszukiwarka.pue.uprp.gov.pl/search/simple-search accessed December 10, 2022

Patentowy). The numbers highlight that the late 1960s and late 1970s saw the largest amounts of patent grants. This is in line with the investment increases after 1966 and the implementation of foreign technologies in the first half of the 1970s.

3 Transformation Period

In the 1980s, both CFG and Stilon entered a stage of stagnation with regard to investments and overall employment. This had a direct effect on the technology level as well as innovation output. In 1990, the management at CFG made the first steps toward a significant reduction of workers as well as (re)establishing contacts with potential investors in West Germany. Employment was reduced by way of early retirement schemes, gratuities especially for the large Polish workforce, reduced working hours, and dismissals. In 1990, 1260 people were dismissed, 280 of them working pensioners, 620 foreign employees, and 360 East Germans, especially well-educated staff. In the following two years, 2300 more persons were planned to be dismissed to achieve a sustainable workforce number comparable to Western standards. As a result, overall employment was reduced by 50 percent, from 7120 in March 1990 to 3500 at the end of 1992 (BLHA 903 853, no pagination). Due to collapsing sales in the domestic and Eastern European markets, further significant cuts in production output and, consequently, workforce numbers were necessary. Employment numbers were already decreasing, because socialist factories had provided employees with a whole range of social services such as housing, shops, medical care, or kindergarten and schools, which were swiftly outsourced in the early 1990s.

Regarding potential investors, contacts were (re)established with the West German company Hoechst, whose subsidiary Uhde had delivered a production line for polyester contracted in 1969 (Knappe et al. 2009, 19). CFG was split into several smaller units in order to facilitate the privatization process. Due to considerable overcapacities in the Western European synthetic fiber market, however, the outlook was rather unfavorable. Starting in the 1970s, there existed considerable overcapacities which were tackled in the following decades by EU legislation. West German production capacities nevertheless stood at only 75 percent in the late 1980s (Knoll 2022a, 440). Hoechst was planning to take over core parts

of CFG, especially those pertaining to its polyester production. Due to the collapse of traditional outlets in the East, however, the purchasing agreement between Hoechst and the Treuhand, which was responsible for the remnants of the former CFG, was signed only in December 1991. Alongside Hoechst Guben GmbH, Lausitzer Teppichfaser GmbH was established. Meanwhile, the electricity production was sold as Energiewerk Guben to the regional electricity company ESSAG, which later became part of the energy company RWE (BLHA 903 851, 7).

In the following years, Hoechst invested large sums into its Guben site and relocated production processes in the field of polyester production from other sites in West Germany to Guben. This specialization process enhanced the establishment of a sustainable product niche. Since Hoechst itself was occupied with fundamental restructuration processes in the 1990s, however, the polyester production in Guben was outsourced to Hoechst Trevira and sold several times. After insolvency in 2009, the independent Trevira GmbH continued the production at Guben and was finally bought by the Thai investor Indorama Ventures in 2017. Currently, around 550 persons are employed at this plant (www.trevira.de/die-geschichte).

Two other companies can also be seen as CFG's successors. Megaflex is a family-owned enterprise that carried over from West Germany in 1991, with around 400 employees in 2019 (https://www.megaflex-schaumstoffe.de/de/about). ATT Polymers, a subsidiary of the Polish chemical giant Grupa Azoty in Tarnów, produces plastic granulate based on polyamide and employs around 60 persons. This means that there are still around 1000 people employed in the synthetic fiber industry in Guben today (Knoll 2022b, 233). Regarding R&D activities, however, at least the subsidiaries Trevira and ATT Polymers are typical examples of so-called extended workbenches focusing in production, whereas other important tasks like management or R&D are located at the company's headquarters.

