Eiserfeld: European production and development centre for European data technology

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1. Introduction

In contrast to many other 'mythical' places in the history of computers and data technology, the site of Eiserfeld does not appear in the standard works on computer history. Although the computer giant IBM made the rather small towns of Endicott and Armonk (in the state of New York) famous,[1] and its later competitor Apple did the same for the small town of Los Alto (in the state of California) or the German manufacturer Nixdorf for the tranquil town of Paderborn in East Westphalia (North Rhine-Westphalia),[2] Eiserfeld in South Westphalia (North Rhine-Westphalia) is hardly known. However, there are few places in Europe where the eventful history of data technology 'made in Europe' can be found in so many facets. Traces can be found at the Eiserfeld site from mechanical typewriters and early semi-electrical booking machines to the first ever fully electronic booking machine or the small computer division of the European joint venture 'Unidata', to the last great attempt by a European company to keep up with personal computer (PC) development – the Philips :Yes computer. It is remarkable that Eiserfeld is a neglected site of European data technologies and computers if we consider the multifaceted developments there.

This paper takes a closer look at the location of Eiserfeld in the development of data technology of European production. What is the significance of the production site and the companies producing there for the development of European data technology? How did location factors affect entrepreneurial activity? Why has the Eiserfeld production site hardly been mentioned in the history of computing?

1 Pugh: Building IBM.
2 Berg: Heinz Nixdorf

The majority of studies focus on the business history and individual European producers of data technology.[3] These works have always taken into account a production site's characteristics for the development and production of data technology. However, a location itself, with its specific factors, and their suitability at different phases in the history of computing, has seldom been zoomed in on.[4] In order to be able to do this for Eiserfeld, this article is based on the archives of and business history studies on Siemag and Philips (Philips Electrologica, Philips Data Systems and Philips Kommunikationstechnologien AG)[5] producing there, isolated interviews with contemporary witnesses and works on local (economic) history.

In the following, the basic location factors of Eiserfeld are outlined, then the development of the Eiserfeld production site is presented in six chronological chapters. Finally, the guiding questions of this paper are answered in a concluding chapter.

2. Production site characteristics at Eiserfeld, South Westphalia

The economic history of South Westphalia has been shaped by the mining industry and strong companies for mechanical engineering, especially plant and rolling mill construction, since the 19th century. These companies had mixed mining-industrial product portfolios up to the mid-20th century. Thereafter, the focus was increasingly on highly specialized products sold worldwide.[6]

The founding of the European Coal and Steel Community (ECSC) in 1952 was extraordinarily significant for the region and the Eiserfeld site due to the ECSC banning the railway's exceptional tariffs for the transport of iron ore, which had existed since the 1880s, from this region to the Ruhr area because of their competition-distorting effect.[7] From then on, the extraction of various ores was no longer lucrative. After a final ruling by the European Court of Justice, the last mine in the region, Pfannenberger Einigkeit in Eiserfeld, ceased operations in April 1962. This meant the end

3 Müller: Kienzle; Berghoff: Zwischen Kleinstadt und Weltmacht; Feldkamp/Dressler: 120 Jahre Wanderer.
4 Mahoney: Histories of Computing.
5 Henrich-Franke: Innovationsmotor; Stähler: Frühe Innovationen.
6 Hufnagel: Interesse und Verantwortung; Gösche: Insolvenzen und wirtschaftlicher Wandel.
7 Petzina: Eine Industrieregion, p. 66.

of an almost 2000-year mining history for Eiserfeld, which was followed only a few years later by the end of steel production in the Eiserfeld ironworks.[8] This marked the beginning of the search for new motors of industrial development. Data technology was to play an essential role in that context.

Concerning the classic production factors, the Eiserfeld site was characterized by a number of disadvantages regarding the production of data technology in the mid-20th century. Firstly, Eiserfeld, located in the peripheral mountain region of South Westphalia, had a poor transport infrastructure and high transport costs.[9] The region had neither navigable waterways nor an efficient railway system. Until it was connected to the motorway network in the 1970s, road freight transport was not an alternative either. Secondly, the region was comparatively scarcely populated. Eiserfeld itself had just 9,000 inhabitants in the second half of the 20th century; together with the neighbouring towns of Hüttental and Siegen (all three merged into to the town of Siegen in 1975), the population was close to 100,000. The labour supply was limited both in terms of numbers and specialized qualifications for data technology. The regional education system hardly trained for such expertise. Even the University of Siegen, which was founded in 1972, focused primarily on the heavy industrial plant construction. Thirdly, there was the difficult topographical situation in the narrow Siegtal valley, which made a large integrated plant scarcely possible. What was available, however, was entrepreneurial expertise in (inter-)national cooperation. The leading mechanical engineering companies in the region had opened up to world markets, especially North American companies, at a very early stage.[10]

