



Socialist Life of a U.S. Army Computer in the GDR's Financial Sector

Martin Schmitt

► To cite this version:

Martin Schmitt. Socialist Life of a U.S. Army Computer in the GDR's Financial Sector. IFIP International Conference on the History of Computing (HC), Sep 2018, Poznan, Poland. pp.139-164, 10.1007/978-3-030-29160-0_9 . hal-02386553

HAL Id: hal-02386553

<https://inria.hal.science/hal-02386553>

Submitted on 29 Nov 2019

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

Socialist Life of a U.S. Army Computer in the GDR's Financial Sector

Import of Western Information Technology into Eastern Europe in the Early 1960s

Martin Schmitt^(✉)

Leibniz Centre for Contemporary History, Potsdam, Germany
schmitt@zzf-potsdam.de

Abstract. This article investigates the role of the first digital computer in the GDR's socialist financial system. Why did the GDR's Ministry of Finance import a Univac computer from the U.S. army in 1965, even though the country aimed at computational autarky and was restricted by embargo? The main argument is that the Ministry of Finance imported the computer to kickstart its program for electronic data processing. They succeeded because they not only imported a machine, but also reframed it ideologically. They drew on the notion of the computer as a universal machine and adapted it to local conditions. The process hints to the ambiguity of the later decision of the East Bloc toward copying IBM's system architecture. This article investigates this process by following the traces of an early computer and the ideas surrounding it through the Iron Curtain. It stresses the role of early computer users with the example of GDR's financial system in contrast to better known producer stories. Through the analysis of exclusive material, this is suggesting a different perspective on the import procedures of Eastern European countries in the Cold War. A policy change in the Cold War towards détente becomes visible as early as in 1965.

Keywords: Banking History • Cold War • German Democratic Republic (GDR) • History of Computing • Technology Transfer.

1 Introduction: Why did the GDR's Ministry of Finance Import a Computer from the U.S. Army?

The first digital computer running in GDR's financial system was a capitalist one. In 1965, the East German Ministry of Finance imported a used midrange computer by Univac from the U.S. Army. This was remarkable for various reasons: it was imported from the ideological enemy, it conflicted with the drive to autarky, it came not from IBM, its import should have been prohibited by external embargos and internal security measures, and its acquisition was carried out by an organization of minor political position in GDR's hierarchy. The main research question resulting out of these contradictory facts is: Why did GDR's Ministry of Finance import a Univac computer from the U.S. army in 1965 even though the country aimed at computational autarky and was

restricted by embargo? Why were they able to succeed with their efforts while others failed? My main argument is: The Ministry of Finance was able to import the computer to kickstart its distinct program for electronic data processing (EDP) because they not only imported a machine, but also reframed it ideologically. They drew on the notion of the computer as a universal machine and adapted it to local conditions. They benefited from a policy change in the Cold War towards détente already in 1965. The process hints to the ambiguity of the later decision of the East Bloc toward copying IBM's system architecture. This decision was not as clear as it seems in hindsight.

Why was this process so remarkable, as other Eastern European states also imported computers from the west in that year? Firstly, the Ministry of Finance imported a machine of the enemy army. It had been used to fight against socialism, but it ended up in the banking system of a self-proclaimed "peace-loving" socialist country. Secondly, this very procedure conflicted with the approach of the East German government to achieve computational autarky. With its sophisticated "program for the development, implementation and enforcement of electronic data processing" [1], the Socialist Party set the foundation of an East German computer industry in 1964. Importing foreign computers from the ideologic enemy did not fit well into that line at first glance.

Thirdly, Western producers were not supposed to deliver computers to their enemies in turn. Especially for the U.S. administration computers were crucial in the global conflict of political systems. The embargo policy of the Coordinating Committee on Multilateral Export Controls (CoCom) should have prevented socialist states from acquiring high-end computer technology [2]. Nevertheless, the Univac Card Tabulator II passed this barrier. Its travel route took it through the heartlands of capitalism: from the United States via the Netherlands, Frankfurt in West-Germany to East Berlin. The UCT II was only one example for how porous the Iron Curtain could be as other states from Eastern Europe also imported similar machines already in 1965 [3]. Fourthly, the Ministry of Finance did not acquire an IBM computer but one from Remington Rand, an early competitor of IBM. So far, historians have often highlighted an early dominance of IBM in the East Bloc [4]. The exemplary fact that officials chose a Remington machine questions the current state of knowledge about imported computers in the Eastern Block. Especially, European producers tried to strengthen their position by expanding into a market not yet dominated by IBM. Fifthly, the banking system in the socialist state had a minor position. Despite its weak power position, its leaders succeeded in importing such an expensive machine earlier than many others.

This article investigates this process by following the traces of an early computer and the ideas surrounding it through the Iron Curtain in three sections. I stress the role of early computer users with the example of GDR's banking system in contrast to better-known producer stories. This provides new insights to technology transfer during the Cold War and into the inner logic of socialist regimes in Eastern Europe. Other institutions and companies in the GDR as well as in countries like Czechoslovakia, Poland and the Soviet Union also began to import computers in 1965. They considered the appropriation of western technology not as a simple takeover, but as the cornerstone on the way towards a socialist information age in its own respect. I am providing evidence through the analysis of so-far unknown documents from German archives and various oral history interviews with key figures of the computer center of the Ministry

of Finance. This exclusive material allows me to suggest a different perspective on the import procedures of Eastern European countries in the 1960s [4]. It also deepens our knowledge on recent questions of the history of computing, like computer technology and knowledge transfer [5, 6], early digital technology [7], knowledge acquisition through training [8], communities of practice of programmers [9, 10] and alternative paths to the digital age beyond system borders.

2 Computerization for Socialist Progress: The Electronic Data Processing Program of 1964 as the Basis of an Alternative Information Age

The party leaders of the GDR had high hopes for computer technology [11, p. 35], [12]. Perhaps like no other European country, they tied their fate to the success of computerization. This section shows how they developed their own concepts of a socialist information age [9, p. 4–21] and why it was nevertheless necessary to import western computer and knowledge to do so. In the eyes of the party leaders, computers should build the base for political-organizational reforms and economic growth. The GDR's economic development in the 1950s is known for investments in heavy industry and reconstruction. After having built the Berlin wall in 1961 to stop the exodus of well-trained specialists, the planners felt breathing space for reforms [13]. Party leader Walter Ulbricht and his advisors planned to introduce more market-oriented mechanisms to overcome GDR's lack of productivity in 1963. The 1964 "program for the development, implementation and enforcement of electronic data processing" [1] was ratified as a vital base for these reforms. On the one hand, the party deployed computers as a tool for optimizing the flow of information within the economy. On the other hand, they used them as one tool for control as they were slackening the reins and giving more responsibilities to the corporations. Being in a middle position between East and West, Ulbricht fulfilled Khrushchev's dreams of a nation-wide network of regional computer centers¹ as well as western ideals of price mechanisms having a discipline effect on the economy. He and his advisors imagined computer use for the sake of communism.

Nonetheless, computers and software were a scarce in the GDR. Planners, managers and workers had little knowledge of how to use computers for their sakes or how to integrate them into economic processes. The only "computer" in mass production was an electronic calculator distributed by the optical industry at Zeiss. Zeiss engineers mainly designed the so-called "Zeiss Electronic Calculator 1" (ZRA 1) for scientific calculations in 1956. Employees of the Savings Bank of East Berlin experimented with electronic calculators attached as modules to office machines for book-keeping purposes. Even though, fast input/output capabilities and flexible programmability were missing. Therefore, neither the ZRA 1 nor the modules were useful for mass use in the economy in the long run. The party invested large sums of money in computers between

¹ See Kitov, "On the History of Gosplan," this volume. Similar plans were pursued in Poland with ZETO. See Sikora, "Cooperating with Moscow, Stealing in California," this volume.