In comparison to CFG, Stilon's path through the transformation period of the 1990s seemed to be rather even. Unlike in Germany, there was no political pressure for swift privatization. Because Poland entered the EU only in 2004, Polish companies like Stilon did not immediately become subject to fully fledged competition and EU legislation. Rather, Poland could protect domestic companies, which might have been impossible to

such a degree in eastern Germany. Starting in 1992, Stilon was financed by the state treasury in the form of a one-person company. In September 1995, 60 percent of Stilon's stocks were transferred to the National Investment Fund, 25 percent remained at the state treasury, and the remaining 15 percent were sold to the employees themselves. In 1998, the majority of shares were bought by the industrial group Rhodia and Nylstar, which had belonged to the French company Rhône Poulenc before it fused with Hoechst and became Aventis. In 2003, the company was divided into three parts. The production of synthetic fiber stayed at Stilon owned by Nylstar, whereas the production of granulate and monofilaments went to other companies belonging to Rhodia. The remaining units were specialized to find a niche in the competitive international market. In 2008, Stilon became part of the Polish group Martis, a producer of textile materials (www.martis-stilon.pl/firma), to which it belongs to this day, employing around 500 persons. Stilon's monofilament production was, in turn, taken over by the Swiss company Monosuisse, formerly belonging to Rhodia (https://www.monosuisse.com/de/unternehmen/geschichte.html). In April 2022, Monosuisse's production site in Gorzów employed around 175 people (https://gorzowwielkopolski.naszemiasto.pl/w-monosuisse-stawiaja-na-jakosc-i-rozwoj-ta-firma-wciaz/ar/c3-8757227).

The relatively slow privatization of Stilon, however, resulted in rather low investments at least in the first half of the 1990s (APG 37/2/1304, 287). As a consequence of the long stagnation period starting in the late 1970s, the production process was characterized by relatively high energy and labor costs as well as high consumption of raw and auxiliary materials, according to an internal analysis. Because Poland did not immediately enter into full-fledged competition with technologically more-advanced Western companies, Stilon was able to survive on the basis of its traditional polyamide production (APG 37/2/1304, 276–277). In order to gain access to the necessary amounts of capital for modernizing the factory, Stilon's marketing department recommended actively searching for foreign investors as well as active market cultivation to find new outlets for Stilon's products (APG 37/2/1304, 279). Stilon was able to close investment agreements with Western companies such as Barmag in 1994 to modernize its polyamide production to increase export possibilities (APG 37/2/1304, 287–288). Still today, Stilon does not possess its own production line for polyester fibers, but imports such fibers from abroad. In contrast to Trevira, however, Stilon has its own R&D unit.

4 Results

This chapter sheds light on the following three questions. What kind of modernization barriers were encountered by the two plants? Are there significant differences between them? In which way did these conditions influence their development paths during the transformation period? Special attention has been given to four indicators: investments, technology levels, the workforce structure, and innovation output. These indicators are closely interconnected. Whereas overall investments give an idea of the political and economic importance of a company or branch, they are usually used to improve the technology level (intensive growth), especially after an initial construction period (extensive growth). An improving technology level has a direct, positive impact on innovation output, but only if a skilled workforce is in place.

This chapter identifies several modernization barriers. First, overambitious construction and production plans or their hasty implementation regularly resulted in significant setbacks, disproportions, and cost explosions, with tremendous adverse effects on the entire branch. Such overzealous implementation and kick-start problems are visible especially in the development of CFG. Second, despite massive investments in their early years, the machinery park in both plants became increasingly outdated starting in the late 1970s, resulting in gradual attrition of production assets. The shift away from the chemical branch toward new and more promising industries like microelectronics played a role especially in the case of CFG, whereas the overall economic crisis in Poland was decisive in the case of Stilon. Third, the rather low reliability of domestic and Eastern European suppliers and a general unavailability of state-of-the-art technology resulted in a growing dependency on Western technology, that is, the exact opposite of what was politically intended. This is true for both plants and over different time periods. Fourth, the increasing dependence on or entanglement with the West posed new challenges for the plants and higher-level institutions regarding the legal protection of economic interests and patenting endeavors. In both cases, these challenges could be met only partially. Finally, with regard to R&D, there are accounts from both plants that R&D staff were not employed according to their education level, indicating that meeting plan targets in production was more important than research.