3. Eiserfeld – a production site in transition

a) The beginnings of production in Eiserfeld

The Eiserfeld production site was established in the early 1920s by the Siegener Maschinenbau AG (Siemag) to produce precision mechanics, especially bicycles and chains, for regional markets. From the beginning,

8 Neutsch: Einmischen.
9 Franke: Zur regionalen Industrialisierung.
10 Henrich-Franke/Neutsch: Aus dem Siegerland in die Welt, p. 82–84.

however, precision mechanics was a secondary part of Siemag's product portfolio. The actual core business, the construction of rolling mills, which increasingly developed into the main pillar of the company, was not carried out at the Eiserfeld site. Regarding the rolling mills, the company had conquered world markets already in the interwar period and formed its own expertise in areas such as research and development around this product.[11] Siemag owed its entrepreneurial success to a strategic policy of cooperation and licensing as well as its own research and development. Before the Second World War, however, data processing, in the broadest sense, was neither part of the Eiserfeld site nor of Siemag.[12]

b) External expertise and the entry into data processing

External expertise was the entry into data processing and its subsequent technical development at Eiserfeld. After the Second World War, typewriters were manufactured for the first time alongside the production of steel chains, following a suggestion by refugees who had worked in the Saxon Wanderer-Werke on the production of office machines. In the shadow of the rapidly expanding typewriter business, the Siemag management in the first half of the 1950s pushed to extend the product range into the field of office communication to include accounting and invoicing machines, especially in view of fierce international competition in the mechanical typewriter segment. This should also meet the more sophisticated demand for data processing equipment. However, the necessary technical expertise was available neither among the staff at Eiserfeld nor at Siemag as a whole. The company, therefore, entered more sophisticated machine production without its own research and development. A balancing machine was connected to a Siemag typewriter, which was produced externally, as was the relay technology connecting them.[13]

11 Hufnagel: Interesse und Verantwortung.
12 Henrich-Franke/Neutsch: Aus dem Siegerland in die Welt, p. 85.
13 Henrich-Franke: Innovationsmotor, p. 100.

Picture 1: Typewriter production in Eiserfeld (1950) (Source: Archives of the SMS Group)

The early 1950s were characterized by a price war in the segment of semi-electronic accounting machines, which Siemag could not survive. The location conditions at Eiserfeld were simply not suitable for low-priced, mass production because of the high transport costs, lack of qualified personnel and lack of technical expertise. Data technology could only be successfully produced and sold if it was highly innovative. This, in turn, required technical research and development, which was not available. Consequently, Siemag entered a (patent) cooperation with leading companies in the industry in the mid-1950s, including Zuse KG in the field of electronic component production.[14]

Siemag took an important step for the further development of the Eiserfeld site when, on 1 July 1954, it concluded a general licence agreement with the Frankfurt-based engineer Gerhard Dirks, who had registered leading patents on data storage methods and storage devices.[15] In this agreement, Siemag received the exclusive first right of the commercial exploitation of

14 Hanewinkel: Computerevolution; Zuse: Der Computer.
15 Rimmer: Die Flucht.

the patents in the areas of typewriters and calculating machines, as well as calculating and non-calculating office machines, which also applied to new models to be developed. The management secured the company's entry into the field of electronic data processing. In return, Dirks' engineering office retained its independence, basic financial resources and became the actual research and development centre for production at the Eiserfeld site, albeit in distant Frankfurt.[16]

Research and development by Dirks' engineering firm, however, hardly paid off for Siemag. On the one hand, Dirks did not succeed in implementing his basic concept of decentralized data processing at small input terminals – the subsequent core concept of medium range computing[17] and, 20 years later, also the recipe for the PC's success. On the other hand, the technical advances of Dirk's company did not serve Siemag's market segment. Siemag was able to present the world's first fully electronic accounting machine, the Dataquick, at the technical fair in Hanover in 1959. But the Dataquick was simply too expensive for the market segment below mainframe computers that Siemag served at the time.