1964–1971 to change that situation and to base socialism in the digital age. They even rooted digitalization in their first party program:

Mastering and applying the most advanced [...] computer technology and mechanical data processing [...] is of decisive importance for the rationalization of production processes and the highest benefit of labor. The further investigation of economic problems with mathematical methods and the establishment of a network of computer stations and computer centers [...] should therefore be given special attention. (first program of the Socialist Unity Party of Germany, 1964)

SED party leaders regarded economic autarky as the core of their overall reform program [14, pp. 37–38]. Therefore, they also adapted the computer development program to that line. Their experiences at the beginning of the 1960s fueled the establishment of an autarkic computer and software production. Then, the West-German Government cut exports to the GDR in reaction to SED restrictions of freedom of movement. In many sectors of the GDR economy, this caused grave delays and production problems. In information technology, this should have been prevented by an own production. Based on the manufacturing of own electronic components, often “inspired” by Western design, a vital computer industry was planned. Also, money should be saved by avoiding costly imports. Some planners even hoped to export computer technology and gain foreign currency, as the business machine industry of the GDR succeeded to do since the very beginning of the GDR. The program’s main goal was to develop a competitive computer, the Robotron 300. Parallel to establishing hardware production, the party deployed concepts for the implementation of computers in different sectors of state and economy [4], [11, p. 38].

In the early 1960s, cross-national transfer processes were indispensable despite dreams of autarky. The program’s preparation as well as its realization were supported by technology and knowhow transfer. Again, the GDR took a middle role between East and West: Technical experts and leading managers of the GDR had a close look especially on West Germany, but also on other socialist countries [11, pp. 37–38]. While they adopted the concept of central, state-run data centers in the region capitals from the Soviet Union [15], they adapted programming methods, process digitalization and usage fields from the West. Since 1962, representatives of the GDR visited data centers in Japan, Switzerland, West Germany, France, Austria, Sweden and the USA in the West, as well as the Soviet Union, Czechoslovakia, Hungary and Poland in the East various times. Delegations of the financial sector participated amongst them. However, the exchange went even further: In order to achieve its goals, the party hired a number of West German and West Berlin experts on electronic data processing in the mid 1960s. Their task was to provide GDR workers the missing expertise of the Digital Age, for example in programming. In addition, the GDR joined the renowned “Diebold research institute for the use of electronic data processing” [16]. They were willing to pay large sums of membership fees in foreign currency for that transfer. The state leadership launched an import offensive of Western and socialist computers to speed up the production of its own computers. The financial institutions of the GDR, mainly the State Bank, played a key role in these efforts. The State Bank² was one of the leading forces

² At that time still called “National Central Bank.”

in the rationalization of mass data processing. They cooperated with national developers of the Robotron 300, participated in user groups, and wrote proposals for an advanced computer usage. However, besides electronic calculators running in Berlin, computers were missing in the financial sector.

3 Import vs. Autarchy in a Not-so-Hostile International Landscape

At the end of 1964, the top level of the Ministry of Finance already realized that the deployment of the Robotron 300 would be further delayed. Even though they had a good starting position and were granted early access to the supposedly self-built technology,³ early access still meant rather 1969–1970 than 1967 [17]. In this section, I analyze how they pursued the import of an U.S. army computer despite the embargo and autarchy because of this delay. Due to these planning uncertainties, many enterprises waited to make organizational changes until computers were finally available. In contrast, the State Bank had prepared a couple of state-of-the-art concepts for computer usage. They aimed at a double, intertwined goal: First of all, a rationalization of mass transaction data processing. Secondly, they wanted to optimize planning with transaction data analysis [18]. The delay in delivering the Robotron 300 endangered the development and implementation of their concepts. Especially the programming part was crucial for a successful deployment: The programs had to be written, tested, debugged, and implemented; the personnel had to be trained; the working routines had to be practiced, and the organizational schemes had to be proofed reliable. However, software testing was not possible without a computer. The banking sector was especially sensitive in terms of security and reliability. Messing up money transfers or savings of the population could possibly lead to discontent and economic disturbances. Party leaders feared that it could produce a decrease in legitimacy of the regime or even cause hard-to-control protests.

3.1 Why Did the Ministry of Finance Decide on an American Computer?

Therefore, the necessity of importing a computer became urgent. The minister of finance, Willy Rumpf, commissioned the Institute for Financial Economics with a study on the ideal type of computer for socialist financial purposes. Their scientists assessed the technical data and the performance of the computer “as well as the necessary accessories for data storage, sorting, input, output and printing [...], the mode of operation and the working rhythm ... and the level of programming difficulty.” Also, the “time of delivery, the price, the assurance of technical maintenance and the supply of spare parts, the expandability and the assurance thereof, the programs and the duration and location

³ Many parts of the first Robotron 300 computers were also imported from Western countries because the GDR microelectronics industry was not capable of producing parts of sufficient quality.

of the training of the operating personnel and, to a certain extent, commercial policy aspects” [19] played a vital role in their decision-making process.

Eventually, the Institute’s economists put three machines on the shortlist: An ICT 1301 from the British manufacturer International Computers and Tabulators, a computer famous for the complicated task of British currency calculations; a Bull Gamma 30 from the French *Compagnie des Machines Bull*, which was a rebranded RCA 301 in use in several banks all over Western Europe; and finally, an NCR 315 by the U.S. based National Cash Register, known for its sophisticated error-handling and the use of thin film memory as storage.⁴ All the machines were competitors of IBMs 1401 in size, speed and price. Therefore, it is more than remarkable that IBM computers did not even get into top three. IBM was strong in the banking and finance sector in Western Europe at that time, especially in the savings banks of Western Germany. Notwithstanding, Remington Rand still was a strong player since the 1950s. In 1965, GDR officials had more specific reasons not buy an IBM machine besides competition: its unwillingness to circumvent export policies.

Finally, Ministry officials took the decision to import the Bull Gamma 30. They had already established good relations with the company in the past. These good experiences and trustworthiness in delivery in times of the CoCom embargo were essential. In contrast, American companies like IBM complied with embargo rules. It is remarkable that IBM, which held advantages from longstanding customer relationships, was ruled out because of missing relationships to the East. The ministers’ decision on a machine had to comply GDR’s import regulations afterwards. This clearly shows that importing a machine from the West did not run smoothly. Many internal interests of the GDR left their marks on the final decision. Importing a U.S. army computer was not the decision of the Ministry of Finance, but the result of a typical negotiation process in the socialist system. A large number of players were involved in imports and they even changed in between. The decision-making structures in the supposedly centralized, hierarchical GDR state were interwoven and overlapping in terms of electronic data processing. Until 1965, the authority to import computers was primarily in the hands of the State Planning Commission. For a better coordination of the computing approaches of users, they established a commission for “Machine Data Processing” at the end of 1964. Their members issued import recommendations for specific machines and determined rules for evaluating import proposals.

Those import rules were changed between 1964 and 1965 and published in June 1965 [20]. Therefore, the Ministry of Finance had to reformulate their proposal. Every user was obliged to defend their proposal in front of this commission. The recommendations as well as every proposal were assessed from technical experts of the Institute for Data Processing⁵ in Dresden. Afterwards, the commission bundled the proposals and decided on their eligibility. Finally, the eligible import proposals went to the highest state offices of the politburo and the council of ministers because they included large

⁴ The State Bank of Poland imported such a machine in 1965. The company producing the Robotron 300 did likewise, which underscores the argument that IBM did not dominate every domain in the early 1960s again.

⁵ This institute in turn was part of a bigger association of all manufacturers of information technology in the GDR.

sums of foreign currency. After the decision was taken, the foreign trade company, “Büromaschinen Export GmbH,” was responsible for carrying out the import of the equipment.

During this nested process, the original decision of the Ministry of Finance was changed. The commission members argued that a Univac UCT II computer did fit better for the needs of the Ministry. Officially, their argument was that it was obligatory to have a backup machine. Supposedly, none existed for a Bull Gamma 30. However, a business machine producer from Erfurt issued an import proposal for a UCT II, so the commission allowed only an import of that same computer. This was important for the deciding bodies within the GDR because one user could switch over to similar types of computers in the case of a breakdown. In addition, programs and use cases could be exchanged and maintenance be bundled. Especially, spare parts were a scarce resource and could always fall under the embargo rules, which complicated or prohibited their delivery. Therefore, GDR users of Western computers often ordered the double amount of spare parts and consumable supplies.

Behind the scenes, other interests played a bigger role. Actually, another state institution imported a Bull Gamma 30 at the very same time. That meant that the producer’s wish was rated higher in the decision-making process. The company from Erfurt asserted itself against the Ministry of Finance. Furthermore, that the commission members were not aware of that import shows that by no means was the commission the only way to import a computer. Eventually, the price might also have influenced the commission’s decision on the UCT II. The Büromaschinen Export GmbH succeeded in getting an offer for a used UCT II computer by the Remington salespeople for a lower price than for a Bull Gamma 30.