These modernization barriers apply to both factories under study here. However, there are also significant differences. Regarding investments, at

CFG, a peak was reached in the second half of the 1960s, and at Stilon, roughly five years later in the first half of the 1970s. This is related to the general development of both plants, especially the fact that the chemicalization program in Poland was adopted only in 1973, that is, 15 years later than in East Germany. Due to the following economic crisis, its implementation failed. Whereas in the case of CFG the first decade can be called a hasty kick-start, the older plant Stilon underwent comparatively consistent development. Interestingly, this difference is also true for the 1990s. Regarding the technology level, CFG was meant to produce technologically demanding polyester fibers from the very beginning, but managed to do so only in the early 1970s through the adoption of Western technology. Stilon, however, has only ever produced polyamide fiber. Regarding the overall workforce, the numbers started to decrease at Stilon as early as the late 1970s, whereas the numbers at CFG stagnated throughout the 1980s. The R&D unit at Stilon seemed to be significantly smaller than that at CFG, but managed to survive in the 1990s. In turn, the remnants of CFG can be described as typical examples of extended workbenches without relevant R&D units. Regarding innovation output, a patenting peak was reached at Stilon in the late 1960s and early 1970s, whereas a peak at CFG was reached in the mid-1980s. With regard to the transformation process, the main difference between CFG and Stilon seems to be that, due to German unification, CFG became subject to restrictive EU legislation immediately, whereas Stilon received state financial support for several more years.

Despite these differences, the overall similarities between both plants predominate. Both were the targets of massive investments due to their importance as the largest synthetic fiber producers in East Germany and Poland. This resulted in similar developments in workforce numbers and the introduction of new technologies according to a similar sequence. Consequently, dependencies on Western technology supplies increased over the course of time. Both plants entered a period of stagnation in the 1980s.

These conditions heavily influenced the further development of both plants in the transformation period. Since both companies had already entered stagnation, with partly outdated production assets, neglected patenting, a rather small and inappropriately deployed R&D staff, and a steadily growing dependency on Western technologies, CFG and Stilon were ill-equipped for the upcoming transformation challenges. Furthermore, the cessation of former outlets in Eastern Europe

constituted a fundamental financial and structural challenge, and maintaining total self-sufficiency under new market conditions was unfeasible for both plants. Rather, a successful start in the transformation period seemed to depend on whether the company management acted proactively by seeking out potential investors in the West or implementing painful employment cuts. Such was the case with both factories and eventually resulted in survival and further development under the prevailing conditions. The remaining parts of CFG and Stilon thus had to accomplish "fast-track" specialization in order to find their product niches.

With the entire synthetic fiber branch in (Western) Europe entering a stage of reorganization in the 1990s due to considerable overcapacities, both companies saw repeated ownership changes for roughly another decade. Seen from this angle, it is rather surprising that both companies continue to exist today and are doing generally well, especially compared to other factories in their sectors and other sectors. On the basis of these two cases, however, it is impossible to draw a broader conclusion about the effectiveness of an abrupt versus gradual transformation. To be sure, both paths implied considerable financial transfers by state institution s with the aim of preserving as much of the former CFG and Stilon as possible.

Archival Sources

Archiwum Akt Nowych (AAN)

- 1154/0/38/77: Najwyższa Izba Kontroli w Warszawie. "Kontrola Zakładów Włókien Sztucznych "Stilon" w Gorzowie Wlkp. w zakresie zakupu licencji oraz uruchomienia produkcji. Pismo Ministra Przemysłu Chemicznego do prezesa NIK. Warsaw 01.12.1969.
- 1154/0/67/124: Najwyższa Izba Kontroli w Warszawie. Przygotowanie i realizacja inwestycji w przemysłowych kompleksach gospodarczych. Zakłady Włókien Chemicznych "Chemitex-Stilon" w Gorzowie Wielkopolskim. Warsaw 1972.