The basic problem for the future development of data technology at the Eiserfeld production site at the end of the 1950s was that technical development, production and sales were not co-ordinated and bundled. To specialize in production, develop innovative products and establish an effective sales and customer service network was a matter of survival for the Eiserfeld site. These challenges, however, had already subsequently been taken up by Siemag in the 1950s.[18]

c) Specialization and extension

Siemag intensified its efforts at the beginning of the 1960s, and rebuilt the Eiserfeld site having specialization and expansion in mind. To this end, a number of measures were taken. (1) Firstly, the product portfolio was reduced by ceasing the production of chains and mechanical booking machines. In 1963, the production of typewriters was transferred completely to Portugal. From then on, only fully electronic office computers and (for a transitional period of two years) electromechanical invoicing machines

16 Henrich-Franke: Patents and Licences, p. 76–77.
17 Heinrich: Mittlere Datentechnik.
18 Henrich-Franke: Innovationsmotor, p. 105.

were manufactured in Eiserfeld. The specialization of the Eiserfeld site also included the production of semifinished items, such as cable harnesses, in their own production facility in Hamm. Siemag wanted to make more effective use of the limited possibilities in Eiserfeld and, at the same time, become less dependent on suppliers. 2) The specialization in office computers went hand in hand with product diversification in this area, which was demanded by an expanding market. From 1965 onwards, Siemag produced a functional range of office computers in Eiserfeld in various sizes: the Data 1000, 2000 and 5000 were aimed at a heterogeneous clientele ranging from retail shops to commercial banks. (3) Siemag became independent in research and development. The company took a decisive step by setting up its own research and development centre in Eiserfeld, which was to further develop the fully electronic product range independently of external expertise. Subsequently, Siemag built up its own technical proficiency in the first half of the 1960s and specifically recruited engineering staff from outside the region. A truly independent technology development was established around the storage technology of magnetic ledgers for the first time. The research and development department was converted into a modern research centre, which has been based on the production site in Eiserfeld since 1968. A special focus was then placed on sales-oriented thinking and concrete application references, which is why the development centre did not see itself as a pure engineering laboratory but rather as a centre for combined hardware and software. In the tradition of Gerhard Dirks' concepts, decentralized data processing was the guiding principle of development activities.[19] (4) The technical development of the equipment and the ever-increasing importance of different software solutions resulted in the construction of a special training centre in 1965 for employees and customers using office computers. However, the training centre had to move to neighbouring Herdorf as rooms could be rented there at a reasonable price. It would have been too expensive to build from scratch on the narrow site in Eiserfeld.

In the mid-1960s, despite all the entrepreneurial efforts, it became apparent that the production and development of modern data technology at the Eiserfeld site had reached its limits. The magnetic card computers of the data series were at the forefront of the technical development of ultra-modern single-user machines and machine systems. The business

19 Henrich-Franke: Patents and Licences, p. 77–78.

challenges, however, were growing steadily, especially the cost pressure from distribution networks, research and development, training and ever shorter product cycles. At that time, large corporations, such as IBM, were able to offer their comparable products, such as the 'IBM 6400 Accounting Machine', at much more favourable conditions than the corresponding Siemag products.[20] The Eiserfeld site, with its 2000 employees, had reached the upper limit of its capacity to be able to survive alone in the long term on highly competitive national and international markets. Eiserfeld was simply too small, the product portfolio of the entire Siemag too heterogeneous and the capital base of the company too limited to master the rapid technical changes with their manifold entrepreneurial challenges. Recruiting staff also proved to be increasingly difficult. The more smaller business computers became a mass product, the more difficult it became to survive in the market as a medium-sized company. In addition, data technologies and computing were industries that required entrepreneurial expansion strategies that did not match the tradition and expertise of Siemag's management. Nevertheless, the location in Eiserfeld, with its newly established research and development centre, product concepts, increasingly differentiated sales network and specialized staff, was an attractive site for integration into a larger business complex with a compatible overall portfolio.[21]

d) Joint ventures and international cooperation as answers to the American challenge

In this critical situation, Siemag entered into a 'joint venture' with the Dutch Philips group, which ended in a unanimous takeover of the site within a few years. In the second half of the 1960s, Philips – the largest European electronics group at the time – tried to make massive inroads into the future industry of data processing and computing. This move was also prompted by the fact that their previous major customer, IBM, had switched to producing electronic components for computer production by itself. For Philips, the step into the production of office computers at Eiserfeld was, therefore, not only an investment in the future but also a step to safeguard its own production capacities. In 1968, Philips also ac-

20 Cortada: IBM
21 Stähler: Frühe Innovationen.

quired the Dutch computer manufacturer Electrologica,[22] partly to anticipate IBM's advance into the European market, and integrated it into its own, previously rather insignificant 'Philips Computer Industrie' in Apeldoorn: henceforth, under the name 'Philips Electrologica'. Remarkably, as early as 1964, Philips had enticed Dr. Munter, the head of the new development centre in Eiserfeld, away from Siemag.