The Ministry in turn succumbed under protest, as this machine seemed the only possibility of getting an advanced computer at all. In their second meeting, Deputy Minister of Finance Kaminsky defended the proposal in front of the commission. Afterwards, their members acknowledged the import decision of the UCT II computer. Meanwhile, they denied the import requests of other ministries like that of the Ministry for Trade and Supply [21].

3.2 Reframing the UCT II as a Midrange Universal Vomputer

The UCT II was a special machine. This is important to understand because it explains the decision of the commission and helps historians to keep track of the process. First of all, it bore various names. In the U.S., Australia and other English-speaking parts of the world, Remington marketed the UCT II computer as Solid State II or “SS II” for short. It was obvious that this would not be the best product name in Germany, referring to the Nazi elite soldiers in World War II. Therefore, it was marketed as “Univac Card Tabulator” in Europe.⁶ This still refers to the beginnings of an industry and a time in which sale contracts were not based on a standardized portfolio.

⁶ This name change complicates the task of tracking the path of the computer through the Iron Curtain a lot for the historian. Only with the help of computer journals it was possible for me to assess the imported computer and find its origins.

The UCT II was the successor of the bestselling UCT I that marked a bridge from the punched card world to the digital age. Users could still continue to use their punched card equipment while already enjoying the benefits of digitalization. It was a midrange computer like the IBM 1401 and was especially capable of dealing with many magnet tape units at once. Up to ten units could be connected to one machine, with an addition yet another ten. The UCT II was also able to read from one tape and write on another directly, which gave the computer an advantage in overall speed. Univac engineers wrote specific commands that enabled the machine to sort alpha characters in an optimized way. In finance, this was a huge advantage because it empowered employees to sort customer data not only according to account numbers but by names. For memory, the UCT II used a combination of core and drum memory, which combined the advantages of speed and size. The acceptance of the UCT II by the Ministry of Finance underscores not only the huge importance of magnetic tapes in the digitalization of banking, but also of memory and sorting [22].

The irony of this import is that the UCT II was not only designed for the U.S. Army, but actively used by them. In 1965, IBM delivered the first models of its far-reaching System /360. Supposedly, the U.S. Army upgraded from a leased UCT II to a more versatile IBM 360 and gave back the old one to the producer. Importing a computer used before by military forces of the so-called imperialist aggressor stood in sharp contrast to the GDR's rhetoric of peace. Depicting the GDR as a peace-loving state against an aggressive enemy was one of the main columns of socialist self-understanding. Peace was used as a counter-argument against the Western rhetoric of "freedom."

The official state newspaper *Neues Deutschland* as well as the *Berliner Zeitung* published various articles on the use of computers for the Vietnam War and other violent conflicts between 1961–1969 (ND: 7.4.1966, p. 5; 4.5.1968, p. 8; ...). In 1968, an author of the newspaper *Neue Zeit*, reviewing the premier of a French theater play in Leipzig, described the Pentagon even as a computer center and wrote: "They use computers and superweapons to plan the inhumanity of the total war against all of Vietnam" (*Neue Zeit*, 7.7.1968, p. 4). In contrast, Walter Ulbricht officially declared in a speech that the orientation towards peace "shows that socialism can and will make more fruitful use of cybernetic machines than capitalism has ever been able to" (ND, 27.3.1964, p. 3). Consequently, the computer was understood as a neutral machine and not as a war machine. This interpretative openness made it possible to use the very same computers, but also telling a story of adaptation. Language was adapted. In contrast to the current literature, the larger import processes were accompanied by a change of language. The perspective on regular computer users and technicians brings that to the front. They adapted English terms like "software" [23, p. 2] or "computer" (exemplary ND: 6.5.1956; 3.1.1965; 10.2.1965; 11.7.1965; 9.1.1966, ...) besides official language regulations.

However, adapting the computer to local conditions also meant integrating it into the ideological framing of socialism. In front of employees, the Ministry of Finance supposedly used a legend to cover the belligerent background of the computer: officially, the computer was bought from an Australian department store [16, 24]. This cover story consequently was reproduced in grey literature. It is rather unlikely that this story was true. The first and most convincing point is that with respect to Philipson (2017), in Australia Remington Rand had a difficult stand with its Univac computers. Philipson

cited a substantial list of computers in use in Australia gathered by civil servants in December 1962. The UCT II appears in this list only at the service bureaus of Univac themselves.⁷ Not a single company nor state institution there used Univac computers. There seem to be no sources supporting the thesis of a SS II running in an Australian department store. Even if this would have been the case, it is unlikely that a private company would have given it back after only two or three years of use. Univac introduced the UCT II to the market not earlier than 1962. Regarding that it was necessary and time consuming to adapt all personnel and processes to the machine, it would have produced huge costs to change computers within such a short timeframe. The U.S. military, though, not having such a pressure for profit but for security, were able to upgrade their machines after three years, especially when supporting a national vendor.

The second proof is that GDR technicians told in an interview that they built a module for changing the frequency of electricity from 60 Hz to 50 Hz after the import. This was necessary to adapt the computer to the local conditions. The GDR electricity grid was running on 50 Hz, as the Australian one. However, the frequency of the U.S. electricity grid was 60 Hz. Therefore, it is more likely that the machine ran on 60 Hz in the U.S. and not in Australia before. Otherwise, no module would have had to be built. Also, oral records provide evidence for the U.S. origin of the computer. Three people independently from each other told the story of the U.S. import while only a single person working for the GDR press supported the Australia story [25–27]. Therefore, the Ministry of Finance used the Australian story rather as a cover story that they told to the press and to their employees.

3.3 A Changing International Landscape and the Decision against a Socialist Machine

By the time the Council of Ministers approved the import request of the Ministry of Finance in 1965, the international political landscape already had begun to change. Both superpowers established communication channels between them after a period of conflict. While the Vietnam War intensified, U.S. president Lyndon B. Johnson used his second term for a more cooperative approach towards the Soviet Union in regards of economic trade and cultural transfer. Looking at the bigger picture, this led to the *détente* in the years 1969–1975, while on small scale, it made a bunch of sensitive computer imports possible. From the U.S. side, the export was also a two-faced process. The official embargo policy required that if East Bloc producers were able to construct machines by themselves, similar machines were allowed to export. At the same time, the State Department blocked every export request on machines that still were in use in the U.S. Army. Thus, the fact that the UCT II now was dismantled changed the scene for the Ministry of Finance.

Furthermore, with the Minsk-22, the East Bloc was in theory able to build a computer more or less similar to the UCT II. It was in the interest of the Western producers

⁷ In Australia, it was marketed as Univac SS II 80. The 80 in the name stood for the use of punch cards with 80 columns instead of 90 columns. This corresponded to the IBM standard, not the standard of Remington Rand.

to argue that it was more similar than different. Especially, smaller U.S. producers under economic pressure by IBM like Remington Rand and non-U.S. producers like ICT, Bull and later Siemens [28] hoped to conquer the Eastern European market. Their managers wanted to balance IBM's strong position on their respective home markets and to solve their economic problems. While in the years 1963–1964 only a single import proposal was allowed, this situation dramatically changed in 1965: more import requests were issued and suddenly they were approved, as shown in the Appendix. This did not only apply to the GDR, but to many other socialist states like Czechoslovakia, Poland, and even the Soviet Union as well. In addition, the before-mentioned import issued by the Polish National Bank of an NCR 315 in 1965 [29] is another proof for that changing international landscape. In contrast to previous literature, the import of computers to the Eastern Bloc began earlier and did not include IBM machines, even though IBM salesman offered IBM 1400s to socialist officials.