Archiwum Państwowe w Gorzowie (APG)

- 37/1.5/61: Zakłady Włókien Chemicznych "Stilon" w Gorzowie Wielkopolskim. Organizacja zakładu. Rozrzut etatów na 1980 r. Gorzów 1980.

- 37/2/1304: Zakłady Włókien Chemicznych "Stilon" w Gorzowie Wielkopolskim. Wieloletnie plany działalności przedsiębiorstwa. Gorzów 17.08.1994.
- 37/3/90: Zakłady Włókien Chemicznych "Stilon" w Gorzowie Wielkopolskim. Plan 5-letni rozwoju przedsiębiorstwa. Gorzów 21.01.1967.
- 37/12/378: Zakłady Włókien Chemicznych "Stilon" w Gorzowie Wielkopolskim. Generalne założenia rozwoju przemysłu włókien sztucznych w latach 1971–1990. Łódź 1972.
- 37/12/379: Zakłady Włókien Chemicznych "Stilon" w Gorzowie Wielkopolskim. Prognozy kierunków inwestowania w ZWCH „CHEMITEX-STILON do roku 1990. Łódź 1983.
- 37/13/459: Zakłady Włókien Chemicznych "Stilon" w Gorzowie Wielkopolskim. Skrócona historia Stilonu, 1949–1985. Gorzów 1986.
- 37/13/570: Zakłady Włókien Chemicznych "Stilon" w Gorzowie Wielkopolskim. Rys historyczny Zakładu, 1951–1979. No place and year.

Brandenburgisches Landeshauptarchiv (BLHA)

- 903 145: VEB Chemiefaserwerk "Herbert Warnke" Guben. Stand der wissenschaftlich-technischen Zusammenarbeit mit sozialistischen Ländern. Guben 1985.
- 903 206[a]: VEB Chemiefaserwerk "Herbert Warnke" Guben. Perspektivische Entwicklung bis 1990. Jahresscheibe 1982 zum Kader- und Bildungsplan 1981–85 des CFK. Guben 15.02.1982.
- 903 206[b]: VEB Chemiefaserwerk "Herbert Warnke" Guben. Konzeption zur Entwicklung der Erfindertätigkeit und Schutzrechtsarbeit im CFG im Perspektivzeitraum bis 1985. Guben 17.10.1983.
- 903 206[c]: VEB Chemiefaserwerk "Herbert Warnke" Guben. Abstimmungsprotokoll zur Arbeitskräfteentwicklung und Bilanzierung 1983–1985. Guben 1983.
- 903 326: VEB Chemiefaserwerk "Herbert Warnke" Guben. Investitions- und Forschungsvorhaben. Staatliche Aufgaben des Fünfjahresplanes 1976–1980 für VEB Chemiefaserwerk "Herbert Warnke" Wilhelm-Pieck-Stadt Guben. Rudolstadt-Schwarza 05.03.1976.