The joint venture, which started in 1966, enabled Eiserfeld to overcome the existing production restrictions more easily in the group of the large corporation. The internationally widespread sales network and many semi-finished products, especially electronic components, which could be supplied much cheaper within the large Philips group were important aspects. At the same time, Eiserfeld was a prime site for Philips to expand its computer division. In this respect, it seemed only logical that the Philips board of directors, who were extremely positive about the development opportunities at Eiserfeld, planned to take over the production site as early as 1967. It enabled Philips to be able to "regroup the entire area of electronic data processing systems and office machines".[23] From then on, the computers manufactured at Eiserfeld, such as the extremely successful P250 and P350 models – the latter alone sold 25,000 units worldwide between 1969 and 1975 – bore the Philips label, although technically the Data series designed by the Eiserfeld development centre continued to be concealed behind the devices. Eiserfeld was organizationally integrated into Philips AG, however, for the time being, a high degree of continuity was maintained in terms of staff, products and work processes.

The binational joint venture from 1966 onwards had been a first step for Philips towards meeting the 'American challenge' represented by IBM. Just a few years later, at the beginning of the 1970s, Philips and other European companies in the data processing industry were again confronted with the question of having to join forces in a European 'joint venture'.[24] Governments across Europe made a plea for European cooperation. Previously, Siemens had lost the American technology supplier RCA, the French CII had problems with technical development and Philips was still busy developing its own strategy to become a major European producer of data

22 De Wit: The Construction.

23 Correspondence of Bernhard Weiss (Siemag) with P.H. le Clercq (Member of the management at N.V. Philips Gloeilampenfabrieken), in: Archives of the SMS Group Dahlbruch, S-Da 01 D2 33 2844.

24 Hilger: Von der Amerikanisierung.

processing equipment. All three companies cooperated in 1972/73 to form the European alliance 'Unidata'. Together, they were able to offer the whole range of data technologies as a European competitor to IBM.[25] Philips took over the small business computer division in Unidata, which meant that they joined Unidata essentially with the products of the Eiserfeld site. From then on, the P410, which was developed and manufactured at Eiserfeld, was sold as the Unidata 410. One of Unidata's design flaws, however, was that each of these partners only sought its own advantages. Philips did not bring any of the new developments conceived in Eiserfeld into the joint venture and, instead, hoped that it would be able to take advantage of the technical expertise of Unidata's partners, especially that of Siemens in the field of mainframe computers. It is, therefore, hardly surprising that Unidata, which was declared a 'European champion' by the European Community and celebrated as a prime example of a European industrial alliance, broke up again as early as 1974 due to national and corporate egoisms.[26] Unidata ultimately meant only a temporary relabelling of an established model from the portfolio of its office computers for the Eiserfeld site and the development and production there.

All in all, the Eiserfeld site emerged as a central building block of the Philips electronics group regarding the competition on the markets for data technologies and computers. Eiserfeld became an important driving force in the transformation of the Philips group into a provider of modern data technology because of its development centre and technical expertise.

e) Specialization and expansion within the Philips group

As a result of the Unidata intermezzo, Philips stopped producing mainframes. However, this did not change the fact that the incorporation of the Eiserfeld site into the Philips group was a smooth transition. Within the large corporation, Eiserfeld stood for the production and development of the smaller office computers and was, thus, able to continue the strategy of modularized and decentralized data processing still adopted in Siemag times under the new name Philips Data Systems.[27] As part of Philips, the new possibilities, such as the joint production of components, complement-

25 Hilger: The European Enterprise.
26 Kranakis: Politics, Business; Sandholtz: High Tech Europe.
27 Stähler: Frühe Innovationen.

ary research or professionalized international sales, became noticeable in the sales figures, which increased sharply. Even the production changed. Philips manufactured semifinished products (electronic and electrotechnical elements) at other company sites and primarily manufactured finished products in Eiserfeld.