Why did GDR institutions not import computers from the Soviet Union instead of those from the ideological enemy? The so-called “international friendship” with the Soviet Union was an important base for the existence of the socialist state. There are four main reasons for that dismissal: first of all, the Soviet Union leaders decided to reserve their machines for their own institutions. There was a huge demand in the country for computing power. Even though almost 1,000 Minsk-22 were produced between 1965–1970, only a few were exported to the GDR.⁸ Furthermore, the production just started in 1965 so that, at first, Soviet institutions were provided with computing power. The second reason was the lower reliability of Soviet computers. As technicians of the Ministry's data center in Berlin affirmed, the quality of the Soviet computers was lower due to missing components and lower standards in mechanical engineering. Thirdly, the high level of maintenance and services that the Western producers promised to deliver attracted Eastern European users. While domestic producers or those from other socialist countries often left their users alone with installation, operation and repair, Western producers regularly sent their own personnel to the users' site. It was part of computing as a service. Moreover, a lot of software already existed for Western computers, ranging from use case scenarios to applications, from system programs to sophisticated solutions to urging problems. This made Western technology even more attractive to socialist users.

3.4 Computer Import under Embargo Regulations: Adaptation for Security

According to sources in the Ministry of Finance, GDR's foreign trade officials negotiated with the Swiss subsidiary of Remington, a mysterious company called “Mithra.” Mysterious, because the company changed its headquarters various times, failed in their research objectives, and experienced a dramatic ending in 1967 [30, pp. 188–190]. In contrast to IBM, Remington had not yet centralized its European sales divisions, but operated in every country on its own. Until 1967, this did not change and simplified such deals as the UCT II import despite the embargo. But the GDR side acted not less

⁸ See the paper of Mate Szabo, p. 11.

mysterious, as a letter from Willy Rumpf to the head of the Council of Ministers shows. They knew that the embargo policy prohibited the delivery of a computer to a state institution. Therefore, they ordered the computer in the name of the Central Bank. Unfortunately, the negotiators blabbed out the secret, as Rumpf angrily notes in a letter to the head of state Willi Stoph [31]. Nevertheless, Univac and the Ministry agreed on a contract that included the delivery of the computer and its peripherals.

How did the export computer pass through the Iron Curtain? It is telling that transfer processes were partly reciprocal, as not only technology flowed to the East Bloc but also people and knowledge to the West. The UCT II was delivered by plane via Amsterdam's Schiphol airport. This is not surprising, because more than once, the Netherlands acted as an entry point for computer technology. For example, Amsterdam was an early hub for Arpanet, bringing the TCP/IP protocol suite to Europe [32]. Likewise, the Soviet Union offered their BESM 6 mainframe computer for sale in the Netherlands for the first time in 1965 [2, p. 140]. From Schiphol, the UCT II was then transferred to Frankfurt am Main, West Germany, the location of the European headquarter of Remington. There, Remington engineers overhauled the computer and refurbished it in the beginning of 1966. Meanwhile, the East German Ministry of Finance sent GDR engineers and programmers to Frankfurt for training. All Stasi-approved for travels, they were taught by Remington technicians in usage and programming of the machine. As multipliers, they should afterwards teach GDR workers the basics of the digital age [33]. After refurbishment, the computer was then sent to Berlin by truck and crossed the border between capitalism and socialism. After the U.S. military took the computer out of service, it began a new life in East Berlin. According to my thesis, the computer import enabled a total of 30 employees to prepare the introduction of EDP in the financial bodies.

Historians argue about the effect of CoCom restricting computer technology exports [2].⁹ The complicated paths of the UCT II suggest, on the one hand, that the export was not a matter of course for GDR's Ministry of Finance. While computer technology producers hoped for high gains in Eastern Europe, the U.S. government especially saw the danger of a computer-armed socialism after the Cold War extended on the battlefield of the economy. Ways to circumvent the embargo existed, especially because of reluctant British and French governments to obey the restrictions [2]. However, serious hurdles complicated the process for import users as well as for export firms. More than once, this restricted an export at all until 1965 (see Table 1). In the course of 1965, spaces for export to Eastern Europe opened up step by step. Notwithstanding, foreign trade officers applied some atrocities to the importing actors to make such deals more difficult. In the case of the UCT II, they allowed the export of the machine and its peripherals. These were the most valuable components, so their export guaranteed high profits to the producers. In contrast to that, officials restricted the export of smaller parts like a processor module to upgrade the speed of the machine or like the 500 magnetic tapes ordered by the Ministry. Despite the low value of these parts, they were indispensable for the usage of the machine. The GDR was not capable of producing their own magnet tapes yet [34]. Without the magnetic tapes, the UCT II was doomed to idleness

⁹ See Leslie, "From CoCom to Dot-Com," this volume.

because the computer could only be used rudimentary in the first months after its delivery [31]. Only after harsh protests on the GDR side were the parts delivered by Univac. The willful delay of these parts is a good example for the implementation of the CoCom embargo.

Despite the embargo, economic gains were valued higher than possible loss of security by the Western side since 1965. Nevertheless, that did not mean that no security measures were taken. Both sides addressed security issues in this highly sensitive import. Exporting the computer to the GDR, the U.S. side probably added surveillance mechanisms to the computer. GDR technicians who installed the UCT II in Berlin detected irregularities in the computer and found bugging systems. Therefore, it was checked by the State Security Service, who claim to have found several espionage devices in the computer [26]. Stasi officers also briefed every technician and programmer traveling to Frankfurt am Main. For example, they approved only those who were married and politically reliable. The Western side acted likewise. Their State Security Services briefed every technician traveling to the GDR [26] or used them to enforce embargo rules.

The Appendix presents a unique data set of imported computers in the GDR in the 1960s. Based on this data, it is possible to evaluate the regime's import efforts and the flow of foreign computers – not only from IBM, but from many other European companies ranging from Zuse to Bull. Despite strong efforts of IBM to sell 1401 computers to the East Bloc, the GDR officially did not import a single IBM machine until 1968. Only in the background, their engineers conducted research on IBM machines to copy them as well as their operating system. The change towards IBM was made not before 1968, but then full-fledged. Only with the support of GDR programmers, the East got a hand on the operating system of IBM – a reason for the Soviet Union, besides own developments, to choose an IBM architecture for the Unified System of Electronic Computers (ES EVM).

4 Kickstarting the Socialist EDP Program: How GDR's Financial Sector Adapted the Import Computer

It is important to continue analyzing a computerization case after installation. Often, the interesting stories about the impact of computers on users lurk beyond the initial excitement. Stories about first computers describe them more as symbols of modernism and progress than as working machines. This hides the interaction between users and technology. Investigating how the computer actually was used shows a lot about social and economic interaction with information technology. This especially holds true in the case of an import. The foreign machine had to be adapted to local circumstances. Local circumstances had to be adapted to the foreign machine, mainly through software. Therefore, the whole lifecycle of a computer from its design, production, delivery, testing, operation and usage, maintenance, upgrading till scraping and dismantling needs to be addressed [7, pp. 3–7, 207–229]. Afterward, the question of how the computer was or is remembered provides additional insight about the character of former usages

[7, p. 259]. After being in use for the U.S. army, the UCT II began a second life in the GDR.

In December 1966, the UCT II finally was delivered. Five months later, in April 1966, East German Minister Willy Rumpf officially opened the first computer center of the Ministry of Finance. After months of preparation, he pushed the button that metaphorically let the computer begin to calculate (see Fig. 1). The bulbs of the UCT II happily flashed in rhythm of the processor. This opening ceremony was screened on television at prime time: the most important news broadcast in GDR television called *Aktuelle Kamera* reported a whole minute about the opening of the data center on 26 April [35]. It covered the ceremony, but also the inner life of a computer center.



Fig. 1. Minister of Finance Willy Rumpf at the opening of the computer center, Berlin 1966 [36].

The commentator explained in an easy language the purpose and capabilities of the newly installed computer facility. In long scenes, rotating magnetic tapes, punched card readers and printers were shown. The goal of the screening clearly was to show the future of socialism connected to computers. Not a single word was said on the type of computer nor about its origin. More important for the newsmaker was the fact that the computer center acted as a prototype for the fifteen centers to be built all over the republic. Furthermore, the personnel for these centers should be educated in the Berlin facility, ranging from programmers to data typists. Socialist men and women were shown how they unanimously working on the future of socialism.

In the following paragraphs, I show how the financial sector tried to use the UCT II computer to kickstart its EDP program. Their workers adapted the technology and knowledge transferred from the West to the socialist circumstances. Then, they distributed it through multipliers like those people shown in TV. Already through this very appearance in the news, the computer was taken out its original context and framed anew in the Socialist State. Looking at the challenges the technicians and programmers had to overcome in this process provides a clearer picture of how technology transfer in the Cold War between East and West worked, as well as an insight into the operation of early digital computers in Eastern European countries in the 1960s.