- 903 342: VEB Chemiefaserwerk "Herbert Warnke" Guben. Lizenz- und Schutzrechtsarbeit. Vorlage zur Arbeitsberatung des Betriebsdirektors am 10.03.1980. Guben 13.02.1980.
- 903 558: VEB Chemiefaserwerk "Herbert Warnke" Guben. Bericht über die zentrale Veranstaltung am 04.11.1970 in Magdeburg zum Thema "Sozialistische Schutzrechtspolitik – Element der sozialistischen Wissenschaftsorganisation." Guben 12.11.1970.
- 903 679: VEB Chemiefaserwerk "Herbert Warnke" Guben. Perspektivische Entwicklung des VEB Chemiefaserwerkes Guben bis 1980. Guben 20.09.1972.
- 903 681: VEB Chemiefaserwerk "Herbert Warnke" Guben. Kader- und Bildungsprogramm des VEB Chemiefaserkombinat Schwarza "Wilhelm Pieck", Chemiefaserwerk Wilhelm-Pieck-Stadt Guben 1971–1975. Guben 01.01.1970.
- 903 763: VEB Chemiefaserwerk "Herbert Warnke" Guben. Entwicklungsperspektiven chemische Industries und CFG bis 1985. Grundfondsökonomisches Komplexprogramm des VEB Chemiefaserwerkes für den Zeitraum bis 1980. Guben 31.10.1977.
- 903 815: VEB Chemiefaserwerk "Herbert Warnke" Guben. Wissenschaftlich-technische Zusammenarbeit 1973–1977. Guben 1977.
- 903 851: VEB Chemiefaserwerk "Herbert Warnke" Guben. Gutachten zum Kostenvergleich Liquidation/Gesamtvollstreckung. Guben 31.01.1993.
- 903 853: VEB Chemierfaserwerk "Herbert Warnke" Guben. Personalkonzept. Guben 1990.

Bundesarchiv Berlin-Lichterfelde (BArch)

- DC 14/10799: Komitee der Arbeiter- und Bauerninspektion: Chemiefaserkombinat Wilhelm-Pieck-Stadt Guben. Ergebnisse der Überprüfung "Sicherung und Einhaltung der Staatsplantermine des volkswirtschaftlich wichtigen Investitionsvorhabens, des Chemiefaserkombinates Wilhelm-Pieck-Stadt Guben." Berlin 02.06.1964.
- DC 20/4582: Verfügung vom 23. Dezember 1965 zum Einsatz von Arbeitskräften aus der VR Polen zur Sicherung der planmäßigen Produktion im VEB Chemiefaserkombinat Guben. Berlin 23.12.1965,

- DC 20/7271: Ministerrat der DDR. Sicherung der Versorgung der Bevölkerung mit Textilien und technischen Konsumgütern. Bericht zur Entwicklung der Produktion von Polyesterfasern und -seiden. Berlin 20.05.1965.
- DC 20/9664: Ministerrat der DDR. Informationsbericht über die Entwicklung des VEB Chemiefaserwerk "Herbert Warnke" Wilhelm-Pieck-Stadt Guben. Berlin 12.08.1977.
- DC 20/18439: Vorbereitendes Material für den Rapport am 24.1.1970 auf der Baustelle des VEB Chemiefaserwerk Wilhelm-Pieck-Stadt Guben. Berlin 19.02.1970.
- DC 20-I/3/292: Ministerrat der DDR. Dokumente und Materialien der 50. Sitzung des Ministerrates der DDR vom 13. Nov., 8. und 18. Dezember 1958: Programm der Entwicklung der chemischen Industrie bis 1965.
- DE 1/770: Staatliche Plankommission. Grundkonzeption und Beschlussvorlage der Abt. Chemie zur Errichtung des Chemiefaserwerkes Guben. Berlin 09.01.1959.
- DE 1/27850: Staatliche Plankommission. Industriezweigökonomik Chemiefaser Band 1. Berlin 1959.
- DE 1/61539: Staatliche Plankommission. Schwerpunkte der Investitionskonzeption auf dem Gebiet der Chemiefaserproduktion. Berlin 10.02.1964.
- DE 4/20074: Bericht über die Patentsituation bei Halbleiterbauelementen und Geräten mit Halbleiterbauelementen. Berlin 04.09.1962.
- DF 3/2485. Bericht über die Untersuchung der Leitung des Patent-, Muster- und Zeichenwesens sowie der Art und des Umfanges der Durchführung schutzrechtspolitischer Maßnahmen in der VVB Chemiefaser und Fotochemie. Berlin 19.11.1964.
- DG 11/273: Ministerium für Chemische Industrie. Kaderangelegenheiten im Industriebereich. Untersuchung der erforderlichen Qualifikationsstruktur als Auswirkung der Rationalisierungskonzeption im VEB Chemiefaserkombinat W.-P.-Stadt Guben. Berlin 1967.
- DG 11/386: Ministerium für Chemische Industrie: VEB Chemiefaserwerk Wilhelm-Pieck-Stadt Guben. Studie über die perspektivische Entwicklung des VEB Chemiefaserkombinat Wilhelm-Pieck-Stadt Guben bis 1980. Berlin 29.10.1966.