The P300 series, which was designed in the Eiserfeld research and development centre and launched on the market in 1975, was quickly to become a bestseller. More than 10,000 units had already been sold to customers from 28 states in the first 2.5 years. More than 80 % of the production in Eiserfeld was exported, which also meant that Eiserfeld no longer served regional or national markets, as had been the case in Siemag times. Instead, Eiserfeld had turned into a production site for international markets. Business newspapers, such as Handelsblatt, were full of success stories about Eiserfeld in the years between 1975 and 1980. Philips Data Systems mastered this positive development. However, when the German government tried to financially support the manufacturers of data processing machines in the 1970s with its 'DV' programmes,[28] Eiserfeld was regarded as a Dutch producer and was received no support.

The strategy of decentralized and modularized devices had been continued with the P300 series, but, at the same time, new options for system integration and networking had been created. The series had a modular hardware design, so that magnetic account devices, display terminals, floppy disk drives, line printers, punch card punches and other peripherals could be flexibly combined. Various models of the series were equipped with components for the remote transmission of data, so that, with the appropriate network equipment, online connections could be established between decentralized company branches or with central data centres. Depending on the number of connected or networked devices, the integrated systems could no longer really be called 'small computers'. The P300 series developed in Eiserfeld also introduced new user software solutions. Software development was closely tied to the devices and their manufacturers can be seen in the name of the programming language 'PHOCAL' (Philips Office Computer Assembler Language). Software solutions were developed for the specific requirements of data processing in, for example, hotels, local authorities, clinics, industrial companies and construction companies. The good sales figures of the P300 series also prompted Philips to expand its customer network further.

28 Ahrens: Varieties of Subsidization.

Expanding production figures, ever-increasing research and development requirements, and a steadily rising need for training once again revealed the capacity limits of the Eiserfeld site. In the early 1970s, therefore, new facilities were built in the Weidenau district of Siegen, 5 km away, for the head office and the main headquarters of the customer service network, which was composed of 300 technicians in 70 support points and a sales network with 4 regional sales directorates and 30 sales offices only in Germany. In 1977, facilities in Weidenau were extended by a new training and information centre to train customers and employees in areas such as data systems, process computers, terminals and their application in business and administration. This was even more important as the competitive pressure on the market for office computers further increased in the second half of the 1970s and marketing became more and more important. During this phase, Philips Data Systems consistently relied on the concept of a 'full-service' sales organization that continued to aggressively promote and sell office computers as complete packages of hardware, software, technical support, consulting and customer training.[29]

At the same time, Eiserfeld was transformed into a pure centre of development and production. Once again, a new development centre for another 450 technicians and scientists from various disciplines was built at Eiserfeld, because the development of software was becoming increasingly important for successful sales. It required interdisciplinary research by computer scientists, engineers, business economists, organizational scientists and work psychologists. After all, 40 % of the Eiserfeld workforce was already employed in research and development at this time, making the site into an increasingly important centre of innovation for the office computer sector. Eiserfeld (including the new facilities in Weidenau) could now be expanded so consistently also for customer training, because South Westphalia was better connected to the European road network through the construction of the A45 and A4 motorways in the first half of the 1970s, which put the unfavourable site conditions into perspective somewhat. At the end of the 1970s, the development and production site in Eiserfeld was Philip's largest and most important in the Data Systems Division.[30]

29 Linssen: PDS – Philips Data Systems.
30 Ende/Wijnberg/Meijer: The Influence, p. 202.

Picture 2: The Eiserfeld production site (1974) (Source: Foto Loos, Siegen)

f) Competition with the PC and networking of devices

The decision of the group management to completely discontinue the production of mainframes was accompanied by a realignment of the internal company organization, which resulted in a greater centralization at Philips Data Systems. This particularly affected the rather autonomous location in Eiserfeld. Important decisions regarding production and development were no longer made there but at Philips headquarters in the Netherlands. The greater centralization continued in 1982 when Philips merged its office and telecommunications divisions – henceforth, Philips Communications Industry. Merging technologies made the Philips management even merge their divisions. This also meant that strategic and operational decisions were made in the Netherlands, where expertise tended to be in electrical engineering and telecommunications. This was considered more significant for the further development of the company compared to data technology.[31]

31 Dekker: Levenslang Philips.

Philips' computer division developed extremely positively in the second half of the 1970s and the early 1980s – the years 1984 and 1985 were even the most successful ever – although with clear differences between the individual departments. The production and development of small computers in Eiserfeld stood out particularly positively. Van de Ende/Wiganberg/Meijer[32] even conclude that of all the activities of the Philips Group in the field of data processing and computing, only the office computers developed and produced in Eiserfeld were a business success. Thus, the success with the P 300 series was continued with the successor models P 4000 and P 9000. The established concept of modularized and decentralized data processing equipment, which was developed in Eiserfeld, corresponded to the possibilities for decentralized office work created at the time by new digital data networks.