4.1 Installation of the UCT II: Adapting the Computer to Local Conditions

Installing a computer of that size was something completely different than known before in the Ministry of Finance. The workers of the Ministries Institute for Financial Economics, who were in charge of that task, had gained knowledge on how to build central data gathering offices. However, installing a computer was more like a mix of setting up an assembly line in a factory and a control room of a railway station simultaneously. One of the main goals of the Ministry importing a computer was to acquire expertise in setting it up. Consequently, the months until the computer could be productively used were not as smooth as the television images might suggest. According to my main argument, the Institute's workers adapted the computer to local conditions. First of all, the Institute had to find a building to host the computer. In the GDR's economy of scarcity, space also was scarce. Originally, the Institute intended to set up the computer in a building on the main street Unter den Linden between Brandenburg Gate and the future Berlin TV-tower. Negotiations failed, so they had to find new premises. Finally, they chose an old building on Otto-Nuschke-Straße,¹⁰ just parallel to the newly erected Berlin Wall in the very city center [26] (see Fig. 2). The location chosen for installing the computer underscores the importance it had for the Ministry of Finance. The pulse of electronic calculations of financial transactions beat in the heart of the capital.

In contrast to later computer projects, the Ministry of Finance did not erect a new building that suited the needs of the computer but repurposed an old house where previously a bar was located. Repurposing the rooms to the needs of a computer meant heavy reconstruction: the technicians laid a double floor for taking the cables to the machine room, fortified the ceilings to carry the immense weight of the machine and its peripherals, and installed noise-reducing walls. In addition, the ministry imported air conditioners from Switzerland as well as a power generator to guarantee perfect environmental conditions for the computer. The biggest challenge of adaptation for the technicians posed the fact that the U.S. computer ran on a 60 Hz electricity supply. The GDR's electricity frequency was 50 Hz. Therefore, a unique electricity supply with a converter was installed. Separated rooms for reading and archiving of paper tape and of magnetic tape had to be equipped as well as for the personnel.

¹⁰ Today, Otto-Nuschke-Straße in Berlin is called Jägerstraße.



Fig. 2. UCT II in the computer center of the Ministry of Finance, Berlin 1966 [36].

Workers began repurposing the building months before the delivery. This process already took place in close communication between Univac experts and GDR technicians. While setting up the building, the Ministry did not prioritize security concerns. Instead, they regarded measures that guaranteed a working computer more important. That the ministry acted very differently in later projects shows the kickstarting and learning characteristics of this early installation.

A flow of ideas, data carrier, and people accompanied the physical transfer of electromechanical parts between East and West. They were indispensable for the adaptation. At the end of September 1965, even before the import computer was delivered, Minister Rumpf visited the computing center under construction. Overall, he was satisfied with the progress of work but suggested a number of changes to intensify the preparation. Rumpf clearly noticed that the computer center lacked skilled workers as well as software to integrate the machine to the routines of socialist finance. He did not only demand organizational measures such as an overview of machine utilization but also an active knowledge transfer. Because his staff had already intensively studied the experiences of western savings banks, he set up a lecture devoted explicitly to the question of electronic data processing in savings banks operations. The “programs” of the Savings Banks in Saarbrücken, Vienna and Hamburg were evaluated, adapted to socialist conditions and communicated far beyond savings banks workers. For example, between 1965–1966 two authors from the Ministry of Finance wrote a manual for computer usage in savings banks that was a clear copy of the Saarbrücken manual (original: [37], adaptation: [38]).

Furthermore, the computer center achieved an adaptation of the computer to local conditions by programming. This also was enabled by knowledge transfer. Remington

Rand provided programming support as part of the contract. Therefore, GDR programmers did not only travel to Frankfurt am Main for taking seminars, but Remington consultants also came to the GDR. This was not restricted by CoCom nor by Stasi. It was even supported from the Western side as they could evaluate the civil computer use through their own technicians [2, p. 141]. A Univac instructor travelled to Erfurt and gave courses for people of the computer center for financial services as well as for programmers from Optima in 1966 [27]. Rumpf's inspection and the following consequences are a telling example for the knowledge transfer between East and West.

In the adaptation process, the data center employees connected foreign knowledge with local knowledge entities. For example, the Ministry of Finance pulled off a coup to support the work of their young computer center. Rumpf managed to lure away Wilhelm Pohle from Carl Zeiss Jena, one of the developers of the first mass-produced computer of the GDR. Pohle managed the transition from analog to digital banking at the newly erected computer center. He was one of the people travelling to Frankfurt am Main. Afterward, he trained GDR technicians the maintenance and repair of the UCT II [26]. Wilhelm Pohle is a perfect example for how foreign knowledge was adaptation from the West, and how it was integrated with local expertise. Pohle built up the first computer center in the financial sector together with others from the top management of the Institute for Financial Economics. More than once, they relied on their knowledge acquired in West-Germany, combining it with their engineering spirit of the GDR [39].

4.2 Early Use: The UCT II as the Data Processing Power Horse of the Ministry of Finance

In the months following the grand opening, the UCT II became the power horse of data processing at the Ministry of Finance. It was used together with an older Univac 1004 as front-end processor. It calculated everything from transactions to savings, from account numbers to interest. Computing time was seen as a valuable resource, so officials tried to use the machine to the maximum without overloading it. All institutions under the ministry tried to get a hold on the machine. Four main projects were tested or productively run on the machine: a project on settling and clearing giro funds transfer transactions between companies and citizens in Berlin, ranging from the State Bank and the Savings Bank of Berlin to the Agriculture Bank; a project on savings developed together with the Savings Bank of Berlin in 1967; a planning project on the national budget; and a project on pensions. All of the banking projects had experimental status but productive use on a limited scope.

The UCT was imported for programmers to write and test their programs. In the case of the digitalization of the savings project, they sort of fulfilled their task. In this project, the integration of the analog passbook and digital accounting was tested. They aimed to rationalize manual labor, ranging from counter service to interest calculations. It was a reaction on the users' behavior: initially, the Ministry of Finance planned to abandon passbooks as paper technology altogether. However, the customers were reluctant to change and kept their books. Therefore, the Ministry began to use the UCT II for this in early 1968 and ended the test phase in 1969. Based on already existing routines from

the giro transaction program, programmers from the computer center wrote thousands of lines of code, preparing working routines and error handling. The tests not only affected the computer center, but also required interaction between them, the Savings Bank of Berlin, the employees and the customers. The results were positive. Minor calculation and organizational errors occurred without affecting compliance. Therefore, the parallel work of manual and automatic processing ceased. The computer alone processed 60,000 accounts from there on. Only because of insufficient capacity, the project was not expanded. At the end of 1969, all the basic testing was finished and the software for the digitalization of banking and finance was created by programmers [40, pp. 23–24].

4.3 Having Done the Job: Transition from UCT II to Robotron 300

In 1969, the Berlin computer center of the Ministry of Finance received their first three Robotron 300 computers. Now, programmers had to convert the projects written for the UCT II to the computers they were once intended for. Scaling programs always is a tricky thing in computer science. The Ministry of Finance and the GDR banks had to learn this the hard way. Since the beginning of that year, they had been working on transferring the programs to the UCT II. There were several reasons the conversion was done: higher cost-effectiveness through the use of self-produced machines, higher compatibility between them, the gain of practical experience with these machines in Berlin, and standardization of preparation and follow-up work. Ultimately, it was also done out of capacity reasons as no further computers would be imported for the financial sector.

In 1970, after the beginning of the transition, more and more production problems emerged. The imported UCT II had already been in operation for four years. Most of the time, it operated steadily. In 1970, it suddenly was working side by side with the R 300. Now, the data production had a much bigger scale which resulted in constant errors. Criticism of the results grew. The banks, savings banks, and financial authorities in Berlin criticized the way projects were processed, from giro payments to the state budget. The savings banks also criticized the quality of analyses carried out by the data center on the UCT II, such as savings statistics. The agricultural bank even preferred to work with programs of third-party stations because they proved more reliable. The general criticism was that the computer center delivered unpunctual and erroneous results. The worker of the computer center often blamed machine failures. When the supervisors checked, though, they realized that most of the time it was not the cause. Due to operating errors, tapes were read twice by mistake, operators used the wrong data, and the quality of digitized data sets were poor. Printing results were hardly legible. Results were sent to the wrong county. Salaries were calculated incorrectly and transferred because after digitization the data was not rechecked. In addition, during the transfer to the R 300, departments were not deleted from the UCT tape, so salaries were transferred twice [41]. What perfectly worked on a small scale on the UCT II caused huge problems on large scale. Without the experiences and software developed on the import machine, the project would have been doomed.