- DG 11/2541: Ministerium für Chemische Industrie (1969): Vertrag zwischen der VE AHB Industrieanlagen-Import und der Firma Vickers-Zimmer, Frankfurt/M., über die Lieferung und Errichtung einer Pilotanlage im Chemiefaserwerk Guben. Berlin 28.03.1969.
- DY 30/38571: Abteilung Grundstoffindustrie im ZK der SED. Zusammenarbeit mit Büro Günter Mittag. Information über die vorgesehene Nutzung wichtiger Forschungsergebnisse im Chemiefaserkombinat "Wilhelm Pieck." Berlin 11.02.1976.
- DY 30/38642[a]: Abteilung Grundstoffindustrie im ZK der SED. Übersicht über nicht benutzte Erfindungen von volkswirtschaftlicher Bedeutung im Bereich des Ministeriums für Chemische Industrie. Berlin 20.06.1978.
- DY 30/38642[b]: Abteilung Grundstoffindustrie im ZK der SED. Information über eine Beratung im Chemiefaserwerk Guben zu Qualitätsproblemen. Berlin 29.01.1985.
- DY 30/78871[a]: Abteilung Grundstoffindustrie im ZK der SED: Chemiefaserindustrie. Einschätzung der technisch-ökonomischen Zielstellung des Investitionsvorhabens "Chemiefaserkombinat Wilhelm-Pieck-Stadt Guben." Berlin 29.04.1965.
- DY 30/78871[b]: Abteilung Grundstoffindustrie im ZK der SED: Chemiefaserindustrie. Einige Probleme des VEB Chemiefaserkombinat Wilhelm-Pieck-Stadt Guben. Berlin 01.02.1966.
- MfS BV Cottbus Abt. AKG 6556: Bezirksverwaltung für Staatssicherheit Cottbus. Einige Probleme der Qualitätsarbeit im VEB Chemiefaserwerk Guben. Guben 08.07.1982.
- MfS BV Cottbus Abt. AKG 6557: Ergebnisse und Erfahrungen bei der Beschleunigung des wissenschaftlich-technischen Fortschritts im VEB CFG, der langfristigen Arbeit des VEB CFG auf den Gebieten der Einführung neuer Verfahren und Techniken, der Entwicklung neuer Titer und Konsumgüter, der Entwicklung der Forschungseffektivität und der Patentergiebigkeit. Guben 25.05.1982.
- MfS BV Cottbus Abt. AKG 6562: Bezirksverwaltung für Staatssicherheit Cottbus. Einige Probleme im Zusammenhang mit der Überarbeitung des Planes Wissenschaft und Technik im Bereich Forschung und Entwicklung des VEB Chemiefaserwerk Guben. Guben 04.02.1982.