Nevertheless, the decline came quickly. Philips reacted less successfully to the PC, which entered the market in the first half of the 1980s, intensified competition enormously and spelled the end for many European producers of data technology. After 1986, Philips tried to counter the IBM PC with its flexible software applications with the Philips :Yes computer, which had not been developed in Eiserfeld after the restructuring of the Philips group. Eiserfeld was realigned with a focus on terminals and components, including printers, which were now manufactured in Eiserfeld. The :Yes computer, while faster than IBM's PC, was not compatible with the PC's software and, thus, much more limited in its application possibilities. While the PC software was flexible to use and adult education centres (*Volkshochschulen*) started to offer a wide range of software courses, Philips customers had to rely on the company's own software and training. Philips simply failed to move away from the concept of a 'full-service' sales organization offering office computers as complete packages of hardware, software, technical support, consultancy and customer training at this crucial stage in the development of data technologies. In addition, the PC was significantly cheaper than a comparable :Yes computer from Philips. As Philips slipped increasingly into the red in the second half of the 1980s, the entire computer division was sold to the American manufacturer DEC (Digital Equipment Corporation) in 1991.[33]

The site in Eiserfeld/Weidenau, which had lost its key position as Philip's research and development centre, was given up in the course of the sale

32 Ende/Wijnberg/Meijer: The Influence, p. 201.
33 Dekker: Levenslang Philips, p. 277ff.

of the computer division. Only some parts were able to survive under new brands, such as the printer division, which from then on served the market niche of continuous feed printers as a management buyout in the new company PSI (Printer Systems International).

4. Conclusion

First Siemag and then Philips manufactured data processing technologies at the production site in Eiserfeld for four decades, from the first mechanical typewriter to the :Yes computer, perhaps the last European competitor to the IBM PC. Location factors forced Siemag and Philips to be highly innovative and permanently adapt their corporate structures to changing markets and technologies. In these four decades, the Eiserfeld site periodically reached the limits its capacity, which initially led to its integration into the Philips group and then to the outsourcing of administration, service and training to Siegen-Weidenau. From the end of the 1960s, the comparatively small Eiserfeld site was only able to survive the fierce competition of a consolidating data industry as part of the Philips Group because it was able to concentrate on small office computers and purchase semifinished products cheaply from Philip's own production facilities.

After the takeover in 1969, Philips continued to run the Eiserfeld site in its substance and made the factory the entrepreneurial base for one of the strongest European competitors to US producers. The large corporation created the preconditions for a continuation of a gradual development and expansion of the site, where research, development and production were closely linked. Even in the 1990s, when many European manufacturers of medium-sized data technology had long since disappeared from the market, computers and their devices were still being manufactured in the same halls in which Siemag had produced the first mechanical typewriters in 1948. Remarkably, the Eiserfeld site (under both Siemag and Philips) was transformed from a pure production site in the 1950s, where neither research nor development was carried out, to a research and development centre for small office computers.

Eiserfeld must be regarded as a truly European location for the production of data processing technologies, because it was integrated into a transnational group, produced for international (especially European) markets and was even part of European cooperation projects, such as Unidata.

It is likely that Eiserfeld has received so little attention from historical research because there was no actual 'national champion' there. When national governments designed their support programmes for the data processing industry in the late 1960s and early 1970s, they addressed national manufacturers and – as in the case of the Federal Republic – not Dutch companies on German soil. The extent to which the 'national glasses' influenced the perception can be seen precisely in the historiography, which – with a few exceptions – tends to attribute Philips to the locations in Eindhoven and Apeldoorn in the Netherlands. (Historical) research on 'German' producers of data and computer technologies have neglected Philips and, instead, tended to focus on 'domestic' companies. such as Nixdorf (Paderborn), Kienzle (Villingen) and Hohner (Trossingen).

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