In late 1970, the government of the GDR was about to abandon the whole project because of these huge problems. However, through the personal engagement of banking

employees, leaders and support from the highest ranks, the State Bank and the Ministry of Finance managed to find solutions. In their argumentation, they used the UCT II as an example of hope. The computer center operated it already in three-shift operation five days a week in 1970. It had a productive runtime of 70 percent. In September 1970, only 11 percent of machine time had to be used for repeating wrongly calculated results. Half of them were caused by technical errors, the other half out of operating errors. Robotron 300 stood still 22 percent of the time while the UCT II experienced only 11 percent standstill. The director of the Berlin computer center argued in front of the Ministry of Finance that this was due to longer qualification and greater experience of the UCT II shifts [41]. His argument countered the skepticism the new technology faced. The UCT II proved that computers could function in socialist finance. In the end, the state leaders trusted the capacities of the computer center. It would have been too late to change anyway.

4.4 Maintaining a Foreign Computer: How GDR Technicians Kept the UCT II Running

To evaluate the historic impact of technology over time, its maintenance comes into view. Technology should not be taken for granted once it is running [42, p. 4]. These efforts tell a story of how it was actually used, who had interests in it and in general about how computers, software, and people interacted. During its life cycle, the UCT II was maintained by GDR technicians with the support of Univac engineers. They regularly took care of the UCT II, changed parts, cleaned and checked the machine. Univac engineers repaired the machine if errors occurred the GDR technicians could not solve. A former GDR technician remembers: “We had no problems with Univac. They always provided spare parts. They came over to us regularly. That was an incredibly good service” [26]. Maintenance was a tricky business because the party executives demanded high usage rates and production of financial data was time sensitive. Most of the time, maintenance was done in the middle of the night or in the early morning when the banking transactions had not yet come in. Looking at maintenance also brings to the fore the physicality of the foreign machine again that was black boxed for customers as well as banking clerks by the party leaders. The highly complex digital computer still was a mechanical thing in many instances. An example for the manual treatment of the machine – not necessarily for a culture clash between Western and Eastern approaches – was a power loss a former GDR technician reported:

Once, there was no power on the 1004. What did Theo [his head of department] do? He took a hammer and banged it. Then, everything was all right again. The error never occurred again. He said I’ve done that before. Me and my boss with our diploma stood there amazed. We had measured, we did this and that but the guy just hit it with a hammer and it worked again! [26]

Nevertheless, selling only one old machine was not the business model Univac was aiming at. Rather, they hoped to sell more and newer machines once their socialist customers were locked into their system. The hurdles of the transition from one system to another were already described before. Therefore, Univac technicians often were accompanied by salespeople. They did not only ask for missing spare parts, they were

highly interested in further demands of their customers. They always tried to sell more computers in the eastern countries; that was their philosophy.

Meanwhile, Univac delivered the backup UCT II to Optima Erfurt. Berlin technicians had intensive communication with those at the Erfurt center. This second computer only once was used as a backup; most of the time, it served normal productive use. In 1971, just months after the transition to Robotron 300 was completed, a problem in the magnetic tape archive occurred. An operator had accidentally overwritten parts of the primary magnetic tape that contained all the service routines necessary for production. Other parts of the tape had errors. When using the replacement tapes, the responsible personnel realized that all three generations of the magnetic tape had been lost. The first backup tape was handed over to a programmer who overwrote it during test work. The second magnetic tape stored in another building was nowhere to be found. With considerable effort, the magnetic tape was finally restored from the VEB Optima backup system. Until then, production had to be stopped and the results were delivered with a delay of six hours. The conclusions there to prevent such an accident were subsequently implemented on the R 300 [43].

4.5 The Process of Aging: Use of the UCT II after It Fulfilled Its Task

With the delivery of the R 300, the UCT II got new neighbors. These were installed in a building specially erected for them, while the UCT II stayed at Otto-Nuschke-Street. The latter was imported to prepare the scene for these computers, but was not out of fashion, yet. Employees wholeheartedly called her “the old lady” [44], as it was now nearly ten years old. Even so, some still perceived it as a better computer than their own R 300. This might be explained by the long experiences gathered with the machine, and also by the personal ties people developed to a machine they worked with so many years. Apparently, serious problems with the UCT II import system occurred for the first time in 1972. The director of the computer center reported that the production goals were difficult to achieve with the machine. Therefore, the Ministry of Finance ordered a separate test of the machine’s performance and a comparison with that of VEB Optima. Then it should be decided whether the UCT II was about to be finally replaced or not [45]. Step by step also the smaller programs were transferred to the R 300 computers. Left without cause, the UCT II was mainly used by programmers for testing. However, it still took some years until it was replaced. Finally, it was deconstructed as the new Robotron 4000 was installed in late 1970s. The new machine literally took the place of the UCT II, as it was installed in the very same premises using the infrastructure already in use. The import computer was dismantled and scraped.

5 Conclusion

Following the traces of a computer through the Iron Curtain highlights three important points. First of all, it shows how CoCom embargo was effective in the 1960s, but left spaces of transfer and exchange for ideas as well as for computer technology. GDR

engineers and programmers even were sent to West Germany; as well, Univac technicians regularly traveled to the GDR. The countries participating in CoCom did not regard this as breaking the embargo, but rather as a vital part of it enforcing control over exported equipment. However, the import did not necessarily mean a pure take-over of technology. The Ministry of Finances employees adapted the computer through software to their own socialist needs. They kickstarted their distinct EDP program with this Western import. Since 1970, they migrated the developed software to their native Robotron 300s. Then, they widely distributed it to the 15 data centers for financial services in administrative areas. The demand in the East and the interests in profits especially by smaller producers besides IBM fueled a cross-border exchange. That these spaces behind the so-called “Iron Curtain” extended around 1965 points to a policy change in the U.S. as well as to a new openness towards foreign (computer) technology in Moscow and East-Berlin. It is important to note that this change affected all of Eastern Europe and is indicating a broader trend.

Second, I show how these import processes began already before 1968 and did not only focus on the U.S. This enabled me to establish a different perspective to the existing literature. Especially, banking officials rather looked to West Germany for how to use a computer than to the USA. Furthermore, technical experts and leading managers of the GDR also had a close look on other socialist countries to develop a distinct path to information age. While the computer industries in Eastern Europe might be a special case, computer users in state companies and state institutions not only trusted IBM or Univac, but were inspired by other users’ programs, for example of the Savings Bank of Saarbrücken. This also resulted in a change of language, as regular computer users and technicians adapted English terms like “software” or “computer” and continued to use it besides official language regulations.

Third, IBM computers did not even make it into the top three of list of the Ministry of Finance for import. In contrast to the current state of knowledge, this clearly shows that IBM did not dominate the Eastern Europe computing scene until 1968–1969 [4, pp. 34–35].¹¹ It rather was a competitive situation under CoCom rulings in which all western producers from West Germany, France, Great Britain, the United States and even Japan tried their luck. But it was not a tabula rasa, as the Soviet Union, Czechoslovakia, Poland and the GDR already were developing distinct concepts of a socialist information age [9, 46].

This openness lasted until the beginning of the 1970s when the contract on the “Unified System of Electronic Computers” (ES EVM) was ratified and the combine Robotron was forged. While Cain argues that since the 1970s western computer exports “flooded” Eastern Europe, this thesis needs precise distinctions. While some bigger combines of the GDR longed for faster computers from the West, the financial system of the GDR based their services on self-produced computer technology for decades. Confronted with in an incompatible collage of imported systems resulting of this new openness, officials tightened liberties and centralized all import negotiations in the

¹¹ Doing and other are mentioning various computer imports from Bull, National Elliot, Siemens, Zuse, Univac and others until 1966. Even though, the literature estimated IBM’s influence between 1964–1967 much higher so far.

hands of the so-called “Schalck commission.” This commission was subordinated under the Ministry of Foreign Trade but enjoyed close contact to the Ministry of State Security. From 1969 on, their officials forcefully orientated the development towards computers from socialist origins. This has to be interpreted in the bigger process of institutions struggling with the results of the first phase of computerization termed “software crisis”: the lack of productivity increases through computing, rising incompatibilities, failing software projects and sky-rocketing development and maintenance costs.