- MfS BV Cottbus 7811: Probleme zur Importrealisierung Polyamid-Cordanlage von der Firma Techint/Italien. Guben 26.03.1985.
- MfS BV Cottbus Abt. AKG 7912: Bericht über den gegenwärtigen kritischen Realisierungsstand der Polyamidreifencordversuchsanlage im VEB Chemiefaserwerk Guben und der sich daraus abzeichnenden Auswirkungen auf den Import und Anfahrprozeß der Reifencordgroßanlage der Firma … (Italien). Guben 06.05.1986.
- MfS HA XVIII 6804: Information über den Stand der Realisierung ausgewählter Aufgaben aus dem Staatsauftrag "Entwicklung neuer Technologien zur Herstellung modifizierter Chemiefaserstoffe" zur Gewährleistung der beschleunigten Ablösung von NSW-Importen. Berlin 20.02.1984.
- MfS HA XVIII 13212: Analyse der Geschäftstätigkeit der Firmen Radyne und Metals Research zur Mikroelektronik der DDR. Berlin 31.07.1979.
- MfS HA XVIII 30226: Analyse zu den Granulatlieferungen an Firma Schulman. Guben 28.04.1986.
- MfS ZAIG 2283: Information über einzelne, die Situation im VEB Chemiefaserwerk Guben beeinflussende Vorkommnisse und Erscheinungen. Guben 31.01.1974.

Online Information

- German Patent and Trade Mark Office (DPMA) https://depatisnet.dpma.de/DepatisNet/depatisnet?window=1&space=menu&content=index&action=index Accessed August 5, 2020
- Polish Patent Office (UPRP) https://ewyszukiwarka.pue.uprp.gov.pl/search/simple-search Accessed December 10, 2022
- Trevira factory Guben www.trevira.de/die-geschichte Accessed February 17, 2023
- Megaflex company Guben https://www.megaflex-schaumstoffe.de/de/about Accessed March 22, 2023
- "Stilon" S.A. factory Gorzów www.martis-stilon.pl/firma Accessed February 17, 2023
- Monosuisse factory Gorzów https://www.monosuisse.com/de/unternehmen/geschichte.html Accessed March 21, 2023
- Internet portal naszemiasto https://gorzowwielkopolski.naszemiasto.pl/w-monosuisse-stawiaja-na-jakosc-i-rozwoj-ta-firma-wciaz/ar/c3-8757227 Accessed February 24, 2023

References

Bahr J (2001) Innovationsverhalten im Systemvergleich. Bilanz und Perspektiven neuerer wirtschaftshistorischer Forschungen. In: Abele J et al. (eds) Innovationskulturen und Fortschrittserwartungen im geteilten Deutschland, 33–46. Köln, Böhlau

Balcerowicz L (1995) Socialism, capitalism, transformation. Central European University Press, Budapest

Bode H (1998) Geschichte der Chemiefaserindustrie der Deutschen Demokratischen Republik. *Mitteilungen der Gesellschaft Deutscher Chemiker* 14:158–169.

Buchheim C (1995) Die Wirtschaftsordnung als Barriere des gesamtwirtschaftlichen Wachstums in der DDR. *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte* 82(2):194–210

Flade F (2022) Sozialistischer Wettbewerb im Halbleiterwerk Frankfurt (Oder). In: Aldenhoff-Hübinger R et al. (eds) Halbleiterstadt Frankfurt (Oder), 1959–1990, 115–135. Bäßler, Berlin

Fraunholz U (2003) Mobilisierung der „Produktivkraft Wissenschaft"? Die Hochschulen und das Chemieprogramm der DDR in den 1950er und 1960er Jahren. *Dresdener Beiträge zur Geschichte der Technikwissenschaften* 28:33–70.

Gayko A (2000) Investitions- und Standortpolitik der DDR an der Oder-Neiße-Grenze. 1950–1970. Peter Lang, Frankfurt a. M.

Gomułka S (1990) The theory of technological change and economic growth. Routledge, London

Grabas M (1995) Der wechselvolle Verlauf der wirtschaftlichen Entwicklung in der DDR – Zusammenspiel von akkumulierten Innovationspotential und institutionellen Diffusionsblockaden. Jahrbuch für Wirtschaftsgeschichte 36(2):149–162

Gutmann G (1999) In der Wirtschaftsordnung der DDR angelegte Blockaden und Effizienzhindernisse für die Prozesse der Modernisierung, des Strukturwandels und des Wirtschaftswachstums. In Kuhrt E (ed) Die Endzeit der DDR-Wirtschaft. Analysen zur Wirtschafts-, Sozial- und Umweltpolitik, 1–6. Leske+Budrich, Opladen