The closing remarks of Günther Mittag, Economic Secretary of the Central Committee of the SED, on a conference in Dresden on January 31th 1969 are exemplary for this change. He extensively criticized intellectual orientation toward U.S. solutions in computing. In his opinion, this was an ideological ambiguity dangerous for the GDR. In the following, the party corrected the development program, limited liberties, tried to regulate official language and implemented changes of management personnel [47], [48, p. 17]. This change resulted in a focus on native hardware for the financial institutions of the GDR. Nevertheless, they hold tight contacts especially to West Germany in software development and the possible usages of computers in banking.

Acknowledgement. I am thankful for the valuable feedback on this article by Christopher Neumeier, my three peer-reviewers, and the fruitful discussion at the WCC 2018 in Poznań. Also, I am grateful for Maren Rohleder’s grammar and language checks.

Appendix: Computer Imports into the GDR, 1956–1970.

This overview of selected acquisition and inventory was compiled by the author.

Year	Organization	Type	Origin	Application
1959	Academy of Science, Berlin	URAL-1	SU	Training and education in EDP; imported from the Soviet Union against the will of the Planning Commission
1962	State Planning Commission	Bull Gamma 3 ET	F	Economic-mathematical modelling of the economy that were not possible with punch card technology
1963	Institute for Applied Mathematics, Berlin	URAL-1	SU	Scientific calculations
1965	VEB Electronic Computing Machines, Karl-Marx-Stadt	NCR 315	USA	Testing of basic programs for the whole economy, especially for the industry. Imported for preparing the introduction of the Robotron 300 computer

Year	Organization	Type	Origin	Application
-	Ministry of State Security	2x Bull Gamma 10	F	Import request and delivery already in 1964; used for border control
-	Institute for Data Processing, Dresden	National Elliot 503	GB	
-	Ministry of Finance / State Bank	UCT II Univac 1004	USA	Mainly used for payment processing & planning optimization; delivered at the end of December 1965; 3-shift operation
1966	Ministry of Finance	Bull Gamma 10	F	Economic calculations, mainly of prices
-	Ministry of Basic Materials Industry	ZAM 2	PL	Evidence of inventory
-	Ministry of Ore Mining, Metallurgy and Potash	ZAM 2	PL	Evidence of inventory
-	Ministry of Chemical Industry	Zuse Z25 Univac 1004 Elliott Arch 2000	FRG USA GB	Evidence of inventory
-	Ministry of Electronics	NCR 315 Univac 1004 National Elliot 503 Librascope LGP 21	USA USA GB USA	Evidence of inventory
-	Ministry of Transport	Minsk 22	SU	Evidence of inventory
-	Ministry of Trade and Supply:	Siemens 3003	FRG	Evidence of inventory
-	Academy of Science, Berlin	Odra 1003	PL	Evidence of inventory
-	Ministry for Inner German trade	3x Gamma 10 / 30	F	Evidence of inventory
-	State Head Office for Statistics	7 x Gamma 10	F	Evidence of inventory
-	State Planning Commission	Gamma 10	F	
-	VEB Optima, Erfurt	Univac UCT II	USA	Used as a substitute in the case of damage of the UCT II of the Ministry of Finance
-	VEB Carl Zeiss, Jena	ICT 1900	GB	Import affirmed already in 1964

Year	Organization	Type	Origin	Application
-	VEB Leuna-Factory “Walter Ulbricht”	CDC 3000er	USA	Included training and education in Frankfurt (Main)
-	Ministry of State Security	Bull GE 100	F/ USA	Surveillance, border control
1967	College for Transport, Dresden	Minsk 22	SU	
1968	VEB Maschinelles Rechnen, Dresden	Bull Gamma 10	F	Regional Computer Center working mainly for forestry and other mid-small companies, also used for education and training; 2-shift operation
-	VEB Maschinelles Rechnen, Berlin	Ural-14	SU	Regional Computer Center, also used for education and training
-	Funkwerk, Berlin- Köpenick	Odra 1013	PL	
-	EVW Schwedt	Process Computer		Evidence of inventory
-	Ruhla-Watches	2x Gamma 10	F	Evidence of inventory
1969	VEB Combine for Construction, Berlin	IBM 360/40	USA	Calculations for city planning
-	Mail-Order House, Leipzig	IBM 360/40	USA	Logistics
-	Aluminium factory Rackwitz	Dnepr II		
-	N.N.	2x CDC 3300	USA	Supposedly imported, used by huge combines
-	N.N.	ICL 1905	USA	Supposedly imported, used by huge combines
1970	Institute for High Energy Physics	BESM 6 SIEMENS 4004/26	SU FRG	Combined with a SIEMENS 4004/26 for I/O
-	Ministry of State Security	3x Siemens 4004/45	FRG	Imported in the name of the State Institute for Information and Documentation
-	N.N.	Siemens 4004/45	FRG	Supposedly imported, used by huge combines
-	Computer Center Neubrandenburg	Ural-14	SU	Take-over of a used machine, supposedly from Berlin
-	N.N.	7x IBM 360/40	USA	Supposedly imported, used by huge combines

Year	Organization	Type	Origin	Application
-	N.N.	2x IBM 360/30	USA	Supposedly imported, used by huge combines
-	N.N.	2x DDP-516	USA	Supposedly imported
-	N.N.	ICL 4/50	GB	Supposedly imported, used by huge combines

References

1. Zentralkomitee der DDR der SED, 'Programm zur Entwicklung, Einführung und Durchsetzung der maschinellen Datenverarbeitung in der DDR in den Jahren 1964–1970'. 23-Jun-1964. BArch DY 30 / J IV 2/2 – 1035.
2. F. Cain, 'Computers and the Cold War: United States Restrictions on the Export of Computers to the Soviet Union and Communist China,' *Journal of Contemporary History*, vol. 40, no. 1, pp. 131–147, 2005.
3. Ministerium der Finanzen, 'Niederschrift über die Unterredung des Sekretärs des Ministeriums der Finanzen mit dem Generaldirektor der Büromaschinen-Export GmbH am 20.1.1965'. 02-Feb-1965. BArch DN 1/17445
4. S. Donig, 'Appropriating American Technology in the 1960s: Cold War Politics and the GDR Computer Industry', *IEEE Annals of the History of Computing*, vol. 32, pp. 32–45, Jan. 2010.
5. C. Schlombs, 'Engineering international expansion: IBM and Remington Rand in European computer markets', *IEEE Annals of the History of Computing*, vol. 30, no. 4, pp. 42–58, 2008.
6. C. Schlombs, 'Productivity machines: Transatlantic transfers of computing technology and culture in the Cold War', Ph.D., University of Pennsylvania, Ann Arbor, 2010.
7. T. Haigh, M. Priestley, and C. Rope, *ENIAC in action: making and remaking the modern computer*. Cambridge, MA; London: The MIT Press, 2016.
8. N. Ensmenger, *The computer boys take over: computers, programmers, and the politics of technical expertise*. Cambridge, Mass: MIT Press, 2010.
9. K. Tatarchenko, 'A House with the Window to the West': *The Akademgorodok Computer Center (1958-1993)*. Princeton, N.J., 2013.
10. K. Tatarchenko, "'The Computer Does Not Believe in Tears": Soviet Programming, Professionalization, and the Gendering of Authority', *Kritika: Explorations in Russian and Eurasian History*, vol. 18, no. 4, pp. 709–739, 2017.
11. J. W. Cortada, 'Information Technologies in the German Democratic Republic', *Annals of the History of Computing, IEEE*, vol. 34, no. 2, pp. 34–48, 2012.
12. R. G. Stokes, *Constructing socialism: Technology and change in East Germany 1945 - 1990*. Baltimore [a.o.]: Johns Hopkins Univ. Press, 2000.
13. A. Steiner, *The plans that failed: an economic history of the GDR*, New York: Berghahn Books, 2010.
14. A. Steiner, *Die DDR-Wirtschaftsreform der sechziger Jahre: Konflikt zwischen Effizienz- und Machtkalkül*. Berlin: Akademie Verlag, 1999.
15. B. Peters, *How not to network a nation: the uneasy history of the Soviet internet*. Cambridge, MA: MIT Press, 2016.

16. F. Loll, 'Der Untergang der DDR aus der Sicht ihrer EDV-Berichterstattung. Bastelzwang und Softwareklau', *Die ZEIT*, Hamburg, 22-Sep-1995.
17. E. Sobeslavsky and N. J. Lehmann, *Zur Geschichte von Rechentechnik und Datenverarbeitung in der DDR 1946-1968*. Dresden: Hannah-Arendt-Institut für Totalitarismusforschung, 1996.
18. M. Schmitt, 'The code of banking. Software as the Digitalization of German Savings Banks', *Tatnall, Arthur/Leslie, Christopher (Hgg.): International communities of invention and innovation, New York, NY.*, pp. 141–164, 2016.
19. Finanzökonomisches Forschungsinstitut beim Ministerium der Finanzen und Sektor Maschinelles Rechnen, 'Vorlage über den Import einer mittleren elektronischen Datenverarbeitungsanlage für das Finanzökonomische Forschungsinstitut beim Ministerium der Finanzen'. 1964. BArch DN 1/17445.
20. Staatliche Plankommission, 'Anordnung über die Ordnung der Verfahrensweise beim Import von elektronischen Rechen- und Datenverarbeitungsanlagen und Lochkartenmaschinen vom 21.06.1965', *GBl. II*, no. 66, pp. 492–494, Jun. 1965.
21. Staatliche Plankommission and Kommission 'Maschinelle Datenverarbeitung', 'Protokoll der 2. Sitzung der Kommission "Maschinelle Datenverarbeitung"'. 06-Jan-1965. BArch DN 1/17287.
22. T. Haigh, 'The Chromium-Plated Tabulator: Institutionalizing an Electronic Revolution, 1954-1958', *IEEE Annals of the History of Computing*, vol. 23, no. 4, pp. 75–104, 2001.
23. Ministerium der Finanzen and Abteilung Datenverarbeitung, 'Niederschrift über die 8. Sitzung des Beirates für Datenverarbeitung'. 03-Oct-1968. BArch DN1/38310.
24. K. Brüll, 'Eine kleine Zeitreise durch die Geschichte vom VEB Datenverarbeitung der Finanzorgane'. 2008.
25. M. Schmitt, U. Hennig, 'Interview "Projektorganisation und Koordination für die Finanzorgane der DDR"', 02-Jul-2018.
26. M. Schmitt, W. Löwenstein and M. Bartusch, 'Interview "VEB Datenverarbeitung der Finanzorgane"', 12-Jul-2018.
27. M. Schmitt, D. Wolff, 'Interview "Programmierung für die Finanzorgane der DDR"', 26-Jun-2018.
28. R. Bergien, 'Programmieren mit dem Klassenfeind. Die Stasi, Siemens und der Transfer von EDV-Wissen im Kalten Krieg', *Vierteljahrshefte für Zeitgeschichte*, vol. 67, no. 1 (forthcoming), 2019.
29. Finanzökonomisches Forschungsinstitut beim Ministerium der Finanzen and Datenverarbeitungszentrum, 'Bericht zum Erfahrungsaustausch über Fragen der elektronischen Datenverarbeitung mit der Polnischen Nationalbank im Oktober 1965'. 30-Oct-1965. BArch DN 6/3318
30. H. Bruderer, *Erfindung des Computers, Elektronenrechner, Entwicklungen in Deutschland, England und der Schweiz*, vol. 2, 2 vols. Boston, MA: De Gruyter Oldenbourg, 2018.
31. Ministerium der Finanzen and W. Rumpf, 'Schreiben Willy Rumpfs an den Ministerpräsidenten Willi Stoph vom 9.2.1966: Durchführung des Beschlusses über die Einführung der elektronischen Datenverarbeitung in der DDR'. 09-Feb-1966. BArch DN 1/13451.
32. C. Paloque-Berges and G. Alberts, 'Beyond the protocol wars: 1980s user cultures in Dutch internet nodes', conference talk, Lugano, 14-Dec-2017.
33. Ministerium der Finanzen and Datenverarbeitungszentrum der Finanzorgane, 'Aktenvermerk: Arbeitsräume'. 07-Dec-1965. BArch DN 1/17439
34. K. Köhler, 'Entwicklung und Produktion von Magnetbändern für die elektronische Datenverarbeitung in der DDR', *Jenaer Jahrbuch zur Technik- und Industriegeschichte*, vol. 9, pp. 209–228, 2006.

35. Aktuelle Kamera, 'Einweihung von Datenverarbeitungszentrum in Berlin', *Aktuelle Kamera*, DFF-1, 26-Apr-1966. DRA ID 325585
36. Re, 'Finanzorgane erhielten Datenverarbeitungszentrum', *Deutsche Finanzwirtschaft*, vol. 20, no. 11, p. 23, 1966.
37. R. Hupp and W. Mohm, *Elektronische Datenverarbeitung im Sparkassenbetrieb. Dargestellt und erläutert am Verfahren der Kreissparkasse Saarbrücken*, vol. 1, 2 vols. Stuttgart: Deutscher Sparkassenverlag, 1964.
38. S. Jähn, K. Sinnig, and G. Weißbach, *Elektronische Datenverarbeitung für die Sparkassen der Deutschen Demokratischen Republik*, vol. 1, 2 vols. Berlin: Ministerium d. Finanzen, Sektor Sparkassen, 1967.
39. D. L. Augustine, *Red Prometheus: Engineering and Dictatorship in East Germany, 1945-1990*. Massachusetts, 2007.
40. Ministerium der Finanzen, Abteilung Rationalisierung und Datenverarbeitung, Magistrat von Groß-Berlin, and Abteilung Finanzen, 'Plan der Einsatzvorbereitung und der Organisation des Übergangs zur elektronischen Datenverarbeitung für die zentralen und örtlichen Finanz- und Bankorgane in der Hauptstadt der DDR, Berlin'. 15-Jul-1969. BArch DN 1/16993-3
41. Ministerium der Finanzen and Abteilung Informationssystem und Datenverarbeitung, 'Lage im VEB Datenverarbeitungszentrum - zusammengefasste Darstellung'. 20-Feb-1970. BArch DN 1/17439
42. B. Fidler and A. Russel, 'Infrastructure and Maintenance at the Defense Communications Agency: Recasting Computer Networks in Histories of Technology (Preprint)', *Technology and Culture*, vol. 59, no. 4, 2018.
43. VEB Datenverarbeitung der Finanzorgane and Inspektion, 'Vorläufiges Untersuchungsergebnis der Ursachen der Zerstörung aller (3) Generationen des Sammelbandes der Servicerroutine (SEBBA 01)'. 08-Jun-1971. BArch DN 1/17439.
44. Ministerium der Finanzen, 'Berichte, Referate, Informationen, Vermerke zu EDV-Problemen für Partei, MR, Minister/Staatssekretär, Finanzrat, Bezirke und Sonstige'. 1965-1970. BArch DN 1/17437.
45. Ministerium der Finanzen and Staatssekretär Kaminsky, 'Festlegungsprotokoll aus der Beratung am 12. Juli 1972 beim Staatssekretär, Genossen Kaminsky'. 17-Jul-1972. BArch DN 1/17439.
46. P. Paju and H. Durnová, 'Computing Close to the Iron Curtain: Inter/national Computing Practices in Czechoslovakia and Finland, 1945-1970', *Comparative Technology Transfer and Society*, vol. 7, no. 3, pp. 303–322, Dec. 2009.
47. D. L. Augustine, 'Innovation and Ideology: Werner Hartmann and the Failure of the East German Electronics Industry', in *The East German Economy, 1945-2010: Falling Behind or Catching Up?*, New York; Cambridge, U.K.: Cambridge University Press; Washington, D.C.: the German Historical Institute, 2013, pp. 95–110.
48. G. Merkel, *Institut für Datenverarbeitung. Ein Institut der VVB Datenverarbeitungs- und Büromaschinen*. Dresden, 2005.