Hanson P, Pavitt K (1987) The comparative economics of research development and innovation in East and West: A survey. Harwood, New York

Hempel K (1998) Historia polskiego przemysłu włókien sztucznych. Stowarzyszenie Inżynierów i Techników Przemysłu Chemicznego, Warsaw

Herzog G (1998) Schwäche als Stärke: Bargaining Power im RGW. Berlin, Freie Universität Berlin

Hoffmann D, Malycha A (eds) (2016) Erdöl, Mais und Devisen. Die ostdeutsch-sowjetischen Wirtschaftsbeziehungen 1951–1967. Eine Dokumentation. De Gruyter, Berlin

Karlsch R (1999) "Wie Phönix aus der Asche?" Rekonstruktion und Strukturwandel in der chemischen Industrie in beiden deutschen Staaten bis Mitte der sechziger Jahre. In: Baar L, Petzina D (eds) Deutsch-deutsche Wirtschaft 1945 bis 1990. Strukturveränderungen, Innovationen und regionaler Wandel. Ein Vergleich, 262–303. Scripta Mercaturae, St. Katharinen

Knappe U et al. (2009) Chronik zur Geschichte des VEB Chemiefaserwerkes "Herbert Warnke" (CFG). Teil 2 1971–1989. Regia-Verlag, Cottbus

Knoll W-R (2022a) Die Treuhandanstalt in Brandenburg. Regionale Privatisierungspraxis 1990–2000. Ch. Links, Berlin

Knoll W-R (2022b) Deindustrialisierung oder Aufschwung Ost? Der Strukturwandel in Ostdeutschland und die Rolle der Treuhandanstalt am Beispiel des Landes Brandenburg. In Hoffmann D (ed) Die umkämpfte Einheit. Die Treuhandanstalt und die deutsche Gesellschaft, 183–244. Ch. Links, Berlin

Kornai J (1992) The socialist system. The political economy of communism. Clarendon Press, Oxford

Krause C et al. (2009) Chronik Chemiefaserwerk "Herbert Warnke" Wilhelm-Pieck-Stadt Guben. Teil 1 1959–1970. Regia-Verlag, Cottbus

Neumann G (1972) Das Chemieprogramm der DDR. *Jahrbuch für Wirtschaftsgeschichte* 13(II): 241–272

Pojda J (1974) Przemysł Chemiczny. *Rocznik Polityczny i Gospodarczy* 1974:341–345.

Poznański K (1986) Economic adjustment and political forces: Poland since 1970. *International Organization* 40(2): 455–488

Rubin E (2008) Synthetic Socialism. Plastics & Dictatorship in the German Democratic Republic. Chapel Hill, University of North Carolina Press

Schröter H (1996) Ölkrisen und Reaktionen in der chemischen Industrie beider deutscher Staaten. Ein Beitrag zur Erklärung wirtschaftlicher Leistungsdifferenzen. In Bähr J, Petzina D (eds) Innovationsverhalten und Entscheidungsstrukturen. Vergleichende Studien zur wirtschaftlichen Entwicklung im geteilten Deutschland 1945–1990, 109–138. Duncker&Humblot, Berlin

Stokes R (2000) Constructing socialism. Technology and change in East Germany 1945–1990. Johns Hopkins University Press, Baltimore

Trojecki M (2012) Legitymizacja ekonomiczna władzy PZPR, w dekadzie lat siedemdziesiątych XX wieku. Studium przypadku Zakładów Włókien Chemicznych "Stilon" w Gorzowie Wlkp. Uniwersytet im. Adama Mickiewicza, Poznań

Wiessner M (2015) Das Patentrecht der DDR. In: Otto M, Klippel D (eds) Geschichte des deutschen Patentrechts, 239–288. Mohr Siebeck, Tübingen